An Ecological Momentary Assessment Study of the Functions of Non-Suicidal Self-Injury in Young Adults with and without a History of Interpersonal Trauma

by

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Abstract

Non-suicidal self-injury (NSSI) involves acute deliberate damage to one’s body without suicidal intent. Considerable heterogeneity has been reported in NSSI characteristics and in the functions NSSI serves for individuals who engage in it. The present study investigated a theorized link between NSSI functions, particularly self-punishment, and interpersonal trauma history. As well, cross-sectional and experience sampling methodologies were compared. Participants were 39 community-based young adults (ages 18 to 30; 90% female) with a history of repeated NSSI and at least 2 NSSI urges in the previous 2 weeks. The sample was diverse: 44% identified non-European ethnocultural backgrounds and 46% identified nonheterosexual orientations. Electronic daily diary methodology was used. Participants tracked NSSI urges and acts for 21 days, completing measures of NSSI characteristics, urge severity, and functions. All participants completed the study ($M = .49$ missed days). All participants reported NSSI urges or acts ($M = 5, SD = 4.21$).

NSSI characteristics related to trauma severity were number of NSSI methods, number of NSSI functions, and urge severity. NSSI functions related to trauma severity were affect regulation, interpersonal boundaries, anti-dissociation, self-care, and marking distress. In multiple regression analysis, a model including number of NSSI functions and the relevance scores for anti-dissociation and interpersonal boundaries functions predicted 34.2% of the variance in trauma severity and remained significant when controlling for the number of NSSI
functions \( (p = .002) \). Although self-punishment did not correlate with trauma severity, it was endorsed by 95% of participants and for 81% of NSSI urges and acts.

Experience sampling data reflected cross-sectional data, with significant correlations between measures of NSSI functions, urge severity, and NSSI method use. However, experience sampling contributed information about variation over time both across and within participants. Relevant to explanatory models of NSSI, some NSSI functions (e.g. anti-dissociation) exhibited more variation between participants and over time than others (e.g. affect regulation).

Findings indicate that interpersonal trauma is important in explaining the heterogeneity of NSSI functions. Explanatory models of NSSI should account for the role of contextual factors such as trauma, and address the multiplicity of NSSI functions and the importance of self-punishment. Clinical and research implications are discussed.
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Table of Contents

Abstract ................................................................................................................................. ii

Acknowledgements ........................................................................................................... iv

List of Tables ....................................................................................................................... x

List of Figures ..................................................................................................................... xii

List of Appendices ............................................................................................................. xiii

Chapter 1: Introduction ..................................................................................................... 1

Chapter 2: Literature Review ............................................................................................ 3

NSSI Prevalence, Risk Factors, and Characteristics .......................................................... 3

Prevalence, frequency, and methods ............................................................................... 3

Demographic characteristics of individuals who self-injure ........................................... 5

NSSI urges and impulsivity ............................................................................................... 7

Psychiatric characteristics of individuals who self-injure ............................................... 8

Accounting for heterogeneity in NSSI characteristics ..................................................... 11

Explaining NSSI ............................................................................................................... 12

Self-reported functions of NSSI ....................................................................................... 13

The Experiential Avoidance Model .................................................................................. 18

The Four-Factor Model .................................................................................................... 22

Interpersonal trauma and NSSI ......................................................................................... 25

Methodological Gaps in NSSI Research ............................................................................. 30

Existing ecological momentary assessment research on NSSI ........................................ 31

The Present Study .............................................................................................................. 34
Chapter 3: Method ................................................................................................................. 38
  Participants......................................................................................................................... 38
  Procedure ............................................................................................................................ 41
  Recruitment ......................................................................................................................... 41
  Initial time-point: In-person meeting ................................................................................ 42
  Ecological momentary assessment protocol .................................................................... 43
  Debrief interview .............................................................................................................. 44
  Measures ............................................................................................................................. 44
    NSSI history ..................................................................................................................... 44
    NSSI functions ................................................................................................................ 44
    NSSI urges ....................................................................................................................... 45
    Interpersonal trauma ....................................................................................................... 46
  Data Analysis ..................................................................................................................... 47
    Preparation and description of data from the initial time-point ..................................... 47
    Preparation and description of data from EMA ............................................................. 48
    Analyses addressing the first research question ............................................................ 49
    Analyses addressing the second research question ....................................................... 51
    Analyses addressing the third research question ........................................................ 51
    Analyses addressing the fourth research question ........................................................ 52

Chapter 4: Results ................................................................................................................. 54
  Initial Time-Point: Description of the Data ..................................................................... 54
Trauma history .................................................................................................................. 54

NSSI history .......................................................................................................................... 56

NSSI urges ............................................................................................................................... 60

NSSI functions ......................................................................................................................... 61

Ecological Momentary Assessment: Description of the Data ............................................ 64

NSSI characteristics ............................................................................................................. 64

NSSI functions ......................................................................................................................... 70

Research Question 1: Do characteristics of the demographic profiles (e.g. age, diagnosis, past and current use of mental health services), NSSI behaviour (e.g. age of onset, frequency, number of methods) or NSSI urges (e.g. frequency, severity) of self-injuring young adults correlate with interpersonal trauma severity? .......................................................... 76

Categorical variables ............................................................................................................. 76

Continuous variables ............................................................................................................ 77

Research Question 2: Does the self-reported relevance of individual NSSI functions correlate with interpersonal trauma severity? .................................................................................. 79

Correlation analyses ............................................................................................................. 79

Multiple regression analyses ............................................................................................... 81

Research Question 3: Does the self-reported relevance of the self-punishment function of NSSI correlate with interpersonal trauma severity? .......................................................... 83

The importance of self-punishment for participants in the present sample .......... 83

The relationship between self-punishment and interpersonal trauma severity .... 84
Differentiating participants with low and high self-punishment scores.............. 85

Research Question 4: Do real-time data on NSSI behaviours, urges, and functions support retrospective generalized self-report data as collected at the initial time-point?........ 87

Concordance between historical NSSI methods and NSSI methods used during EMA .................................................................................................................. 87

Concordance between NSSI urges at the initial time-point and EMA .................. 91

Concordance between NSSI functions at initial time-point and EMA ................. 92

Chapter 5: Discussion .......................................................................................... 98

Interpersonal Trauma Severity, Participant Characteristics, and NSSI Acts and Urges ................................................................................................................. 98

Interpersonal Trauma Severity and NSSI Functions ........................................... 102

Interpersonal Trauma Severity and Self-Punishment ....................................... 104

Comparing Cross-Sectional and EMA Findings ................................................. 108

NSSI methods ..................................................................................................... 108

NSSI urges .......................................................................................................... 110

NSSI functions ................................................................................................... 111

Generalizability, Limitations, and Future Directions ........................................ 115

Generalizability of the present sample .............................................................. 115

Assessment of trauma severity ......................................................................... 118

Methodological limitations ............................................................................... 119

Future directions in the understanding of NSSI functions ............................... 121
List of Tables

Table 1. Demographic Description of the Sample.................................................................39
Table 2. Mental Health History................................................................................................40
Table 3. Number of Participants Reporting Each Trauma Type and Perpetrator Type.........55
Table 4. Number of Participants Reporting Each Trauma Type by Age of Occurrence........56
Table 5. Historical NSSI Frequency by NSSI Method Type.......................................................58
Table 6. Time Since Most Recent NSSI Acts Prior to EMA......................................................58
Table 7. Description of Historical NSSI Characteristics..........................................................59
Table 8. Characteristics of NSSI Urges in the Week Prior to EMA............................................61
Table 9. Mean NSSI Function Scores at the Initial Time-Point...................................................62
Table 10. Use of NSSI Methods During EMA...........................................................................65
Table 11. NSSI Urges and Acts Across EMA by Participant.......................................................67
Table 12. Characteristics of NSSI Urges During EMA Across Participants..............................68
Table 13. Means of Mean NSSI Function Scores during EMA....................................................71
Table 14. Proportion of NSSI Urge/Act Days When Each Function Was Endorsed.................73
Table 15. Point Biserial and Spearman's Rho Correlation Results Between TECMod Score and Categorical Demographic and NSSI Variables.................................................................77
Table 16. Pearson's Correlation Results Between TECMod Score and Continuous Demographic and NSSI Variables........................................................................................................78
Table 17. Multiple Linear Regression for Trauma Severity Score, with Number of NSSI Methods and Number of NSSI Functions as Predictors.................................................................79
Table 18. Pearson's Correlation Results Between TECMod Score and EMA Mean NSSI Function Scale Scores................................................................................................................80
Table 19. Multiple Linear Regression for Trauma Severity Score, with NSSI Functions as
Predictors………………………………………………………………………………82

Table 20. Stepwise Multiple Linear Regression for Trauma Severity Score with NSSI Functions as Predictors, Controlling for Number of Functions…………………………………….82

Table 21. Pearson's Correlation Results Between NSSI Function Scale Scores at the Initial Time-Point…………………………………………………………………………………84

Table 22. Pearson's Correlation Results Between Self Punishment Means and Continuous Demographic and NSSI Variables……………………………………………………………86

Table 23. Point Biserial Correlation Results Between Self Punishment Means and Dichotomous Demographic and NSSI Variables……………………………………………………………86

Table 24. Pearson's Correlation Results Between Initial and EMA Mean NSSI Function Scores………………………………………………………………………………………………………94

Table 25. Number of Participants Endorsing Each NSSI Function Across Time-Points………95
List of Figures

Figure 1. The Number of Participants who Reported Each Historical NSSI Frequency at the Initial Time-Point………………………………………………………………………………57

Figure 2. Boxplots Representing the Spread of the NSSI Function Scale Scores at the Initial Time-Point………………………………………………………………………………63

Figure 3. Boxplots Representing the Spread of the Mean NSSI Function Scale Scores During EMA…………………………………………………………………………………………72

Figure 4. Graphs for Each of the 12 NSSI Functions, Comparing Each Participant’s Mean Function Scale Score at the Initial Time-Point with the Range of Each Participant’s Function Scale Scores During EMA………………………………………………………74

Figure 5. Scatterplot Demonstrating the Relationship Between Trauma Severity Score and Participants’ Mean EMA Self-Punishment Scale Scores……………………………85

Figure 6. Mean Scale Scores for NSSI Functions at the Initial Time-Point Compared with Mean Scale Scores for NSSI Functions During EMA……………………………………94
List of Appendices

Appendix A. Information Letter ........................................................................................................137
Appendix B. Informed Consent Form .................................................................................................141
Appendix C. Resource List ................................................................................................................142
Appendix D. Pre-Screening Questions: Phone Interview .................................................................145
Appendix E. Demographic Questionnaire ........................................................................................147
Appendix F. Inventory of Statement about Self-Injury ......................................................................148
Appendix G. Alexian Brothers Urge to Self-Injure Scale ..............................................................151
Appendix H. Traumatic Experiences Checklist ..............................................................................153
Appendix I. Instructions & Initial Questions: EMA .........................................................................159
Appendix J. Adapted Alexian Brothers Urge to Self-Injure Scale ..................................................160
Appendix K. Adapted Inventory of Statements about Self-Injury ....................................................162
Appendix L. Online Study Advertisement ......................................................................................164
Appendix M. Study Flyer ....................................................................................................................165
Appendix N. Debrief Interview .........................................................................................................166
Chapter 1: Introduction

Non-suicidal self-injury (NSSI) is commonly defined as deliberate damage to one’s own bodily tissue without suicidal intent (e.g. Klonsky & Glenn, 2009; Washburn, Juzwin, Styer, & Aldridge, 2010). NSSI does not include aesthetically-motivated and culturally normative forms of body modification, such as tattooing and piercing. It also does not include more indirect and cumulative methods of self-harm such as substance abuse and disordered eating, self-injury inflicted in response to command hallucinations in psychosis, or the stereotyped, habitual self-injurious behaviours often engaged in by people with pervasive developmental disabilities (Jacobson & Gould, 2007; Kamphuis, Ruyling, & Reijntjes, 2007; Klonsky, 2007). Other terms commonly used to refer to NSSI include self-harm, deliberate self-harm, self-injury, self-injurious behaviour, parasuicide, and self-mutilation. These labels are generally broader than NSSI as they often include behaviours with suicidal intent, indirect self-harm (e.g. disordered eating, substance abuse), or culturally normative body modification (Heath, Toste, Nedecheva, & Charlebois, 2008; Jacobson & Gould, 2007).

Research indicates that NSSI serves a purpose or purposes for individuals who engage in it repeatedly, and that it is also connected with various environmental and contextual factors such as experiences of trauma (Gratz, 2006; Weismoore & Esposito-Smythers, 2010). In addition, people who engage in NSSI display extensive heterogeneity in such factors as NSSI methods, frequency, and self-reported functions, the presence and type of psychopathology or related symptoms, and the context and impact of the NSSI behaviours (e.g. whether NSSI is engaged in alone or in the presence of others, and the changes in positive and negative emotions following NSSI; Anderson & Crowther, 2012; Klonsky & Olino, 2008; Whitlock, Muehlenkamp, & Eckenrode, 2008). The present study uses an environmental factor – the severity of past interpersonal trauma experiences – to account for some of the heterogeneity in
NSSI and in the characteristics of people who engage in it, as well as in the self-reported functions of NSSI. The following literature review summarises the extant research relevant to these areas, focusing on prevalence of and risk factors for NSSI, the range of characteristics reported to be relevant to NSSI, and the most established explanatory and theoretical models of NSSI including the support for and gaps within these. In addition, the present study aims to contribute to the growing body of research accounting for the repeated and often long-term character of NSSI by using a combination of cross-sectional and experience sampling. The following literature review addresses the need for such methodology in addition to cross-sectional research, and summarises other experience sampling studies of NSSI to date. Finally, the aims of the present study and the research questions investigated will be detailed.
Chapter 2: Literature Review

NSSI Prevalence, Risk Factors, and Characteristics

Prevalence, frequency, and methods. Among United States adults, lifetime prevalence of NSSI is estimated at 5.9% and 12-month prevalence at 0.9% (Klonsky, 2011). Prevalence is higher in adolescents and young adults, and it is estimated that anywhere from 11 to 46% of individuals in these age groups have engaged in NSSI (Heath et al., 2008; Klonsky & Olino, 2008; Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007; Nelson & Muehlenkamp, 2012). Average age of onset of NSSI has been found to be between 12 and 16 years (Jacobson & Gould, 2007; Klonsky, 2009; Klonsky, 2011; Muehlenkamp & Brausch, 2012), with 35% of individuals reporting onset at or after 18 years, median age of offset at 20 years of age, and the behaviour continuing over the age of 25 in one third of individuals who self-injure (Klonsky, 2011). Thus the course of NSSI varies between individuals, and evidence has been found for two developmental trajectories: “a persistent course beginning in early childhood and continuing into adulthood; and a time-limited course beginning in early adolescence and decreasing in late adolescence or early adulthood” (p. 132, Anderson & Crowther, 2012; see also Whitlock, Eckenrode, & Silverman, 2006).

Research on NSSI frequency has used a range of different metrics, making it difficult to generalize regarding how many times individuals engage in the behaviour. For example, many studies collapse frequencies above 10 or 20 instances into a single category (e.g. Cohen et al., 2015; Zetterqvist, Lundha, & Svedin, 2014) and others only inquire about NSSI frequency in a single period (e.g. Nock, Prinstein, & Sterba, 2009) or ask about how often the behaviour occurs rather than total frequency (e.g. Ross & Heath, 2002). In a random sample of American adults, about half of those who have ever self-injured report having done so five or more times, and 1% of adults with a history of NSSI report more than 10 episodes of the behaviour (Klonsky, 2011).
Similarly, about half of community adolescents and young adults with a lifetime history of NSSI report only one or two episodes of the behaviour (Brausch & Gutierrez, 2010), but around one third report four or more episodes (Brausch & Gutierrez, 2010) and 9 to 17% report 10 or more episodes (Arens, 2012; Gratz, 2006). Frequency has tended to be higher in samples reporting recent NSSI. For example, 44.6% of an 816-person sample of community adolescents in Sweden with past-year occurrence of NSSI had hurt themselves 11 or more times (Zetterqvist et al., 2014), and median lifetime frequency of NSSI in samples of university and community adults who had engaged in NSSI in the previous 6 months were found to be 144 and 175, respectively (Victor & Klonsky, 2014). Further complicating summarising NSSI frequency, the range of occurrences can be quite large which renders the mean a relatively uninformative representation of actual experience. For example, in a study of 67 university students who had engaged in NSSI in the previous year the mean lifetime frequency was 15 instances, but the range spanned one to 1,000 NSSI instances (Bresin, Carter, & Gordon, 2013). The large range in NSSI frequency in the population likely accounts for some of the drastically-different reported means in demographically-similar samples; for example, two community adolescent samples with recent NSSI had respective mean past-year NSSI frequencies of 113.4 ($SD = 174.9$, range $= 3$ to 500; Nock et al., 2009) and 12.9 ($SD = 29.4$, range not reported; Lloyd-Richardson et al., 2007). Longitudinal research has found that many individuals engage in NSSI briefly or experimentally while a sizeable minority engage in it repeatedly, but for a portion of individuals who self-injure the behaviour remains stable and chronic - and that individuals may have periodic waxing and waning of NSSI (Barrocas et al., 2015). Even within these trajectories, though, how often the behaviour is repeated may vary widely. For example, in a sample of 61 community adolescents who reported at least one instance of NSSI 18% reported that they had engaged in NSSI once and 19.6% reported occasional NSSI; the others reported frequently
engaging in NSSI including a couple times a month (19.6%), a couple times a week (27.9%), and more than once per day (13.1%; Ross & Heath, 2002). Higher-frequency NSSI has been shown to be associated with depression, rumination, suicide attempts, emotional inexpressivity, emotion dysregulation, lack of emotional clarity, low access to emotion regulation strategies, higher-severity interpersonal trauma and invalidating family environments, self-criticism, and low levels of positive affect (Barrocas, Giletta, Hankin, Prinstein, & Abela, 2015; Baetens, Claes, Hasking, Smits, & Grietens, 2015; Cohen et al., 2015; Gratz, 2006; Gratz & Roemer, 2008; Lloyd-Richardson et al., 2007).

NSSI can take many forms, the most common of which are skin-cutting, burning, scratching, skin-picking, hitting oneself, and preventing wounds from healing (e.g. Klonsky, 2011; Paivio & McCulloch, 2004; Victor & Klonsky, 2014; Williams & Hasking, 2010). Forty to 70% of individuals who self-injure report using multiple methods of NSSI (Kamphuis et al., 2007; Klonsky, 2011; Lloyd-Richardson et al., 2007; Whitlock et al., 2006), with means ranging from three to seven NSSI methods in community samples (Armey, Crowther, & Miller, 2011; Bresin et al., 2013; Victor & Klonsky, 2014).

**Demographic characteristics of individuals who self-injure.** Research suggests that the prevalence of NSSI is similar across men and women (Heath et al., 2008; Klonsky, 2011; Klonsky & Glenn, 2009; Klonsky & Olino, 2008; Oyefeso, Brown, Chiang, & Clancy, 2008); however, some evidence points to differing features of the behaviour depending on an individual’s gender. In some studies, women have been found to be more likely to use cutting and scratching, whereas men have been more likely to use self-hitting (Klonsky, 2011; Whitlock et al., 2008); in one study with a broader definition of self-harm, women were more likely to use cutting and men were more likely to engage in interpersonal violence with the intention of hurting themselves (Goldstein, Flett, Wekerle, & Wall, 2009). Women have also reported a
higher number of NSSI methods overall (Dixon-Gordon, Tull, & Gratz, 2014). While some studies have found repeated or frequent NSSI to be more common in women (Dixon-Gordon et al., 2014; Whitlock et al., 2006), a recent study in China found higher NSSI frequency in male adolescents (Barrocas et al., 2015). Other studies have found no difference between men and women on NSSI characteristics (e.g. Oyefeso et al., 2008; Ray-Sannerud, Bryan, Perry, & Bryan, 2015). Despite the comparable prevalence of NSSI across genders, most studies have used primarily female samples, sometimes because of deliberately sampling women and sometimes as a result of convenience sampling (e.g. Armey et al., 2011; Zaki, Coifman, Rafaeli, Berenson, & Downey, 2013).

Although little research has considered whether NSSI prevalence differs between ethnocultural groups, comparable occurrence of the behaviour across groups is suggested by the large range of ethnicities reported by self-injuring samples (Klonsky & Glenn, 2009; Klonsky & Olino, 2008; Gratz, 2006; Victor & Klonsky, 2014; Zaki et al., 2013), as well as by research on NSSI occurring across the world including in China, Finland, Sweden, New Zealand, Turkey, and Japan (Bentley, Cassiello-Robbins, Vittorio, Sauer-Zavala, & Barlow, 2015; Barrocas et al., 2015; Zetterqvist et al., 2014).

Several studies have indicated that individuals with minority sexual orientations such as bisexuality or homosexuality are at increased risk for NSSI (Deliberto & Nock, 2008; Gratz, 2006; Ray-Sannerud et al., 2015; Whitlock et al., 2006). For example, in a study comparing adolescents with a history of NSSI to a healthy control group, 32.6% of the NSSI group reported a non-heterosexual orientation compared to 11.1% of the control group (Deliberto & Nock, 2008). Some evidence indicates that the higher prevalence of NSSI in this population may be accounted for by higher rates of trauma experiences (Ray-Sannerud et al., 2015).
NSSI urges and impulsivity. Individuals who self-injure commonly report ongoing urges to engage in NSSI, and NSSI has often been characterized as having addictive properties. Nixon, Cloutier, and Aggarwal (2002) reported that 79% of self-injuring participants in their hospitalized adolescent sample reported almost daily urges to engage in NSSI, but community samples also report regularly-occurring NSSI urges. Nearly 90% of a community adult sample reported thinking about NSSI at least once per month in the previous 6 months (Kamphuis et al., 2007), and experience sampling studies have found NSSI urges without NSSI acts occurring a mean of 1.2 times in 2 weeks ($SD = 2.02$) among university students with recent NSSI (Bresin et al., 2013), 1.53 times in 3 weeks ($SD = 3.49$, range = 0 to 15) among community adults with BPD (Zaki et al., 2013), and 5 times per week ($SD = 3.4$) in self-injuring community adolescents (Nock et al., 2009). Greater intensity of NSSI thoughts has been found to predict NSSI acts (Nock et al., 2009).

NSSI has often been characterized as an impulsive behaviour, and individuals with NSSI histories self-report high levels of impulsivity (Evans et al., 2000; Herpertz, Sass, & Favazza, 1997; Janis & Nock, 2008). However, some experimental evidence challenges this characterization, suggesting either that people who self-injure may only be impulsive in certain situations (such as when experiencing extreme distress), may only be impulsive with regards to NSSI, or that they may perceive themselves as impulsive specifically because they engage in NSSI. In two experiments using well-established behavioural measures of impulsivity (that had been demonstrated to show impulsiveness among individuals who have attempted suicide, individuals with substance addictions, prison inmates with high psychopathy, and patients with prefrontal brain damage), Janis and Nock (2008) found no evidence that either adolescents or adults who self-injure are more impulsive than non-self-injuring controls who were matched by age, sex, and ethnicity. There is also evidence that individuals who self-injure vary widely in
self-reported time spent between the consciously-noted idea to self-injure and the act itself; although in a sample of 26 community adults with a history of NSSI 77% reported that 15 or fewer minutes typically elapse between the thought to self-injure and the action (Klonsky, 2011), Lloyd-Richardson et al. (2007) found that 31.1% of individuals engaging in moderate-to-severe NSSI reported contemplating NSSI before acting, and Klonsky and Olino (2008) found that for 30 to 60% of self-injuring young adults, more than an hour elapsed between the urge to self-injure and the action, depending on other factors such as symptoms of psychopathology and methods and functions of NSSI. Research suggests that individuals who have a history of suicidality and serious suicide attempts as well as those who engage in more severe NSSI methods are more likely to contemplate NSSI and to wait longer than an hour before engaging in the behaviour (Klonsky & Olino, 2008; Lloyd-Richardson et al., 2007). Interestingly, although 94% of a self-injuring university student sample reported that under an hour elapses between NSSI urges and acts, assessment of the emotional experiences before and after NSSI demonstrated that it was possible to predict the behaviour even 8 hours before it occurred due to a characteristic spike in particular negative emotions (Armey et al., 2011).

**Psychiatric characteristics of individuals who self-injure.** NSSI is by definition distinct from attempted suicide due to the requirement of a lack of suicidal intent. However, NSSI is a risk factor for suicide attempts: Approximately half of self-injuring adolescents and young adults report suicidal ideation and 20% report a history of suicide attempts (Klonsky & Glenn, 2009; Lloyd-Richardson et al., 2007). Additionally, individuals may engage in NSSI as a way to avoid suicide, and may sometimes feel suicidal while they are engaging in NSSI even though they are not intending to die (Klonsky, 2011). Although NSSI and suicide attempts have been suggested to represent different levels of severity on a single continuum (Brausch & Gutierrez, 2010), much research distinguishes NSSI and suicide attempts with evidence of
differences between the behaviours as well as differences between the individuals engaging in one versus the other (Hulbert & Thomas, 2010; Lloyd-Richardson et al., 2007). For example, research has found that people who self-injure very rarely think about suicide while they are thinking about NSSI – only 1 to 4.2% of the time (Nock et al., 2009). In general, individuals with a history of both NSSI and suicide attempts report higher levels of depression, lower self-esteem and parental support, and higher likelihood of meeting criteria for Post-Traumatic Stress Disorder (PTSD) than individuals who have engaged in NSSI but never attempted suicide (Brausch & Gutierrez, 2010). In contrast, there is evidence that emotion dysregulation is particularly predictive of NSSI but not of suicide attempts (Dixon-Gordon et al., 2014). NSSI rarely seems to require medical attention, suggesting lower medical risk associated with the behaviour overall: Between 3 and 7% of in participants in self-injuring community samples report that they have ever sought or required medical attention for NSSI (Klonsky, 2011, Lloyd-Richardson et al., 2007, Whitlock et al., 2006). However, 20% of a 490-person university sample reported that at some point they had sustained injuries from NSSI that were serious enough that they feel they should have spoken to a medical professional (Whitlock et al., 2006).

NSSI is common in individuals who meet criteria for a variety of psychiatric diagnoses, as well as in individuals who do not meet diagnostic criteria according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR; Klonsky & Olino, 2008). For example, in a study of adolescents with a recent history of NSSI in an inpatient psychiatric program, 13% did not meet criteria for a DSM-IV diagnosis (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Historically NSSI has been strongly associated with Borderline Personality Disorder (BPD), which includes repetitive self-injurious behaviours as a diagnostic criterion (American Psychiatric Association, 2013). Unsurprisingly, there is evidence for high rates of BPD and related symptoms among individuals who self-injure
Other diagnoses common to individuals who self-injure include anxiety disorders such as PTSD, Panic Disorder, Obsessive-Compulsive Disorder, and Social Anxiety Disorder (Bentley et al., 2015; Evren, Dalbudak, Evren, Cetin, & Durkaya, 2011; Hulbert & Thomas, 2010; Zaki et al., 2013), mood disorders such as Major Depressive Disorder and Dysthymic Disorder (Bentley et al., 2015; Garisch & Wilson, 2010; Williams & Hasking, 2010; Zaki et al., 2013), Eating Disorders, especially Bulimia Nervosa, and related symptoms (Muehlenkamp et al., 2009; Nelson & Muehlenkamp, 2012), other Personality Disorders such as Avoidant Personality Disorder (APD; Nock et al., 2006; Snir et al., 2015), and substance use disorders (Nock et al., 2006; Zaki et al., 2013). As a result, NSSI is commonly described as a trans-diagnostic behaviour (e.g. Bentley et al., 2015). The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychiatric Association, 2013) includes an NSSI disorder as a condition for further study, based around a 12-month prevalence of at least five NSSI instances, engaging in NSSI with at least one of the following expectations: “1. To obtain relief from a negative feeling or cognitive state. 2. To resolve an interpersonal difficulty. 3. To induce a positive feeling state,” and the presence of one or more of the following: “interpersonal difficulties or negative feelings or thoughts” just before engaging in NSSI, preoccupation with NSSI just before engaging in it that is difficult to control, or frequent thoughts about NSSI (p. 803). However, NSSI Disorder is not yet a formal diagnostic category in the DSM-5.

Studies comparing individuals with and without a history of NSSI find that those who self-injure are more likely to have received psychiatric treatment for any reason. Almost 40% of a sample of community adults with a history of NSSI reported having received treatment for an emotional problem, in contrast with 21.8% of adults with no history of NSSI (Klonsky, 2011). In a sample of adolescents with a history of NSSI, 78.2% had been in psychotherapy and 64.2%
had used psychiatric medication; in contrast, in the control group 27.3% had been in psychotherapy and 17.7% had used psychiatric medication (Deliberto & Nock, 2008). However, the prevalence of psychotherapy varies widely between self-injuring community samples: Rates of past treatment range from 35 to 85% (Kamphuis et al., 2007; Lloyd-Richardson et al., 2007; Whitlock et al., 2006; Zaki et al., 2013), likely reflecting the heterogeneity in the presentations of people who engage in NSSI and in the severity of the behaviour, as well as differences in access to treatment.

**Accounting for heterogeneity in NSSI characteristics.** Although the criteria of the proposed NSSI Disorder as described above imply definitive features of NSSI and individuals who engage in it such as repetition, the experience of urges or preoccupation, and the intention of modifying either feeling states or interpersonal situations, people who self-injure present with considerable variation in NSSI methods, frequency, severity, clinical symptoms, and the self-reported functions of NSSI (discussed below in the section Explaining NSSI). Some evidence exists for separate groupings of individuals who self-injure based along these characteristics that may require differential assessment and treatment (Barrocas et al, 2015; Klonsky & Olino, 2008; Whitlock et al., 2008). Whitlock et al. (2008) found evidence for three NSSI typologies using latent class analysis: one, largely composed of women who engaged in mild tissue damage via a single method of NSSI and who had hurt themselves fewer than 11 times; a second, largely composed of men who engaged in self-battery and mild tissue damage via one to three methods, and who had hurt themselves between two and 10 times; and a third, composed largely of women using more than three methods of NSSI with a higher degree of tissue damage and lifetime incidents. Klonsky and Olino (2008) found evidence for four distinct subgroups of self-injuring young-adults. In their study, 80% of individuals with a history of NSSI belonged to two groups characterized by low-frequency and low-severity NSSI, with few clinical symptoms. The
remaining 20% were evenly divided between two more clinically-relevant groups with higher frequency and severity of NSSI: one with high anxiety symptoms, tending to engage in NSSI within less than an hour of experiencing the urge to do so, a high number of NSSI methods, and a broad range of endorsed *social* (e.g. for attention; to influence others) and *automatic* (e.g. affect regulation; self-punishment) NSSI functions; the other with higher suicidality, depression, and Borderline Personality symptoms, tending to engage in NSSI more than an hour after experiencing the urge to do so, whose primary NSSI method was self-cutting, and who practiced NSSI in private for primarily automatic functions. In a prospective longitudinal study of 617 self-injuring adolescents in China, participants were found to be separable into low, moderate, and chronic frequency of NSSI over the 2-year follow-up period, with the majority (69.2%) engaging in no or very little NSSI in the 2-year period, and only 4.7% engaging in chronic NSSI (Barrocas et al., 2015). Negative attributional style predicted chronic as opposed to low or moderate NSSI frequency, and lifetime depression, rumination, and male gender predicted moderate or chronic as opposed to low NSSI frequency. Overall, these findings suggest that most people who have low lifetime occurrence of NSSI likely present little clinical risk, and will not continue to engage in the behaviour; and that NSSI may be associated with notable clinical variation, serving a range of functions and correlating with a variety of psychopathology.

As evidenced by the above literature review, there exists extensive variability in psychiatric diagnoses, impulsivity levels, clinical severity, frequency, developmental pattern, methods, and demographic characteristics associated with NSSI behaviours. The next section will address hypothesized explanations of common factors linking individuals who self-injure, focusing on intrapersonal and interpersonal factors that may motivate and maintain the behaviour.

