

Non-suicidal self-injury:
The associations among
emotional, parental,
and peer influences

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By

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ABSTRACT

Non-suicidal self-injury (NSSI) is a complex and dangerous set of behaviours that has been gaining increased research attention in recent years. Although existing research indicates that NSSI is prevalent among both adolescent and young adult clinical and community samples, few studies have empirically examined models of factors involved in the etiology and maintenance of these behaviours, particularly the role of social factors. Further, although existing research supports the use of NSSI for emotion regulation purposes, less research attention has focused on the impact of emotion reactivity. The focus of the current project was to examine the role of emotional, interpersonal, and subcultural factors in NSSI. Utilizing a sample of 397 university students, Study 1 presents a psychometric re-evaluation of the Emotion Reactivity Scale (ERS; Nock et al., 2008), used to inform the most appropriate use of the measure in the subsequent studies. Results supported the reliability and validity of the ERS and suggested that the ERS is best utilized as a unidimensional measure of emotion reactivity. Study 2 examined an intra- and inter-personal model of NSSI among the same sample of 397 university students. Support was obtained for the Experiential Avoidance Model of NSSI (Chapman et al., 2006) as well as for the mediational influence of interpersonal relationships on NSSI via emotion regulation. Preliminary support was also provided for the influence of identification with more deviant subcultures, including Goth and Emo groups. Finally, Study 3 aimed to replicate support for the model among a sample of 178 members of self-injury internet forums. Contrary to hypotheses, little support was demonstrated for the model, and fewer significant associations were demonstrated for the influence of subcultural identification. Examination of the characteristics of the sample suggested that the online forum members represent a unique group in regard to the severity of their NSSI experiences that has been understudied in the existing literature. Alternative

hypotheses to account for the observed findings are presented. Limitations and directions for future research are discussed.

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Chapter 1. Literature Review

1.1 Overview

Non-suicidal self-injury (NSSI; commonly referred to as self-injury, deliberate self-harm, and formerly self-mutilation or parasuicide) is a dangerous and increasingly common behaviour that has been gaining significant research attention in recent years. The most commonly cited system for classifying self-injurious behaviours is the typology proposed by Favazza, which has seen numerous evolutions since 1987 (Walsh, 2006). Under this system, self-injurious behaviours can be classified as stereotypic, major, compulsive, or impulsive. Stereotypic self-injury includes behaviours such as self-hitting and biting and is commonly observed in individuals with severe autism, developmental disability, or related conditions. Major self-injury is often associated with psychotic disorders and includes behaviours such as self-enucleation and auto-castration. Of particular relevance to the current review are the final two categories: compulsive and impulsive self-injury, which were previously both conceptualized under the same category of moderate self-injury (Cumming, Covic, & Murrell, 2006).

The following sections present a comprehensive review of the current literature regarding the development, maintenance, and correlates of non-suicidal self-injury. First, an operational definition of NSSI is offered, followed by a brief discussion of the early work pertaining to these behaviours. Second, the research exploring the intrapersonal characteristics of individuals who self-injure and the proposed functions that these behaviours might serve is summarized, with a particular emphasis on the experiential avoidance/emotion regulation model of NSSI. Finally, emerging work regarding the familial and social factors that have been implicated in the development and maintenance of NSSI will be explored.

1.2 Defining Non-Suicidal Self-Injury

A common concern in the literature is the definitional confusion regarding what constitutes self-injury and the lack of a universally accepted operational definition of these behaviours. For example, some researchers use the term deliberate self-harm (DSH) interchangeably with NSSI, although others include both suicidal and non-suicidal acts of self-harm under this term (e.g., Hawton, Rodham, Evans, & Weatherall, 2002; Sinclair, Hawton, & Gray, 2010). However, distinguishing the intent to die underlying the behaviour is crucial, as NSSI and suicide attempts likely occur for different motivations and require different intervention strategies. For example, Favazza (1998, 2009) described NSSI as morbid self-help, and others (e.g., Suyemoto, 1998) have suggested that self-injury may represent a coping strategy used to prevent suicide.