**Explaining NSSI**
Researchers have investigated why individuals engage in NSSI and have sought to explain NSSI using psychological, biological, social, and integrated models. Below, research on self-reported functions of NSSI will be reviewed, followed by a description of prominent theoretical explanations of NSSI: the Experiential Avoidance Model (EAM), the Four-Factor Model (FFM) of social/automatic and positive/negative reinforcement, and interpersonal trauma explanations. Integrated within these sections, the literature relating to the self-punishment function of NSSI will be examined in more depth, highlighting the importance of this function and linking self-punishment to interpersonal trauma and NSSI.

**Self-reported functions of NSSI.** NSSI is regarded as a coping behaviour, and one that is engaged in and repeated because it serves a function or multiple functions for the individual (e.g. Chapman, Gratz, & Brown, 2006; Klonsky, 2011). Although measures of NSSI functions differ somewhat, support has generally been found through self-report for the following functions or variations thereof: the reduction of or relief from distressing emotions or thoughts; punishing oneself, expressing anger at oneself, or expressing self-disgust or self-criticism; increasing one’s level of physical or emotional sensation or proving to oneself that one exists in response to feeling “numb,” “unreal,” or “dissociated”; taking care of oneself through caring for the physical injury; increasing a sense of personal control, self-sufficiency, and strength; creating or emphasizing boundaries between oneself and others; managing suicidal ideation without attempting suicide; generating excitement or exhilaration; fitting in or bonding with others; communicating distress to others or requesting help; acknowledging or proving the existence of emotional distress to oneself through a physical representation; and hurting or getting revenge on others (e.g. Kaess et al., 2013; Kamphuis et al., 2007; Klonsky & Glenn, 2009; Klonsky & Olino, 2008; Oyefeso et al., 2008; Ross & Heath, 2003). Functions have tended to be categorized as those serving an intrapersonal or automatic purpose, such as
changing how one feels or punishing oneself, and those serving an interpersonal or social purpose, such as bonding with others or communicating distress (Nock et al., 2009; Sadeh et al., 2014; Snir et al., 2015), with most studies finding higher endorsement of automatic functions (e.g. Snir et al., 2015).

Preliminary evidence suggests some gender differences in the self-reported functions of NSSI, with women endorsing more automatic functions than men (e.g. to feel better, to punish oneself), and men and women endorsing comparable levels of social functions (e.g. to communicate with others, to express autonomy); men have also endorsed sensation-seeking functions more than women (Klonsky & Glenn, 2009). In Klonsky and Olino’s (2008) study described above differentiating distinct subgroups of individuals who self-injure, women comprised 82% of the subgroup that endorsed primarily automatic functions, but only half of the subgroup that endorsed a high number of both automatic and social functions. In contrast, at least one study found no gender differences in self-reported NSSI functions (Oyefeso et al., 2008). The above findings suggest that although there is considerable overlap, NSSI functions may not always be the same for men and women.

The most endorsed NSSI functions tend to relate to relief from negative feelings or attempts to modulate or modify the nature or intensity of one’s emotional experience (affect regulation). Most literature treats NSSI as primarily an affect regulation behaviour (Armey et al., 2011; Kaess et al., 2013; Klonsky, 2011; Oyefeso et al., 2008), although a few researchers have also emphasized that NSSI is also used to regulate cognitive experiences such as unwanted memories or rumination (Cohen et al., 2015; Nock et al., 2009). Punishing oneself or expressing anger and disgust at oneself (self-punishment) is usually the second most-endorsed NSSI function (Kaess et al., 2013; Klonsky, 2011; Oyefeso et al., 2008), but it has been under-researched and under-addressed in NSSI theory. Findings relevant to the importance of this
function in NSSI behaviour are detailed next, followed by findings demonstrating the plurality of reported NSSI functions.

**The importance of self-punishment to NSSI.** While many NSSI studies address concepts related to self-punishment, terminology and specific foci vary widely. The present paper uses the term self-punishment to summarise functions of NSSI related to self-hatred, self-directed anger, self-blame, low self-worth, self-abuse, self-criticism, and believing one is worthless or stupid and thus deserves to be hurt, which are generally grouped together in NSSI measures and theoretical articles under this label (e.g. Chapman et al., 2006; Klonsky & Glenn, 2009; Oyefeso et al., 2008; Snir et al., 2015). However, it is notable that some studies have measured the self-punishment function with more emphasis on punishment itself (e.g. “Do you use NSSI to punish yourself?”), while others define self-punishment more broadly to include expressing anger at oneself or enacting self-disgust (e.g. “to express hatred for yourself”, Oyefeso et al., 2008), or a combination of the two. Preliminary research does support a connection between such concepts; for example, in Glassman et al.’s (2007) study of 86 adolescents, overall self-criticism scores were significantly associated with endorsement of the self-punishment function of NSSI.

NSSI statements related to affect regulation tend to be endorsed by nearly all individuals who self-injure in self-report studies (e.g. Oyefeso et al., 2008); however, statements related to self-punishment such as “to express anger at myself” or “to express hatred for self” are also endorsed by up to 70% of individuals who self-injure (Klonsky, 2009; Oyefeso et al., 2008), and a majority of endorse both affect regulation and self-punishment (61% of the sample in Oyefeso et al., 2008).

In addition to the self-reported importance of self-punishment to NSSI, related concepts such as self-blame and self-criticism have been linked to the behaviour, and have recently been
referred to as representing cognitive vulnerabilities to NSSI in contrast to the emotional vulnerabilities represented by emotion dysregulation and high negative emotion (Cohen et al., 2015; Weismoore & Esposito-Smythers, 2010). Self-injuring university students and community adults have been found to have higher levels of self-dissatisfaction than control groups, with self-dissatisfaction differentiating between the groups more strongly than other negative affective states such as anxiety and loneliness (Victor & Klonsky, 2014). In a study where relief from negative emotions predicted occurrence of NSSI a self-blaming style of coping predicted higher frequency of the behaviour (Hulbert & Thomas, 2010), and self-criticism has predicted NSSI frequency in adolescents and young adults with low levels of positive affect (Cohen et al., 2015). Self-injuring adolescents in an experimental study were more tolerant of physical pain if they believed that “they are bad, flawed, and defective” (Glassman et al., 2007; p. 2485).

Experience sampling studies have found that self-directed anger, shame, and self-hatred peak prior to NSSI and reduce following the behaviour, predicting NSSI acts better than fear, anxiety, sadness, worthlessness, or feeling overwhelmed (Armey et al., 2011; Nock et al., 2009).

In addition to the evidence that self-punishment-related factors are important in NSSI overall, some studies indicate that they may be more relevant to some individuals than others. One study found that the affective experience surrounding NSSI differed between participants with BPD and participants with APD; while dissociation and perceived rejection/isolation increased in both groups before NSSI and decreased after, self-devaluation only increased prior to NSSI in the group with APD (Snir et al., 2015).

**The plurality of NSSI functions.** Although affect regulation and self-punishment functions of NSSI are the most endorsed across studies and populations, it is notable that other NSSI functions receive comparable levels of endorsement in some studies. For example, in a community adolescent sample “to try to get a reaction from someone” and “to get control of a
situation” received a comparable level of endorsement as “to get rid of bad feelings” (Lloyd-Richardson et al., 2007), and in a community adult sample “to communicate with someone else” and “to get attention” received comparable endorsement as “to punish yourself” (Klonsky, 2011). In a Dutch community sample, although affect regulation remained the highest-endorsed NSSI function, loneliness had the second-highest endorsement and self-punishment was endorsed comparably with influencing others (Kamphuis et al., 2007). Moreover, most individuals who self-injure endorse multiple functions for their NSSI: In a community sample of 293 adolescents who had engaged in NSSI in the past year, participants endorsed a mean of 4.76 NSSI functions ($SD = 5.56$; Lloyd-Richardson et al., 2007), and in a treatment sample of 39 adults with opiate addiction 92% endorsed at least two NSSI functions (Oyefeso et al., 2008).

A growing body of research suggests that NSSI functions vary between individuals in clinically-relevant ways (e.g. Kaess et al., 2013; Klonsky & Olino, 2008; Sadeh et al., 2014; Snir et al., 2015). For example, in the Klonsky and Olino (2008) study described above in which NSSI subgroups were delineated, the subgroup that only endorsed automatic NSSI functions was more likely to be depressed, suicidal, and endorsing BPD traits, whereas the subgroup endorsing high numbers of both automatic and social functions showed higher levels of anxiety. In a daily diary study comparing NSSI functions in patients with BPD and APD, only the group with APD endorsed self-punishment and interpersonal-avoidance functions of NSSI, whereas both groups endorsed anti-dissociation and perceived-rejection functions (Snir et al., 2015). Findings indicating clinically-distinct self-injuring subgroups that are at least partially based on different NSSI functions suggest that NSSI serves different purposes for different individuals, and possibly within the same individual at different times (McKenzie & Gross, 2014; Oyefeso et al., 2008). Klonsky (2009) noted:
It is unclear how to reconcile evidence for multiple functions [of NSSI]…It would be useful to determine if affect-regulation reasons are indeed more fundamental than self-punishment reasons or if both types of reasons are equally prominent. Distinguishing primary and secondary reasons would inform case conceptualization and treatment planning in clinical settings, and provide a meaningful context for the design of future studies on the etiology, course, and treatment of self-injury (p. 261).

Some researchers have argued that the range of commonly endorsed functions of NSSI such as acknowledging emotional distress or taking care of oneself also serve a primary affect regulation function (e.g. Chapman, Gratz, & Brown, 2006; McKenzie & Gross, 2014), whereas others have treated these as distinct (e.g. Kaess et al., 2013; Lloyd-Richardson et al., 2007; Sadeh et al., 2014). However, NSSI is generally regarded as at its core resulting from a desire to feel better or at least to feel different, suggesting that it is fundamentally about affect regulation. The Experiential Avoidance Model (EAM), which incorporates this perspective, is described below.

**The Experiential Avoidance Model.** One of the most established explanatory models of NSSI is based on the concept of *experiential avoidance* – referring to the avoidance of or escape from aversive internal experiences such as unwanted emotions, thoughts, memories, or somatic sensations (Chapman et al., 2006). The Experiential Avoidance Model of NSSI (EAM) posits that NSSI is one example of a group of experience avoidance behaviours such as substance abuse and binge eating. In their widely cited theoretical article introducing the EAM, Chapman et al. (2006) suggest that NSSI is especially explained by avoidance of high-intensity emotions, and that many of the other self-reported functions of NSSI function to help individuals relieve or avoid aversive affect. The high rates of endorsement given to affect regulation functions for NSSI in self-report studies support this hypothesis (e.g. Klonsky, 2011;
Klonsky & Glenn, 2009; Oyefeso et al., 2008). As well, the specificity of experiential avoidance to NSSI is supported by findings that endorsing relief from negative emotions predicts frequency of non-suicidal but not suicidal self-harming behaviours (Hulbert & Thomas, 2010).

The EAM proposes that individuals who engage in experiential avoidance behaviours such as NSSI do so in the context of high-intensity emotional experiences, difficulty regulating emotions once aroused, difficulty tolerating distress, frequency of aversive experiences of oneself (for example emotions such as shame), and deficient emotion-regulation skills, and that they will tend to engage in avoidant behaviours rather than using other coping strategies (Chapman et al., 2006). Support for such assertions exists in findings that self-injuring college students score significantly lower on emotion-regulation measures than non-self-injuring college students (Heath et al., 2008), and that individuals who self-injure tend to only experience urges to engage in NSSI in the context of negative emotions and stressful events (Victor, Glenn, & Klonsky, 2012). Alexithymia, or difficulties in awareness and labelling of emotion states, is considered to be related to difficulties in emotion regulation and has been found to be a unique predictor of NSSI history (Paivio & McCulloch, 2004). Studies have also shown that as hypothesized in the EAM, individuals who self-injure report higher levels of negative emotional experiences than non-self-injuring individuals including disgust, shame, sadness, and self-dissatisfaction (Victor & Klonsky, 2014). Newer experience-sampling techniques have made it possible to study affective experience associated with NSSI and compare it to affect at other times. In support of the EAM, such studies have generally found that NSSI tends to occur during a period of intense negative emotions – these generally include guilt, self-directed anger and dissatisfaction, and anxiety/tension – and that the negative emotions reduce in the time following NSSI (Armey et al., 2011; Kamphuis et al., 2007; Victor & Klonsky, 2014). Moreover, such studies have found that similar emotional peaks were not reported by non-self-
injuring participants (Victor & Klonsky, 2014) or by self-injuring participants who had not engaged in NSSI at that time (Armey et al., 2011).

The original article proposing the EAM addresses the role of self-punishment in NSSI, hypothesizing that self-punishment through NSSI reinforces the behaviour through the reduction of negative emotions in individuals who believe they deserve punishment (Chapman et al., 2006). It explains that self-punishment through NSSI would function by providing the punishment that the individual believes he or she deserves, thus providing confirmation of transgressions or overall unworthiness and resulting in relief from guilt or shame. In discussing the relationship between the EAM and self-punishment, Chapman et al. (2006) go on to propose a link between the self-punishment function of NSSI and a history of interpersonal trauma:

Individuals may develop a conditioned association between punishment by others and emotional relief, particularly including relief from guilt or shame…abusive family members may be less likely to deprecate or punish a child who already has pre-emptively engaged in self-deprecation or self-punishment (p. 384).

A somewhat earlier model of NSSI – the Hostility Model, which has been little-researched despite promising initial findings – is concordant with the EAM overall by positing the role of NSSI in reducing negative affect but proposes a central role of self-punishment that is somewhat different from the EAM (Ross & Heath, 2003). It proposes that NSSI may serve as a substitute for hostility that cannot be directed at the appropriate target and that over time is directed inward:

Since the anger cannot be directed at the source, it becomes internalized whereby the individual may come to see the self as “bad” and somehow worthy of punishment…an underlying assumption is that the inability to express feelings of hostility results in
increasing tension which leads the individual to experience feelings of anxiety (Ross & Heath, 2003, p. 278).

Thus, while Chapman et al. (2006) propose that self-punishment through NSSI would function to reduce guilt and shame by confirming the individual’s guilt, Ross and Heath (2003) propose that self-punishment would reduce tension and anxiety that build up as a result of not being able to direct hostility at others. However, both agree that NSSI is primarily reinforced by reducing aversive experiences, and that emotionally invalidating or dysfunctional environments would be important to the self-punishment function of NSSI.

Some studies also indicate that NSSI is more complex than posited by the EAM (Hulbert & Thomas, 2008). For example, The EAM is based on the assumption that NSSI is a negatively reinforced behaviour – that NSSI is repeated because it reduces or eliminates strong aversive emotions. However, an experience sampling study of self-injuring women with Bulimia Nervosa indicated the need to consider positive reinforcement as well: As expected, self-reported negative affect increased and positive affect decreased prior to NSSI. However after NSSI, although negative affect remained unchanged, positive affect actually increased (Muehlenkamp et al., 2009). Similarly, Kamphuis et al. (2007) found in a community sample that at the same time as negative feeling states such as depression and fatigue reduced during and after NSSI, “vigor” increased during and after NSSI. In addition, findings have indicated that low levels of positive emotion are just as important to NSSI as high levels of negative emotion: Low levels of positive affect increase the risk of engaging in frequent NSSI, rather than solely or primarily high negative affect (Gratz, 2006), and not only do individuals who self-injure report higher levels of negative emotions than individuals who do not, they also report lower levels of positive emotions including joy and cheerfulness (Victor & Klonsky, 2014). Further indicating the complexity of affective experience in NSSI, Cohen et al. (2015) found
that individuals with low levels of positive affect had more frequent NSSI when they also had high levels of rumination, whereas rumination did not have the same role for self-injuring individuals with high levels of negative affect – suggesting that positive and negative affect patterns may influence NSSI differently in different self-injuring individuals.

In addition, although it is possible that NSSI may always serve to avoid intrapsychic discomfort in some way the EAM does not emphasize and may not sufficiently account for the heterogeneity in self-reported functions of NSSI – for example in that many individuals claim to engage in NSSI to enhance or increase emotionality or to improve or change their relationships (e.g. Kaess et al., 2013; Lloyd-Richardson et al., 2007). The Four-Factor Model (FFM) proposed by Nock and Prinstein (2004 & 2005), described below, seeks to more broadly encompass the range of NSSI functions using theories of positive and negative as well as automatic and social reinforcement.

**The Four-Factor Model.** The FFM suggests that NSSI is reinforced (and thus becomes likely to be repeated) based on two dimensions of reinforcement: The first involves either positive reinforcement, the addition or increase of a desired experience; or negative reinforcement, the reduction or removal of an aversive experience (e.g. Nock & Prinstein, 2004 & 2005; Victor & Klonsky, 2014). The second involves either social reinforcement (sometimes called interpersonal, referring to impact on one’s environment) or automatic reinforcement (sometimes called intrapersonal, referring to impact on one’s internal state). Social positive reinforcement includes NSSI functions that improve access to interpersonal resources such as intimacy and support, whereas social negative reinforcement removes interpersonal demands – for example, avoiding a responsibility or reducing intimacy in a relationship. Automatic positive reinforcement includes NSSI functions that generate internal experiences, such as increasing emotions or sensations, whereas automatic negative reinforcement reduces internal experiences,
for example relieving distress or stopping memories (Arens, 2012; Klonsky & Glenn, 2009; Nock & Prinstein, 2004 & 2005). Although social functions have notable importance for many individuals who self-injure, automatic functions are endorsed more often and are described by as more primary (Klonsky & Glenn, 2009; Nock & Prinstein, 2004, Nock et al., 2009; Sadeh et al., 2014; Snir et al., 2015).

The FFM has the benefit of accounting for the vast majority of self-reported NSSI functions including those that relate to proximal environmental factors such as relational conflict, as well as accounting for the findings regarding positive emotion and NSSI. There is empirical support for the factors it proposes, particularly for the distinction between automatic and social functions (Klonsky & Glenn, 2009; Lloyd-Richardson et al., 2007; Sadeh et al., 2014) with some support for the distinction between positive and negative reinforcement as well (Nock & Prinstein, 2004 & 2005). However, some studies have not replicated support for the four-factor loading of functions even when using the same NSSI function measure (e.g. Kaess et al., 2013). For example, Kaess et al. (2013) found that their data loaded onto three factors which they labeled “interpersonal influence” (e.g. “to make your parents understand you”), “automatic functions” (e.g. “to relieve feeling ‘numb’ or ‘empty’”), and “peer identification” (e.g. “to feel more part of a group”) in their sample of inpatient adolescents and young adults, and did not find the hypothesized differentiation between positive and negative reinforcement.

One possible shortcoming of the FFM is that it does not further differentiate between the functions included in its factors, which are not always endorsed together by the same individuals; for example, although self-punishment and anti-dissociation functions are both classified under automatic positive reinforcement, in most studies self-punishment is endorsed more strongly or by a greater number of individuals who self-injure (Klonsky, 2009; Klonsky, 2011; Klonsky & Glenn, 2009; Sadeh et al., 2014). A growing number of studies are
investigating the factors as a whole or use a single question to assess each factor, rather than further differentiating the roles of their component functions (Kaess et al., 2013; Nock et al., 2009; Sadeh et al., 2014; Zetterqvist et al., 2014). This practice is useful for validating the FFM and for reducing the number of predictors in order to maintain statistical power in analyses, but it may oversimplify the factors which motivate and maintain NSSI. Some researchers have emphasized the need for a more in-depth understanding of the plurality of NSSI functions (e.g. Klonsky, 2009; Oyefeso et al., 2008).

As noted above, self-punishment is classified in the FFM as a form of automatic positive reinforcement – suggesting that it increases or adds something intrapersonally, rather than reducing negative emotions as proposed by the EAM and the Hostility Model. In factor analysis self-punishment has tended to load most strongly with other automatic positive reinforcement statements such as “to feel something, even if it was pain” (e.g. Nock & Prinstein, 2004). However, most studies of the FFM to date – despite including questions about self-punishment – do not directly address it as having a distinct role in NSSI engagement (Kaess et al., 2013). Although the positive reinforcement provided by self-punishment has been described as a sense of “satisfaction” related to confirmation of one’s negative self-image (Arens, 2012, p. 14), to my knowledge there is no consistent theory as to the positively-reinforcing aspect of self-punishment in writing addressing the FFM.

Studies investigating the EAM or FFM rarely address distal environmental factors that could contribute to engagement in or the heterogeneity of NSSI, despite often theorizing that emotionally invalidating or dysfunctional environments likely shape NSSI engagement – especially as relates to self-punishment. However, exposure to potentially-traumatic events has often been investigated as a predictor of NSSI, and is discussed below. Subsequently, existing
findings are discussed that are relevant to the theorized link between interpersonal trauma, self-punishment, and NSSI.

**Interpersonal trauma and NSSI.** Theorists and clinicians report links between experiencing potentially traumatic interpersonal events (referred to here as *interpersonal trauma*, referring to potentially traumatic events directly perpetrated by another person(s), such as in abuse, assault, and neglect) and engaging in NSSI. Indeed, research indicates that individuals who self-injure have significantly higher rates of various forms of interpersonal trauma as well as higher levels of trauma symptoms and PTSD, even in clinical samples (Bentley et al., 2015; Evren et al., 2011; Kaess et al., 2013) and that individuals who engage in repeated NSSI are more likely to have trauma histories and more severe trauma symptoms than individuals who engage in lower-frequency NSSI (Zetterqvist et al., 2014). However, empirical research reveals a complicated relationship between trauma and NSSI, challenging the hypothesis that individuals who experience interpersonal trauma necessarily engage in NSSI, or that individuals who engage in NSSI have necessarily experienced interpersonal trauma.

**Direct relationships between interpersonal trauma and NSSI.** Studies have tested the hypothesis that various potentially traumatic interpersonal experiences including childhood physical abuse, childhood sexual abuse, childhood emotional abuse and neglect, maladaptive family dynamics, bullying, adolescent and adult dating violence, and adult sexual harassment, sexual assault and physical assault predict lifetime engagement in, frequency of, and severity of NSSI (Adrian, Zeman, Erdley, Lisa, & Sim, 2011; Baker, Helm, Bifulco, & Chung-Do, 2015; Garisch & Wilson, 2010; Glassman, Weierich, Hooley, Deliberto, & Nock, 2007; Goldstein et al., 2009; Gratz, 2006; Gratz & Roemer, 2008; Kaess et al., 2013; Oyefeso et al., 2008; Paivio & McCulloch, 2004; Wachter, Murphy, Kennerley, & Wachter, 2009; Weismore & Esposito-Smythers, 2010; Whitlock et al., 2006). These studies have yielded mixed results. For example,
the types of traumatic experiences found to predict NSSI often vary between studies. While some studies have found that NSSI is significantly related to all of the following: childhood emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect (e.g. Paivio & McCulloch, 2004), others found no link between NSSI and childhood physical abuse (Glassman et al., 2007; Weismoore & Esposito-Smythers, 2010), childhood emotional neglect (Glassman et al., 2007), or childhood sexual abuse (Goldstein et al., 2009; Weismoore & Esposito-Smythers, 2010). Although Glassman et al. (2007), Goldstein et al. (2009) and Wachter et al. (2009) both used the same measure of childhood maltreatment (the Childhood Trauma Questionnaire), they had drastically different findings: Glassman et al. (2007) found significant associations between a recent history of NSSI and childhood physical neglect, emotional abuse, and sexual abuse; however, they found no link between a recent history of NSSI and physical abuse or emotional neglect. By contrast, Wachter et al. (2009) found that only physical abuse predicted frequent NSSI (defined as 10 or more instances) versus infrequent or no NSSI, and that none of the other forms of maltreatment emerged as significant predictors. Goldstein et al. (2009) found that only emotional abuse and physical neglect significantly predicted a higher number of NSSI methods, whereas sexual abuse and physical abuse did not. In another study, participants who had never self-injured actually reported higher levels of physical abuse than participants who had self-injured in the past (Wester & Trepal, 2010), and in some studies, no links are found between NSSI and a history of maltreatment (e.g. Heath et al., 2008). As well, most studies with significant results find only small-to-medium effect sizes linking traumatic experiences and NSSI (e.g. Glassman et al., 2007; see Klonsky & Moyer, 2008 for a review of literature on NSSI and childhood sexual abuse). Design shortcomings exist as well, such as only assessing a single form of interpersonal trauma such as sexual abuse, only assessing childhood or intrafamilial trauma, failing to assess neglectful or invalidating family
environments in addition to overt abuse, or treating interpersonal trauma as a dichotomous event (either as having occurred or not) rather than accounting for other dimensions such as severity, age of onset, duration, or relationship to the perpetrator (Kaess et al., 2013; Wachter et al., 2009).

**Explaining the relationship between trauma and NSSI.** Several pathways have been proposed that could link interpersonal trauma and NSSI. First, interpersonal trauma is theorized to lead to NSSI by contributing to long-term emotion dysregulation (Arens, 2012; Paivio & McCulloch, 2004; Ullman, Peter-Hagene, & Relyea, 2014). Abusive and neglectful families often do not help children learn to recognize, label, tolerate, make effective use of, or modulate affect, leading to a deficit in these skills and associated habits (Linehan, 1993; Paivio & McCulloch, 2004). Accordingly, emotion regulation deficits (Adrian et al., 2011), emotional inexpressivity (Gratz, 2006), and alexithymia (Garisch & Wilson, 2010; Paivio & McCulloch, 2004) have mediated the relationship between trauma and the presence or frequency of NSSI, and emotion dysregulation has moderated the relationship between PTSD and NSSI frequency (Dixon-Gordon et al., 2014).

Interpersonal trauma has been linked to NSSI by PTSD symptoms. Etzel (2005) defined PTSD as “a diagnostic exemplar of experiential avoidance” (p. 1), linking the avoidance-related symptoms of the disorder such as avoiding trauma memories to the negative reinforcement properties of NSSI (see also Bentley et al., 2015 for a review of related literature). Similarly, depression, dissociative symptoms, and intense and labile affect are common in individuals with PTSD and other trauma-related difficulties, and have been shown to mediate the relationship between interpersonal trauma and NSSI (Baetens et al., 2015; Garisch & Wilson, 2010; Gratz, 2006; Muehlenkamp et al., 2011; Ullman et al., 2014). As well, in a chaotic and invalidating relational environment individuals – and especially children – may be unable to get their needs
met except through more extreme behaviours such as self-destructive acts, making it theoretically more likely that NSSI would be used to communicate with others (Linehan, 1993).

It is notable that interpersonal trauma has also sometimes been found to have a direct relationship to NSSI even when factors such as dissociation and emotion-regulation deficits are accounted for (Adrian et al., 2011; Baetens et al., 2015; Gratz, 2008; Wachter et al., 2009). In addition, although a model proposing multiplicative effects of emotional inexpressivity, affective intensity/reactivity, and childhood maltreatment significantly predicted frequency of NSSI, the model was much stronger at predicting that individuals with low levels of these variables would not engage in NSSI rather than that individuals with high levels of these variables would engage in NSSI (Gratz, 2006).

Interpersonal trauma is also theorised to lead to NSSI as a form of re-enactmentment of abuse (Wachter et al., 2009); a response to a belief that one is inherently bad or unworthy of care internalized as a response to serious or repeated trauma (Ullman et al., 2014; Weismoore & Esposito-Smythers, 2010); or a modeled association between care and pain or punishment that leads to a tendency to self-soothe in the same manner (Arens, 2012; Gallop, 2002). Glassman et al. (2007) explain the proposed link thus:

One possibility is that some people select NSSI due to the directly self-injurious nature of this behavior, and that they learn to do so via modeling of earlier abuse by others. In other words, individuals who are excessively criticized and verbally or emotionally abused may, over time, learn to engage in excessive self-criticism and use NSSI as a form of direct “self abuse” (p. 2484).

Thus, the aggressive, punishing quality of injuring oneself may be part of the reason for a trauma survivor’s engagement in NSSI (Glassman et al., 2007; Victor & Klonsky, 2014). In support of this hypothesis, various forms of interpersonal trauma have been found to relate to
NSSI mediated by difficulties such as low self-esteem (Muehlenkamp et al., 2011) and self-criticism (Baetens et al., 2015; Glassman et al., 2007; Weismoore & Esposito-Smythers, 2010) in both community and clinical samples of adolescents and young adults, with interpersonal trauma no longer independently predicting NSSI frequency when self-criticism or negative self-views are accounted for (Baetens et al., 2015; Weismoore & Esposito-Smythers, 2010).

Much of the research relating interpersonal trauma and NSSI has focused on using a history of interpersonal trauma to predict engagement in NSSI; however, not everyone who engages in NSSI has a history of interpersonal trauma. Given that interpersonal trauma experiences tend to be precursors to a distinctive constellation of intrapsychic and interpersonal difficulties (e.g. Ford & Courtois, 2009), the presence or severity of such experiences may help explain some of the heterogeneity in NSSI and in the presentations of those engaging in it. Some existing evidence suggests that NSSI in individuals affected by trauma may actually have different predictors and correlates than NSSI in individuals not suffering from trauma-related difficulties. Evren et al. (2011) studied NSSI in male alcohol-dependent inpatients with and without PTSD. They found that in those individuals without PTSD, NSSI was predicted by age at onset of regular alcohol use, history of suicide attempts, anxiety, depression, and somatisation. By contrast, only level of hostility predicted NSSI in participants with a diagnosis of PTSD. There is also some indication that trauma experiences may influence the functions of NSSI, with two studies finding that sexual abuse, emotional abuse, paternal antipathy, and paternal neglect were significantly related to endorsement of automatic functions, while physical abuse was significantly related to endorsement of just social or combined social and automatic functions (Kaess et al., 2013; Zetterqvist et al., 2014). Taken together, the preceding studies suggest that the context in which NSSI develops – and specifically trauma history – may influence the factors that motivate or maintain later NSSI (Zetterqvist et al., 2014). Existing
research has only begun to address whether the experience of interpersonal trauma may account for some of the variation in presentation between individuals who self-injure, and more research is needed to elucidate the specific ways this may occur.

Interpersonal trauma has been theorised to lead to NSSI via the development of emotion dysregulation, PTSD symptoms, and a proclivity toward negative self-views. There is some research support for these three theories, with less research to date investigating the role of negative self-views despite the frequency with which this theory is cited. Moreover, attempts have not been made to use interpersonal trauma to explain the prominence of self-punishment to NSSI for a large subset of individuals, despite the overlap between the self-punishment concept and the described trauma theories.

**Methodological Gaps in NSSI Research**

Along with theoretical gaps in NSSI research to date, the extant literature reflects several methodological gaps. Often, studies have not accounted for either the recency or frequency of NSSI behaviours in their samples (Armey & Crowther, 2008; Glassman et al., 2007; Heath et al., 2008; Muehlenkamp & Brausch, 2012), despite the fact that current findings suggest that these are important factors (Jacobson & Gould, 2007; Klonsky & Olino, 2008). As a result, self-injuring samples are often comprised of individuals who have only hurt themselves a few times (e.g. Anderson & Crowther, 2012; Brausch & Gutierrez, 2010; Paivio & McCulloch, 2004), or who have not engaged in NSSI within the past year or even longer (e.g. Muehlenkamp & Brausch, 2012), and sometimes there is no indication at all of when participants most recently hurt themselves (e.g. Heath et al., 2008; Paivio & McCulloch, 2004). Thus, it is difficult to clarify the relationships between NSSI and purportedly connected factors such as traumatic experiences or psychiatric symptoms, and self-report data on NSSI characteristics and functions may be based on memories from years earlier. More research is needed that clarifies the
temporal relationships between NSSI and its precedents and antecedents, and that targets individuals with current or recent NSSI experiences to reduce memory bias.

As noted above, NSSI presents with considerable heterogeneity not only in the behaviour itself but in the individuals who engage in it. However to date, most NSSI research has focused on predicting the presence or absence of NSSI and only a few studies have begun distinguishing subgroups or patterns based on such characteristics as NSSI functions and frequency and psychiatric and environmental risk factors such as trauma history (Anderson & Crowther, 2012; Evren et al., 2011; Jacobson & Gould, 2007; Klonsky & Olino, 2008; Washburn et al., 2010).

In addition, little research has incorporated questions or methodology that take account of repeated engagement in NSSI, despite its tendency to persist over months or years as an urge-driven behaviour. Instead, research on the functions of NSSI has tended to ask participants to generalize from what may be anything from a single incident of NSSI to sporadic acts of NSSI with varied precipitants, to daily NSSI over a period of years, without differentiation between individuals with different characteristics or between different NSSI incidents. As a result, several researchers have recommended experience sampling research that assesses the characteristics and correlates of NSSI on an ongoing basis in an individual’s natural environment – titled ecological momentary assessment (EMA; Adrian et al., 2007; Chapman et al., 2006; Cohen et al., 2015; Klonsky, 2009; Lloyd-Richardson et al., 2007; McKenzie & Gross, 2014; Muehlenkamp et al., 2009; Victor & Klonsky, 2014). Only a few studies to date have made use of such methodology, but those that exist demonstrate its feasibility with this population. Existing EMA studies are discussed below.

**Existing ecological momentary assessment research on NSSI.** An increasing number of EMA studies have been conducted in recent years regarding NSSI. These have generally
addressed the role of positive and negative emotion surrounding instances of NSSI (Armey et al., 2011; Bresin et al., 2013; Muehlenkamp et al., 2009; Snir et al., 2015), and less frequently interpersonal circumstances (Snir et al., 2015), NSSI functions (Snir et al., 2015; Nock et al., 2009), and trait characteristics such as rumination, emotion differentiation, and impulsivity (Bresin et al., 2013; Zaki et al., 2013); one study has also tracked emotion in participants with and without NSSI histories without assessing NSSI acts (Victor & Klonsky, 2014). Some studies have also reported findings on NSSI thoughts or urges (Bresin et al., 2013; Nock et al., 2009; Snir et al., 2015; Zaki et al., 2013), or on other self-destructive behaviours such as binge eating or substance abuse (Muehlenkamp et al., 2009; Nock et al., 2009), or have compared NSSI to suicidality (Nock et al., 2009).

The duration of existing studies has generally been one to three weeks, with data collection varying from a single time-point per day (Bresin et al., 2013; Victor & Klonsky, 2014; Zaki et al., 2013) to a combination of event-contingent (e.g. after an NSSI act) and signal contingent reporting comprising multiple time-points per day (Armey et al., 2011; Muehlenkamp et al., 2009; Nock et al., 2009; Snir et al., 2015), using electronic tools to collect data such as handheld computers and secure websites. Some studies have had low occurrence of NSSI acts during EMA, leading to the necessity of summing NSSI acts across participants (Muehlenkamp et al., 2009), only examining NSSI urges (Bresin et al., 2013), or conflating NSSI urges and acts for some analyses (Snir et al., 2015; Zaki et al., 2013) in order to maintain statistical power. Some studies also suffered from participant drop-out or incomplete data relative to the small sample sizes generally required in EMA for practical reasons (Bresin et al., 2013; Snir et al., 2015; Victor & Klonsky, 2014; Zaki et al., 2013). However, these methodological difficulties did not occur at greater rates than in EMA samples with other populations (e.g. Epstein et al., 2009; Freedman et al., 2006), and did not generally occur more
frequently in the clinical or more severe samples than in community or control samples. The highest compliance and instances of NSSI-related data were reported by Nock et al. (2009) despite a demanding research design with multiple surveys per day; all 30 adolescent participants completed the 14-day study, and 83.3% of participants completed all of the required entries. Over 85% of participants reported NSSI acts during the study and nearly 95% reported NSSI thoughts, with a total of 104 reported NSSI acts and 344 reported NSSI thoughts. It is notable that the large amount of usable NSSI-related data in this study may relate to the recency of NSSI relevance to the sample (all participants had engaged in NSSI in the past year and had experienced NSSI thoughts in the previous 2 weeks), and to the relatively high mean recent frequency of NSSI ($M = 113.4$ NSSI acts in the past year, $SD = 174.9$, range = 3 to 500).

Although many of the EMA studies on NSSI have noted methodological challenges, the instance of these is similar to EMA research in other populations and has been mitigated with the inclusion of assessment of NSSI urges as well as the focus on participants for whom NSSI is presently relevant. Moreover, they have provided invaluable opportunities to address real-time sequelae of NSSI as well as describing the variation in these sequelae within participants at different times. The present study makes use of similar methodology to address characteristics and functions related to both NSSI acts and urges in participants with a range of interpersonal trauma experiences, in order to describe and explain some of the heterogeneity in NSSI and in individuals who self-injure.

Overall, the above literature review demonstrated that there is considerable heterogeneity between self-injuring individuals on characteristics such as age, psychiatric severity, and ethnocultural background as well as in NSSI characteristics such as methods, frequency, and severity; moreover, preliminary evidence was provided for different typologies of individuals who self-injure. Explanatory models of NSSI were detailed, and it was
highlighted that although these have aimed to address the functions NSSI serves, they have not accounted for the full range of reported NSSI functions. Moreover, the self-punishment function has largely been unaddressed despite its relevance to a majority of individuals who self-injure. The mixed findings regarding interpersonal trauma experiences and NSSI were described, including the existing theories and empirical findings regarding how trauma relates to NSSI; despite the common suggestion that interpersonal trauma experiences explain the importance of the self-punishment function of NSSI, this hypothesis has not been investigated. As well, some evidence was provided for overall different trajectories of NSSI among survivors of trauma, but it was noted that little research has addressed trauma as a possible factor in explaining variation in NSSI. Finally, methodological gaps in NSSI research were discussed, and newer studies that focus on experience sampling were described as a possible means of addressing these gaps. The aims of the present study are described below.

**The Present Study**

The present study serves several aims. These are each explained in turn below, followed by a list of the specific research questions addressed by this study.

Although a large body of research predicts the presence of lifetime or repeated NSSI, the diversity of NSSI characteristics and of the presentations of individuals who self-injure has only begun to be addressed. The present paper proposes that given the heterogeneity of NSSI, development of accurate and complete NSSI theory requires determination of how individuals who self-injure differ from each other considering such factors as NSSI functions, environmental stressors, and NSSI frequency. The literature indicates that a history of interpersonal trauma is important to the presence of NSSI, but also that a sizable portion of individuals who self-injure report no discernible trauma history – and some preliminary research suggests the relevance of different explanatory models of NSSI for individuals with and without
trauma histories. One aim of the present research was to examine whether interpersonal trauma severity relates to basic characteristics such as NSSI frequency and self-injuring individuals’ demographic information.

Similarly, a growing body of research points to the potential importance of NSSI functions in differentiating groups of individuals who self-injure, and endorsement of various NSSI functions has demonstrated considerable heterogeneity. However, much research examining the functions of NSSI has focused on a single function of interest (such as affect regulation) or has grouped the functions based on their posited automatic or social role; few studies have considered the differential relevance of individual functions. Moreover, the differential relevance of some NSSI functions for trauma survivors is suggested by the common occurrence of related symptoms after trauma (e.g. dissociation, affect dysregulation, interpersonal difficulties). The present research considers the self-reported relevance of various NSSI functions, with particular attention to whether these correlate with the severity of self-injuring individuals’ interpersonal trauma history.

Notably, although self-punishment is the second-most-endorsed function of NSSI, it has only received brief, cursory explanation in existing literature. Importantly, self-punishment may represent a reason why some individuals choose to regulate their affect with NSSI rather than via less auto aggressive coping methods. Theory posits a link between self-punishment and NSSI in survivors of interpersonal trauma, but this link has not been examined empirically despite evidence that related concepts such as self-criticism mediate or moderate the relationship between interpersonal trauma and lifetime NSSI. The present research investigates whether the strength of endorsement self-punishment receives correlates with self-injuring individuals’ interpersonal trauma severity.
Finally, the present study seeks to add to the new body of research accounting for the repeated, often urge-driven pattern of NSSI, and to add to the data drawn from individuals for whom NSSI is presently relevant. These methodological gaps were addressed using an EMA design in which participants responded to daily questionnaires that addressed both NSSI acts and urges. This experience sampling method allowed for participants’ experience to be recorded before it could be distorted by the passage of days or weeks, and provided a more nuanced representation than if participants only generalized about their experience as a whole (Freedman et al., 2006; Tournier et al., 2003). The present study included description and analyses to investigate the possible added value of conducting EMA research with regarding NSSI in addition to or instead of cross-sectional research, as well as further validation of the methodology.

The present study addressed the following research questions:

1. Do characteristics of the demographic profiles (e.g. age, diagnosis, past and current use of mental health services), NSSI behaviour (e.g. age of onset, frequency, number of methods) or NSSI urges (e.g. frequency, severity) of self-injuring young adults correlate with interpersonal trauma severity?

2. Does the self-reported relevance of any of the individual NSSI functions correlate with interpersonal trauma severity?

3. Does the self-reported relevance of the self-punishment function of NSSI in particular positively correlate with interpersonal trauma severity?

4. Do real-time data on NSSI behaviours, urges, and functions reflect retrospective generalized self-report data as collected at the initial time-point?

Given the relatively new use of experience sampling regarding NSSI acts, urges, and functions, considerable attention will be paid to describing the sample and the EMA findings;
detailed description will be reported at the beginning of the Results section prior to addressing the four research questions.

The methodology used to address these questions is outlined below.
Chapter 3: Method

Participants

Forty young adults recruited from the community participated in the present study; full demographic data are displayed in Table 1. The initial sample included 35 females, four males, and one participant who declined to report a gender. One male participant was removed from analyses because debrief questions at the end of the study revealed that he did not meet inclusion criteria; analyses were conducted on the other 39 participants. The decision was made to retain the other non-female participants in analyses because although their NSSI characteristics differed somewhat from female participants (discussed below in Results), removing the non-female participants did not impact the direction of the results.

Participants’ ages ranged from 18 to 30 ($M = 21.79; SD = 2.68$), with 43.6% ($n = 17$) either 21 or 22 years of age. In line with past research indicating that NSSI is more common among people of minority sexual orientations, 45.9% ($n = 17$) of the sample identified with an orientation other than heterosexual or “straight.” Reflective of the diversity of the city where the research took place (Toronto, Canada) and of past research indicating that NSSI is common across individuals from different ethnocultural backgrounds, 43.6% ($n = 17$) of the sample identified with backgrounds other than European and 56.4% ($n = 22$) identified with solely European origins. Overall, the sample was highly educated: All participants indicated that the highest level of education attained included at least some university. Over 3/4 of participants were university students in an undergraduate or postgraduate degree at the time of study participation, which is likely reflective of the target age range of the study as well as the high occurrence of NSSI among university students in both American (e.g. Arens, 2012; Nelson & Muehlenkamp, 2012) and Canadian samples (e.g. Goldstein et al., 2009).
Table 1.

*Demographic Description of the Sample*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
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<tr>
<td>Female</td>
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<td>Male</td>
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<tr>
<td>Sexual orientation</td>
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<td></td>
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<tr>
<td>Heterosexual</td>
<td>22</td>
<td>56.41</td>
</tr>
<tr>
<td>Homosexual</td>
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<td>7.69</td>
</tr>
<tr>
<td>Bisexual</td>
<td>6</td>
<td>15.38</td>
</tr>
<tr>
<td>Queer</td>
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</tr>
<tr>
<td>Pansexual</td>
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<td>12.82</td>
</tr>
<tr>
<td>Heteroflexible</td>
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<td>2.56</td>
</tr>
<tr>
<td>Asexual</td>
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<td>2.56</td>
</tr>
<tr>
<td>Ethnocultural background</td>
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<td></td>
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<tr>
<td>European</td>
<td>22</td>
<td>56.41</td>
</tr>
<tr>
<td>East Asian</td>
<td>6</td>
<td>15.38</td>
</tr>
<tr>
<td>South Asian</td>
<td>3</td>
<td>7.69</td>
</tr>
<tr>
<td>African</td>
<td>1</td>
<td>2.56</td>
</tr>
<tr>
<td>South/Central American</td>
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<td>2.56</td>
</tr>
<tr>
<td>Mixed</td>
<td>6</td>
<td>15.38</td>
</tr>
<tr>
<td>European/East Asian</td>
<td>3</td>
<td>7.69</td>
</tr>
<tr>
<td>East Asian/South Asian</td>
<td>1</td>
<td>2.56</td>
</tr>
<tr>
<td>European/South-Central American</td>
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<td>2.56</td>
</tr>
<tr>
<td>South Asian/North African-Middle East</td>
<td>1</td>
<td>2.56</td>
</tr>
<tr>
<td>Highest level of education completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some university</td>
<td>30</td>
<td>76.92</td>
</tr>
<tr>
<td>University degree</td>
<td>7</td>
<td>17.95</td>
</tr>
<tr>
<td>Some postgraduate school</td>
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<td>2.56</td>
</tr>
<tr>
<td>Postgraduate degree</td>
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<td>2.56</td>
</tr>
<tr>
<td>Occupation</td>
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<tr>
<td>Postsecondary student</td>
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<td>76.92</td>
</tr>
<tr>
<td>Unemployed</td>
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<td>5.13</td>
</tr>
<tr>
<td>Social services</td>
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</tr>
<tr>
<td>Retail</td>
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</tr>
<tr>
<td>Designer</td>
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<td>2.56</td>
</tr>
<tr>
<td>Administrative</td>
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<td>2.56</td>
</tr>
<tr>
<td>Bartender</td>
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<td>2.56</td>
</tr>
<tr>
<td>Relationship status</td>
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<td></td>
</tr>
<tr>
<td>Single &amp; never married</td>
<td>21</td>
<td>53.85</td>
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<tr>
<td>Committed relationship</td>
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<td>35.90</td>
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<tr>
<td>Commonlaw relationship</td>
<td>2</td>
<td>5.13</td>
</tr>
<tr>
<td>Married</td>
<td>2</td>
<td>5.13</td>
</tr>
</tbody>
</table>
Eight of these students indicated that they were also employed. The majority of participants (53.8%; \( n = 21 \)) reported that they were not in a relationship at the time of the study and had never been married.

Participants were asked about their past and current use of mental health services, as well as any psychiatric diagnoses that had been communicated to them (Table 2).

Table 2.

<table>
<thead>
<tr>
<th>Mental Health History</th>
</tr>
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<tbody>
<tr>
<td>Characteristic</td>
</tr>
</tbody>
</table>

**Past mental health treatment**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>( n )</th>
<th>( % )</th>
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</thead>
<tbody>
<tr>
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<td>84.62</td>
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<tr>
<td>Individual therapy</td>
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<td>82.05</td>
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<tr>
<td>Psychiatric medication</td>
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<tr>
<td>Group therapy</td>
<td>9</td>
<td>23.08</td>
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<tr>
<td>Peer support program</td>
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<td>17.95</td>
</tr>
<tr>
<td>Hospital day program</td>
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<td>2.56</td>
</tr>
</tbody>
</table>

**Current mental health treatment**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>( n )</th>
<th>( % )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any treatment</td>
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<td>41.03</td>
</tr>
<tr>
<td>Individual therapy</td>
<td>10</td>
<td>25.64</td>
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<tr>
<td>Psychiatric medication</td>
<td>11</td>
<td>28.21</td>
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<tr>
<td>Group therapy</td>
<td>2</td>
<td>5.13</td>
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<tr>
<td>Peer support program</td>
<td>2</td>
<td>5.13</td>
</tr>
<tr>
<td>Hospital day program</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Diagnosis (self-report)**

<table>
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<tr>
<th>Characteristic</th>
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<th>( % )</th>
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<td>41.03</td>
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<tr>
<td>Generalized Anxiety Disorder</td>
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<td>Obsessive-Compulsive Disorder</td>
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<td>Panic Disorder</td>
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<tr>
<td>Social Anxiety Disorder</td>
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<td>2.56</td>
</tr>
<tr>
<td>Posttraumatic Stress Disorder</td>
<td>2</td>
<td>5.13</td>
</tr>
<tr>
<td>&quot;Anxiety Disorder&quot;</td>
<td>4</td>
<td>10.26</td>
</tr>
<tr>
<td>Major Depressive Disorder</td>
<td>8</td>
<td>20.51</td>
</tr>
<tr>
<td>Dysthymic Disorder</td>
<td>1</td>
<td>2.56</td>
</tr>
<tr>
<td>Attention Deficit/Hyperactivity Disorder</td>
<td>2</td>
<td>5.13</td>
</tr>
<tr>
<td>Eating Disorder</td>
<td>1</td>
<td>2.56</td>
</tr>
</tbody>
</table>

The vast majority of participants had accessed some kind of mental health service in the past (84.62%; \( n = 33 \)), and just over 40% of participants were also accessing mental health services at the time of their study participation; individual psychotherapy and psychiatric medication
were the most common forms of treatment both historically and at the time of the study. Just over 40% \((n = 16)\) of participants reported that at least one psychiatric diagnosis had been communicated to them, and nine of these participants reported two or more diagnoses. Anxiety disorders and mood disorders were the most common diagnoses, reported by 13 and nine participants respectively. Family doctors were the most common sources of diagnosis, for eight participants, followed by Psychiatrists \((n = 7)\) and Psychologists \((n = 4)\).

**Procedure**

**Recruitment.** Recruitment involved the distribution of study notices, both electronically (Appendix L) and in hard copy (Appendix M). Hard-copy recruitment notices were posted at locations frequented by young adults such as university campuses, and locations such as medical and outpatient mental health clinics where individuals who self-injure may be receiving care. Electronic recruitment notices were posted on social media websites such as Craigslist and Kijiji, as well as the websites and Facebook pages for university associations and mental health clinics and organizations.

Individuals interested in study participation contacted the researcher by phone or email for more information. Prior to inclusion in the study all potential participants responded to screening questions by telephone (Appendix D). Inclusion criteria were:

1. Ages 18 to 30,
2. Lifetime NSSI frequency of at least five occurrences (to select for repetitive NSSI),
3. Having experienced at least two self-reported urges to self-injure during the past month (to ensure current relevance of the behaviour and increase likelihood of observing NSSI urges or acts during the study period),
4. Regular access to a private email account (to allow for confidential online completion of measures)
5. Access to a medical or mental health professional the participant could contact as-needed for support, and
6. Identification of a medical/mental health professional or other trusted adult and consent given for the researcher to contact this person in case of medical emergency.

Exclusion criteria were:
1. Self-reported diagnosis of psychotic or personality disorder communicated to the individual by a licensed mental health professional (Psychologist or Psychiatrist),
2. History of suicide attempt(s), and

The purpose of these exclusion criteria was to delineate a higher-functioning community sample appropriate for participation in a daily online research protocol including standard measures to assist participants in crisis (obtaining emergency contact information, providing a list of community resources), but without more intensive supports for monitoring and assistance of higher-risk individuals.

**Initial time-point: In-person meeting.** Each participant attended an in-person meeting which began with a reiteration of the study rationale, protocol, and limits of confidentiality (Appendix A). Participants were given a resource list (Appendix C), and they provided signed consent as well as emergency contact information as outlined above and in Appendix B.

The measures completed at the initial time-point included demographic and relevant background information (e.g. education level, employment, age; Appendix E) and measures of NSSI history (ISAS – Section 1, Appendix F), NSSI functions (ISAS – Section 2, Appendix F), NSSI urge severity in the previous week (ABUSI, Appendix G), and interpersonal trauma history (TEC, Appendix H). All participants who attended the in-person meeting provided signed consent and completed all initial-time-point measures.
Following completion of the measures, participants were instructed in the daily survey protocol and created an identification code to facilitate within-participant data tracking. Participants also determined a preferred daily time to complete the survey when the participant would have time and privacy to do so and support services would be easily accessible.

Ecological momentary assessment protocol. Participants completed a brief survey at approximately the same time each day for 21 consecutive days in which they reported on their experience of NSSI urges or acts in the previous 24 hours. In order to access the survey, participants used either a permanent web-link provided to them at the in-person meeting or a web-link included in a daily reminder email. Data were collected via a secure website that participants accessed on their own preferred electronic device(s). This mode of data collection was selected in order to avoid reported difficulties with more commonly-used EMA tools such as Personal Digital Assistants or paper-and-pencil methods, such as the need for regular meetings with participants to download data, or the inability to track exactly when measures were completed (Epstein et al., 2009; Freedman et al., 2006; Moskowitz & Young, 2006).

All participants who attended the in-person meeting completed the EMA portion of the study. The mean number of missed surveys over the 21-day EMA period was 0.49 (SD = 0.85), and all participants completed at least 18 of the 21 daily surveys. Nearly 70% (n = 27) of the total sample completed the study with no missed surveys.

The survey began with instructions followed by yes/no questions inquiring whether the participant had engaged in NSSI within the previous 24 hours and if not, whether the participant had experienced the urge to engage in NSSI in the previous 24 hours (Appendix I). If the participant reported engaging in NSSI there were follow-up questions regarding the number of times NSSI was engaged in and the method(s) used (Appendix I). If the participant reported either NSSI acts or urges, they then completed a measure of NSSI urge severity (modified
ABUSI, Appendix J), and a measure of the relevance of NSSI functions relevant to that 24-hour period (modified Section 2 of the ISAS, Appendix K). All participants reported at least one NSSI urge or act during EMA; 16 participants reported at least one NSSI act. There was very little missing data for any of the submitted surveys and all participants and variables were retained for analyses except as described below in the Data Analysis section.

**Debrief interview.** Following the 21-day data-collection period, 69% (n = 27) of the participants chose to participate in an optional debrief interview either in person or by phone to allow for the collection of qualitative feedback about study participation (Appendix N).

**Measures**

**NSSI history.** NSSI history was assessed using Section 1: Behaviours of the Inventory of Statements About Self-Injury (ISAS), a brief self-report measure (Klonsky & Olino, 2008; Appendix E). Section 1 assesses lifetime frequency and methods of NSSI as well as other characteristics such as whether the individual self-injures alone or with other people, whether physical pain is experienced during NSSI, and whether the individual wants to stop engaging in NSSI. It comprises short-answer and multiple choice questions. Section 1 of the ISAS has demonstrated good reliability and validity (internal consistency of the 12 NSSI methods: α = 0.84; test-retest reliability: median Spearman correlation = .74; Klonsky & Olino, 2008). Both Section 1 and Section 2 (discussed below) of the ISAS have demonstrated strong correlations with related constructs based on established measures (Klonsky & Glenn, 2009; Klonsky & Olino, 2008). The original version of Section 1 was used to assess NSSI history at the initial timepoint, and a modified version of Section 1 addressing the previous 24 hours rather than lifetime NSSI was created (Appendix I) to assess NSSI behaviours engaged in during EMA.

**NSSI functions.** Individuals who self-injure report that NSSI serves multiple functions that may reinforce the behaviour. In the present study the self-reported relevance of each of the
NSSI functions was assessed using Section 2: Functions of the ISAS (Appendix E). Section 2 is comprised of a list of 39 statements representing 13 common functions of NSSI that individuals can endorse on a 3-point scale, where higher scores indicate higher relevance for that individual. The 13 functions measured are: affect regulation (reducing distressing emotions), interpersonal boundaries (demonstrating and establishing boundaries between oneself and others), self-punishment (punishing or expressing anger and disgust at oneself), self-care (caring for oneself by treating the physical injury), anti-dissociation (creating physical sensation to eliminate a sense of derealization and/or depersonalization), anti-suicide (stopping or avoiding suicidal thoughts), sensation-seeking (generating excitement or exhilaration through pushing one’s limits), peer bonding (bonding or fitting in with others), interpersonal influence (seeking interpersonal support and/or communicating distress), toughness (testing and/or demonstrating strength), marking distress (creating a physical representation of emotional distress), revenge (getting revenge against someone), and autonomy (demonstrating or establishing independence).

Each of the functions receives a relevance scale score between 0 and 6 that is comprised of three of the item scores; participants can endorse as many functions as are relevant to them. Section 2 of the ISAS has demonstrated good reliability and validity (Klonsky & Glenn, 2009). The original version of Section 2 was used in the study’s initial interview to assess NSSI functions overall and historically. A modified version of Section 2 addressing the previous 24 hours rather than lifetime NSSI was used to assess the relevance of each function to particular NSSI urges and acts during EMA (Appendix K).

**NSSI urges.** The present study tracked the occurrence, severity, and functions not only of NSSI acts, but also NSSI urges – meaning the consciously noted urge to engage in NSSI. The severity of NSSI urges was assessed using The Alexian Brothers’ Urge to Self-Injure Scale (ABUSI; Washburn, Juzwin, Styer, & Aldridge, 2010; Appendix G), a brief self-report measure
that uses forced-choice questions to assess ease of resisting, frequency, and strength of the urge to engage in NSSI as well as time spent thinking about NSSI over a 1-week period. Responses are on a 7-point scale with a maximum total score of 30; higher scores reflect more intense urges to engage in NSSI. The ABUSI is based on the Penn Alcohol Craving Scale (e.g. Flannery et al., 2003). In preliminary studies of its psychometric properties, the ABUSI demonstrates adequate internal consistency ($\alpha = 0.92$ at admission and $\alpha = 0.96$ at discharge), test-retest reliability (interclass correlation coefficient = .84), sensitivity to change, and convergent, incremental, and predictive validity (Washburn, Juzwin, Styer, & Aldridge, 2010). The original ABUSI was used in the study’s initial time-point. A modified version of the ABUSI addressing the previous 24 hours was created for collection of daily data (Appendix J).

**Interpersonal trauma.** Participants in the present study were asked about their self-reported history of interpersonal trauma – meaning potentially-traumatic experiences directly perpetrated by another person(s), such as various forms of abuse, assault, harassment, and neglect (DePrince, Combs, & Shanahan, 2009; Nilsson, Gustafsson, & Svedin, 2012; Stein et al., 2006). Interpersonal trauma is often differentiated from potentially-traumatic experiences not directly perpetrated by another person(s) such as accidental injury or natural disaster, and this distinction is relevant to theories about the relationship between trauma and NSSI. In the present study, interpersonal trauma history was reported on the Traumatic Experiences Checklist (TEC; Nijenhuis, Van der Hart, & Kruger, 2002; Appendix H). The TEC is a brief self-report measure of lifetime experience of 29 types of potentially traumatic experiences, such as abuse, sexual harassment, emotional neglect and dysfunctional family environments, physical assault, war, and life-threatening disease. The individual questions assess whether each event occurred, as well as other characteristics of the event such as duration, age of onset, and relationship to the perpetrator (when applicable). Each individual question also involves rating the current level of
traumatic stress associated with the event. The TEC demonstrates good internal consistency (Cronbach’s α for the first administration of the TEC was 0.86, and 0.90 for the TEC retest) and test-retest reliability ($r = .91$), and there is support for its criterion validity and concurrent validity (Nijenhuis, Van der Hart, & Kruger, 2002). The TEC includes a numerical developmental trauma severity score regarding solely interpersonal trauma, which accounts for the occurrence, age of onset, duration, impact, and relationship to the perpetrator for each of five types of interpersonal trauma occurring up to the age of 18 (emotional abuse, emotional neglect, physical abuse/assault, sexual abuse/assault, and sexual harassment). Since the present study included several participants reporting significant interpersonal trauma occurring after the age of 18 which theoretically could influence NSSI behaviours, a modified trauma severity score was created which applied the same scoring criteria to young adulthood.

**Data Analysis**

**Preparation and description of data from the initial time-point.** Data collected at the initial time-point – the in-person meeting – were analysed and are reported first. Prior to initial data analysis, a total ABUSI score was calculated to represent NSSI urge severity in the week prior to the study, and scale scores were calculated for each of the 13 NSSI functions on the ISAS to represent the self-reported relevance of each function to the participant’s overall NSSI engagement. In addition, the TEC score for developmental trauma severity was calculated, and modified (referred to hereafter as TECMod score) to include a category for trauma experienced in young adulthood (between age 18 and study participation); the TECMod score is used in all analyses to represent interpersonal trauma severity. Qualitative responses regarding NSSI methods were examined for consistency with the study’s definition of NSSI; all reported NSSI using methods that corresponded with the study’s definition were summed to create a total historical NSSI frequency variable. Drug use, which was included by one participant as an NSSI
method, was not included in historical NSSI frequency as the harm caused is not necessarily acute, and there is no direct tissue damage. All variables of interest were examined for departures from normality. The TECMod score was negatively skewed; examining the spread of individual TECMod scores revealed a single extreme outlier with a score of 60 (the range otherwise was 0 to 44), and this score was winsorized.

A two-step cluster analysis on ISAS function relevance scores was conducted to investigate whether participants could be grouped solely based on profiles of their relevance scores on the ISAS function scales; however, results did not support separating the participants into clusters based on groups of function scores, and the function relevance scales are addressed separately throughout the remainder of analyses.

Initial descriptive data analyses including means, frequencies, and examination of graphical representations of data were conducted on variables of interest assessed at the initial time-point, and the results are described below.

**Preparation and description of data from EMA.** The next stage of data analysis involved description of data collected during EMA. Scores were calculated on the modified version of the ABUSI (referred to hereafter as ABUSIMod score) to represent urge severity for each NSSI urge/act day (referring to a day when either NSSI urges or acts were reported) during EMA, and mean ABUSIMod scores were calculated for each participant to represent mean urge severity over each of the 3 weeks as well as across the entire study. Qualitative responses regarding NSSI methods used during EMA were examined for fit with the study’s definition of NSSI, and reported NSSI instances involving methods not fitting the study’s definition were removed from the data.

NSSI function scale scores were calculated for each NSSI urge/act day to represent the self-reported relevance of each of the 13 functions to each instance of NSSI urges or acts. One
participant who reported NSSI as occurring once during EMA but did not score any of the functions as relevant has been removed from analyses concerning the NSSI functions in this section, which are conducted on the remaining 38 participants. Since the peer-bonding function was only endorsed a single time by one participant, this function was removed from all analyses involving EMA data. Since NSSI function relevance scores fluctuated over time during EMA, hierarchical linear modelling was conducted for each function to investigate whether the fluctuations matched a pattern. Modelling treated each time-point as a dummy variable in order to avoid assuming the presence of a linear pattern. Results indicated that the fluctuations did not generally follow a pattern, meaning that they simply represent nuances in the overall relevance of a given function. As a result, mean daily function relevance scores across each participant’s NSSI urge/act days were calculated to represent how relevant each participant considered each function to be in all further analyses regarding the EMA data. Descriptive comparison was conducted between mean function relevance scores for NSSI urge days and act days, and as there were no systematic differences, NSSI urge/act days are considered together for all analyses involving the NSSI functions.

All variables of interest assessed during EMA were analysed descriptively including means, frequencies, and graphical representations of the data, with particular attention paid to describing variation over time. The results are reported below.

Analyses addressing the first research question. To address the first research question, the variables of interest were separated into categorical and continuous variables for separate analyses. An extreme outlier with reported historical NSSI frequency of over 60,000 was removed from all analyses involving NSSI frequency. The following dichotomous variables were created based on the distribution of responses in the present study and on common groupings in the extant literature: sexual orientation (heterosexual and non-heterosexual),
diagnosis (any diagnosis and no diagnosis), past treatment (any past treatment and no past treatment), current treatment (any current treatment and no current treatment), pain during NSSI (always experience pain and sometimes experience pain), social context during NSSI (always alone during NSSI and sometimes alone during NSSI), time between NSSI urges and acts (less than one hour and more than one hour), desire to stop NSSI (want to stop and do not want to stop), and whether participants reported engaging in NSSI during EMA (any or none). Due to the very large range of the historical NSSI frequency variable, a three-level categorical variable was also created to represent historical NSSI frequency in low (n = 12; range = eight to 51 NSSI acts), medium (n = 13; range = 52 to 300 NSSI acts), and high (n = 13; range = 301 to 3,245 NSSI acts) NSSI groups based on comparable group size. As a first step, data were examined graphically and with crosstabs, followed by correlation analyses (point-biserial correlations for the dichotomous variables and Spearman’s rho for the group representing NSSI frequency).