In addition to considering the intent to die motivating these behaviours, the literature commonly makes a distinction between direct and indirect forms of self-injury. There appears to be a general consensus among researchers that indirect forms of self-injury, such as eating disorders, substance abuse, and cigarette smoking, are not considered NSSI as conceptualized in this review. As described by Nock (2010), the harm resulting from behaviours such as substance abuse or risk-taking is often unintended and these behaviours are better considered as indirectly self-damaging or self-defeating. Indirect forms of self-injury are likely performed for different functions, such as stimulation or enjoyment, and direct forms of self-injury (e.g., cutting, burning, or banging/hitting oneself) are often performed to gain immediate relief from a negative emotional state (Klonsky, 2007). Further, although individuals commonly engage in both direct and indirect forms of self-injury, individuals who engage in NSSI have been shown to

demonstrate a higher potential for eventual suicide, when compared to those who only engage in indirect self-injury (St. Germain & Hooley, 2012).

In light of the above distinctions, the current review defines self-injury as: the deliberate, direct destruction or alteration of body tissue, severe enough for tissue damage to occur, but without suicidal intent, and which is not socially sanctioned. Further, this conceptualization excludes stereotypic forms of self-injury performed by individuals with developmental disorders or cognitive disability, as well as the severe forms of self-injury seen exclusively in the context of psychotic experiences. This definition is consistent with one often used by researchers (e.g., Buckholdt, Parra, & Jobe-Shields, 2009; Walsh, 2006), as well as the consensus definition developed by the International Society for the Study of Self-Injury in 2007 (Heath, Toste, Nedecheva, & Charlebois, 2008).

1.3 Brief History of Non-Suicidal Self-Injury

Discussions of self-injury have appeared in the psychiatric literature since the second half of the nineteenth century, including some early attempts to distinguish these acts from suicide. For example, early "case notes, textbooks, and journals... refer to a wide variety of acts, ranging from the refusal of food to many attempted suicides" (Chaney, 2011; pg. 280). As Chaney (2011) further outlined, the term self-mutilation was adopted in the 1860s, and excluded behaviour such as food refusal or anything obviously suicidal but included behaviours consistent with today's conceptualization of NSSI, such as flesh-picking, biting, hair-pulling, punching objects, cutting the body, or inserting foreign objects into the skin. Self-mutilation appeared in the Surgeon-General's Index Catalogue for the first time in 1910 and was often associated with narratives involving selfishness, excessive religion, and sexual guilt (Chaney, 2011). Published articles during the early development of this literature (i.e., rather than hospital casebooks and reports)

tended to focus on more severe forms of injury, with Hoyt (2003) stating that the first psychological case study involving a case of self-castration was published in 1901. Following this there were a number of published case studies involving self-injury; however, explanations for this behaviour did not begin to emerge until 1930. Attempts to distinguish NSSI from suicide attempts were renewed in 1938, when self-mutilation was considered to be classified under four types: organic, religious, psychotic, and neurotic (see also: Favazza, 2009). Research specific to wrist-cutting behaviour emerged in the 1960s, including theoretical discussions of the emotion regulation and tension reduction functions of NSSI, and in 1983, Pattison and Kahan (as cited in Hoyt, 2003) proposed the deliberate self-harm syndrome, which included symptoms such as: a sudden and recurrent impulse to hurt oneself, a sense of being unable to cope with a given situation, anxiety, anger, and depression (without suicidal ideation), and a sense of relief after the inflicted pain. The behaviours related to this syndrome were believed to begin during late adolescence and be associated with low lethality and the use of several methods (e.g., different ways to cut the skin).