The continuous variables explored in terms of their relationship to interpersonal trauma severity were participant age at the time of the study, participant age when first engaging in NSSI, number of endorsed NSSI methods, historical NSSI frequency, number of NSSI functions endorsed at the initial time-point, NSSI urge severity in the week prior to study outset (ABUSI score), number of NSSI functions endorsed during EMA, mean NSSI urge severity during EMA (mean ABUSIMod score), number of days during EMA when NSSI urges were reported (referred to as NSSI urge days), number of days during EMA when NSSI acts were reported (referred to as NSSI act days), and number of combined NSSI urge/act days reported. Descriptive analysis was conducted on the continuous variables of interest, followed by calculation of Pearson’s correlation between the continuous TECMod score and each continuous variable. A multiple linear regression analysis was conducted predicting TECMod score using
those continuous predictors that met the appropriate assumptions and in consideration of the sample size.

**Analyses addressing the second research question.** To address the second research question, a correlation matrix was created with the 12 mean function relevance scores from the EMA portion of the study and the TECMod score. In consideration of the number of predictors appropriate to the sample size, those functions which were significantly correlated with TECMod score and not correlated with each other were then used to predict TECMod score in a multiple linear regression analysis. An additional stepwise multiple linear regression was conducted to control for factors that were shown to predict TECMod score in the first research question.

**Analyses addressing the third research question.** To address the third research question, the overall endorsement of self-punishment was analysed descriptively and then described in conjunction with the results from the analyses in the second research question. In addition, exploratory correlation analyses were conducted to identify possible relationships between mean initial and EMA self-punishment scores and other variables relevant to NSSI: Pearson’s correlation analyses were conducted with several continuous variables (age, number of NSSI methods, NSSI frequency, age of first engagement in NSSI, ABUSI score, mean ABUSIMod score, number of urge/act days during EMA, and the number of NSSI functions endorsed both initially and during EMA), and point biserial correlation analyses were conducted with several dichotomous variables (sexual orientation, past and current use of mental health services, presence of a psychiatric diagnosis, pain during NSSI, social context of NSSI, desire to stop engaging in NSSI, amount of time between NSSI urges and acts, and engagement in NSSI during EMA).
Analyses addressing the fourth research question. Analyses addressing the fourth research question are categorized as those addressing: 1. The concordance between the NSSI methods reported at the initial time-point and those used during EMA, 2. The concordance between NSSI urge data reported on the ABUSI at the initial time-point and information collected about NSSI urges on the ABUSIMod during EMA, and 3. The concordance between NSSI function relevance scores at the initial time-point and during EMA.

1. Crosstabs and chi-square analyses were used to explore whether use of an NSSI method during EMA corresponded to its use prior to study participation. Frequencies were calculated to determine whether participants had used NSSI methods during EMA that they had labeled at the initial time-point as a “main method,” and methods that had the highest historical frequency. Point biserial correlations were conducted between historical frequency for each NSSI method and whether or not it was used during EMA.

2. Pearson’s correlation was calculated between ABUSI scores, mean ABUSIMod scores, and the number of NSSI urge/act days reported during EMA. In order to investigate consistency in the self-reported strength of NSSI urges between the initial time-point and each of the 3 weeks of EMA, a repeated-measures Friedman’s ANOVA was conducted comparing the response to the ordinal ABUSI question “At the most severe point, how strong was your urge to self-injure in the last week?” to the highest response in each of the 3 EMA weeks for the corresponding ABUSIMod question which uses the same scale (“At the most severe point, how strong was your urge to self-injure in the last 24 hours?”) as a representation of the most severe urge in a given week. Dunn-Bonferroni pairwise comparisons were used to identify the location of significant differences.

3. Peer bonding was removed from all of the analyses in this section due to only four endorsements at the initial time-point and one endorsement during EMA. The range of function
scores during EMA were examined graphically for each participant in conjunction with their function scores at the initial time-point, and these results are described. Additionally, Pearson’s correlation analyses were conducted between each function’s scale score at the initial time-point and its mean scale score from EMA. Finally, the frequency with which each function was endorsed during EMA was considered in relation to its endorsement at the initial time-point.
Chapter 4: Results

Initial Time-Point: Description of the Data

In this section, description of the data collected at the initial time-point is detailed. Participants’ trauma histories are described first, followed by their historical engagement in NSSI, the severity of their NSSI urges in the week prior to the study, and the relevance of each of the 13 NSSI functions to their overall experience of NSSI.

Trauma history. Participants’ trauma histories are described below including the overall trauma severity score (TECMod score), the types of trauma participants reported experiencing (including emotional neglect, emotional abuse, physical abuse/assault, sexual abuse/assault, and sexual harassment), as well as the ages at which trauma occurred and the relationships of the perpetrators to the participants.

Participants in the present study reported a range of trauma experiences. The TECMod score ranged from 0 to 44 (\(M = 16.92, \ SD = 12.43\)), and all but two participants endorsed at least one experience of interpersonal trauma. It is notable that no non-female participants had TECMod scores in the highest third of scores; this is most likely accounted for by the fact that no non-female participants endorsed having experienced sexual abuse/assault or harassment, which tended to co-occur with other trauma types resulting in higher severity scores.

Nearly 80% \((n = 29)\) of participants reporting trauma experiences endorsed more than one type of trauma; beyond that, trauma types, duration, and perpetrators varied widely. Participants endorsed having experienced a mean of 2.62 types of trauma \((SD = 1.44; \ max = 5, \ min = 0)\), with 48.7% \((n = 19)\) endorsing two or fewer types of trauma and 51.3% \((n = 20)\) endorsing three to five types of trauma. The breakdown of participants’ trauma histories based on type of trauma as well as participants’ relationships with trauma perpetrators is displayed in Table 3.
Emotional abuse and neglect were the most-endorsed trauma types (endorsed by 79.49% and 61.54% of participants respectively), but each of the five trauma types were endorsed by at least a third of participants. Parents were the most common perpetrators of emotional abuse and neglect, and parents and strangers were the most common perpetrators of physical traumas. Friends, peers, and romantic/sexual partners were the most common perpetrators of sexual abuse/assault, and strangers and non-family adults such as teachers or parents’ friends were the most common perpetrators of sexual harassment.

The trauma experiences participants reported tended to begin in childhood and continue over a number of years; the breakdown of participants’ endorsement of each trauma type by the developmental stages at which they were experienced is displayed in Table 4. Emotional and physical traumas had the highest occurrence between ages 7 and 18, and sexual abuse/assault and harassment had the highest occurrence in both the teenage years and in young adulthood.

### Table 3.
**Number of Participants Reporting Each Trauma Type and Perpetrator Type**

<table>
<thead>
<tr>
<th>Trauma type</th>
<th>% of sample</th>
<th>Any perpetrator</th>
<th>Extended family</th>
<th>Trusted adult</th>
<th>Sibling</th>
<th>Friend</th>
<th>Peer/sexual partner</th>
<th>Work/colleague</th>
<th>Stranger/violent crime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neglect</td>
<td>24 (61.54)</td>
<td>21</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>31 (79.49)</td>
<td>16</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>18 (46.15)</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>15 (38.46)</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Sexual harassment</td>
<td>14 (35.90)</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Note. Participants could report more than one perpetrator type for each trauma type; 'Any perpetrator' represents the number of participants who endorsed each trauma type, regardless of perpetrator. 'Trusted adult' includes non-familial adults in authority positions, such as teacher, family friend, or coach.
**NSSI history.** Participants’ NSSI histories are described in a number of ways, including the age at which they first engaged in NSSI, the overall historical frequency of their NSSI, the number of NSSI methods participants’ had used as well as the frequency with which each method was used, and how recently participants had engaged in NSSI prior to this study. As well, participants were asked to generalize about several other characteristics of their NSSI experiences including their experience of pain during NSSI, the social context of their NSSI, the amount of time usually elapsing between NSSI urges and acts, and whether or not they want to stop engaging in NSSI.

Consistent with past research the mean age of first engagement in NSSI was 13.00 (SD = 3.50), and 66.6% (n = 26) of participants began hurting themselves between ages 12 and 16. It is notable that non-female participants had relatively lower age of first NSSI: The only three participants who reported beginning NSSI between ages 4 to 6 were male or did not report a gender. If only female participants are considered, the mean age of first NSSI was 13.71 (SD = 2.73).

The total estimated number of previous instances of NSSI varied widely, ranging from eight to over 60,000. Even when an extreme outlier was removed from this variable the mean number of previous NSSI instances was not an informative representation of central tendency due to a very large range and standard deviation (n = 38; M = 407.37; SD = 675.12; min = 8,
max = 3,245). The breakdown of participants’ self-reported historical NSSI frequencies is displayed in Figure 1. Nearly 30% of participants estimated having engaged in NSSI fewer than 50 times \((n = 11)\); however, over 1/4 of participants also estimated having engaged in NSSI 500 or more times \((n = 10)\).

![Figure 1](image_url)

*Figure 1.* Boxplots representing the spread of the NSSI function scale scores at the initial time-point.

All participants except for five endorsed having used more than one method of NSSI. The mean number of methods was 5.15 (SD = 2.80), ranging from one to 11. Descriptive data on the use of each NSSI method are reported in Table 5. Cutting was the NSSI method that had been used at least once by the greatest number of participants – by 81.18% of the sample \((n = 34)\) – but all of the NSSI methods listed on the ISAS had been used by at least three participants. Cutting was also the NSSI method with the highest reported lifetime frequency for 19 participants, out of all the methods they had used. Other NSSI methods that had the greatest lifetime frequency included pinching for eight participants, severe scratching for seven participants, and interfering with wound healing for six participants.
Participants were asked to estimate when they had most recently engaged in NSSI prior to beginning participation in the present study; times ranged from less than a week to more than a year. Seventy-seven percent of participants ($n = 30$) had hurt themselves within the previous 6 months, with half of those having hurt themselves in the past 4 weeks and five participants within the week before beginning study participation (Table 6).

Table 6.

<table>
<thead>
<tr>
<th>Time Since Most Recent NSSI Acts Prior to EMA</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6 days</td>
<td>5</td>
<td>13.16</td>
</tr>
<tr>
<td>7-13 days</td>
<td>4</td>
<td>10.53</td>
</tr>
<tr>
<td>13-28 days</td>
<td>6</td>
<td>15.79</td>
</tr>
<tr>
<td>1-2 months</td>
<td>7</td>
<td>18.42</td>
</tr>
<tr>
<td>3-4 months</td>
<td>5</td>
<td>13.16</td>
</tr>
<tr>
<td>5-6 months</td>
<td>3</td>
<td>7.89</td>
</tr>
<tr>
<td>7 months-1 year</td>
<td>3</td>
<td>7.89</td>
</tr>
<tr>
<td>year+</td>
<td>5</td>
<td>13.16</td>
</tr>
<tr>
<td>$n = 38$</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

The ISAS collects data on several characteristics of participants’ overall NSSI experience, including whether they experience pain during NSSI, whether they engage in NSSI alone or with others, the amount of time that usually elapses between an NSSI urge and acting
on it, and whether or not they want to stop engaging in NSSI (Table 7). Only one participant reported never experiencing pain during NSSI, but the other participants were split between always and sometimes experiencing NSSI as painful. Over 75% \((n = 30)\) of participants reported that they are always alone when engaging in NSSI, with the other nine participants reporting that they are sometimes alone and sometimes with other people. Notably, three-fourths of the non-female participants said that others are sometimes with them when they engage in NSSI. Over 80% \((n = 32)\) of participants reported that they usually hurt themselves within 3 hours of experiencing the urge to do so; by contrast, three participants reported that more than a day will elapse between when they experience the urge to hurt themselves and when they engage in NSSI. Most participants endorsed wanting to stop hurting themselves, but a minority reported that they did not want to stop and one participant endorsed both wanting and not wanting to stop engaging in NSSI.

<table>
<thead>
<tr>
<th>Description of Historical NSSI Characteristics</th>
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<tbody>
<tr>
<td>Characteristic</td>
</tr>
<tr>
<td>Pain during NSSI</td>
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<tr>
<td>Yes</td>
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<tr>
<td>Sometimes</td>
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<tr>
<td>No</td>
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<tr>
<td>Social context of NSSI</td>
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<tr>
<td>Always alone</td>
</tr>
<tr>
<td>Sometimes alone</td>
</tr>
<tr>
<td>Time between NSSI urge and act</td>
</tr>
<tr>
<td>&lt; 1hr</td>
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<tr>
<td>1hr to 3hr</td>
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<td>3hr to 6hr</td>
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<td>6hr to 12hr</td>
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<td>12hr to 24hr</td>
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<tr>
<td>&gt; 1 day</td>
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<tr>
<td>Desire to stop NSSI</td>
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<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>
In summary, the majority of participants began engaging in NSSI in early adolescence, had used multiple NSSI methods, engaged in NSSI when they are alone, had engaged in NSSI as recently as 6 months prior to study participation, and reported wanting to stop engaging in NSSI. Cutting was the NSSI method that had been used at least once as well as with the highest lifetime frequency by the greatest number of participants. There was a very large range of historical NSSI frequencies, as well as for other NSSI characteristics such as whether pain is experienced and how long participants wait before engaging in NSSI once they notice the urge.

NSSI urges. Participants completed the ABUSI (Appendix G), which assessed the severity of the urge to engage in NSSI (ABUSI score) in the week prior to beginning the study; in addition, at the item level the ABUSI provides summary information regarding how many times participants thought about NSSI and how long they spent thinking about it, how strong they considered their most severe urge to have been, and how difficult it was to resist engaging in NSSI.

ABUSI scores ranged from 0 to 24 with a mean of 10.28 (SD = 6.39). Item-level data for the individual ABUSI questions are detailed in Table 8. Nearly 90% (n = 34) of participants endorsed having thought about NSSI one to 10 times in the week prior to the study. While just over half (n = 20) of participants reported spending under 20 minutes thinking about NSSI in the week prior to the study, the other participants varied in the amount of time spent thinking about NSSI up to a duration of more than 6 hours. Participants were fairly evenly-distributed with regards to how difficult it was for them to resist NSSI urges in the week prior to the study. However, it is notable that very few participants reported that they had strong urges that they felt able to resist; most participants either reported that they found urges relatively easy to resist or that they were unable to resist.
NSSI functions. At the beginning of the study participants completed Section 2 of the ISAS (Appendix F), which assessed the overall relevance they ascribed to each of 13 commonly-endorsed functions of NSSI using scale scores between 0 and 6, with higher numbers reflecting greater relevance. In this section, the function relevance scores are described in a number of ways: 1. Each function’s mean relevance score averaged across all participants, and how this compares with the other functions’ mean relevance scores; 2. The spread of scores
observed for the functions; and 3. The frequency with which each function had the highest relevance score for a given participant relative to the other 12 functions.

Consistent with the extant literature, affect regulation had the highest relevance score when averaged across participants ($M = 5.13, SD = 1.15$), and self-punishment had the second-highest ($M = 4.49, SD = 1.70$). Marking distress had the third-highest mean relevance score ($M = 3.00, SD = 2.20$), and all the other functions had mean scores of 2.1 or lower (Table 2).

<table>
<thead>
<tr>
<th>NSSI function</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affect Regulation</td>
<td>5.13</td>
<td>1.15</td>
</tr>
<tr>
<td>Interpersonal Boundaries</td>
<td>1.33</td>
<td>1.60</td>
</tr>
<tr>
<td>Self-Punishment</td>
<td>4.49</td>
<td>1.70</td>
</tr>
<tr>
<td>Self-Care</td>
<td>1.55</td>
<td>1.84</td>
</tr>
<tr>
<td>Anti-Dissociation</td>
<td>2.10</td>
<td>1.71</td>
</tr>
<tr>
<td>Anti-Suicide</td>
<td>1.95</td>
<td>2.01</td>
</tr>
<tr>
<td>Sensation-Seeking</td>
<td>0.92</td>
<td>1.35</td>
</tr>
<tr>
<td>Peer Bonding</td>
<td>0.21</td>
<td>0.70</td>
</tr>
<tr>
<td>Toughness</td>
<td>2.08</td>
<td>1.81</td>
</tr>
<tr>
<td>Influencing Others</td>
<td>1.38</td>
<td>1.65</td>
</tr>
<tr>
<td>Marking Distress</td>
<td>3.00</td>
<td>2.20</td>
</tr>
<tr>
<td>Revenge</td>
<td>1.05</td>
<td>1.82</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.64</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Boxplots demonstrating the spread of all 13 function relevance scores are displayed in Figure 2. Scores had a heavy negative skew for both affect regulation and self-punishment indicating that these functions tended to be given high relevance scores by most participants, and were relatively platykurtic for marking distress, reflecting that participants varied widely in the relevance scores assigned to this function. All scores for the other functions had differing degrees of positive skew, indicating that a large proportion of participants gave them low scores, but some participants still gave them higher scores. All functions were given a relevance score of 3 or higher by at least one participant, and nine of the 13 functions received a score of 6 by at least one participant. In addition several functions were given relevance scores of 0 by a
considerable proportion of participants, but were scored as moderately to highly relevant by others (interpersonal boundaries, self-care, anti-suicide, sensation-seeking, influencing others, revenge, and autonomy). Thus, whereas affect regulation and self-punishment appear to have been the most universally-relevant functions across participants, the other functions were also relevant to a subset of participants.

Figure 2. Boxplots representing the spread of the NSSI function scale scores at the initial time-point.

Although the affect regulation function had high relevance scores for nearly all participants, it did not always have the highest relevance score for a given participant relative to the other functions; for some participants it had the same score as other functions, and for some participants there was at least one function with a higher score. Affect regulation had the highest relevance score relative to the other functions for 66.7% \( (n = 26) \) of participants; self-punishment had the highest relative score for 53.8% \( (n = 21) \) of participants, marking distress had the highest relative score for 25.64% \( (n = 10) \) of participants, and any other function had the
highest relative score for 23.08% (n = 9) of participants (including anti-suicide, interpersonal boundaries, toughness, anti-dissociation, self-care, and revenge). Just over half (n = 20) of participants had at least two functions tied for their highest score; for eight of these participants the combination was affect regulation tied with self-punishment, and the other 12 were distributed across a range of combinations with no more than two participants with the same combination.

**Ecological Momentary Assessment: Description of the Data**

In this section, descriptive data are reviewed with regard to the NSSI acts and urges participants reported during EMA. Characteristics of the reported NSSI acts and urges are detailed first, followed by the relevance scores participants gave to the NSSI functions during EMA. Particular attention is paid to describing the variation in participants’ data across multiple NSSI urges and acts.

**NSSI characteristics.** All participants reported at least one NSSI urge or act during EMA; 16 participants reported at least one NSSI act. Below, the frequency and methods of the NSSI acts are described followed by the frequency and severity (ABUSIMod score) of NSSI urges and the spread of NSSI urges and acts across the 3-week EMA period.

**NSSI acts.** Across the 16 participants who reported engaging in NSSI behaviours during EMA, 74 NSSI acts were reported on 48 days. Among participants who reported any NSSI acts, the mean number of days when NSSI acts were reported was 3.00 (SD = 3.08; min = 1, max = 10), and the mean number of acts during the 21-day period was 4.63 (SD = 6.45; min = 1, max = 20). All of the participants who engaged in NSSI during EMA had most recently engaged in NSSI within the previous 4 months. Similarly, out of 26 participants who had engaged in NSSI in the 4 months prior to participating in EMA, 61.54% (n = 16) reported engaging in NSSI at least once during EMA.
Although cutting was the primary method of NSSI reported at the initial time-point, it was not the most frequent method reported during EMA – likely reflecting that cutting may be regarded as more important or more prototypical of NSSI but is not necessarily more common. Hitting, pinching, and hair-pulling were the methods used by the highest number of participants and on the greatest number of days during EMA; cutting was the next most-endorsed method (Table 10).

Table 10. 
Use of NSSI Methods During EMA

<table>
<thead>
<tr>
<th>Method</th>
<th>Number of participants endorsing</th>
<th>Total number of days method was endorsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Severe scratching</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Burning</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Carving</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hitting</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Pinching</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Hair-pulling</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Biting</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Interfering with wounds</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Sticking with needles</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

NSSI urges. Across all participants, NSSI urges without acts were reported on 149 days. The mean number of urge days per participant was 3.82 (SD = 3.077; min = 0, max = 14), and the mean combined number of urge/act days was 5.00 (SD = 4.21; min = 1, max = 16).

The mean urge severity (ABUSIMod) score across participant means for all NSSI urge/act days was 9.08 (SD = 2.95), ranging from 4.00 to 15.91. Across all NSSI urge/act days regardless of participant, the mean ABUSIMod score was 10.21 (n = 195; SD = 4.799) and ranged from 4 to 23. The mean ABUSIMod score for NSSI act days (M = 15.13; n = 46; SD = 4.23) was noticeably higher than the mean ABUSIMod score for NSSI urge days (M = 8.68; n = 148; SD = 3.87); this is as expected given that the score is impacted by whether NSSI was engaged in, and also reflects past findings that higher-intensity NSSI thoughts predict NSSI acts
ABUSIMod scores varied widely both within and between participants. In terms of within-participant variation, for participants with two or more reported NSSI urges or acts the mean range between scores was 8.71 points \((n = 31; \text{SD} = 4.71)\), with one participant always scoring the same on the ABUSIMod on the low end, and on the high end three participants with a range of 15 points between their lowest and highest ABUSIMod scores; thus, a given participant would have experienced NSSI urges of varying severity across the 21 days.

Each participant’s reported NSSI urges and acts across the 21 days are displayed in Table 11, including ABUSIMod scores to represent urge severity. Participants who reported a relatively low number of NSSI urge/act days generally only reported urges rather than acts: Of 23 participants reporting 4 or fewer NSSI urge/act days, only 6 reported any NSSI acts, and none reported more than one day in which they engaged in NSSI. By contrast, of the 16 participants reporting 5 or more urge/act days 10 reported NSSI acts, with seven of these reporting at least 2 days when they engaged in NSSI. The six participants who reported 11 to 16 urge/act days had a mean of 5.33 days during the study when they engaged in NSSI \((\text{SD} = 4.08)\), with some reporting multiple NSSI acts in a given day. However, several participants who reported a relatively high number of urge/act days did not engage in NSSI during the study or engaged in it only once: Six participants with 5 or more urge/act days did not engage in NSSI (including two participants with 8 and one participant with 14 urge days), and an additional three engaged in NSSI on only 1 day (including one participant with 11 urge days but only 1 act day). For some participants urges and acts were spread out, and for some they clustered together.
Table 11.
NSSI Urges and Acts Across EMA by Participant

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<tr>
<th>Day</th>
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</tr>
</tbody>
</table>

Note. A tabular representation of the reporting of NSSI urges and acts (including the severity of NSSI urges) across the 21-day EMA study, separated by participant.

- Colouring indicates days when NSSI urges but not acts were reported
- Colouring indicates days when NSSI acts were reported
- Numerals indicate ABUSIMod score; a score of 0 is assigned to days when no NSSI urges or acts were reported.
- ### indicates a day when no survey was submitted
Descriptive information from ABUSIMod responses was examined across participants to inform understanding the nature of NSSI urges during EMA (Table 12).

Table 12.  
*Characteristics of NSSI Urges During EMA Across Participants*

<table>
<thead>
<tr>
<th>ABUSIMod question</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often have you thought about NSSI?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never, 0 times</td>
<td>3</td>
<td>1.53</td>
</tr>
<tr>
<td>Rarely, 1-2 times</td>
<td>121</td>
<td>61.73</td>
</tr>
<tr>
<td>Occasionally, 3-4 times</td>
<td>62</td>
<td>31.63</td>
</tr>
<tr>
<td>Sometimes, 5-10 times</td>
<td>10</td>
<td>5.10</td>
</tr>
<tr>
<td>At the most severe point, how strong was your urge?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slight/very mild urge</td>
<td>46</td>
<td>23.59</td>
</tr>
<tr>
<td>Mild urge</td>
<td>40</td>
<td>20.51</td>
</tr>
<tr>
<td>Moderate urge</td>
<td>44</td>
<td>22.56</td>
</tr>
<tr>
<td>Strong urge, easily controlled</td>
<td>29</td>
<td>14.87</td>
</tr>
<tr>
<td>Strong urge, difficult to control</td>
<td>9</td>
<td>4.62</td>
</tr>
<tr>
<td>Strong urge, did self-injure</td>
<td>27</td>
<td>13.85</td>
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<td>How much time have you spent thinking about NSSI?</td>
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<td>None</td>
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<td>Less than 20 minutes</td>
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<td>21-45 minutes</td>
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<td>46-90 minutes</td>
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<td>12.24</td>
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<tr>
<td>90 minutes to 3 hours</td>
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</tr>
<tr>
<td>3-6 hours</td>
<td>1</td>
<td>0.51</td>
</tr>
<tr>
<td>How difficult was it to resist injuring yourself?</td>
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<td></td>
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<tr>
<td>Not difficult</td>
<td>38</td>
<td>19.39</td>
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<tr>
<td>Very mildly difficult</td>
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<td>22.45</td>
</tr>
<tr>
<td>Mildly difficult</td>
<td>40</td>
<td>20.41</td>
</tr>
<tr>
<td>Moderately difficult</td>
<td>31</td>
<td>15.82</td>
</tr>
<tr>
<td>Very difficult</td>
<td>6</td>
<td>3.06</td>
</tr>
<tr>
<td>Was not able to resist</td>
<td>37</td>
<td>18.88</td>
</tr>
</tbody>
</table>

*Note. n refers to the total number of NSSI urge/act days when each response was given. % refers to the percentage of total NSSI urge/act days when each response was given.*

On most NSSI urge/act days participants reported thinking about NSSI one to two times, and participants never reported thinking about NSSI more than 10 times in a day. Participants reported spending less than 20 minutes thinking about NSSI on just over half of NSSI urge/act days, but on a minority of days they reported spending upwards of an hour thinking about NSSI;
by contrast, on four urge/act days participants reported that they spent no time at all thinking about the behaviour. NSSI urge/act days spanned the full range of responses with regards to how difficult they were to resist. However, notably, participants almost never reported strong urges that they felt able to resist; urges were either reported to be relatively easily resisted or not able to be resisted.

Descriptive information from ABUSIMod responses was also considered with regards to how a given participant’s responses varied from day to day. Out of the 31 participants who reported more than one urge/act day, only eight reported thinking about NSSI the same number of times on each urge/act day, and only eight reported spending the same amount of time thinking about NSSI on each urge/act day. As an example of variation in the amount of time spend thinking about NSSI, in a 1-week period one participant who reported 5 urge/act days endorsed on 1 day thinking about NSSI for less than 20 minutes, one 1 day 21 to 45 minutes, on 2 days 46 to 90 minutes each, and on 1 day from 90 minutes to 3 hours. Only one participant reported the same strength of NSSI urges on all urge/act days, and 2 participants reported the same difficulty resisting NSSI on all urge/act days. As an example of variation in the difficulty of resisting NSSI urges, in a 1-week period one participant who reported 5 urge/act days endorsed 1 day as not at all difficult to resist, 1 day as mildly difficult, 2 days as moderately difficult, and 1 day when they felt unable to resist.

In summary, participants ranged in the number and severity of NSSI urges they reported during EMA and there were no clear inter-participant patterns in NSSI urge and act days. Generally, urge severity scores were higher on days when NSSI acts were engaged in than on days when only urges were reported, and participants generally spent 45 minutes or less thinking about NSSI on a given urge/act day. Participants who reported a higher number of NSSI urge/act days usually engaged in more NSSI during the study, and participants who
reported a lower number of urge/act days generally only reported urges. There was considerable variation both between participants and within a given participant over time on the various NSSI urge characteristics; this included overall urge severity score, difficulty resisting NSSI urges, and the number of times NSSI was thought about on a given urge/act day.

**NSSI functions.** In this section, the function relevance scores are described in three ways: 1. Each function’s mean relevance score averaged across all participants on all NSSI urge/act days, and how this compares with the other functions’ mean relevance scores; 2. The range of scores observed for most of the functions, including how this varied from day to day within a given participant; and 3. The frequency with which each function had the highest relevance score for a given participant relative to the other 12 functions.

Consistent with the literature and the initial time-point data, affect regulation had the highest mean relevance score \((M = 4.10, SD = 1.53)\) and self-punishment had the second-highest \((M = 3.13, SD = 1.74)\), followed by marking distress \((M = 1.52, SD = 1.44)\). The other functions all received mean relevance scores below 0.80, with the lowest scores associated with the functions of revenge \((M = 0.27, SD = 0.69)\), sensation-seeking \((M = 0.24, SD = 0.58)\), and peer bonding \((M = 0.01, SD = 0.03)\). Mean relevance scores for the 12 functions are presented in Table 13.
Boxplots demonstrating the spread of mean EMA relevance scores for each of the functions are displayed in Figure 3. Similar to the initial time-point, most of the functions received relevance scores of 0 for a considerable number of participants, while receiving moderate-to-high relevance scores for a smaller number of participants. All of the functions except for sensation-seeking, toughness, influencing others, and autonomy had at least one participant with a mean relevance score of 4 or higher.

Table 13.

Means of Mean NSSI Function Scores during EMA

<table>
<thead>
<tr>
<th>NSSI function</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affect Regulation</td>
<td>4.10</td>
<td>1.53</td>
</tr>
<tr>
<td>Interpersonal Boundaries</td>
<td>0.55</td>
<td>0.97</td>
</tr>
<tr>
<td>Self-Punishment</td>
<td>3.13</td>
<td>1.74</td>
</tr>
<tr>
<td>Self-Care</td>
<td>0.60</td>
<td>1.12</td>
</tr>
<tr>
<td>Anti-Dissociation</td>
<td>0.75</td>
<td>1.16</td>
</tr>
<tr>
<td>Anti-Suicide</td>
<td>0.55</td>
<td>1.04</td>
</tr>
<tr>
<td>Sensation-Seeking</td>
<td>0.24</td>
<td>0.58</td>
</tr>
<tr>
<td>Toughness</td>
<td>0.58</td>
<td>0.95</td>
</tr>
<tr>
<td>Influencing Others</td>
<td>0.33</td>
<td>0.46</td>
</tr>
<tr>
<td>Marking Distress</td>
<td>1.52</td>
<td>1.44</td>
</tr>
<tr>
<td>Revenge</td>
<td>0.27</td>
<td>0.69</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.32</td>
<td>0.69</td>
</tr>
</tbody>
</table>
Since EMA research includes the added dimension of time, it was also possible to observe that even participants who endorsed a function as relevant during EMA did not do so on all of the days when they reported NSSI urges or acts. On average, participants who endorsed the relevance of any function did so on 66.99% of their urge/act days. However, there was notable variation between functions, ranging from revenge, which was endorsed on average 37.38% of the time by the 16 participants who endorsed it, to self-punishment and affect regulation which were endorsed 87.33% and 89.97% of the time respectively. The full descriptive information for what proportion of the time participants endorsed each function as relevant is displayed in Table 14.
In addition, the dimension of time allows observation of the range of relevance scores each participant had for each function (Figure 4); participants had a range of at least 2 points in their scores for a given function across EMA participation 57.95% of the time, and a range of at least 4 points in their scores for a given function 18.78% of the time. Participants generally had much larger ranges in their self-punishment relevance scores across EMA participation than for any of the other functions: 47.22% \( (n = 17) \) of the 36 participants who endorsed self-punishment had a range of 4 or more points in their EMA relevance scores, with interpersonal boundaries showing the second-highest range with 25% \( (n = 6) \) of participants having a range of 4 or more points. A large proportion of participants scored self-punishment as low as 0 or 1 on some days, but as high as 5 or 6 on other days. By contrast for affect regulation, which had a similar number of participants with scores of 5 or 6 (28, versus 25 for self-punishment), only 18.4% \( (n = 7) \) of participants had an EMA score range of 4 or more points. Although affect regulation and self-punishment were the most likely functions to receive relevance scores of 5 or 6 out of 6 on a given NSSI urge/act day, all the other functions except for sensation-seeking and influencing others received a score of 5 or 6 on at least one urge/act day.

| Table 14. Proportion of NSSI Urge/Act Days When Each Function Was Endorsed |
|---------------------------------|-----------------|-----------------|
| NSSI function                  | % of days endorsed | Number of participants endorsing |
| Affect Regulation              | 89.97            | 38              |
| Interpersonal Boundaries       | 53.44            | 16              |
| Self-Punishment                | 87.33            | 36              |
| Self-Care                      | 62.06            | 18              |
| Anti-Dissociation              | 62.63            | 19              |
| Anti-Suicide                   | 45.26            | 19              |
| Sensation-Seeking              | 44.55            | 11              |
| Toughness                      | 76.00            | 14              |
| Influencing Others             | 44.61            | 18              |
| Marking Distress               | 77.93            | 28              |
| Revenge                        | 37.38            | 16              |
| Autonomy                       | 57.62            | 13              |

\[ M = 66.99 \quad n = 246 \]
Figure 4. Graphs for each of the 12 NSSI functions, displaying each participant's mean function scale score at the initial time-point (black dot) along with the range of each participant's function scale scores during EMA (grey whiskers).
Affect regulation had the highest mean relevance score relative to the other functions for 69.2% \( (n = 27) \) of participants, and self-punishment had the highest mean relevance score for 35.9% \( (n = 14) \) of participants (for three of these participants, affect regulation and self-punishment had the same score); no other function received the highest mean relevance score. However, when individual urge/act days are considered instead of averaging across the 3 weeks, all of the functions had the highest relative relevance score for at least one participant for at least one NSSI urge or act.

In summary, affect regulation, self-punishment, and marking distress were the most important functions overall during EMA. Nearly all functions received a relevance score of 5 or 6 on at least one day, and all of the functions had the highest relevance score relative to other functions on at least one day. Participants often did not endorse the same functions as relevant on all their NSSI urge/act days, with some functions only endorsed one third to half of the time for the participants who endorsed them at any point during EMA; similarly, participants’ relevance scores for a given function varied from one day to the next. Some functions were more impacted by this variation than others, with affect regulation showing high relevance for nearly all participants on nearly all days, while functions such as anti-dissociation, interpersonal boundaries and anti-suicide had very low overall means but were relatively relevant for a subset of participants on a subset of days.

Overall, the above descriptive results supported the feasibility of investigating the proposed research questions. Firstly, there were commonalities between participants regarding their experience of NSSI, but also differences (e.g. on NSSI frequency, on which NSSI functions they considered to be relevant) that support the assumption that NSSI is not a fully uniform behaviour. Second, participants varied in the severity of interpersonal trauma they reported, allowing for the possibility of investigating the relationship between various NSSI
characteristics and interpersonal trauma severity. Finally, there was descriptive evidence for variation in participants’ NSSI experience over the 3-week EMA period regarding NSSI urge characteristics, NSSI method use, and the relevance of the NSSI functions, suggesting the possibility that EMA methods may provide somewhat different information about NSSI compared to cross-sectional methods. In the remainder of the Results section, each research question presented in the Introduction will be addressed in turn.

**Research Question 1: Do characteristics of the demographic profiles (e.g. age, diagnosis, past and current use of mental health services), NSSI behaviour (e.g. age of onset, frequency, number of methods) or NSSI urges (e.g. frequency, severity) of self-injuring young adults correlate with interpersonal trauma severity?**

**Categorical variables.** In order to clarify the relationship between demographic and NSSI characteristics and interpersonal trauma severity, a point biserial correlation analysis was conducted between the following dichotomous variables and the continuous TECMod score: sexual orientation, diagnosis, past treatment, current treatment, pain during NSSI, social context during NSSI, time between NSSI urges and acts, desire to stop NSSI, and whether participants reported engaging in NSSI during EMA. In addition, Spearman’s rho was calculated between the TECMod score and NSSI frequency based on low, medium, and high-NSSI groups as defined above. None of the correlations were significant (See Table 15). The strongest relationships were between trauma severity and current treatment ($r = .24, p = .15$), and between trauma severity and NSSI frequency (Spearman’s rho = .23, $p = .17$), with a non-significant negative association between trauma severity and waiting more than one hour between NSSI urges and acts ($r = -.21, p = .22$) indicating that participants with higher trauma severity tended to wait less time before engaging in NSSI.
Continuous variables. In order to clarify the relationship between demographic and NSSI characteristics and interpersonal trauma severity, a Pearson correlation analysis was conducted to examine the relationships between each of the continuous variables of interest (participant age, age of first engagement in NSSI, number of NSSI methods, NSSI frequency, number of NSSI functions endorsed at the initial time-point, ABUSI score, number of NSSI functions endorsed during EMA, mean ABUSIMod score, number of NSSI urge days during EMA, number of NSSI act days during EMA, and number of combined urge/act days) and the TECMod score (See Table 16). Significant positive correlations were observed between TECMod score and number of NSSI methods, ABUSI score, and number of NSSI functions endorsed during EMA. In addition, positive trends were observed between TECMod score and the number of NSSI functions endorsed at the initial time-point ($p = .07$) as well as the mean ABUSIMod score ($p = .053$). All other correlations were non-significant but in a positive direction.

Table 15. Point Biserial and Spearman's Rho Correlation Results Between TECMod Score and Categorical Demographic and NSSI Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>$r$ with TECMod Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual Orientation</td>
<td>-.10</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>.18</td>
</tr>
<tr>
<td>Past Treatment</td>
<td>.12</td>
</tr>
<tr>
<td>Current Treatment</td>
<td>.24</td>
</tr>
<tr>
<td>Pain</td>
<td>-.03</td>
</tr>
<tr>
<td>Alone During NSSI</td>
<td>.03</td>
</tr>
<tr>
<td>Want to Stop NSSI</td>
<td>-.03</td>
</tr>
<tr>
<td>Time Between Urge and NSSI</td>
<td>-.21</td>
</tr>
<tr>
<td>NSSI Frequency (groups)</td>
<td>Spearman's rho = .23</td>
</tr>
<tr>
<td>NSSI Acts During EMA</td>
<td>.10</td>
</tr>
</tbody>
</table>

* $p \leq .05$; ** $p \leq .01$
Multiple regression analysis. A multiple linear regression analysis was conducted predicting TECMod score using the number of NSSI methods endorsed at the initial time-point and the number of NSSI functions endorsed during EMA (Table 17). Given the sample size in the present study \((n = 39)\), the number of multiple linear regression predictors was limited to two in order to ensure a reliable regression (Stevens, 2009); as a result, ABUSI score was not included in the regression despite significant correlation with TECMod score, due to also displaying a significant correlation with both other predictors \((r = .32, p = .05\) with number of NSSI methods, and \(r = .39, p = .01\) with number of NSSI functions). The multiple regression analysis with two predictors was significant \((p = .008)\) and explained 23.6% of the variance in the TECMod score. The number of NSSI functions endorsed during EMA was a significant predictor \((\text{Beta} = .34, p = .03)\), such that a 1-point increase in the number of functions corresponded to a 1.42-point increase in TECMod score. The number of NSSI methods showed a trend toward significance \((\text{Beta} = .27, p = .08)\), such that a 1-point increase in the number of NSSI methods corresponded to a 1.2-point increase in TECMod score.

Table 16.

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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</thead>
<tbody>
<tr>
<td>TECMod Score</td>
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<td></td>
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</tr>
<tr>
<td>Age During the Study</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Age at First NSSI</td>
<td>.14</td>
<td>.02</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of NSSI Methods</td>
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<td>-.01</td>
<td>-.02</td>
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</tr>
<tr>
<td>NSSI Frequency</td>
<td>.28</td>
<td>.07</td>
<td>.17</td>
<td>.38*</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of NSSI Functions (initial)</td>
<td>.29</td>
<td>-.12</td>
<td>.03</td>
<td>.43**</td>
<td>.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of NSSI Functions (EMA)</td>
<td>.41**</td>
<td>-.05</td>
<td>.14</td>
<td>.26</td>
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<td>ABUSI Score</td>
<td>.45**</td>
<td>.27</td>
<td>-.04</td>
<td>.32*</td>
<td>.16</td>
<td>.16</td>
<td>.39*</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ABUSIMod Score</td>
<td>.31</td>
<td>.24</td>
<td>-.09</td>
<td>.28</td>
<td>.16</td>
<td>-.07</td>
<td>.28</td>
<td>.64**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Urge Days</td>
<td>.23</td>
<td>.13</td>
<td>.03</td>
<td>.14</td>
<td>.25</td>
<td>.08</td>
<td>.46**</td>
<td>.33*</td>
<td>.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Act Days</td>
<td>.15</td>
<td>.20</td>
<td>-.29</td>
<td>.38*</td>
<td>.21</td>
<td>-.12</td>
<td>.06</td>
<td>.40*</td>
<td>.59**</td>
<td>.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Urge/Act Days</td>
<td>.25</td>
<td>.21</td>
<td>-.15</td>
<td>.32*</td>
<td>.30</td>
<td>-.01</td>
<td>.38*</td>
<td>.47**</td>
<td>.47**</td>
<td>.83**</td>
<td>.69**</td>
<td></td>
</tr>
</tbody>
</table>
In summary, both categorical and continuous variables corresponding to participants’ demographic characteristics, NSSI histories, and NSSI urges and acts during EMA were investigated in terms of their relationship to interpersonal trauma severity. None of the categorical variables were significantly correlated with interpersonal trauma severity. Interpersonal trauma severity was significantly correlated with the following continuous variables: number of historical NSSI methods, NSSI urge severity in the week prior to study participation, and the number of NSSI functions participants endorsed during EMA. The multiple linear regression analysis was significant, with the number of NSSI functions and number of NSSI methods explaining 23.6% of the variance in interpersonal trauma severity. Thus, there is evidence that some characteristics of participants’ NSSI engagement were related to the severity of their trauma histories.

**Research Question 2: Does the self-reported relevance of individual NSSI functions correlate with interpersonal trauma severity?**

**Correlation analyses.** In order to clarify the relationship between each of the NSSI functions and interpersonal trauma severity Pearson’s correlation was calculated between the 12 mean function relevance scores from EMA and the interpersonal trauma severity (TECMod) score (see Table 18 for full results; n = 38). Significant correlations were observed between TECMod score and mean relevance scores for the following functions: affect regulation, interpersonal boundaries, self-care, anti-dissociation, and marking distress.
Affect regulation. The correlation between mean EMA affect regulation relevance and the TECMod score was .33 \((p = .04)\). Although affect regulation relevance scores were generally high across participants, lower affect regulation scores only occurred with lower TECMod scores: Mean EMA affect regulation relevance scores of 3 or lower only occurred with TECMod scores under 30, and mean EMA affect regulation scores of 2 or lower only occurred with TECMod scores at or under 15.

Interpersonal boundaries. The correlation between mean EMA interpersonal boundaries relevance and TECMod scores was .44 \((p = .006)\). In contrast to the relationship between affect regulation and trauma severity, most participants had low interpersonal-boundaries relevance scores but those giving it higher scores tended to have higher TECMod scores.

Self-care. The correlation between mean EMA self-care relevance and TECMod scores was .34 \((p = .04)\). Most self-care relevance scores were low, but all self-care scores lower than 1 occurred with TECMod scores below 30, and all self-care scores higher than 1 occurred with TECMod scores higher than 10.
**Anti-dissociation.** The correlation between mean EMA anti-dissociation relevance and TECMod scores was .39 ($p = .02$). Anti-dissociation relevance scores of 1 or higher only occurred when there was a TECMod score of at least 10, and all but one of the participants with TECMod scores of 30 or higher endorsed anti-dissociation as at least somewhat relevant.

**Marking distress.** The correlation between mean EMA marking distress relevance and TECMod scores was .34 ($p = .04$). Marking distress relevance scores had relatively greater variability than most other functions, with participants scoring it across the full range of relevance. All but one of the marking distress relevance scores of 2.5 or higher occurred with TECMod scores higher than 10, and all of the participants with TECMod scores of 30 or higher endorsed marking distress as at least somewhat relevant.

**Multiple regression analyses.** Given the sample size, it was not appropriate to include all five of the functions that were significantly correlated with TECMod score in multiple regression analysis (Stevens, 2009). The decision was made to include the two functions with the strongest correlations with TECMod score: the interpersonal boundaries and anti-dissociation functions, neither of which were correlated with each other. A multiple linear regression analysis was thus conducted using mean EMA interpersonal boundaries and anti-dissociation relevance scores to predict TECMod scores (Table 19). The regression was significant ($p = .001$) and the two predictor variables explained 31.8% of variability in the TECMod scores. Both predictors were significantly related to the outcome. Interpersonal boundaries had a slightly stronger relationship with TECMod scores (Beta = .41; $p = .005$) than anti-dissociation (Beta = .36; $p = .013$). A 1-point increase in the interpersonal boundaries relevance score corresponded with a 5.29-point increase in trauma severity, and a 1-point increase in anti-dissociation relevance corresponded with a 3.91-point increase in trauma severity.
To investigate whether the relationship between interpersonal boundaries, anti-dissociation, and TECMod score could be accounted for by participants with higher TECMod scores endorsing a higher number of NSSI functions overall, a stepwise multiple linear regression analysis was conducted using interpersonal boundaries and anti-dissociation relevance scores to predict TECMod score while controlling for the number of NSSI functions endorsed during EMA (Table 20). The two NSSI functions explained an additional 15.2% of the variance in TECMod scores above the contribution of number of endorsed NSSI functions (\(p = .03\)), and the regression with all three predictors remained significant (\(p = .002\)) explaining 34.2% of variability in TECMod scores. Number of endorsed NSSI functions was no longer a significant predictor of TECMod scores with the addition of the two NSSI functions (\(p = .34\)), whereas interpersonal boundaries was a significant predictor (\(p = .03\)) and anti-dissociation demonstrated a trend toward significance (\(p = .06\)). Interpersonal boundaries remained a slightly stronger predictor (Beta = .35) than anti-dissociation (Beta = .30).

Table 19.  
*Multiple Linear Regression for Trauma Severity Score, with NSSI Functions as Predictors*

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Unstandardized coefficients</th>
<th>Standardized coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Constant</td>
<td>11.21</td>
<td>2.20</td>
</tr>
<tr>
<td>Interpersonal boundaries score (EMA)</td>
<td>5.29</td>
<td>1.79</td>
</tr>
<tr>
<td>Anti-dissociation score (EMA)</td>
<td>3.91</td>
<td>1.49</td>
</tr>
</tbody>
</table>

Note. Dependent variable: TECMod score; * \(p \leq .05\); ** \(p \leq .01\)

<table>
<thead>
<tr>
<th>Model</th>
<th>(\Delta R^2)</th>
<th>Unstandardized coefficients</th>
<th>Standardized coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Constant</td>
<td>0.191</td>
<td>4.28</td>
<td>4.72</td>
</tr>
<tr>
<td>Number of NSSI functions (EMA)</td>
<td></td>
<td>1.96</td>
<td>0.67</td>
</tr>
<tr>
<td>Step 2 Constant</td>
<td>0.152</td>
<td>7.20</td>
<td>4.50</td>
</tr>
<tr>
<td>Number of NSSI functions (EMA)</td>
<td></td>
<td>0.74</td>
<td>0.77</td>
</tr>
<tr>
<td>Interpersonal boundaries score (EMA)</td>
<td></td>
<td>4.57</td>
<td>2.00</td>
</tr>
<tr>
<td>Anti-dissociation score (EMA)</td>
<td></td>
<td>3.25</td>
<td>1.70</td>
</tr>
</tbody>
</table>

Note. Dependent variable: TECMod score; * \(p \leq .05\); ** \(p \leq .01\)
In summary, five NSSI functions’ mean relevance scores were found to significantly correlate with interpersonal trauma severity: affect regulation, interpersonal boundaries, self-care, anti-dissociation, and marking distress. In multiple regression analysis, the interpersonal boundaries and anti-dissociation functions significantly predicted interpersonal trauma severity even when controlling for the number of functions participants endorsed.

Research Question 3: Does the self-reported relevance of the self-punishment function of NSSI correlate with interpersonal trauma severity?

The importance of self-punishment for participants in the present sample. In line with the extant literature, self-punishment was ranked the second-most relevant function after affect regulation in terms of self-reported relevance scores at both the initial time-point and in the EMA study. However, in contrast with previous findings that self-punishment is endorsed by up to 70% of individuals who self-injure, at the initial time-point 97.44% (n = 38) of participants endorsed self-punishment as at least somewhat relevant to their NSSI. Similarly, during EMA self-punishment received at least some endorsement on 80.99% (n = 98) of the days when NSSI urges or acts were reported. Additionally, 53.80% of participants (n = 21) at the initial time-point and 35.90% of participants (n = 14) during EMA scored self-punishment as highly as or higher than affect regulation. In 191 total NSSI urge/act days, self-punishment had the highest score relative to the other functions on 40.84% of these (n = 78). Notably, in EMA self-punishment was the only function that was not significantly correlated with any other function (Table 8, above), and at the initial time-point only self-punishment and sensation-seeking were not significantly correlated with any other function (Table 21), suggesting some distinctiveness of this construct to participants in the present study.
The relationship between self-punishment and interpersonal trauma severity. As noted above and in Table 18, the hypothesis of increasing self-punishment relevance scores with increasing interpersonal trauma severity as measured by TECMod was not supported by correlation analysis; however, as visible in Figure 5, only participants with lower TECMod scores had mean self-punishment relevance scores below 1.5 in EMA.

Table 21.

*Pearson's Correlation Results Between NSSI Function Scale Scores at the Initial Time-Point*

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td>Interpersonal Boundaries</td>
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</tr>
<tr>
<td>Self-Punishment</td>
<td>.38*</td>
<td>.49**</td>
<td>-.04</td>
<td>.17</td>
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</tr>
<tr>
<td>Self-Care</td>
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<td>-.01</td>
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<td></td>
</tr>
<tr>
<td>Anti-Dissociation</td>
<td>.31</td>
<td>.36*</td>
<td>.15</td>
<td>-.04</td>
<td>.18</td>
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<td></td>
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<tr>
<td>Anti-Suicide</td>
<td>-.3</td>
<td>.06</td>
<td>-.03</td>
<td>-.25</td>
<td>-.05</td>
<td>.27</td>
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<tr>
<td>Sensation-Seeking</td>
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<td>-.06</td>
<td>-.02</td>
<td>.06</td>
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<td>Peer Bonding</td>
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<td>Toughness</td>
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<td>.195</td>
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<td>.43**</td>
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<tr>
<td>Influencing Others</td>
<td>.38*</td>
<td>.17</td>
<td>.11</td>
<td>.45**</td>
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<td>.27</td>
<td>-.15</td>
<td>.12</td>
<td>.36*</td>
<td>.59**</td>
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<tr>
<td>Marking Distress</td>
<td>.24</td>
<td>.51**</td>
<td>.31</td>
<td>.08</td>
<td>.56**</td>
<td>.28</td>
<td>-.13</td>
<td>.16</td>
<td>.37*</td>
<td>.67**</td>
<td>.41**</td>
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<tr>
<td>Revenge</td>
<td>.13</td>
<td>.34*</td>
<td>.04</td>
<td>-.12</td>
<td>-.12</td>
<td>.09</td>
<td>.20</td>
<td>-.01</td>
<td>.37*</td>
<td>.13</td>
<td>.03</td>
<td>.27</td>
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<tr>
<td>Autonomy</td>
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</tr>
</tbody>
</table>

* p ≤ .05; ** p ≤ .01
Figure 5. Scatterplot demonstrating the relationship between trauma severity score (TECMod Score) and participants' mean EMA self-punishment scale scores.

Differentiating participants with low and high self-punishment scores. Since self-punishment had higher absolute scores for some participants than others, exploratory descriptive analyses were conducted to investigate possible characteristics differentiating participants attributing higher versus lower relevance to self-punishment. Pearson’s correlation analyses were conducted between both initial and mean EMA self-punishment relevance scores with several continuous variables (age, number of NSSI methods, NSSI frequency, age of first engagement in NSSI, ABUSI score, mean ABUSIMod score, number of NSSI urge/act days during EMA, and the number of NSSI functions endorsed both initially and during EMA; Table 22). In addition, point biserial correlation analyses were conducted between initial and EMA self-punishment scores and several dichotomous variables (sexual orientation, past and current use of mental health services, whether they had a psychiatric diagnosis, whether they always experience pain during NSSI, whether they are always alone during NSSI, whether they want to
stop engaging in NSSI, whether they reported waiting more or less than 1 hour between NSSI urges and acts, and whether they engaged in NSSI during the EMA study; Table 23). Higher self-punishment relevance scores in the EMA study were significantly correlated with currently accessing mental health treatment \((r = .40, p = .01)\), and there was a positive trend between EMA self-punishment relevance scores and having accessed treatment in the past \((r = .31, p = .058)\).

Table 22.

*Pearson’s Correlation Results Between Self Punishment Means and Continuous Demographic and NSSI Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
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<td>1 Self Punishment (Initial)</td>
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</tr>
<tr>
<td>2 Self Punishment (EMA)</td>
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<tr>
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<tr>
<td>4 Number of NSSI Methods</td>
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<td>-.01</td>
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<tr>
<td>5 NSSI Frequency</td>
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<td>6 Age at First NSSI</td>
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<td>7 ABUSI Score</td>
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<td>-.04</td>
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<td>8 Mean ABUSIMod Score</td>
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<td>-.03</td>
<td>.24</td>
<td>.28</td>
<td>.16</td>
<td>-.09</td>
<td>.64**</td>
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</tr>
<tr>
<td>9 Number of Urge/Act Days</td>
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<td>.14</td>
<td>.21</td>
<td>.32*</td>
<td>.30</td>
<td>-.15</td>
<td>.47**</td>
<td>.47**</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10 Number of NSSI Functions (Initial)</td>
<td>.18</td>
<td>.27</td>
<td>-.12</td>
<td>.43**</td>
<td>.04</td>
<td>.03</td>
<td>.16</td>
<td>.07</td>
<td>-.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Number of NSSI Functions (EMA)</td>
<td>.09</td>
<td>.10</td>
<td>-.05</td>
<td>.26</td>
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<td>.14</td>
<td>.39*</td>
<td>.28</td>
<td>.38*</td>
<td>.44**</td>
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</table>

* \(p \leq .05\); ** \(p \leq .01\)

Table 23.

*Point Biserial Correlation Results Between Self Punishment Means and Dichotomous Demographic and NSSI Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>(r) with Self-Punishment (Initial)</th>
<th>(r) with Self-Punishment (EMA)</th>
</tr>
</thead>
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<tr>
<td>Past Treatment</td>
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<td>Diagnosis</td>
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<td>Pain During NSSI</td>
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<td>Alone During NSSI</td>
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<tr>
<td>Want to Stop NSSI</td>
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<td>.14</td>
</tr>
<tr>
<td>Time Between Urge and Act</td>
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<td>-.26</td>
</tr>
<tr>
<td>Any NSSI During EMA</td>
<td>.19</td>
<td>.08</td>
</tr>
</tbody>
</table>

* \(p \leq .05\); ** \(p \leq .01\)

In summary, the hypothesis that the self-punishment function of NSSI would be more relevant with increasing interpersonal trauma severity was not supported statistically, although
the only participants who gave very low self-punishment relevance scores also had relatively low trauma severity scores. Self-punishment was more important to participants’ self-reported NSSI urges and acts in the present sample than expected based on previous studies, with this function endorsed as at least somewhat relevant by nearly all participants and on nearly all NSSI urge/act days, and a notable subset of participants had self-punishment relevance scores that were as high as or higher than their affect regulation scores. However, there was still variation in self-punishment scores; exploratory correlation analyses were conducted between EMA self-punishment scale scores and a range of other NSSI characteristics. Only likelihood of accessing mental health services was significantly related to self-punishment relevance, and only in the case of EMA self-punishment scores.

Research Question 4: Do real-time data on NSSI behaviours, urges, and functions support retrospective generalized self-report data as collected at the initial time-point?

Concordance between historical NSSI methods and NSSI methods used during EMA. Fifteen of the 16 participants who reported engaging in NSSI during EMA also endorsed at least one NSSI method. The NSSI methods that were endorsed during EMA were cutting, severe scratching, biting, hitting, burning, interfering with wound healing, carving, pinching, sticking oneself with needles, and hair-pulling. The correspondence between historical and EMA NSSI method is described below in three ways: First, participants’ use or lack of use of each method is compared between the initial and EMA time-points using crosstabs and chi-square analyses. Second, frequency data are described for whether participants tended to use NSSI methods during EMA that they had indicated at the initial time-point to be their “main” method or their highest-frequency method. Finally, point-biserial correlation analysis results are detailed between the historical frequency of each method and whether or not it was engaged in during EMA.
Among the 15 participants who reported at least one NSSI method during EMA, all the methods they reported using during EMA were also methods they had used historically with the exception of self-burning; neither of the two participants who reported using burning during EMA had endorsed it at the initial time-point. Chi-square analyses were significant for pinching ($\chi^2(1) = 5.00, p = .03$), hitting ($\chi^2(1) = 5.00, p = .03$), hair-pulling ($\chi^2(1) = 5.00, p = .03$), biting ($\chi^2(1) = 4.29, p = .04$) and interfering with wound healing ($\chi^2(1) = 4.29, p = .04$). Cutting and severe scratching were only used during EMA by participants who had used them historically, but neither had significant chi-square results; this is likely because had each been used historically by a large portion of participants (13 and 10 out of 15, respectively), but were only used by four and three participants respectively during the present study. Notably, examining phi for scratching (.35) indicated a medium effect size, and the effect size for cutting was low to medium ($\phi = .24$). Although five of the 15 participants had historically used sticking themselves with needles, only one reported using it during EMA.

Eleven participants who had reported NSSI methods during EMA had also endorsed having at least one main method of NSSI at the initial time-point ($M = 2.18$ main methods, $SD = 1.33$). Of these 11 participants, all but one reported using at least one of their main methods during EMA. Eight of these 10 participants also reported using methods during EMA that had not been labeled as main methods at the initial time-point. Descriptive data were also considered for whether participants tended to use their highest-frequency NSSI method when engaging in NSSI during EMA. Of the 15 participants who reported NSSI methods during EMA, 11 used at least one of their highest-frequency methods at least once during EMA and three of these used two of their highest-frequency methods (where more than one method was tied for highest-frequency). However participants also used historically lower-frequency NSSI methods during EMA, including four participants who used a lower-frequency method two or more times.
Finally, point biserial correlation analysis was conducted between historical frequency for each method and whether or not it was used during EMA. Given the very small number of participants who used each method during EMA the results are very preliminary; however generally those participants who used cutting, hitting, interfering with wound healing, severe scratching, carving, and sticking themselves with needles during EMA had a relatively higher frequency of using that method historically. Those who used burning, biting, pinching, and hair-pulling did not have discernably different historical frequencies with these methods than those who did not use them during EMA.

**Cutting.** The point biserial correlation for cutting was significant \((r = .66, p = .01)\). The participants who reported cutting themselves during EMA had historical cutting frequencies of 40 to 1,000, whereas the participants who used NSSI during EMA but did not cut themselves all had a historical cutting frequency of 50 or less. Of the 33 participants who reported any history of cutting at the initial time-point, two thirds \((n = 22)\) had cut themselves 50 or fewer times and only one third had cut themselves more than 50 times.

**Hitting.** The point biserial correlation for hitting was significant \((r = .57, p = .04)\). The participants who reported hitting themselves during NSSI had historical hitting frequencies of 10 to 500, whereas participants who used NSSI during EMA but did not hit themselves had a historical hitting frequency of zero to 15. Of the 21 participants who reported any history of hitting at the initial time-point, 10 had hit themselves four to 10 times, seven had hit themselves from 15 to 25 times, and the remaining four reported historical frequencies from 50 to 500.

**Interfering with wound healing.** The point biserial correlation for interfering with wound healing was significant \((r = .73, p = .003)\). The participants who reported interfering with wound healing during EMA had historical frequencies of 100 to 1,000, and the participants who used NSSI but not this method had historical frequencies of zero to 150 with 66.67% \((n = 8)\)
never having used this method. Of the 18 participants who reported any history of interfering with wound healing at the initial time-point, 11 reported frequencies from one to 75, and only seven reported frequencies higher than 100.

**Severe scratching.** Although the point biserial correlation for severe scratching was not significant \((p = .25)\), the magnitude of the correlation coefficient indicated a moderate correlation \((r = .33)\). The three participants who reported using scratching during EMA had historical frequencies of 5, 100, and 300 instances respectively; participants who used NSSI during EMA but did not use this method had historical frequencies of 0 to 300 with 46\% \((n = 6)\) never having used this method. Of the 25 participants who reported a history of scratching at the initial time-point, 64\% \((n = 16)\) reported having scratched themselves 50 or fewer times, with the remaining 9 reporting more than 100 instances.

**Carving.** Only one participant engaged in carving during EMA in the present study; this participant had a historical carving frequency of 50, whereas those who endorsed NSSI but did not use carving had historical carving frequencies of zero to 10. Of the eight participants who reported any history of carving, six reported frequencies from five to 20, and only two reported frequencies of 50.

**Sticking oneself with needles.** Only one participant engaged in sticking herself with needles during EMA in the present study; this participant had a historical frequency with this NSSI method of 100, whereas the participants who endorsed NSSI but did not use this method had historical frequencies of zero to five. The eight participants who reported any history of sticking themselves with needles had historical frequencies ranging from one to 100 with little clustering; only the one participant reported a frequency of 100 and all other responses were between one and 70.
Concordance between NSSI urges at the initial time-point and EMA. The concordance between NSSI urges in the week prior to the study and across EMA is described below in three ways: First, correlation analysis results are provided for the relationship between NSSI urge severity at the initial time-point (ABUSI score) and three indicators of urge severity during EMA. Second, results of a Friedman’s ANOVA are provided comparing the maximum strength of NSSI urges in the week prior to EMA to the maximum strength of NSSI urges in each of the three weeks of EMA. Finally, item-level description from the ABUSI and ABUSIMod is provided to consider whether participants tended to describe their NSSI urges similarly in cross-sectional and daily data collection.

There was a significant positive correlation between ABUSI and mean ABUSIMod scores \( (r = .64, p < .001) \), as well as with the number of NSSI urge/act days reported in EMA \( (r = .47, p = .003) \), indicating that participants with higher urge severity score at the initial time-point also had higher urge severity during EMA, as well as having NSSI urges on more days.

There was a positive trend between ABUSI scores and engaging in at least one NSSI act at some point during the study (point biserial \( r = .297, p = .07 \)), suggesting that participants may have been more likely to engage in an NSSI act during the study if they had more severe NSSI urges recently.

The repeated-measures Friedman’s ANOVA comparing the maximum strength of NSSI urges in the week prior to the study to each of the three EMA weeks was significant \( (\chi^2(3) = 9.7, p = .02) \). Dunn-Bonferroni pairwise comparisons revealed a significant difference between the first and third weeks of EMA (Test Statistic = 0.795, \( SE = 0.29 \), adjusted \( p = .04 \)), but no significant differences between the initial time-point and any of the 3 EMA weeks. There was an overall pattern of reduction in reported NSSI urge strength across study participation (average
rank at the initial time-point = 2.68; at EMA week 1 = 2.83; at EMA week 2 = 2.45; at EMA week 3 = 2.04).