Despite this early discussion of the deliberate self-harm syndrome, which appears consistent with the classification of compulsive/impulsive self-injury and the definition used in this review, much of the early literature focused on major self-injury, as well as on skin-cutting as a symptom related to another disorder. More specifically, recurrent suicidal or self-injurious behaviour is a symptom of Borderline Personality Disorder (BPD; APA, 2000). Consistent with the clinical picture of BPD, self-injury was thought to be more common in females and, despite theorists' early efforts at distinguishing between self-injury and suicide attempts, much of the early research did not make this distinction, assuming, for example, that it can sometimes be too difficult to determine intent or that individuals are often ambivalent in their suicidality (e.g.,

Taiminen, Kallio-Soukainen, Nokso-Koivisto, Kaljonen, & Helenius, 1998). Indeed, it was historically quite progressive to consider suicidal and non-suicidal self-injurers as representing overlapping, yet distinct, populations (e.g., Creswell & Karimova, 2010). However, it was apparent that not all individuals who engaged in self-injury were experiencing suicidal ideation, psychotic disorders or BPD, and conceptualizing the behaviour this way in the research literature seemingly ignored a significant subgroup of compulsive or impulsive self-injurers.

1.4 Characteristics of Individuals who Self-Injure

With the shift in the literature from focusing on self-injury largely only in the context of psychosis, personality disorders, and attempted suicide came a need for researchers to explore the characteristics of this different group of individuals. Indeed, the literature regarding compulsive or impulsive NSSI has grown significantly in the last decade or so. This section will review the prevalence of NSSI and some of the characteristics of those who self-injure. This review focuses on NSSI as it occurs in adolescence and young-adulthood, age-groups where this behaviour appears to be the most common across the lifespan. Although self-injurious behaviours are also seen in older adults and elderly individuals (e.g., Hawton & Harriss, 2008), the behaviour appears to be associated with different concerns than for adolescents and younger adults (such as poor physical health, chronic medical conditions, and social isolation) and is more often related to a direct wish to die (e.g., Dennis, Wakefield, Molloy, Andrews, & Friedman, 2007; Oude Voshaar, et al., 2011).

1.4.1 Prevalence.

Estimates for the prevalence of NSSI are variable, owing to the lack of standard methodological approaches for assessing self-injury, although the literature suggests that these behaviours are increasing in prevalence and are not a rare occurrence among adolescents and

young-adults, both in clinical samples and in the community. The average age of onset for self-injurious behaviours is most consistently reported to be during early or middle adolescence (Favazza & Conterio, 1989; Nock, 2010), although in a study of college students it was noted that nearly 40% of individuals reported beginning self-injury in late adolescence or early adulthood (Whitlock, Eckenrode, & Silverman, 2006). Of note, community research in this area is of vital importance, given the large proportion of adolescents and young-adults who self-injure but will never come to the attention of the health care system (e.g., Safer, 1997). Although prevalence estimates in 1993 suggested that less than 3% of the community population engaged in NSSI, current prevalence estimates are often cited around 15% (Jacobson, Muehlenkamp, Miller, & Turner, 2008) or even higher. In a recent study of adults aged 19 to 92 years old across the United States, overall lifetime prevalence was found to be 5.9%, although this increased to 18.9% among individuals aged 30 years or younger (Klonsky, 2011). Additionally, there is evidence for the prevalence of NSSI among college students ranging from 12% to as high as 48% (Brown & Williams, 2007; Selby, Connell, & Joiner, 2010) and estimates within clinical populations have been alarmingly high, with some studies estimating prevalence rates as high as 62.7% to 78.5% among psychiatrically hospitalized adolescents (Adrian, Zeman, Erdley, Lisa, & Sim, 2011; Weismore and Esposito-Smythers, 2010). Internationally, large multi-site community-based studies have reported similar prevalence rates (13.5% and 4.3% for adolescent females and males, respectively), and have found little variability across multiple regions in the reported functions of engaging in NSSI (Hjelmeland, et al., 2002; Madge et al., 2008). More recently, Giletta, Scholte, Engels, Ciairano, and Prinstein (2012) reported an overall NSSI prevalence of 24% among adolescents in Italy, the Netherlands, and the United States, with no difference in prevalence across countries. Clearly, NSSI represents a significant medical and

mental health concern both in clinical and non-clinical populations, nationally and internationally.