With regards to qualitative comparison of the item-level ABUSI and ABUSIMod responses, considering Table 8 (p. 60) and Table 12 (p. 67) allows for observation that there were many similarities in which urge characteristics were most and least common across participants in initial and EMA data. With regards to time spent thinking about NSSI, with both forms of data collection participants tended to endorse thinking about NSSI 1 to 2 times, and for 20 minutes or less. Similarly, with regards to urge strength and difficulty resisting urges, participants tended to endorse all possible responses except for strong urges that were difficult to control – at both time points it was rare for participants to report that they did resist urges that were difficult to resist or control. However, as described above, there was notable variation within a given participant in all NSSI urge characteristics from one day to the next within a given week that would not be represented by the ABUSI questions.

**Concordance between NSSI functions at initial time-point and EMA.** The concordance between the function relevance scores at the initial time-point and during EMA is described below with regards to the correspondence of initial function relevance scores to the range of scores each participant provided during EMA, correlation results between initial and EMA function relevance scores, whether the functions followed a similar order of relevance relative to each other during EMA as in the initial time-point, and whether participants endorsed the same functions during EMA that they did at the initial time-point.

Mean NSSI function relevance scores were all higher at the initial time-point than during EMA. However, the majority of the time (in 58.89% of cases), participants’ initial function relevance scores fell within the range of the scores they gave during EMA (Figure 4, on p. 73). The best concordance between initial function relevance scores and the range of EMA scores
was for the functions of autonomy (76.92% or \(n = 30\) of participants), self-punishment (71.79% or \(n = 28\) of participants), and revenge (71.79% or \(n = 28\) of participants). When initial function relevance scores did not fall within a participant’s range of EMA scores, 96.72% of the time they were higher than the EMA range. This tendency for initial scores to be higher than EMA scores was particularly strong for the anti-dissociation, toughness, and anti-suicide functions. For anti-dissociation and toughness, many participants who endorsed these functions as relevant at the initial time-point did not endorse them at all during EMA (14 of 32 participants for anti-dissociation and 17 of 30 participants for toughness). In addition, 83.33% \((n = 5)\) of the participants who had anti-suicide relevance scores of either 5 or 6 at the initial time-point only had EMA anti-suicide relevance scores ranging from 0 to 2.

Function relevance scores at the initial time-point were significantly correlated with the mean EMA function relevance scores for all 12 functions (Table 24), and their relevance relative to each other followed the same overall pattern, with some slight differences in the relative relevance of two of the lower-scored functions: interpersonal boundaries and autonomy (Figure 6). The number of functions participants endorsed at the initial time-point was significantly correlated with the number of functions endorsed during EMA \((r = .52, p = .001, n = 38)\).
Table 24.

Pearson’s Correlation Results Between Initial and EMA Mean NSSI Function Scores

<table>
<thead>
<tr>
<th>NSSI functions: Initial time-point</th>
<th>NSSI functions: EMA</th>
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<tbody>
<tr>
<td>Affect Regulation</td>
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<td>Interpersonal Boundaries</td>
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<td>Self-Care</td>
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<td>Anti-Suicide</td>
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<td>Revenge</td>
<td>.61**</td>
</tr>
<tr>
<td>Autonomy</td>
<td>.44**</td>
</tr>
</tbody>
</table>

* p ≤ .05; ** p ≤ .01

Figure 6. Mean scale scores for NSSI functions at the initial time-point compared with mean scale scores for NSSI functions during EMA.
It is notable that although the functions’ order of relevance was comparable at the initial time-point and during EMA, participants who endorsed a particular function initially did not necessarily do so during EMA (Table 25). With regards to the three highest-scored functions, participants who endorsed them as at least somewhat relevant at the initial time-point nearly always endorsed them during EMA, and vice versa: 97.44% \( (n = 38) \) of the participants who endorsed affect regulation at either time did so both initially and during EMA, as well as 94.74\% \( (n = 36) \) of the participants who endorsed self-punishment and 81.82\% \( (n = 27) \) of the participants who endorsed marking distress. In contrast, for most of the other functions approximately half of participants who endorsed them at one time did so at the other; on the lower end, of the 22 participants who endorsed sensation-seeking at any point in the study only 27.27\% \( (n = 6) \) endorsed it at both the initial time-point and during EMA, and none of the five participants who endorsed peer bonding at any point in the study did so at both the initial time-point and during EMA. Generally participants who endorsed a function at only one time-point did so at the initial time-point but not during EMA, but a minority of participants endorsed functions during EMA that they had not endorsed at the initial time-point.

Table 25.

<table>
<thead>
<tr>
<th>NSSI functions</th>
<th>Either time-point</th>
<th>Both time-points</th>
<th>Only initial time-point</th>
<th>Only EMA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n )  ( n )</td>
<td>( n ) (%)</td>
<td>( n )  ( n )</td>
<td>( n )  ( n )</td>
</tr>
<tr>
<td>Affect Regulation</td>
<td>39</td>
<td>38  97.44</td>
<td>1  2.56</td>
<td>0  0.00</td>
</tr>
<tr>
<td>Interpersonal Boundaries</td>
<td>27</td>
<td>11  40.74</td>
<td>11 40.74</td>
<td>5 18.52</td>
</tr>
<tr>
<td>Self-Punishment</td>
<td>38</td>
<td>36  94.74</td>
<td>2  5.26</td>
<td>0  0.00</td>
</tr>
<tr>
<td>Self-Care</td>
<td>25</td>
<td>14  56.00</td>
<td>7  28.00</td>
<td>4 16.00</td>
</tr>
<tr>
<td>Anti-Dissociation</td>
<td>33</td>
<td>18  54.55</td>
<td>14 42.42</td>
<td>1  3.03</td>
</tr>
<tr>
<td>Anti-Suicide</td>
<td>28</td>
<td>15  53.57</td>
<td>9  32.14</td>
<td>4 14.29</td>
</tr>
<tr>
<td>Sensation-Seeking</td>
<td>22</td>
<td>6  27.27</td>
<td>11 50.00</td>
<td>5 22.73</td>
</tr>
<tr>
<td>Peer Bonding</td>
<td>5</td>
<td>0  0.00</td>
<td>4 80.00</td>
<td>1 20.00</td>
</tr>
<tr>
<td>Toughness</td>
<td>31</td>
<td>13  41.94</td>
<td>17 54.84</td>
<td>1 3.23</td>
</tr>
<tr>
<td>Influencing Others</td>
<td>25</td>
<td>14  56.00</td>
<td>8  32.00</td>
<td>3 12.00</td>
</tr>
<tr>
<td>Marking Distress</td>
<td>33</td>
<td>27  81.82</td>
<td>4 12.12</td>
<td>2 6.06</td>
</tr>
<tr>
<td>Revenge</td>
<td>20</td>
<td>10  50.00</td>
<td>4 20.00</td>
<td>6 30.00</td>
</tr>
<tr>
<td>Autonomy</td>
<td>18</td>
<td>9  50.00</td>
<td>5 27.78</td>
<td>4 22.22</td>
</tr>
</tbody>
</table>
In summary, to investigate whether EMA data reflected the generalized data collected at the initial time-point, the concordance between the initial time-point and EMA were considered with regards to NSSI methods, urges, and function relevance scores. In many ways, EMA data reflected initial data in all three areas – for example, in that the NSSI functions maintained a comparable relative order of relevance, that NSSI urge severity in the week prior to study participation did not differ significantly from any of the three weeks of EMA, and participants tended to use their main and highest-frequency NSSI methods when they engaged in NSSI during EMA. Moreover, despite the small sample correlations between the historical frequency of cutting, hitting, and interfering with wound healing and the use of these methods during EMA were significant. However, there were also notable distinctions between the two modes of data collection. With regards to NSSI functions, it was notable that initial function relevance scores were higher overall than EMA function relevance scores, reflecting both the fact that participants often scored the same function differently on different days during EMA, and that some participants did not endorse functions during EMA that they had endorsed initially. There were also some cases in which participants endorsed functions during EMA that they had not endorsed initially. Some functions showed much more consistency in endorsement than others, with affect regulation and self-punishment the most likely functions to be endorsed both at the initial time-point and EMA. With regards to NSSI urges, the most notable difference between the initial time-point and EMA was within-participant variation in NSSI urge characteristics (such as how long participants spent thinking about NSSI or how difficult it was to resist NSSI urges) from one day to the next within a given week; in contrast, the cross-sectional measure generalizes about the whole week’s experience. With regards to NSSI methods, although participants were likely to use main and high-frequency NSSI methods during EMA, they also
used methods that had historically been used with lower relative frequency, and two participants used an NSSI method (in both cases, burning) that they had never used before.
Chapter 5: Discussion

NSSI is a common behaviour, particularly in young adults, that has demonstrated considerable variation in its characteristics and in the functions it serves for people who engage in it (Anderson & Crowther, 2012; Klonsky & Olino, 2008; Ross & Heath, 2002; Whitlock et al., 2008). Similarly, considerable heterogeneity has been observed between individuals who self-injure on such factors as gender, ethnocultural background, psychiatric diagnosis and symptoms, and environmental stressors such as experiences of interpersonal trauma (Bentley et al., 2015; Heath et al., 2008; Klonsky & Glenn, 2009; Zetterqvist et al., 2014). The present study was conducted to investigate the hypothesis that severity of interpersonal trauma experiences would relate to factors that have demonstrated large variation in NSSI research including the characteristics of individuals who self-injure, NSSI characteristics, and the self-reported functions of NSSI – in particular self-punishment. The present study also added to the growing body of research using experience sampling methods such as EMA to account for the repeated and urge-driven nature of much NSSI behaviour. Each of the four research questions investigated in the present study are addressed in order below; specific study limitations are incorporated as relevant. Overall generalizability and limitations of the present study are then addressed, in conjunction with future research directions. Finally, this section provides overall conclusions and covers the implications of the present study’s findings to research and clinical practice.

Interpersonal Trauma Severity, Participant Characteristics, and NSSI Acts and Urges

A range of variables were explored in descriptive and correlation analyses in terms of their relation to interpersonal trauma severity. Several NSSI characteristics were significantly correlated with trauma severity: the number of NSSI methods that participants had used, the severity of participants’ NSSI urges in the week prior to the study, and the number of NSSI
functions that participants endorsed during EMA as being relevant to their NSSI. Moreover, the number of NSSI functions remained a significant predictor of trauma severity in multiple regression analysis. Number of NSSI methods (labeled in the literature NSSI versatility e.g. Dixon-Gordon et al., 2014) has been found to relate to sexual assault and PTSD in substance-disordered patients (Dixon-Gordon et al., 2014), to emotional abuse and physical neglect in university students (Goldstein et al., 2009), and to co-occur with psychopathology and psychiatric severity in other NSSI research (Whitlock et al., 2008); higher trauma severity would also be expected to correspond with markers of psychiatric severity (Ullman et al., 2014). Number of NSSI functions has also been found to relate to NSSI severity as well as overall psychiatric severity (Zetterqvist et al., 2014). These findings may indicate an overall more complex and entrenched NSSI engagement among individuals with more severe trauma histories. Given the fact that survivors of severe and varied interpersonal trauma beginning in childhood tend to have complex symptom presentations with a range of emotional, cognitive, and interpersonal manifestations (Ford & Courtois, 2009), it would follow that NSSI could come to regulate and impact a number of areas of for individuals with severe trauma histories who engage in NSSI. The finding that NSSI urge severity score in the week prior to study participation was also higher with increasing trauma severity points to the ongoing relevance of the behaviour to participants with more severe trauma, especially in light of the additional significant positive correlations between urge severity and number of NSSI methods and functions.

Contrary to findings in the extant literature (Whitlock et al., 2008), in the present sample interpersonal trauma severity was not significantly related to several other indices of psychiatric severity such as likelihood of having received a diagnosis or past use of mental health treatment. The latter is likely accounted for by the very high treatment rate overall in the present sample, as
only six participants had never accessed mental health services; thus 91.67% had received some form of treatment. This is on the high end of treatment rates among community samples of individuals who self-injure, which range from 40 to 85% (Deliberto & Nock, 2008; Kamphuis et al., 2007; Klonsky, 2011; Lloyd-Richardson et al., 2007; Whitlock et al., 2006; Zaki et al., 2013). The high treatment rates in the present sample may reflect the inclusion criteria of repeated NSSI and access to a medical or mental health professional, although the exclusion of individuals with a history of suicide attempts, personality disorder diagnosis, and inpatient hospitalization excludes some of the self-injuring individuals likely to make the greatest use of psychiatric treatment. The high treatment rate may also reflect growing knowledge of the behaviour in the public, leading to greater likelihood of individuals who self-injure coming forward and greater awareness of treatment resources. The location of the study (Toronto, Canada) may also impact treatment history in the present sample in contrast with other existing studies in the United States; a universal health care system may increase access to affordable care, particularly in a largely university-student sample. The sample was more mixed with regards to current use of treatment services (n = 16; 41%), and use of current treatment did have a low-to-moderate correlation with interpersonal trauma severity (r = .24). Although higher frequency of NSSI did not significantly relate to interpersonal trauma as it has in some past research with adult outpatients (Wachter et al., 2009), college students (Whitlock et al., 2008), and community adolescents (Zetterqvist et al., 2014), a study with adolescent and young adult inpatients found NSSI frequency and severity to be unrelated to trauma whereas NSSI functions were (Kaess et al., 2013). Both the continuous NSSI frequency variable and the categorical NSSI frequency groups did have a low-to-moderate non-significant correlation with interpersonal trauma severity (r = .28 and Spearman’s rho = .23 respectively), and the
categorical NSSI frequency groups had the second-highest correlation with trauma severity out of all the categorical variables investigated (Table 15).

Similar to past research, participants in the present study reported a large range in the time between noticing an NSSI urge and acting on it, with the majority of participants acting within less than one hour and a small minority waiting as long as a day or more (Klonsky, 2011; Klonsky & Olino, 2008). The small sample size in the present study precluded the ability to consider much variation between participants on this variable, and instead a dichotomous variable was created differentiating individuals who engage in NSSI within an hour and those who wait longer. Although the correlation was not statistically significant, participants with higher trauma severity tended to wait less time between NSSI urges and acts than those with lower trauma severity in the present study, in contrast with research suggesting that self-injuring individuals with more severe presentations contemplate NSSI for longer before acting (Klonsky & Olino, 2008; Lloyd-Richardson et al., 2007). A short time before acting on an NSSI urge could represent lower tolerance for distress and thus correspond with higher severity, or it could correspond with less severe NSSI that has few repercussions. Future research should investigate the factors impacting time between NSSI urges and acts, both in terms of markers of severity and to explain the longer wait times such as a day or more.

There were too few non-female participants in the present sample to compare interpersonal trauma severity statistically with gender; however, it is notable that all four non-female participants had interpersonal trauma severity scores in the lower two thirds of the sample. This is largely accounted for by the fact that no non-female participants reported sexual traumas (assault/abuse or harassment) despite reporting other notable trauma experience such as physical and emotional abuse. In contrast, 43% of female participants reported experiences of sexual abuse or assault, and 40% reported experiences of sexual harassment. A similar pattern of
gendered trauma characteristics was reported in another study using the TEC with 153 outpatients, in which 37% of women reported sexual abuse and 48.9% reported sexual harassment, in comparison with 3.5% and 14% of men respectively (Nijenhuis et al., 2002).

**Interpersonal Trauma Severity and NSSI Functions**

As hypothesized, there were significant relationships between interpersonal trauma severity and NSSI functions that have face validity based on common trauma symptoms: affect regulation, interpersonal boundaries, self-care, marking distress and anti-dissociation.

Interpersonal boundaries was the strongest predictor of trauma severity and makes sense in the context of higher likelihood of both interpersonal difficulties in survivors of childhood maltreatment as well as greater likelihood of their having learned to communicate through extreme or self-damaging behaviours (Linehan, 1993). Although it is notable than none of the other functions usually categorized as social were significantly correlated with trauma, there were non-significant low-to-moderate positive correlations between interpersonal trauma and toughness ($r = .28$), influencing others ($r = .26$), revenge ($r = .22$), and autonomy ($r = .23$). As described in more detail below these functions may only be seen to be relevant in certain interpersonal situations and thus much more rarely than some of the automatic NSSI functions.

The anti-dissociation function of NSSI is likely to relate to interpersonal trauma severity in the context of the dissociative symptoms that are common in trauma survivors (Arens, 2012; Muehlenkamp et al., 2011). In this sample, anti-dissociation was only relevant to the participants with the top two-thirds of trauma severity scores, meaning that the function was not endorsed by participants with little to no trauma history. Moreover at the initial time-point, the participants with the top two-thirds of trauma severity scores all had anti-dissociation scores of 2 or higher, indicating that this function was relevant to everyone with a certain severity of trauma history.
Affect regulation likely relates to trauma severity in the context of the greater emotion dysregulation and lower levels of emotion regulation skills common to traumatized individuals (Adrian et al., 2011; Dixon-Gordon et al., 2014; Gratz, 2006; Paivio & McCulloch, 2004; Ullman et al., 2014). The relationship between the affect regulation function of NSSI and trauma severity in the present study is notable given that this function was highly relevant to nearly all participants – even those with low trauma severity – but only participants with low trauma severity had low scores. The finding of any variation in this function is notable as well given the general assumption in the literature that affect regulation is always central to NSSI (Armey et al., 2011; Kaess et al., 2013; Klonsky, 2011; McKenzie & Gross, 2014; Oyefeso et al., 2008). The pattern of endorsement observed in the present study does continue to support affect-regulation models of NSSI in suggesting that NSSI may be always or nearly always related to affect regulation, but with the addition that this function has more self-reported relevance for some individuals than others or that as suggested above, NSSI serves a more important purpose overall for some individuals than others (Zetterqvist et al., 2014).

Self-care may be related to interpersonal trauma severity in the context of self-soothing hypotheses of NSSI, meaning that traumatized individuals may begin to associate pain and injury with care and nurturance (Arens, 2012; Gallop, 2002). However, this function is little discussed in the extant literature and future research should further investigate the possible relationship of self-care-focused NSSI to trauma severity. Similarly, the marking distress function of NSSI is little discussed in the literature, and it is unclear how it may relate to interpersonal trauma severity. There is some evidence that NSSI is related to difficulties with labeling and differentiating emotions (Garisch & Wilson, 2010; Paivio & McCulloch, 2004), which may fit with using NSSI to acknowledge and reify distress in a physical manner, and which may develop in the context of invalidating environments (Linehan, 1993). However, both
of these functions require more complete treatment in theoretical and qualitative literature in order to properly discern possible relationships both to NSSI and to interpersonal trauma.

Contrary to hypotheses, self-punishment was not related to trauma severity (discussed below). As well, contrasted with the extant literature on complex and severe trauma which indicates that trauma survivors may be at higher risk of suicide and may be known for impulsive or sensation-seeking behaviour (Ford & Courtois, 2009; Linehan, 1993), anti-suicide and sensation-seeking functions actually had a low negative correlation with trauma severity ($r = -0.14$ for each). The lack of a link between interpersonal trauma severity and anti-suicide functions of NSSI may relate to limiting the sample to individuals who had never attempted suicide. As well, both of these functions had very low overall scores and a pattern of being only relevant on certain days; the brevity of the present study may make it difficult to detect relationships between interpersonal trauma severity and experiences that occur more rarely.

Interpersonal boundaries and to a somewhat lesser degree anti-dissociation functions of NSSI remained important predictors of interpersonal trauma severity even after controlling for the number of functions that participants endorsed. This indicates that it is the particular functions of NSSI that are important with increasing trauma severity rather than just the number of functions and is important to the creation of a more complete theory of NSSI as relates to interpersonal trauma.

**Interpersonal Trauma Severity and Self-Punishment**

The data collected in the present study did not support the hypothesis that the self-punishment function of NSSI would be endorsed as more relevant by participants with higher trauma severity. This runs counter to the common theory that the self-directed anger and disgust reported by self-injuring individuals is developed through maltreatment experiences (Chapman et al., 2006; Wachter et al., 2009; Weismoore & Esposito-Smythers, 2010). In fact, self-
punishment had one of the weakest correlations with interpersonal trauma severity out of all of the NSSI functions assessed ($r = .13$). It is notable that in the present sample, all except two participants reported at least some history of interpersonal trauma. Few past studies on NSSI in community populations report the proportion of individuals who self-injure who have experienced interpersonal trauma more broadly; however, based on the existing literature, the present sample was much more likely to report such a history, with 94.87% reporting a trauma history as opposed to 54 to 64% in other NSSI samples (Evren et al., 2011; Kaess et al., 2013; Whitlock et al., 2006). It may be that self-punishment is more important to the presence or absence of trauma than to severity once trauma is present, or that a relationship would have been visible in a larger sample or one with more participants with low-severity trauma histories. For example, all six of the participants who had mean EMA self-punishment scores below 1.5 had trauma severity scores of 14 or lower (Figure 5).

In the present study, small sample size in conjunction with the overlap between trauma types and ages when trauma occurred precluded comparing between trauma characteristics such as trauma type, developmental stage, and relationship to perpetrator even though there was information about these characteristics. Thus, it was not feasible to investigate whether the hypothesized relationship between self-punishment and trauma existed at any of these junctures. Notably, the high co-occurrence between trauma experiences in most trauma survivors often interferes with clear comparison between these variables, and may render statistical differences somewhat artificial (e.g. Wachter et al., 2009; Weismoore & Esposito-Smythers, 2010). It may also be that the participants who had lower trauma severity scores but high self-punishment scores had invalidating or damaging interpersonal experiences that led to the relevance of self-punishment for them, but which may not be captured by standard measures of trauma.
Self-punishment received very strong endorsement in the present study in terms of its self-reported relevance to NSSI, and was endorsed as at least somewhat relevant to NSSI by nearly all participants and on nearly all days when NSSI urges or acts were reported. For example, 97.44% of participants endorsed self-punishment as at least somewhat relevant to their NSSI at the initial time-point and 94.74% during EMA, in comparison with similar cross-sectional community and clinical studies finding endorsement by up to 70% of participants (Kaess et al., 2013; Klonsky, 2009 & 2011; Oyefeso et al., 2008). This was unexpected due to the treatment in the extant literature of self-punishment as secondary and largely encompassed by the affect regulation function of NSSI (Armey et al., 2011; Chapman et al., 2006). The importance of self-punishment in the present study, particularly during EMA when it was endorsed as relevant on over 80% of all NSSI urge/act days, indicates the necessity of further highlighting this NSSI function and theoretically-related variables such as hostility, self-criticism and low self-esteem in ongoing explanatory theories of NSSI – and not solely with regards to interpersonal trauma or as subsidiary to affect regulation (Baetens et al., 2015; Cohen et al., 2015; Ross & Heath, 2003; Victor & Klonsky, 2014).

Despite the general importance of self-punishment in the present study there was considerable variation observed in self-punishment scores, both between and within participants and in notable contrast to the relative consistency of affect regulation scores. For example, nearly half of the participants who endorsed self-punishment during EMA had a range of 4 or more points between their highest and lowest self-punishment scores, indicating that self-punishment was not relevant to some of their NSSI urges or acts and very relevant to them during other NSSI urges or acts. In contrast, only 18.42% \( (n = 7) \) of participants had a range that large in their affect regulation scores during EMA. In addition, the finding that 10 participants had self-punishment scores of 3 or lower at the initial time-point in comparison with only four
participants for affect regulation indicates that some individuals who self-injure consider self-punishment to be relatively irrelevant to their NSSI engagement. Given the lack of observed relationship between self-punishment and interpersonal trauma, the present study included exploratory analyses to identify whether any of the range of assessed demographic or NSSI variables might correlate with self-punishment. Only currently accessing mental health treatment was significantly correlated with self-punishment ($r = .40$, and $r = .31$ between self-punishment and past use of treatment). There is no clear theoretical or empirical explanation for this finding, and it would be worth investigating further. It is possible that self-injuring individuals who engage in NSSI to punish themselves tend to have other characteristic psychiatric symptoms or specific psychiatric severity that makes concurrent treatment more likely, despite a lack of clear relationship with indicators of psychiatric severity in the present study (e.g. having a diagnosis). For example, if the self-punishment function of NSSI is linked – as theorized, and with some support in the extant literature (Glassman et al., 2007) – to low self-esteem and high self-criticism, individuals who self-injure for a self-punishment function may manifest depressive disorders, anxiety disorders, or generally poor self-treatment in their daily lives. Perhaps they may conversely be more likely to regard themselves as flawed, and thus to seek treatment to remedy their flaws.

It is also notable that the self-punishment function of NSSI did not significantly correlate with any other NSSI functions assessed in the present study, either at the initial time-point or with the summary scores from EMA. The highest correlations by far were with affect regulation ($r = .30$ at the initial time-point, $r = .21$ at EMA) and revenge ($r = .31$ at the initial time-point, $r = .25$ at EMA). A relationship between self-punishment and these variables would fit well with Ross and Heath’s (2003) Hostility Model of NSSI, in which both intrapunitive and extrapunitive hostility were high in conjunction with anxiety. However, the lack of clear co-occurrence of
self-punishment and affect regulation as well as the fact that self-punishment sometimes scored higher than affect regulation suggests that the self-punishment function of NSSI is at least qualitatively distinct from the affect regulation function for some individuals who self-injure.

**Comparing Cross-Sectional and EMA Findings**

The present study included both cross-sectional and experience-sampling methods, and the fourth research question used description and statistical analyses to compare the findings from these with the aim of clarifying the additional contributions of experience-sampling to NSSI research as well as further validating the methodology. In addition, this section will make some comparison between the EMA findings from the present study and both cross-sectional and EMA studies in the extant literature. In many ways, EMA data reflected cross-sectional data; however, some important information was only available from EMA. This was especially the case with regard to variation on responses from one NSSI urge/act day to the next.

**NSSI methods.** NSSI method data collected with cross-sectional and EMA methods showed both similarities and differences. Given the small number of participants who engaged in NSSI during EMA and also reported the method(s) they used (n = 15), the results regarding NSSI methods should be treated as preliminary. However, the finding that three methods had significant positive correlations between historical frequency and their use during EMA (cutting, hitting, and interfering with wound healing) are very promising given the lower statistical power afforded the small sample. Such findings suggest that the EMA methodology provided a good example of participants’ usual NSSI behaviour, as well as suggesting that participants were relatively accurate in estimating in cross-sectional research which were their more versus less frequent NSSI methods.

Nearly all participants used NSSI methods during EMA that they had reported using previously, supported by significant chi-square analyses for all methods except for cutting and
severe scratching (which had both still had low-to-moderate effect size and had been used historically by the vast majority of participants) and sticking needles into skin (which had been used historically by very few participants and only used by one participant during EMA). Two participants also reported NSSI methods during EMA that they had not endorsed using at the initial time-point. It is possible that their historical reporting was somewhat inaccurate, or that EMA reporting captured a shift in their NSSI behaviour; either way, this finding supports the continued use of EMA as well as longitudinal research to improve understanding of how NSSI methods change over time. To my awareness, no empirical research to date has tracked shifts in NSSI method use, which is likely important to understand given the finding that NSSI versatility is an indicator of a more severe overall presentation (Dixon-Gordon et al., 2014; Whitlock et al., 2008).

Ten out of the 11 participants who had used NSSI during EMA and reported at least one historical main NSSI method used at least one of their main methods during EMA, suggesting both that this would also be a fairly accurate predictor of NSSI use during EMA and that EMA provided a good sample of participants’ usual NSSI engagement. However, eight of these 10 participants also reported using methods during EMA that they had not labeled as main methods, suggesting that assessing one or two main methods does not provide a complete picture of NSSI use during a given period. Similarly, 11 of 15 participants used the NSSI method during EMA for which they had reported the highest historical frequency; however, lower-frequency methods were also used by the bulk of participants, and often more than once. Thus, it is likely best for research to ask about and track multiple NSSI methods in both cross-sectional and EMA research rather than relying on a summary variable to represent use, at least with individuals who engage in repetitive and chronic NSSI. However, if the aim is to collect
data regarding particular more-severe NSSI methods during EMA, it may be helpful to use historical high-frequency or current “main method” information for screening.

**NSSI urges.** Nearly all of the indicators used found strong concordance between NSSI urge information collected at the initial time-point and during EMA. There was a strong correlation between urge severity at the initial time-point and averaged across EMA as well as with the number of NSSI urge/act days reported, and the strength of the most severe urge in the week prior to the study did not differ significantly from the strength of the most severe urge in any of the three EMA weeks. There were also a lot of qualitative similarities overall in the responses participants gave on the ABUSI and ABUSIMod, for example in generally thinking about NSSI a similar number of times in a week and for a similar amount of time – even with the modification of the original ABUSI to conform with daily data collection. However, there was within-participant variation apparent in ABUSIMod responses that is not captured in a measure that generalizes across a week. For example, 30 out of the 31 participants reporting more than one urge/act day reported different urge intensities on different days, and 29 reported different levels of difficulty in resisting NSSI. This information is particularly informative for treatment planning, especially in light of the fact that on almost no days did participants report urges that were difficult as opposed to impossible to control. For participants in the present study, it appears that once urges surpassed moderate intensity, they were acted on. This is reflective of findings in a past EMA study, in which when NSSI thoughts were very severe, they nearly always led to NSSI acts (Nock et al., 2009). It may be particularly important for treatment to target the most intense urges in order to reduce NSSI acts, rather than focusing on all urges. Moreover, such patterns could be tracked daily by a patient in order to determine the factors most likely to lead to NSSI in that patient. A sign of treatment progress could be in either a higher proportion of less intense urge days, or a higher proportion of days when urges were
difficult to resist but resisted regardless. A weekly measure might mask such gains, making it more difficult to track areas of effectiveness or difficulty in program evaluation or treatment progress research.

The Friedman’s ANOVA comparing the most severe NSSI urge in each week of study participation found evidence of a reduction of NSSI urge strength over time. Although the reduction was not dramatic, it was significant; this is an important finding with regards to future EMA research, as it suggests that EMA may impact NSSI. Anecdotally, several participants in the present study reported in the debrief conversation that the study did not reduce their NSSI urges but did make it easier to resist acting on them; however, other participants noted that there seemed to be no impact on their NSSI and some noted slight increases in NSSI urge intensity when completing the EMA measures. Thus, there may not be a uniform impact of EMA participation on NSSI. It is also possible that participants self-selected for the study at a time when their NSSI urges were particularly relevant, which may have naturally reduced with time. Future EMA studies would benefit from including a control group that does not track NSSI daily to better understand the impact of tracking on NSSI urges by the end of the study.

**NSSI functions.** NSSI mean function scores were all higher at the initial time-point than during EMA, although it is notable that both are comparable to past research with the ISAS (Klonsky & Glenn, 2009; Sadeh et al., 2014). The difference between initial and EMA function scores may be accounted for by a number of factors. Several participants who endorsed functions at the initial time-point did not endorse them during EMA, possibly pointing to the relevance of certain NSSI functions to particular times in an individual’s life. In addition, functions that were endorsed by a participant on one day during EMA were not necessarily endorsed on other days, pointing to the relevance of some NSSI functions to specific instances of NSSI. In the present study, some function means were particularly shaped by within-
participant variation. For example, initial function scores were especially higher than EMA scores for anti-dissociation and toughness – impacted by the fact that many participants who endorsed these functions at the initial time-point did not endorse them during EMA – and anti-suicide, impacted by the fact that participants who gave it very high scores at the initial time-point gave it low scores during EMA. Dissociative symptoms and suicidal urges represent very specific types of distress and intrapersonal experience, making them relevant potentially less often than more generalized forms of distress that might precipitate the marking distress or affect regulation functions. In support of this assertion, Nock et al. (2009) found that suicidal thoughts very rarely co-occur with NSSI thoughts. However, this does not mean that these two functions are not very relevant to NSSI at some times, as evidenced by the higher scores they received from some participants at the initial time-point and on some days during EMA (Figure 4). The toughness function is rarely addressed in the extant literature and it is unclear why it might be relevant at some times and not others; this would warrant further research. In addition to anti-dissociation, anti-suicide, and toughness functions of NSSI, interpersonal boundaries, sensation-seeking, and influencing others were all endorsed at the initial time-point but not during EMA by at least 32% of the participants who endorsed them at all. These three functions tend to be categorized as social (the sensation-seeking scale includes both items referring to the self and others), and may only be relevant when certain types of interpersonal situations occur or even co-occur with a certain level of distress. This is particularly relevant in relation to the generally lower ratings of social NSSI functions in the literature as compared to the automatic functions (Klonsky & Glenn, 2009; Snir et al., 2015). It may be that automatic functions are actually more important, but it may also be social functions are equally important at times when interpersonal concerns are more prominent. For example, in a sample of self-injuring individuals with BPD automatic functions received higher endorsement among participants with more
dysregulated emotion, while social functions received higher endorsement among participants with more interpersonal symptoms (Sadeh et al., 2014).

Findings in the present study suggest that the mean self-reported relevance scores for NSSI functions reported in cross-sectional research may provide incomplete information, as they do not account for the variable impact of relevance at some times but not others as well as the relevance to some individuals but not others. Emphasizing the differential relevance of the NSSI functions to different individuals and at different times is particularly important in light of the fact that nearly all the NSSI functions received a score of 5 or 6 out of 6 by at least one participant on at least one day, and were often scored as high as or higher than affect regulation. This is in line with past research using the ISAS, in which all NSSI functions received at least one score of 5 or 6 (Sadeh et al., 2014). In addition, although the peer-bonding function received almost no endorsement in the present study, some participants noted anecdotally that this function was relevant to them when they were adolescents. Changes in the relevance of a given NSSI function to a given individual – either from day to day or at different times in the person’s life – are rarely if ever addressed in the literature as shaping explanatory models of NSSI. This may help explain differences in NSSI function scores between samples, as in one adolescent study in which trying to get a reaction from someone and getting control of a situation were scored as highly as affect regulation (Lloyd-Richardson et al., 2007).

For all of the NSSI functions except for affect regulation and self-punishment, a small number of participants endorsed them during EMA who had not endorsed them at the initial time-point, with the highest occurrence of this with sensation-seeking, revenge, and autonomy (see Table 13). This is important in challenging the accuracy of cross-sectional research regarding NSSI functions, in that these participants may not have remembered times when these functions were relevant or may not have reflected before on what functions NSSI was serving
for them. The utility of tracking NSSI triggers in treatment models such as DBT (Linehan, 1993) points to the idea that individuals may gain self-awareness from tracking NSSI that they may not have when reflecting retrospectively. In support of tracking NSSI as a means of developing accurate responses for research, several participants reported in the debrief conversation at the end of EMA that they had learned much about their NSSI engagement and that they had never previously considered the functions that the behaviour serves for them. Alternatively, occurrences of new function endorsements during EMA may relate to changes in the participants’ experience of NSSI relative to their historical NSSI engagement, indicating the importance of continuing to research NSSI as a behaviour that shifts over time (Barrocas et al., 2015; Klonsky, 2011; Whitlock et al., 2006).

There were strong positive correlations between all of the initial function scores and mean EMA function scores as well as between the number of functions endorsed at the initial time-point and during EMA. The relative relevance of the functions in comparison with each other remained nearly identical at the initial time-point and at EMA, and was nearly identical to that reported in other research using the ISAS (Klonsky & Glenn, 2009; Sadeh et al., 2014), suggesting that overall, the same functions will be scored as highly, moderately, or less relevant. These findings indicate the overall similarity of some information gathered by these methods, supporting the continued utility of cross-sectional research for assessing NSSI functions but also supporting the feasibility of using a relatively brief period of EMA to summarise participants’ NSSI function endorsement. It is possible to hypothesize from these findings that individuals who self-injure are likely to maintain some overall stability in the NSSI functions they endorse, that self-injuring individuals who score a function highly relative to other individuals are likely to continue to do so during EMA, and that self-injuring individuals who consider several functions to be relevant to their NSSI will continue to evidence more varied function
endorsement during EMA. However, the findings detailed above emphasize that much information is available from EMA that would not be possible to glean from cross-sectional research, including the extent to which functions receive low scores simply because they are relevant on some days but not others as opposed to always having low relevance. Similarly, information can be gleaned through cross-sectional research that may not be apparent from EMA research, such as which functions have been relevant in the past to an individual even if they are not relevant at the time of the study.

**Generalizability, Limitations, and Future Directions**

**Generalizability of the present sample.** Very specific inclusion and exclusion criteria were used to select the sample for the present study in order to increase the likelihood of observing NSSI urges and acts (repetitive NSSI history, recent NSSI urges) and in order to select participants appropriate to a more demanding study (age 18 or over; no history of suicide attempts, psychotic disorder or personality disorder diagnoses, or inpatient hospitalization; current access to a medical/mental health practitioner); in addition, participants were required to provide emergency contact information. Likely as a result, the sample was highly educated, had high likelihood of past outpatient mental health treatment (as discussed above), and had high historical NSSI frequency.

NSSI frequency in the present sample is difficult to compare with past research due to the common use of upper limits such as 10, 20, 50, or 500 instances in NSSI measures or in publications (e.g. Cohen et al., 2015; Whitlock et al., 2008; Zetterqvist et al., 2014), despite research showing that some individuals engage in NSSI as often as multiple times per day and often for months or years (Barrocas et al., 2015; Ross & Heath, 2003) and that individuals who self-injure use an average of three to seven NSSI methods (Armey et al., 2011; Bresin et al., 2013; Victor & Klonsky, 2014; \( M = 5.15 \) in the present study). However, NSSI frequency in the
present sample appears high relative to several past community young adult samples (Arens, 2012; Bresin et al., 2013; Victor & Klonsky, 2014) with 34.21% of participants reporting more than 300 past NSSI instances. The NSSI frequencies reported in the present study suggest that the estimates provided by much past research may be very low – as fewer than one third of participants in the present sample reported historical NSSI frequency below 50. However, many participants in the present study commented anecdotally that it was very difficult to estimate how many times they had engaged in a behaviour they had often been using for ten years or more. It is not possible to fully eradicate such memory bias, although future studies might consider integrating instructions to help participants create a more informed estimate; prospective longitudinal studies are needed to help track actual NSSI frequency over the full length of engagement in the behaviour. In addition, more studies are needed that do not indicate an upper limit for NSSI frequency and it is important for publications to report the full range of participants’ historical frequencies so that comparison between studies is possible.

The sampling decisions made in the present study introduce limitations with regards to the generalizability of findings, particularly to adolescents, inpatient populations or those with serious mental illness, individuals who engage in occasional or experimental NSSI, individuals with lower SES, and individuals who have never revealed their NSSI to others. However, the newness of using EMA to study NSSI justifies its application to a more limited population while its feasibility and best practices are established; the most successful EMA studies of NSSI to date have used similarly limited samples (e.g. Nock et al., 2009). In fact, the extant literature indicates that there are clinically-relevant variations in individuals who self-injure based on such variables, and that it may make sense to differentiate groups rather than studying all individuals who self-injure together (Barrocas et al, 2015; Klonsky & Olino, 2008; Whitlock et al., 2008). The present study will be of particular interest to clinicians working with self-injuring
individuals common to adult outpatient treatment: university-aged individuals who began using NSSI in their adolescence and for whom it remains problematic, and who are relatively high-functioning but present with a level of clinical severity. It is also particularly applicable to the study of continued and chronic NSSI as opposed to single-instance or experimental NSSI, and it adds to the growing literature that treats NSSI as transdiagnostic rather than as generally occurring in conjunction with BPD or suicide attempts (Bentley et al., 2015; Nock et al., 2006).

The sample used in the present study had a very low number of male participants ($n = 3$). This limits the generalizability of the findings to individuals who self-injure as a population, as the majority of research finds similar or equal prevalence and frequency of NSSI in males and females (Heath et al., 2008; Klonsky, 2011; Klonsky & Glenn, 2009; Klonsky & Olino, 2008; Oyefeso et al., 2008). While the findings of the present study should not be assumed to generalize to males they may still be compared to existing NSSI research, which has largely focused on females (e.g. Bentley et al., 2015; Muehlenkamp et al., 2009; Nock et al., 2009).

There was also one participant in the present sample who declined to report a gender. Given the findings that minority sexual orientation is an important predictor of NSSI (Deliberto & Nock, 2008; Gratz, 2006; Ray-Sannerud et al., 2015; Whitlock et al., 2006; and supported by the data in the present study) and the dearth of research assessing NSSI in individuals with minority gender presentations, I felt it was important to retain this participant’s data in analyses despite potential complications regarding gender labeling and generalizability. Future research should address NSSI in individuals with non-binary or other minority gender presentations as well as individuals with minority sexual orientations, and should practice targeted recruitment of male or mixed-gender samples.

Very few past EMA studies have investigated NSSI engagement in samples who all have a history of the behaviour; instead, some studies have tracked NSSI in individuals with
particular psychiatric disorders of interest (Personality Disorders, Bulimia Nervosa) without necessarily reporting the rates of the behaviour among those with a history of NSSI in particular (Muehlenkamp et al., 2009; Snir et al., 2015), and other studies report the emotions (Victor & Klonsky, 2014) or NSSI urges (Bresin et al., 2013) of individuals who self-injure without reporting NSSI acts. As a result, it is only possible to compare the NSSI act rates from the present study to three other studies (Armey et al., 2011; Nock et al., 2009; Zaki et al., 2013). The percentage of participants who engaged in NSSI during the present study was just under half, which is lower than in Nock et al. (2009) but comparable to Armey et al.’s (2011) findings. The number of NSSI acts reported per week in the present study was quite comparable to past studies, both overall and per person (Armey et al., 2013; Nock et al., 2009; Zaki et al., 2013). It is notable that all 16 participants who engaged in NSSI during the present study had most recently engaged in the behaviour within the previous 4 months, whereas generally studies have used past-year NSSI as an inclusion criterion (Armey et al., 2011; Nock et al., 2013); in future, EMA studies tracking NSSI may want to more stringently limit inclusion based on NSSI recency.

Assessment of trauma severity. The trauma measure used in the present study (the TEC) was chosen for the comprehensiveness of its trauma severity score, in contrast with measures that are limited to fewer trauma types or do not account for characteristics such as duration or impact. However as a result, higher TEC scores may not only reflect higher trauma severity but higher trauma complexity (e.g. the co-occurrence of multiple trauma types with multiple perpetrators, and trauma of very long duration). There is increasing evidence that interpersonal trauma of high complexity and duration, or Type II trauma, tends to correspond to particular symptom presentations that may be distinct from the presentations of survivors of even very severe single-instance trauma, often referred to as Type I (e.g. Ford & Courtois,
It is possible that the findings of the present study apply more to high-complexity trauma than solely high-severity trauma, as in a sample with extensive trauma histories it would be unlikely for a participant with one or two trauma experiences to have a comparatively high TEC score. Notably, only two participants in the present study reported a diagnosis of PTSD, which would tend to correspond more to Type I trauma presentations (Ford & Courtois, 2009). This is in contrast to the past literature, in which rates of PTSD have been high among individuals who self-injure (Bentley et al., 2015; Evren et al., 2011; Hulbert & Thomas, 2010), and is particularly notable in light of the fact that interpersonal trauma severity was not found to correlate with having a diagnosis. It is possible that PTSD is underdiagnosed in the present sample, and it is also possible that the TEC overrepresent the severity of trauma experiences and impact. Limitations of the present study include the lack of specific behavioural questions to better identify trauma experiences as well as a lack of comprehensive measures of impact or related trauma symptoms to confirm diagnosis (e.g. Peirce, Burke, Stoller, Neufeld, & Brooner, 2009). Future research should consider whether more complex (Type II) and single-instance (Type I) trauma presentations differentially relate to NSSI features, and should include consideration of the relationships between specific trauma-related symptoms and NSSI functions.

**Methodological limitations.** The present study has some methodological limitations. The decision was made to use a daily diary model in order to increase compliance and completion rates rather than a more complex model using signal- and event-contingent responding. Thus, results are based on summary measures (generalized from each day as a whole) rather than on each specific instance of NSSI, and may suffer from memory bias. In addition, for those participants with more than one NSSI urge and/or act in a given day, these data are generally conflated rather than considered separately. More complex EMA research is
needed especially regarding NSSI functions and how these may relate to specific instances of NSSI, as well as to contextual factors such as mood and interpersonal conflict that are best addressed with signal-contingent responding.

Although both NSSI urges and acts were assessed in the present study and at times were considered separately in statistical analyses, the decision was made to combine urges and acts in the calculation of NSSI function scores and the subsequent analysis of the relationship between NSSI functions and interpersonal trauma. This decision was important to the maintenance of statistical power in multiple regression analyses, and descriptive investigation of the data did not show obvious differences between NSSI functions associated with urges and acts. Moreover, the conflation of NSSI urges and acts is common in other EMA studies (Snir et al., 2015; Zaki et al., 2013). However, little research has considered possible differences between the characteristics and correlates of NSSI urges and acts, and it has been suggested that the two may differ (Bresin et al., 2013). Future research should consider whether NSSI functions may help differentiate NSSI urges where no acts are engaged in from NSSI acts.

The sample size used in the present study limited the statistical power available to conduct certain analyses of interest, such as considering NSSI urges and acts separately and examining variation in the time between urges and acts; this also limited the number of predictors that could be included in multiple regression analyses, particularly with regard to the relationships between the NSSI functions and interpersonal trauma severity. However, the sample size was comparable to other EMA studies (Armey et al., 2011; Nock et al., 2009; Victor & Klonsky, 2014; Zaki et al., 2013). Despite the limitations of a small sample, a benefit was improved opportunity for rich descriptive consideration of variation on variables such as trauma history and NSSI functions in a way that is rarely feasible with large samples.
**Future directions in the understanding of NSSI functions.** The findings in the present study as well as some of its gaps point to several important research directions, especially with regards to clarifying the breadth of and relationships between NSSI functions, as well as the role of NSSI functions in understanding NSSI overall and in specific populations.

With regard to next steps in addressing the plurality of NSSI functions, both short-term and long-term patterns in NSSI function endorsement should be investigated using longitudinal studies as well as longer-term and more complex EMA studies with larger samples. Going forward, it will also be increasingly important to account for the contextual and environmental factors – both distally, such as interpersonal trauma history, and proximally, such as an immediate instance of interpersonal conflict – that correspond to the relevance of NSSI functions for one individual but not another and at one instance of NSSI and not another; both longitudinal and EMA methodologies are well-situated to include such measures. In conjunction with quantitative research, however, theoretical writing and in-depth qualitative research are needed to account for the empirical findings that the NSSI functions may be more complex than indicated by a single label such as experiential avoidance (Chapman et al., 2006) or by separation into only a few factors (Nock & Prinstein, 2004 & 2005). Although such models provide useful groundwork and have been demonstrated to summarise some of the most universal elements of NSSI, it is important to expand them to account for variation and heterogeneity.

Findings regarding the high relevance of the self-punishment function in the present study as well as lack of clear relationship to interpersonal trauma severity were surprising given the existing treatment of this function as secondary as well as widely-cited theories regarding maltreatment (Armey et al., 2011; Chapman et al., 2006; Wachter et al., 2009; Weismore & Esposito-Smythers, 2010). Future research using other trauma-related variables such as
presence/absence of trauma or trauma type should be conducted. Moreover, qualitative research would be helpful to elucidate self-injuring individuals’ understanding of the development and source of self-directed anger and disgust in that it may uncover common environmental or personality-based factors in the development of this NSSI function. In addition, it will be important going forward to investigate the particular nature of self-punishment in NSSI including how it is reinforced, how it develops, how it is manifested, and whether it is specific to NSSI or generally relevant to other experiential-avoidance or self-damaging behaviours such as substance abuse and binge eating. The multiple definitions and measurement scales of self-punishment should also be addressed, for example the extent to which punishment is itself central as opposed to expressing self-disgust or anger. Future research should address the apparently important role of self-punishment rather than treating it as secondary; for example, research on the EAM should account for how self-punishment can be related to NSSI’s reinforcement through the regulation of affect and the avoidance of unwanted experiences, and future research on the FFM should clarify – both theoretically and empirically – self-punishment’s placement in the automatic positive reinforcement factor.

Conclusions

The present study addressed methodological gaps in past research through the use of experience-sampling, comprehensive and detailed measures of trauma and NSSI, and a focus on individuals who have engaged in NSSI repeatedly and for whom NSSI is currently relevant. The present study also addressed theoretical gaps in past research by addressing interpersonal trauma experiences as a source of heterogeneity in NSSI rather than a predictor of the presence or absence of the behaviour, and by addressing the role of underresearched NSSI functions such as self-punishment that are theorized to be linked to trauma. There was considerable support for the feasibility and utility of EMA research of NSSI. Participants’ experience of NSSI functions
– including both specific theoretically-relevant functions such as anti-dissociation and interpersonal boundaries as well as the overall number of endorsed functions – was particularly important with increasing trauma severity above and beyond the relationship of trauma severity to other demographic, NSSI, and mental health indices. In addition, the variable relevance of NSSI functions on different days was addressed descriptively, expanding on the cross-sectional research demonstrating variation in NSSI functions between individuals who self-injure.

Although the self-punishment function of NSSI did not correlate with trauma severity, the specific relevance of self-punishment to the vast majority of self-injuring individuals was highlighted and supported through experience sampling.

The findings of the present study provide support for using interpersonal trauma not only to predict presence or absence of NSSI but in accounting for heterogeneity in NSSI. In the present study, NSSI functions (both the specific functions and the number of endorsed functions) were particularly important in relation to interpersonal trauma. There is a need for NSSI models that draw together research regarding distal contextual factors such as trauma and the various manifestations of NSSI, rather than solely considering these elements separately. The variable relevance scores of some NSSI functions but not others in the present study also supports the differential assessment of and accounting for multiple NSSI functions, as opposed to focusing primarily on affect regulation or on automatic/social and positive/negative reinforcement binaries. Future research into either the EAM or the FFM, both of which have much empirical support (e.g. Armey et al., 2011; Kamphuis et al., 2007; Klonsky & Glenn, 2009; Lloyd-Richardson et al., 2007; Nock & Prinstein, 2004 & 2005; Sadeh et al., 2014; Victor & Klonsky, 2014), should include theoretical and empirical consideration of the plurality of NSSI functions and their differential relevance to different NSSI acts/urges as well as to different individuals. For example, self-punishment has been under-researched and under-
explained as a function of NSSI, and it is often subsumed under other headings such as affect regulation or automatic positive reinforcement. Whether or not self-punishment ultimately serves an affect regulation function, self-punishment-related statements are distinct enough to that they were endorsed by nearly the entire present sample on almost all NSSI urge and act days, and self-punishment was the only NSSI function not to significantly correlate with any other functions either through cross-sectional or EMA data collection. The possible distinctiveness of the range of NSSI functions has been underemphasized in the focus on developing a unifying theory of NSSI. Differential investigation and explanation of the range of NSSI functions may help explain why NSSI is selected over other self-destructive or affect regulation behaviours, as well as explaining some of the heterogeneity in NSSI and in the individuals who engage in it.

The present study found that in many ways, EMA findings reflect cross-sectional findings indicating both the relevance and feasibility of EMA research and the ongoing utility of cross-sectional research when experience-sampling methods are not called for. The two methods provided different although compatible information, and should continue to be used together. For example, cross-sectional assessment of NSSI functions allows for a historical overview of all the functions that have been relevant to an individual, whereas EMA assessment allows for tracking the relevance of specific functions to particular NSSI acts or urges or in particular periods of stress or conflict and would strongly benefit from inclusion of measures of contextual factors that impact ongoing NSSI experience. The high completion rates and considerable sampling of NSSI urges and acts collected in the present study also point to the potential utility of cross-sectional metrics such as determining an individual’s highest-frequency NSSI method and recency of NSSI urges and acts for delineating a strong EMA sample.
The findings of the present study have important clinical implications. The specific relevance of certain NSSI functions to interpersonal trauma severity indicates the importance of targeting specific symptoms of trauma related to interpersonal concerns – particularly with regards to intimacy and distance – and dissociative symptoms – in this study, particularly derealisation and depersonalization – in order to reduce NSSI. Moreover, both the specific NSSI functions and the number of NSSI functions endorsed were distinctively related to trauma severity above and beyond a range of other NSSI characteristics such as NSSI frequency, versatility, or impulsivity. With regards to treatment, this indicates the particular importance of addressing the functions that NSSI serves for trauma survivors in addition to or instead of focusing on reducing the behaviour itself. The considerable importance of self-punishment in the present sample suggests the utility of emphasizing this NSSI function in treatment for all individuals who self-injure regardless of trauma history; for example, self-care and self-compassion skills could be equally emphasized with affect-regulation skills, and negative views about the self could be directly assessed and targeted.

Similar to the importance of considering the multiplicity of NSSI functions in research, clinicians should also consider that NSSI may serve a range of functions that may vary from day to day. In addition, the present study’s findings highlight the importance of addressing NSSI urges rather than solely acts: NSSI acts in the present study were more common among participants with a large number of urges, and it was very rare for participants to report urges that were difficult to resist without acting on them. NSSI treatment may benefit from focusing on coping with and reducing NSSI urges, and in particular on skills for resisting the strongest NSSI urges. Tracking NSSI urges and acts during treatment may help to clarify and address the multiple functions of NSSI, and the finding of reduced NSSI urge strength across study participation implies that tracking may be inherently therapeutic.
References


findings from experimental and ecological momentary assessment studies and future directions. *Journal of Clinical Psychology, 00(00)*, 1-14.


blame as mediators of sexual abuse and psychological symptoms in adult sexual assault.

*Journal of Child Sexual Abuse, 23*, 74-93.


Appendices

Appendix A. Information letter

Research Study: The functions, characteristics and correlates of non-suicidal self-injury in young adults

My name is Sarah Horowitz and I am a graduate student in Psychology at the Ontario Institute for Studies in Education, University of Toronto. I would like to invite you to participate in a study that I am conducting with young adults who, at some point in their lives, have intentionally caused themselves physical injury without intending to die. The study is under the supervision of Professor Lana Stermac and will help fulfill the requirements for my Ph.D. degree.

WHAT IS THIS STUDY ABOUT?
Non-suicidal self-injury is a behaviour that many people engage in because it serves one or more functions, such as helping to reduce uncomfortable feelings or to distract from emotional pain. The purpose of this research is to learn about the sorts of functions self-injury serves for people who have engaged in it, not only in general but over a period of time. This study will also look at various life experiences of individuals who have self-injured, and at how often individuals who have self-injured either engage in self-injury or experience an urge to do so. This research will help us understand a range of factors that may influence engagement in self-injury, and how these factors differ between different people.

For the study, I am looking for individuals who:

- Are between the ages of 18 and 30, and
- Have engaged in self-injury that was not a suicide attempt at least 5 times in their lives, and
- Continue to experience urges to self-injure (even if you do not act on them), and have experienced at least 2 such urges in the past month, and
- Are willing and able to commit to responding to a brief daily survey about any self-injury-related thoughts or actions for a full 21 days, and
- Are willing and able to identify a medical/mental health professional (e.g. family doctor, therapist, psychiatrist, university health centre) that the individual could contact if in distress or in need of support
- Are willing and able to provide contact information for a medical/mental health professional or other trusted adult who could be contacted by the researchers in case of emergency
- Live in the Greater Toronto Area, to make an in-person interview possible.

WHAT WILL I BE ASKED TO DO?
Initially, you will be contacted by phone and asked several questions to determine your eligibility for participation in the study. You will be asked to participate in one in-person interview that will last for 60-120 minutes. You will have the opportunity to ask questions about the study both by phone and at the interview. After the interview, you will be asked to fill out one 5-minute electronic survey every day for 21 days. After the 21-day period, you will be asked to debrief in person or by phone about your experience in the study.
In the interview, you will be given several paper-and-pencil questionnaires about your demographic characteristics, your experiences of self-harm, and several negative life experiences you may or may not have had. You will also be asked to indicate a medical or mental health professional you have access to in case of distress, and to provide contact information for an adult that study personnel may contact if you indicate during the study period that you are at risk for serious physical harm. At the interview, the daily electronic survey procedure will be explained to you, and a test email will be sent to you to verify ease of participation.

A reminder email with a link to the daily survey will be sent to the email address you designate early each morning; you can also access the survey with the link written on a card given to you at your first study meeting. If possible, you should complete the survey at approximately the same time every day. We recommend that you complete the survey first thing in the morning; however, it is important to find a time that is easiest for you to remember, and at which you have sufficient time and privacy, as well as access to any needed supports. The survey will consist of questions about your experience of self-harm urges or behaviours in the previous 24 hours, and will take approximately 5 minutes to complete. It is important for you to complete the survey every single day, so that you are providing information that is current, complete, and accurately reflects your experience.

**DO I HAVE TO PARTICIPATE?**

Your participation in this research is completely voluntary. You may refuse to participate at any time, decline to answer any questions, and even withdraw during the course of the interview without any negative consequences. You may withdraw from the study at any time, up until the end of final data collection; at that time, any links between data and identifying information will be removed so that it would not be possible to identify which data were submitted by which participant.

**ARE THERE ANY RISKS TO PARTICIPATING?**

It is possible that some of the questions asked in this study may cause some feelings of discomfort. Although some people find that tracking self-harm thoughts and behaviours aids in avoiding self-injury, others may find it distressing. Every effort will be made by the researcher to ensure that you feel safe and comfortable throughout your participation in this study. You are free to refuse to answer any questions(s), and you may end your participation at any time without negative consequences. A resource list is included in this package, in the daily reminder email, and linked to the daily questionnaires with counselling and support services you may access should you feel distressed.

**ARE THERE ANY BENEFITS TO PARTICIPATING?**

There are no personal benefits to you for participating in this study; however, your participation will help us gain a better understanding of the factors that influence engagement in self-injury and urges to self-injure. This may lead to greater awareness and the development of appropriate support and treatment services.

There is compensation available for participation in this study. All participants who complete the initial in-person interview will be compensated $15. After that point, participants will receive a further $15-gift card from Amazon.ca for each seven-day period in which they complete six or more daily surveys (for a combined maximum of $60 if both the individual interview and the full 21-day study are completed).
WHAT WILL HAPPEN TO THE INFORMATION AFTER I HAVE PARTICIPATED IN THE STUDY?

All of the information collected as a result of your participation in this study will remain strictly confidential, meaning that no one other than the members of our research team will have access to your information. Written information collected by the researcher during the phone screening and in-person meeting will be coded and not contain any personally-identifying information, and will be kept in a locked filing cabinet in our research office at OISE/UT. All electronic data will be encrypted and stored securely, consistent with the University of Toronto standards described at: http://www.utoronto.ca/security/UTORprotect/encryption_guidelines.htm. After data collection is complete, all data will be de-linked from any identifying information (e.g. participant ID codes), so that it will not be possible to determine which participant submitted which data. The data will be retained for a period of 5 years. Any publications of the study results, including scholarly publications or presentations will not include any information that will make it possibly to identify research participants.

LIMITS TO CONFIDENTIALITY

Although every effort will be made to maintain confidentiality of your information, we may be legally required to notify appropriate services or individuals in the following circumstances:

- If you are considered to be at imminent risk of serious physical harm
- If you are at imminent risk of harming, or have threatened to harm someone else
- If there is reason to believe that someone you identify who is under the age of 16 may be at risk of abuse or neglect
- If you identify a health professional who is alleged to have sexually abused someone in their care
- If files are subpoenaed by the courts.

HOW CAN I PROTECT MY OWN PRIVACY DURING THE STUDY?

We will maintain confidentiality of all information collected by us during the study, as outlined above. There are also some steps you can take to protect your own privacy for the online portion of the study. You may want to delete previous emails you received about the study or sent to our research email on a regular basis, as well as emptying your ‘deleted items’ folder. If you are using a shared computer, you may also want to delete the history of your internet browser every time you complete the online questionnaire. If you have any questions about how to take these steps, please ask the researcher.

In order to participate in this study, you will need to indicate a specific medical or mental health professional who you are willing to contact if you should feel that you are in severe distress or at serious physical risk. You will also need to provide contact information for an adult who you trust, and who the investigator (Sarah Horowitz) or her supervisor (Dr. Lana Stermac) may contact in case of emergency. Your emergency contact person would only be contacted by us if you should indicate that you are at risk of acting on a plan to seriously harm yourself, or are in need of immediate medical assistance. Every effort would be made to notify you before contacting your emergency contact person.

If you would like a summary of the results of this research when it is available, we would be happy to offer it to you. If so, please fill in your name and email address on the Consent Form.
If you have any questions about your rights as a participant, you may contact the Research Ethics Review Office by e-mail (ethics.review@utoronto.ca) or phone (416-946-3273). If you have any questions about the study please feel free to contact me or my supervisor, Dr. Lana Stermac. Thank you for considering participation in this research.

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Appendix B. Informed consent form

If there is anything you do not understand about the information letter or this consent form, please speak to the researcher.

1. Volunteer’s declaration of informed consent

I have been given a written explanation of the study by the investigator (Sarah Horowitz), including full details of any potential psychological risks and what participation entails. I have been given the opportunity to ask questions. I have had enough time to think about the study, and to decide without pressure if I want to take part. I am free to answer some questions and not others and I can withdraw from the study at any time, up until the completion of data collection. I have been assured that all information collected in the study will be held in confidence. I understand that the only instance in which confidence would be broken would be if I were to share information suggesting that I may be at risk of seriously harming myself or others, that a child is potentially being abused (due to legal requirements), that a medical professional has sexually abused someone in their care, or in case of subpoena by the courts.

2. Emergency contact information
   a) If I am in distress, I can contact the following medical/mental health professional:
      Name: ___________________________   Contact information: _______________________
   b) I understand that if I indicate that I am in serious physical danger, the investigator (Sarah Horowitz) or her supervisor (Dr. Lana Stermac) may contact the person whose information I provide below.
      Emergency contact name: ______________________________________________
      Relationship to participant: _______________________  Phone: ___________________________
      Address:______________________________________________________________________

3. Contact information and request for research summary
   □  I would like to receive a copy of the completed study.

   E-mail address: ________________________________________________________________
   Phone number: ___________________________ Detailed message ok? □ Yes  □ No

4. Signature
   I have received a copy of the Information Letter and Consent Form, and have had all my questions about this study answered to my satisfaction. I agree that I will participate in this study.

   Name: ________________________ Signature: ______________________ Date: ___________
Appendix C. Resource list

Resource List

If you are in crisis, call 911 or go to your nearest emergency room.

Crisis phone lines:

Assaulted Women’s Helpline: 416-863-0511; Toll Free 1-866-863-0511; Free, anonymous and confidential 24-hour telephone and TTY crisis telephone line to all women in the province of Ontario who have experienced any form of abuse.

Distress Centre: 416-408-HELP (4357); The Distress Centre offers 24/7 emotional support, crisis intervention, suicide prevention and linkage to emergency help when necessary.

Gerstein Centre: 416-929-5200; Provides crisis intervention to adults, living in the City of Toronto, who experience mental health problems. The service has three aspects: telephone support, community visits and a ten-bed, short-stay residence. All three aspects of the service are accessed through the crisis line.

Saint Elizabeth: 416-498-0043; Offers a 24/7 Community Crisis Response Program which serves residents of Etobicoke and North York. Services include immediate telephone crisis intervention and support, mobile crisis visits in the home or the community, and referrals to other community services.

Scarborough Hospital Mobile Crisis Program: 416-495-2891; provides Telephone Crisis Response and community mobile crisis visits to individuals over 16 years of age who are experiencing a mental health crisis in Scarborough and East York.

Emergency Shelter

Central Intake for the GTA: 416-338-4766; Toll Free 1-877-338-3398

Comprehensive list of shelters with direct admission: City of Toronto website http://www.toronto.ca/housing/guidetoservices/shelters.htm

Gerstein Centre: 416-929-5200; Provides crisis intervention to adults, living in the City of Toronto, who experience mental health problems. The service has three aspects: telephone support, community visits and a ten-bed, short-stay residence. All three aspects of the service are accessed through the crisis line.