1.4.2 Relationship to suicide.

Although NSSI, as conceptualized in this review, is engaged in without wanting to die, there is a relationship between self-injury and suicide. The behaviours that individuals might engage in vary in degrees of lethality (e.g., skin picking or superficial cuts to the skin to more severe and deeper cuts) and although suicide might not be the intended outcome, accidental death or serious and permanent damage to the body can result from behaviours of higher lethality (Hawton & James, 2005). A six-year follow-up study (Sinclair et al., 2010) reported that self-harm patients experienced higher overall levels of mortality and lower quality of life, although this study included both suicidal and non-suicidal self-injury. In addition, individuals who self-injure might be ambivalent in their intent to die, with some episodes associated with more intent, and suicidal ideation might increase over the course of engaging in self-injury. Mangnall and Yurkovich (2008) noted that individuals who self-injure are 15 to 30 times more likely to eventually attempt suicide than those individuals who do not engage in self-injurious behaviours. In their review of the literature Hamza, Stewart, and Willoughby (2012) reported that suicide attempts were two times more likely among individuals engaged in self-injurious behaviours such as hair-pulling and ten times more likely among those engaged in more severe behaviours such as skin-cutting.

Specifically studying the relationship among NSSI and attempted suicide among adult psychiatric inpatients, Andover and Gibb (2010) found that higher frequency of NSSI was associated with more previous suicide attempts as well as a higher level of lethal intent associated with the most recent suicide attempt, when compared to individuals without a NSSI

history. Their results further revealed that history of NSSI remained a significant predictor of suicide attempts after statistically controlling for symptoms of depression and BPD, hopelessness, and current suicidal ideation. These findings also hold when controlling for family functioning, post-traumatic stress, and a history of child abuse (Hamza, et al., 2012). Similarly, Klonsky, May and Glenn (2013) found that only NSSI and suicidal ideation remained significant predictors of suicide attempt when controlling for depression, anxiety, impulsivity, and BPD. In addition to providing further insight into the relationship between NSSI and suicide, these results also provide support for Joiner's interpersonal-psychological theory of suicidal behaviour (e.g., Joiner, 2005; Van Orden, Merrill, & Joiner, 2005). This theory posits that for a suicide attempt to occur an individual must have both the desire to die and the ability to engage in lethal behaviours. Thus, for at least some cases NSSI might serve to desensitize or habituate the individual to the pain involved in self-injury, and when combined with factors such as perceived burdensomeness and social isolation, increases the risk of suicide. Therefore, NSSI represents a significant risk factor for eventual attempted and completed suicide, although the individual may not express an explicit wish to die.

Although suicidal and non-suicidal self-injury can be comorbid, researchers have also investigated the characteristics and risk factors that distinguish these behaviours. In addition to greater lethality and suicidal intent, other differences include the greater behavioural frequency and number of methods used associated with NSSI, more positive attitudes toward life and negative attitudes toward death associated with NSSI (Muehlenkamp & Gutierrez, 2004), more hopelessness and helplessness associated with suicide attempts, and the psychological consequences of the behaviours. In other words, an unsuccessful suicide attempt can lead to continued distress and frustration, and NSSI is more often associated with an immediate

reduction in negative affect (Hoffman & Kress, 2010; Muehlenkamp & Kerr, 2010). Similarly, in a study of women with BPD, participants reported that suicide attempts were more often related to making other people better off, although non-suicidal gestures were more often related to expressions of anger, self-punishment, and to feel normal again (Brown, Comtois, & Linehan, 2002). Among high school students, Brausch and Gutierrez (2010) found that individuals who engaged in only NSSI reported lower levels of suicidal ideation, greater parental support and self-esteem, and fewer negative self-evaluations, compared to individuals who self-injured and also had a history of suicide attempt. Utilizing data from the National Comorbidity Study in the United States, Nock and Kessler (2006) reported that depressive, impulsive (e.g., substance abuse), and aggressive (e.g., Antisocial Personality Disorder) diagnoses were more common in individuals who attempted suicide versus those who self-injured, although these diagnoses were also elevated in the self-injury group relative to controls. Further, the anti-suicide model of NSSI posits that these behaviours function as an active coping mechanism utilized to prevent more lethal suicidal behaviours (Suyemoto, 1998). Laye-Gindhu and Schonert-Reichl (2005) provide some support for this function of NSSI, with 41% of their sample endorsing “It stopped me from killing myself” as a reason for self-injurious behaviours.

Hamza and colleagues (2012) have offered an integrated model to explain the link between suicidal and non-suicidal self-injury, incorporating third variable, interpersonal-psychological, and gateway (i.e., suicidal behaviours resulting from escalating NSSI) theories. These authors propose that, consistent with gateway theories, NSSI might both uniquely and directly predict engagement in suicidal behaviour and that this path is moderated by an individual's level of interpersonal distress. Their integrated model further posits that there are shared factors (e.g., psychopathology, biological factors) that will also confer risk for both

suicidal and non-suicidal self-injury. Finally, and consistent with Joiner's theory (e.g., Joiner, 2005), the integrated model predicts that there is also an indirect path from NSSI to suicide which is partially mediated by acquired capacity for suicide, including the moderating effects of NSSI severity, perceived burdensomeness, and a sense of thwarted belonging.

In sum, although suicidal and nonsuicidal self-injury appear to serve different functions for the individual who engages in them, NSSI represents a risk factor for eventual suicide attempts/completion, and these behaviours can be comorbid in some individuals. Research related to the risk factors and correlates of suicide is important to explore in order to gain a better understanding of NSSI, including exploring common underlying factors and identifying variables which distinguish these behaviours. In light of this consideration, select literature regarding suicidal behaviours will be discussed in subsequent sections.

1.4.3 Correlates of non-suicidal self-injury.

As previously discussed, there has been a shift in the literature away from considering NSSI largely within the context of BPD or psychotic disorders. Indeed, the recent literature suggests that individuals who self-injure might be experiencing a variety of different mental health concerns and disorders. There has also been renewed interest in discussing NSSI as its own syndrome, rather than considering these behaviours as symptoms of other disorders. Interest in a NSSI syndrome has included support for the addition of a non-suicidal self-injury disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM; e.g., Muehlenkamp, 2005; Selby, Bender, Gordon, Nock, & Joiner, 2011; Wilkinson & Goodyer, 2011). Indeed, in the most recent edition of the DSM, non-suicidal self-injury disorder has been included as a condition for further study (APA, 2013).

Research investigating the other mental health concerns experienced by those who self-injure indicates that DSM-IV-TR (APA, 2000) Axis I disorders are two to four times higher in those who self-injure compared to the general population (Cumming et al., 2006). Individuals who engage in self-injurious behaviours often experience symptoms of depression and anxiety (e.g., Fliege, Lee, Grimm, & Klapp, 2009), dysthymia, and substance abuse or dependence (Cumming et al., 2006). In addition, research has also demonstrated comorbidities between NSSI and Obsessive-Compulsive Disorder (OCD), Posttraumatic Stress Disorder (PTSD), specific phobias and previous experiences of abuse (Jacobson & Gould, 2007; Jacobson, Reinecke, Gollan & Kane 2008), as well as agoraphobia among females and narcissistic and antisocial features among males (Claes, Vandereycken, & Vertommen, 2007). Among children with Bipolar Disorder, NSSI has also been associated with greater severity of depressive symptoms, as well as psychosis and separation anxiety disorder (Esposito-Smythers, et al., 2010).