Walk-In Support

WoodGreen Community Services (Walk-in counselling): 815 Danforth Ave. #202; (416) 645-6000 ext. 2512 or 1367; The WoodGreen Walk-in Counselling Service offers free, immediate drop-in counselling on Wednesday evenings to address a wide range of concerns. They open at 4:00 p.m. with the latest arrival at 6:45 p.m. No appointment or referral is needed. There are no restrictions to access.

Family Service Toronto (Walk-in counselling): 355 Church St.; 416-595-9618; Family Service Toronto provides free, immediate drop-in counselling for a wide range of concerns to
individuals, families, and couples on Wednesday evenings, opening at 4:00p.m. with the latest arrival at 6:45p.m. No appointment or referral is needed.

416 Community Support for Women: 416 Dundas St. E.; (416) 928-3334; 416 Community Support for Women is a daytime drop in program for women looking to gain or give support while coping with, isolation, addiction and/or mental health issues and other difficulties. It is open M-F 8:30am-6:00pm and Sat-Sun 8:30am-4:30pm. Basic services include daily breakfast and lunch, weekly food bank, social/recreational programs and life skills training. The centre also offers weekly medical clinics and mental health and addiction case management services on a daily basis.

**Counselling & Psychotherapy**

**Ontario Psychological Association**: The Ontario Psychological Association has a referral service to link individuals with psychologists for treatment or assessment. Visit the web page: [http://opajoomla.knowledge4you.ca/index.php/findpsychologist](http://opajoomla.knowledge4you.ca/index.php/findpsychologist) or call: (416) 961-0069 or toll-free 1-800-268-0069 Monday to Friday, 10:00am-3:30pm

**Psychology Today**: Psychology Today maintains an online directory of therapists all over Canada and the U.S.A., with information about their location, therapy type, experience, insurance coverage etc. [http://therapists.psychologytoday.com/rms/prof_search.php](http://therapists.psychologytoday.com/rms/prof_search.php)

**Psychotherapy Referral Service**: PRS is a referral service that, based on an intake interview, matches individuals with trained psychotherapists in Toronto. [prs.toronto.com](http://prs.toronto.com); (416) 920-0655

**No- or Low-Cost Counselling & Psychotherapy**

**WoodGreen Community Services**: 815 Danforth Ave. (416) 645-6000 ext. 1367; WoodGreen offers no-cost counselling to individuals who are experiencing problems with mental health. They aim to work with people from a recovery strengths-based perspective.

**Barbra Schlifer Commemorative Clinic**: 489 College Street, Suite 503 (416) 323-9149 ext. 234; Barbra Schlifer offers no-cost group and individual counselling as well as legal and interpretation services to women who have experienced violence.

**Family Service Toronto**: Various locations; (416) 595-9618; Family Service Toronto provides sliding-scale individual, family, couple, and group therapy for a range of difficulties including trauma therapy. They also offer internet counselling. No one is turned away for inability to pay.

**Catholic Family Service Toronto**: Various locations; (416) 921-1163 (Central Toronto); (416) 222-0048 (North Toronto); Catholic Family Service Toronto provides sliding-scale individual, family, couple, and group therapy to people of all backgrounds – clients need not be Catholic. No one is turned away for inability to pay.

**OISE Psychology Clinic**: 252 Bloor St. W.; (416) 978-0654; Sliding scale psychotherapy is provided to individual adults by Counselling Psychology graduate students who are supervised by licensed Psychologists. The clinic is open from September through April. Low cost, with sliding scale; this service is free for University of Toronto students.
**Information and Support**

**Self-Injury Outreach & Support:** sioutreach.org is a Canadian website devoted to providing information, coping resources, and personal stories related to self-injury. The website is directed by psychologists specializing in this area, and is recovery-friendly – meaning that efforts are made to ensure the content will not be triggering.

**Helpguide.org:** [http://www.helpguide.org/mental/self_injury.htm](http://www.helpguide.org/mental/self_injury.htm) provides information to help understand non-suicidal self-harm, as well as coping resources and tips for both self-injurers and people who care about them to aid in talking about the behaviour.
Appendix D. Pre-Screening Questions: Phone Interview

Thank you for expressing interest in participating in our study. Just to reiterate, the purpose of the study is to gain an understanding of the sorts of factors that might motivate some young adults to engage in non-suicidal self-injurious behaviour, such as cutting or burning oneself. The study includes a time commitment, including a one-to-two-hour in-person interview in downtown Toronto, followed by a daily 5-minute internet survey, for 21 consecutive days. There is remuneration for your time, ranging from $15 to $60 depending on your amount of participation, with some remuneration in the form of gift certificates from Amazon.ca. Your participation and information would be kept strictly confidential unless we had good reason to believe you or someone else was at serious physical risk, or unless you communicated to us that child was in danger, or that a medical professional had committed abuse or assault, or if files were subpoenaed by the court.

We would ask that you provide us with information for an emergency contact person just in case you are in serious danger. We would also ask that you think of and tell us the name of a medical or mental health professional who you could contact if you were in distress or needed support – such as a family doctor, university health service, therapist, or psychiatrist.

You would be able to leave the study at any time.

Does this sound like something you might be interested in? Do you have any questions at this time?

If yes:
Before we proceed, I would like to ask you some more specific questions about yourself and your history of self-injury, to help determine whether you are eligible to participate. Because this study is focused on people with a very specific set of characteristics, not everyone will be eligible for this particular study even if they have a history of self-injury. Is now an ok time to go through these questions? It should take around 10 minutes.

If yes:
1. How old are you?
2. Have you ever intentionally (i.e. on purpose) injured yourself, where that injury was not with the intention of killing yourself? Have you done this at least 5 separate times in your life?
3. Have you experienced urges to engage in non-suicidal self-injury at least two times in the past month?
4. Have you ever attempted suicide?
5. Have you ever received a psychiatric diagnosis that you are aware of, that includes a personality disorder? For example, Borderline Personality Disorder, Avoidant Personality Disorder.

If so, who gave the diagnosis? For example, a Family Doctor, Psychiatrist, or Psychologist?
6. Have you ever received a psychiatric diagnosis that you are aware of, that includes a psychotic disorder? For example, Schizophrenia, Schizoaffective Disorder, Delusional Disorder.

If so, who gave the diagnosis? For example, a Family Doctor, Psychiatrist, or Psychologist?
7. Have you ever been hospitalized as an inpatient for mental health reasons?
8. Do you have daily access to a private email account, that only you can access, and that you can access in a place where you have privacy? Do you have daily access to the internet in a place where you have privacy?
9. Are you able to commit to attending a one-hour in-person interview at the University of Toronto during business hours in the near future, followed by filling out a 5-minute daily survey
about your self-injury urges or actions, for 21 consecutive days? Please take into account all factors before you commit, such as time constraints, privacy factors, and psychological stress that may result from tracking self-injury?

10. Is there a medical or mental health professional who you could contact if you needed support or help?

11. Are you able to provide complete current contact information for an emergency contact who study personnel could contact if you were to communicate suicidality or a need for medical attention? Emergency contact people may include mental or medical health professionals, adult family members, or close adult friends; ideally, they will be medical or mental health professionals you received services from, or people who are already aware of your history of self-injury and/or who provided support in the past.

If screening criteria are not met:
Thank you for your willingness to participate, and for taking the time to respond to the screening questions. As I mentioned before, this particular study is focused on people who have a history of self-injury, and who also have specific other characteristics. Based on the characteristics we are currently studying, you are not eligible for this study. Thank you once again for getting in touch.

If screening criteria are met, schedule an initial in-person interview. Also give the following information:

The in-person interview will last about 1-2 hours. There will be paper-and-pencil questionnaires about your experience of self-injury, about you more generally, and about negative life experiences you may have had.

Please bring contact information for a medical or mental health professional who you can contact if you are in distress, and contact information for a trusted adult or professional who study personnel could contact if you communicate that you are at risk for suicide or in need of medical attention at any point during the study period; you will not be able to participate in the study unless you provide an emergency contact. Please also come ready to provide a private email address at which you can receive links to the daily survey. Do you have any questions?
Appendix E. Demographic Questionnaire

1. How old are you?
2. What is your gender?
3. What is your sexual orientation?

4. What is your ethnocultural background (check all that apply)?
   - [ ] European origin
   - [ ] African origin
   - [ ] East Asian origin
   - [ ] South Asian origin
   - [ ] Aboriginal
   - [ ] South American/Central American origin
   - [ ] North African/Middle Eastern origin
   - [ ] Other (please specify): __________________

5. What is your current occupation (e.g. teacher, manager, retail, student, unemployed)?

6. What is the highest level of education that you have completed?
   - [ ] Some elementary school
   - [ ] All elementary school
   - [ ] Some secondary school
   - [ ] Secondary school diploma
   - [ ] Some trade school/college
   - [ ] Trade school/college diploma
   - [ ] Some university
   - [ ] University undergraduate degree
   - [ ] Some postgraduate school
   - [ ] Postgraduate degree

7. What is your marital/relationship status (check all that apply)?
   - [ ] Single & never married
   - [ ] Common-law
   - [ ] Married
   - [ ] In a relationship
   - [ ] Divorced
   - [ ] Separated

8. Have you ever accessed the following types of treatment/support for mental health concerns (check all that apply)?
   - [ ] Individual therapy/counselling
   - [ ] Group therapy/counselling
   - [ ] Psychiatric medication
   - [ ] Crisis phone/drop-in support
   - [ ] Inpatient hospitalization
   - [ ] Hospital day treatment program/partial hospitalization
   - [ ] Emergency room services
   - [ ] Peer support programs (e.g. Alcoholics Anonymous, peer support group)

9. Are you currently receiving mental health treatment support from any of the following (check all that apply)?
   - [ ] Individual therapy/counselling
   - [ ] Group therapy/counselling
   - [ ] Psychiatric medication
   - [ ] Crisis phone/drop-in support
   - [ ] Inpatient hospitalization
   - [ ] Hospital day treatment program/partial hospitalization
   - [ ] Emergency room services
   - [ ] Peer support programs (e.g. Alcoholics Anonymous, peer support group)

10. Has a psychiatric diagnosis ever been communicated to you? If so, what was it, when was it communicated to you? If so, what was it, when was it communicated to you, and who communicated it to you (e.g. Family Doctor, Psychiatrist, Psychologist)?
Appendix F. Inventory of Statements about Self-Injury (ISAS; Klonsky & Glenn, 2009; Klonsky & Olino, 2008)

SECTION I. BEHAVIORS

This questionnaire asks about a variety of self-harm behaviors. Please only endorse a behavior if you have done it intentionally (i.e., on purpose) and without suicidal intent (i.e., not for suicidal reasons).

1. Please estimate the number of times in your life you have intentionally (i.e., on purpose) performed each type of non-suicidal self-harm (e.g., 0, 10, 100, 500):
   - Cutting ____
   - Severe Scratching ____
   - Biting ____
   - Banging or Hitting Self ____
   - Burning ____
   - Interfering w/ Wound Healing __(e.g., picking scabs)
   - Carving ____
   - Rubbing Skin Against Rough Surface ____
   - Pinching ____
   - Sticking Self w/ Needles ____
   - Pulling Hair ____
   - Swallowing Dangerous Substances ____
   - Other _______________, ___

2. If you feel that you have a main form of self-harm, please circle the behavior(s) above that you consider to be your main form of self-harm.

3. At what age did you:
   - First harm yourself? ____________
   - Most recently harm yourself? ____________
   (approximate date – month/date/year)

4. Do you experience physical pain during self-harm?
   - Please circle a choice: YES   SOMETIMES   NO

5. When you self-harm, are you alone?
   - Please circle a choice: YES   SOMETIMES   NO

6. Typically, how much time elapses from the time you have the urge to self-harm until you act on the urge?
   - Please circle a choice:
     - < 1 hour 1 - 3 hours 3 - 6 hours
     - 6 - 12 hours 12 - 24 hours > 1 day

7. Do/did you want to stop self-harming?
   - Please circle a choice: YES   NO

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SECTION II. FUNCTIONS

Instructions

This inventory was written to help us better understand the experience of non-suicidal self-harm. Below is a list of statements that may or may not be relevant to your experience of self-harm.

Please identify the statements that are most relevant for you:

• Circle 0 if the statement not relevant for you at all
• Circle 1 if the statement is somewhat relevant for you
• Circle 2 if the statement is very relevant for you

“When I self-harm, I am …

1. … calming myself down
   0  1  2
2. … creating a boundary between myself and others
   0  1  2
3. … punishing myself
   0  1  2
4. … giving myself a way to care for myself (by attending to the wound)
   0  1  2
5. … causing pain so I will stop feeling numb
   0  1  2
6. … avoiding the impulse to attempt suicide
   0  1  2
7. … doing something to generate excitement or exhilaration
   0  1  2
8. … bonding with peers
   0  1  2
9. … letting others know the extent of my emotional pain
   0  1  2
10. … seeing if I can stand the pain
    0  1  2
11. … creating a physical sign that I feel awful
    0  1  2
12. … getting back at someone
    0  1  2
13. … ensuring that I am self-sufficient
    0  1  2
14. … releasing emotional pressure that has built up inside of me
    0  1  2
15. … demonstrating that I am separate from other people
    0  1  2
16. … expressing anger towards myself for being worthless or stupid
    0  1  2
17. … creating a physical injury that is easier to care for than my emotional distress
    0  1  2

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18. … trying to feel something (as opposed to nothing) even if it is physical pain
0 1 2
19. … responding to suicidal thoughts without actually attempting suicide
0 1 2
20. … entertaining myself or others by doing something extreme
0 1 2
21. … fitting in with others
0 1 2
22. … seeking care or help from others
0 1 2
23. … demonstrating I am tough or strong
0 1 2
24. … proving to myself that my emotional pain is real
0 1 2
25. … getting revenge against others
0 1 2
26. … demonstrating that I do not need to rely on others for help
0 1 2
27. … reducing anxiety, frustration, anger, or other overwhelming emotions
0 1 2
28. … establishing a barrier between myself and others
0 1 2
29. … reacting to feeling unhappy with myself or disgusted with myself
0 1 2
30. … allowing myself to focus on treating the injury, which can be gratifying or satisfying
0 1 2
31. … making sure I am still alive when I don’t feel real
0 1 2
32. … putting a stop to suicidal thoughts
0 1 2
33. … pushing my limits in a manner akin to skydiving or other extreme activities
0 1 2
34. … creating a sign of friendship or kinship with friends or loved ones
0 1 2
35. … keeping a loved one from leaving or abandoning me
0 1 2
36. … proving I can take the physical pain
0 1 2
37. … signifying the emotional distress I’m experiencing
0 1 2
38. … trying to hurt someone close to me
0 1 2
39. … establishing that I am autonomous/independent
0 1 2

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Appendix G. Alexian Brothers Urge to Self-Injure Scale (ABUSI; Washburn, Juzwin, Styer, & Aldridge, 2010)

The questions below apply to the last week. Place an “X” in the box next to the most appropriate statement.

1. How often have you thought about injuring yourself or about how you want to injure yourself?
   - Never, 0 times in the last week
   - Rarely, 1–2 times in the last week
   - Occasionally, 3–4 times in the last week
   - Sometimes, 5–10 times in the last week, or 1–2 times a day
   - Often, 11–20 times in the last week, or 2–3 times a day
   - Most of the time, 20–40 times in the last week, or 3–6 times a day
   - Nearly all of the time, more than 40 times in the last week, or more than 6 times a day.

2. At the most severe point, how strong was your urge to self-injure in the last week?
   - None at all.
   - Slight, that is, a very mild urge.
   - Mild urge.
   - Moderate urge.
   - Strong urge, but easily controlled.
   - Strong urge, but difficult to control.
   - Strong urge and would have self-injured if able to.

3. How much time have you spent thinking about injuring yourself or about how you want to injure yourself?
   - None.
   - Less than 20 min.
   - 21-45 min.
   - 46-90 min.
   - 90 min to 3 hrs.
   - 3-6 hrs.
   - More than 6 hrs.

4. How difficult was it to resist injuring yourself in the last week?
   - Not difficult at all
   - Very mildly difficult
   - Mildly difficult
   - Moderately difficult
   - Very difficult
   - Extremely difficult
   - Was not able to resist

5. Keeping in mind your responses to the previous questions, please rate your overall average urge or desire to injure yourself in the last week.
   - Never thought about it and never had the urge to self-injure.
   - Rarely thought about it and rarely had the urge to self-injure.
☐ Occasionally thought about it and occasionally had the urge to self-injure.
☐ Sometimes thought about it and sometimes had the urge to self-injure.
☐ Often thought about it and often had the urge to self-injure.
☐ Thought about self-injury most of the time and had the urge to do it most of the time.
☐ Thought about self-injury nearly all the time and had the urge to do it nearly all the time.

This scale is available in the public domain from Alexian Brothers Behavioral Health Hospital, alexianbrothershealth.org
Appendix H. Traumatic Experiences Checklist (TEC; Nijenhuis, Van der Hart, & Kruger, 2002)

Instructions:
People may experience a variety of traumatic experiences during their life. We would like to know three things: 1) if you have experienced any of the following 29 events, 2) how old you were when they happened, and 3) how much of an impact these experiences had upon you.

A) In the first column (i.e., Did this happen to you?), indicate whether you had each of the 29 experiences by circling YES or NO.

B) For each experience where you circled YES, list in the second column (i.e., Age) your age when it happened.
If it happened more than once, list ALL of the ages when this happened to you.
If it happened for years (e.g., age 7-12), list the age range (i.e., age 7-12).

C) In the final column (i.e., How much impact did this have on you?), indicate the IMPACT (by circling the appropriate number): 1, 2, 3, 4, or 5.
1 = none
2 = a little bit
3 = a moderate amount
4 = quite a bit
5 = an extreme amount

Example:

<table>
<thead>
<tr>
<th>Did this happen to you?</th>
<th>Age</th>
<th>How much impact did this have on you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>You were teased</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

Thank you for your cooperation.
<table>
<thead>
<tr>
<th>Did this happen to you?</th>
<th>Age</th>
<th>How much impact did this have on you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = none</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2 = a little bit</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3 = a moderate amount</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4 = quite a bit</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5 = an extreme amount</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

1. Having to look after your parents and/or brothers and sisters when you were a child.  
   no  yes  ..........  1 2 3 4 5

2. Family problems  
   (e.g., parent with alcohol or psychiatric problems, poverty).  
   no  yes  ..........  1 2 3 4 5

3. Loss of a family member  
   (brother, sister, parent) when you were a CHILD.  
   no  yes  ..........  1 2 3 4 5

4. Loss of a family member  
   (child or partner) when you were an ADULT.  
   no  yes  ..........  1 2 3 4 5

5. Serious bodily injury  
   (e.g., loss of a limb, mutilation, burns).  
   no  yes  ..........  1 2 3 4 5

6. Threat to life from illness, an operation, or an accident.  
   no  yes  ..........  1 2 3 4 5

7. Divorce of your parents  
   no  yes  ..........  1 2 3 4 5

8. Your own divorce  
   no  yes  ..........  1 2 3 4 5

9. Threat to life from another person (e.g., during a crime).  
   no  yes  ..........  1 2 3 4 5

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<table>
<thead>
<tr>
<th>Did this happen to you?</th>
<th>Age</th>
<th>How much impact did this have on you?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Intense pain (e.g., from an injury or surgery).</td>
<td>no yes</td>
<td>................ 1 2 3 4 5</td>
</tr>
<tr>
<td>11. War-time experiences (e.g., imprisonment, loss of relatives, deprivation, injury).</td>
<td>no yes</td>
<td>................ 1 2 3 4 5</td>
</tr>
<tr>
<td>12. Second generation war-victim (war-time experiences of parents or close relatives)</td>
<td>no yes</td>
<td>................ 1 2 3 4 5</td>
</tr>
<tr>
<td>13. Witnessing others undergo trauma.</td>
<td>no yes</td>
<td>................ 1 2 3 4 5</td>
</tr>
<tr>
<td>14. Emotional neglect (e.g., being left alone, insufficient affection) by your parents, brothers or sisters.</td>
<td>no yes</td>
<td>................ 1 2 3 4 5</td>
</tr>
<tr>
<td>15. Emotional neglect by more distant members of your family (e.g., uncles, aunts, nephews, nieces, grandparents).</td>
<td>no yes</td>
<td>................ 1 2 3 4 5</td>
</tr>
<tr>
<td>16. Emotional neglect by non-family members (e.g., neighbors, friends, step-parents, teachers).</td>
<td>no yes</td>
<td>................ 1 2 3 4 5</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Question</th>
<th>Did this happen to you?</th>
<th>Age</th>
<th>How much impact did this have on you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Emotional abuse (e.g., being belittled, teased, called names,</td>
<td>no</td>
<td></td>
<td>1 = none</td>
</tr>
<tr>
<td>threatened verbally, or unjustly punished) by your parents,</td>
<td>yes</td>
<td></td>
<td>2 = a little bit</td>
</tr>
<tr>
<td>brothers or sisters.</td>
<td></td>
<td></td>
<td>3 = a moderate amount</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>4 = quite a bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 = an extreme amount</td>
</tr>
<tr>
<td>18. Emotional abuse by more distant members of your family.</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Emotional abuse by non-family members.</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Physical abuse (e.g., being hit, tortured, or wounded) by your</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>parents, brothers, or sisters.</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Physical abuse by more distant members of your family.</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Physical abuse by non-family members.</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Bizarre punishment</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If applicable, please describe:</td>
<td>yes</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>24. Sexual harassment (acts of a sexual nature that DO NOT involve</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>physical contact) by your parents, brothers, or sisters.</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<th>Did this happen to you?</th>
<th>Age</th>
<th>How much impact did this have on you?</th>
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</thead>
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<tr>
<td></td>
<td></td>
<td>1 = none</td>
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<tr>
<td></td>
<td></td>
<td>2 = a little bit</td>
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<td>4 = quite a bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 = an extreme amount</td>
</tr>
</tbody>
</table>

25. Sexual harassment by more distant members of your family.  
   no yes ............ 1 2 3 4 5

26. Sexual harassment by non-family members.  
   no yes ............ 1 2 3 4 5

27. Sexual abuse (unwanted sexual acts involving physical contact) by your parents, brothers, or sisters.  
   no yes ............ 1 2 3 4 5

28. Sexual abuse by more distant members of your family.  
   no yes ............ 1 2 3 4 5

29. Sexual abuse by non-family members.  
   no yes ............ 1 2 3 4 5

30. If you were mistreated or abused, how many people did this to you?

A) Emotional maltreatment (if you answered YES to any of the questions 14-19).  
   Numbers of persons: .......

B) Physical maltreatment (if you answered YES to any of the questions 20-23).  
   Number of persons: .......

C) Sexual harassment (if you answered YES to any of the questions 24-26).  
   Number of persons: .......

D) Sexual abuse (if you answered YES to any of the questions 27-29).  
   Number of persons: .......

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31. Please describe your relationship with each person mentioned in your answer to question 30 (e.g., father, brother, friend, teacher, stranger, etc.), and add if the person(s) was (were) at least 4 years older than you at the time when the experience(s) occurred. For example, write "friend (-)" if this friend was less than 4 years older than you. Write "uncle (+)" if this uncle was more than 4 years older than you.

A) Emotional neglect ........................................................................................................
........................................................................................................................................

B) Emotional abuse ..........................................................................................................
...........................................................................................................................................

C) Physical abuse ............................................................................................................
..............................................................................................................................................

D) Sexual harassment ......................................................................................................
................................................................................................................................................

E) Sexual abuse ...............................................................................................................
................................................................................................................................................

32. Please describe any OTHER traumatic events that had an impact on you. 
............................................................................................................................................
................................................................................................................................................
..............................................................................................................................................

33. If you have answered YES to any of the questions 1-29, how much support did you receive afterwards? 
(give the number of the question and the level of support)

<table>
<thead>
<tr>
<th>Question number</th>
<th>Level of support (0 = none, 1 = Some, 2 = Good)</th>
</tr>
</thead>
<tbody>
<tr>
<td>..................</td>
<td>......</td>
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Appendix I. Instructions & Initial Questions: EMA

Instructions:
The following survey will ask you to reflect on any urges to hurt yourself or times you engaged in non-suicidal self-injury during the past 24 hours. Please answer each question honestly and to the best of your ability. You have the option of leaving any question blank, except the first one, where you enter your identification code. On each page of the survey, there is a link to a list of resources that you may access should you feel distressed. Thank you for your continued participation in this study.

Initial Questions:

Identification Code: __________________________

1. In the past 24 hours, have you had the urge to injure yourself?
   □ Yes  □ No

2. In the past 24 hours, have you deliberately injured yourself without suicidal intent?
   □ Yes  □ No

3. If you have injured yourself in the past 24 hours, on how many separate occasions did you do so?
   □ 1 time  □ 2 times  □ 3 times  □ 4 times  □ 5 or more times

4. In the past 24 hours, what method(s) did you use to hurt yourself?
   □ Cutting   □ Severe Scratching
   □ Biting  □ Banging or Hitting Self
   □ Burning  □ Interfering w/Wound Healing (e.g., picking scabs)
   □ Carving  □ Rubbing Skin Against Rough Surface
   □ Pinching  □ Sticking Self w/ Needles
   □ Pulling Hair  □ Swallowing Dangerous Substances
   □ Other (Please specify): ________________
Appendix J. Adapted Alexian Brothers Urge to Self-Injure Scale (ABUSI; Adapted from: Washburn, Juzwin, Styer, & Aldridge, 2010)

The questions below apply to urges to injure yourself in the last 24 hours. Place an “X” in the box next to the most appropriate statement.

1. How often have you thought about injuring yourself or about how you want to injure yourself?
   - □ Never, 0 times in the last 24 hours
   - □ 1–2 times in the last 24 hours
   - □ 3–4 times in the last 24 hours
   - □ 5–10 times in the last 24 hours
   - □ 11–20 times in the last 24 hours
   - □ 20–40 times in the last 24 hours
   - □ Nearly all of the time, more than 40 times in the last 24 hours.

2. At the most severe point, how strong was your urge to self-injure in the last 24 hours?
   - □ None at all.
   - □ Slight, that is, a very mild urge.
   - □ Mild urge.
   - □ Moderate urge.
   - □ Strong urge, but easily controlled.
   - □ Strong urge, but difficult to control.
   - □ Strong urge and would have self-injured if able to/did self-injure.

3. How much time have you spent thinking about injuring yourself or about how you want to injure yourself?
   - □ None.
   - □ Less than 20 min.
   - □ 21–45 min.
   - □ 46–90 min.
   - □ 90 min to 3 hrs.
   - □ 3–6 hrs.
   - □ More than 6 hrs.

4. How difficult was it to resist injuring yourself in the last 24 hours?
   - □ Not difficult at all
   - □ Very mildly difficult
   - □ Mildly difficult
   - □ Moderately difficult
   - □ Very difficult
   - □ Extremely difficult
   - □ Was not able to resist

5. Keeping in mind your responses to the previous questions, please rate your overall average urge or desire to injure yourself in the last 24 hours.
   - □ Never thought about it and never had the urge to self-injure.
   - □ Rarely thought about it and rarely had the urge to self-injure.
Occasionally thought about it and occasionally had the urge to self-injure.
Sometimes thought about it and sometimes had the urge to self-injure.
Often thought about it and often had the urge to self-injure.
Thought about self-injury most of the time and had the urge to do it most of the time.
Thought about self-injury nearly all the time and had the urge to do it nearly all the time.
Appendix K. Adapted Inventory of Statements about Self-Injury – Section II: Functions (ISAS; Adapted from: Klonsky & Glenn, 2009; Klonsky & Olino, 2008)

Instructions
Below is a list of statements that may or may not be relevant to your experience of self-harm in the past 24 hours.
Please identify the statements that are most relevant for you:
• Select 0 if the statement not relevant for you at all
• Select 1 if the statement is somewhat relevant for you
• Select 2 if the statement is very relevant for you

“In the past 24 hours, when I had the urge to self-harm, it was for the purpose of…
Or
“In the past 24 hours, when I engaged in self-harm, it was for the purpose of…

1. … calming myself down
   0 1 2

2. … creating a boundary between myself and others
   0 1 2

3. … punishing myself
   0 1 2

4. … giving myself a way to care for myself (by attending to the wound)
   0 1 2

5. … causing pain so I will stop feeling numb
   0 1 2

6. … avoiding the impulse to attempt suicide
   0 1 2

7. … doing something to generate excitement or exhilaration
   0 1 2

8. … bonding with peers
   0 1 2

9. … letting others know the extent of my emotional pain
   0 1 2

10. … seeing if I can stand the pain
    0 1 2

11. … creating a physical sign that I feel awful
    0 1 2

12. … getting back at someone
    0 1 2

13. … ensuring that I am self-sufficient
    0 1 2

14. … releasing emotional pressure that has built up inside of me
    0 1 2

15. … demonstrating that I am separate from other people
    0 1 2

16. … expressing anger towards myself for being worthless or stupid
    0 1 2

17. … creating a physical injury that is easier to care for than my emotional distress
18. … trying to feel something (as opposed to nothing) even if it is physical pain
19. … responding to suicidal thoughts without actually attempting suicide
20. … entertaining myself or others by doing something extreme
21. … fitting in with others
22. … seeking care or help from others
23. … demonstrating I am tough or strong
24. … proving to myself that my emotional pain is real
25. … getting revenge against others
26. … demonstrating that I do not need to rely on others for help
27. … reducing anxiety, frustration, anger, or other overwhelming emotions
28. … establishing a barrier between myself and others
29. … reacting to feeling unhappy with myself or disgusted with myself
30. … allowing myself to focus on treating the injury, which can be gratifying or satisfying
31. … making sure I am still alive when I don’t feel real
32. … putting a stop to suicidal thoughts
33. … pushing my limits in a manner akin to skydiving or other extreme activities
34. … creating a sign of friendship or kinship with friends or loved ones
35. … keeping a loved one from leaving or abandoning me
36. … proving I can take the physical pain
37. … signifying the emotional distress I’m experiencing
38. … trying to hurt someone close to me
39. … establishing that I am autonomous/independent
Appendix L. Online Study Advertisement

Research Participants Needed – understanding self-harm urges and behaviours

Research participants are needed for a study at the University of Toronto that is aiming to increase understanding of non-suicidal self-harm urges and behaviours in young adults. Participation would include a one-hour in-person meeting, followed by a brief daily online survey for 21 days. Start dates are flexible. Compensation is provided for eligible participants.

You may be eligible to participate if you:

1. are between the ages of 18 and 30
2. have hurt yourself on purpose, but *without intending to die*, at least 5 times in your life
3. continue to experience urges to hurt yourself, even if you do not act on them
4. reside in the Greater Toronto Area
5. are willing to respond to a brief daily online survey for 21 days about your experiences (start date flexible)

For more information about this study, please contact researchers at (416) 978-0686 or at educational.impacts@utoronto.ca. A brief telephone interview is required to determine eligibility for this study.
Research Participants Needed

We are conducting research to understand self-harm urges and behaviours in young adults.

You may be eligible to participate if you:

- are between the ages of 18 and 30
- have hurt yourself on purpose, but without intending to die, at least 5 times in your life
- continue to experience urges to hurt yourself, even if you do not act on them
- reside in the Greater Toronto Area
- are willing to respond to a brief daily online survey for 21 days about your experiences (start date flexible)

Compensation will be provided for your time.
Appendix N. Debrief Interview

1. How was the overall study experience for you? Was it easy, difficult to complete? Did any problems arise?

2. Did the study feel relevant to your experience of self-injury? How or how not? How about the functions of NSSI that were listed? Anything that you felt was missing?

3. How was the time commitment for you?

4. How was the form and amount of compensation?

5. How was the form and amount of support offered?

6. Did the in-person interview have any impact on your level of urge to self-injure? On overall level of distress? Increase/decrease

7. Did the daily online questionnaire have any impact on your level of urge to self-injure? On overall level of distress? Increase/decrease

8. Is there anything that you would want to see change about the study?

9. Any other feedback for us?

10. Any other questions for us?