More recent research has begun to address the relationship among NSSI, coping strategies, attachment style, and personality traits, which represents a further shift away from considering such behaviours solely in the context of other diagnosable mental disorders (i.e., a move towards a more dimensional classification of NSSI). For example, individuals who self-injure have been demonstrated to engage in a more self-blaming coping style, with a tendency to self-derogation, have lower self-esteem and negative body image, less effective problem-solving abilities, as well as an insecure interpersonal attachment style (Hall & Place, 2010; Fliege et al., 2009; Levesque, Lafontaine, Bureau, Cloutier, & Dandurand, 2010; Muehlenkamp & Brausch, 2012). An emotional coping style and low self-esteem have also be found to mediate the relation between a number of personality characteristics, including avoidant, dependent, and negativistic, and NSSI (Cawood & Huprich, 2011). Rumination, a cognitive process that is related to

exacerbation and prolonging of negative emotions, has shown an association with NSSI in a number of studies (e.g., Armev & Crowther, 2008; Hilt, Cha, & Nolen-Hoeksema, 2008; Hoff & Muehlenkamp, 2009; Selby et al., 2010). Further, in support of a vulnerability-stress model of NSSI, the interaction of cognitive processes such as rumination or a negative attributional style (i.e., attributing negative events to internal, global, and stable factors), and negative life events appears to further increase the risk for NSSI, a finding which has been demonstrated in both cross-sectional and longitudinal studies (Guerry & Prinstein, 2010; Hankin & Abela, 2011; Selby et al., 2010).

Among studies that have investigated the personality traits of individuals who self-injure, the existing literature suggests that NSSI is associated with high neuroticism/negative affectivity, low extraversion, higher openness to experience and sensation seeking (Baetens, Claes, Willem, Muehlenkamp, & Bijttebier, 2011; Brown, 2009; Claes, Vandereycken, & Vertommen, 2004; Claes & Muehlenkamp et al., 2010; Goldstein, Flett, Wekerie, & Wall, 2009; Maclaren & Best, 2010). However, results regarding agreeableness and conscientiousness have been mixed, with some studies reporting lower levels of these or similar traits among individuals who self-injure (e.g., Baetens et al., 2011; Brown, 2009; Maclaren & Best, 2010) or, conversely, suggesting that conscientiousness may be protective for individuals with poor problem-solving skills (Hasking et al., 2010) and others finding no such association (e.g., Goldstein et al., 2009). It has also been suggested that NSSI may be more related to internalizing disorders for females and externalizing disorders for males (Hintikka, et al., 2009; Laye-Gindhu & Schonert-Reichl, 2005). More specifically, females may be more likely to self-injure to cope with emotions turned inwards, and be more likely to engage in skin-cutting and more hidden forms of self-injury. In contrast, males may be more likely to engage in public and violent forms of self-injury, such as hitting oneself or

punching through a window with the intention of causing cuts (Laye-Gindhu & Schonert-Reichl, 2005). Regarding the association with BPD, Kerr and Muehlenkamp (2010) found that the symptoms of emotional lability, unstable relationships, and a poor sense of identity might be particularly important among college women who self-injure. Results such as these support exploring the role of core symptom involvement in NSSI, rather than simply associations with specific disorders.

Researchers have reported that individuals who self-injure are more likely to engage in other risky behaviours such as becoming sexually active during adolescence, inconsistent condom use, and sharing cutting instruments with peers, which might, in turn, increase the risk for HIV and other diseases (DiClemente, Ponton, & Hartley, 1991; Brown, Houck, Grossman, Lescano, & Frenkel, 2008). Similarly, it has also been suggested that self-injurers might display greater levels of impulsivity, although the research results regarding this hypothesis appear inconclusive. For example, Dougherty and colleagues (2008) found that adolescents with a history of both suicide attempts and NSSI (SA+NSSI) self-reported greater impulsivity when compared to individuals with NSSI history only. On laboratory-based measures the SA+NSSI group demonstrated more impulsivity on a consequence sensitivity task (i.e., a measure of immediate gratification); in contrast, the groups did not differ in their performance on a response inhibition task. These results suggest that different aspects of impulsivity might be particularly relevant to suicidal versus non-suicidal self-injury; however, a significant limitation of this study is the lack of both a healthy control group and a suicide attempt-only group.

Partially addressing this concern, Janis and Nock (2009) examined self-injurers and healthy controls on self-reported and laboratory-based measures of impulsivity. In the two studies conducted by the authors, although self-injurers self-reported greater levels of

impulsivity, the performance-based tasks did not reveal differences between the groups. The authors suggested that this discrepancy between self-report and performance-based measures might reflect participants' bias towards thinking about their self-injury when responding, or that self-injurers are particularly impulsive under the conditions of emotional distress leading to the behaviour. In further support of this hypothesis, Glenn and Klonsky (2010) found that self-injurers were best distinguished from healthy controls by a self-report measure of the tendency to make rash decisions when experiencing negative affect (i.e., the Urgency subscale of the UPPS Impulsive Behavior Scale). However, self-injurers and healthy control were not distinguished by their performance on a behavioural stop-signal task, which the authors suggested might indicate that self-injurers display more state-based impulsivity, particularly when experiencing negative emotions.

In a novel experimental approach utilizing both self-report and laboratory measures of both impulsivity and NSSI (i.e., using self-administered shock task as an analogue for NSSI), researchers have found that participants with a history of self-injury did not differ from psychiatric and healthy controls on three behavioural impulsivity tasks (McCloskey, Look, Chen, Pajoumand, & Berman, 2012). However, self-administered shock levels were associated with behavioural measures of response initiation impulsivity and disinhibition, further supporting the notion that NSSI might be associated with impulsivity under some, but not all, conditions. Additional research is needed to untangle the role of impulsiveness in NSSI, such as exploring the components of the construct which might be of particular importance, examining state versus trait impulsivity, investigating the mediating role of negative affect, and including adequate comparison groups in a prospective design.

1.5 Functions of Non-Suicidal Self-Injury

Moving beyond a general discussion of the nature, prevalence, and correlates of NSSI, the following sections are dedicated to discussing explanatory models that have been proposed to explain why individuals might engage in self-injury. A number of theories have been proposed to explain the functions of NSSI, including: anti-dissociation, interpersonal boundaries, interpersonal-influence, self-punishment, sensation-seeking, sexual/sadomasochism and emotion regulation (Klonsky, 2007; Messer & Fremouw, 2008). Emotion regulation/experiential avoidance models have received greater research attention to date, and are a central focus of the subsequent empirical investigations of the current project; as such, emotional functions will be explored here in more detail.

The anti-dissociation model considers self-injury to be a way for the individual to end experiences of dissociation or depersonalization. For example, causing physical pain to oneself might serve the function of interrupting dissociative or “numb” sensations in order to feel like oneself again (Klonsky, 2007; Messer & Fremouw, 2008). Anti-dissociation models have received some support in the literature. In a sample of women with BPD, anti-dissociative functions (i.e., feeling generation, to regain normal feelings) were endorsed by 54% of the sample (Brown et al., 2002). Similarly, in a community sample of female patients, Favazza and Conterio (1989) reported that 55% of the sample endorsed “to feel real again” as a reason for their self-harm. In another study of community adolescents, Laye-Gindhu and Schonert-Reichl (2005) found that motivations related to the generation of feelings were endorsed by 41% of the sample. However, Nock and Prinstein (2004) provided less support for the anti-dissociative model, with less than one third of their adolescent sample reporting such functions.

The interpersonal influence model suggests that NSSI functions to gain attention from or manipulate others (e.g., to avoid abandonment), or as a cry for help (e.g., Allen, 1995). Analyzing data for individuals aged 14 to 17 from seven European countries, Scoliers and colleagues (2009) found that interpersonal influence motives were commonly endorsed by participants. In particular, the motives of communicating desperation, frightening someone, finding out if someone really loved them, and attention seeking were endorsed by 35%, 18%, 34% and 20% of participants, respectively (for NSSI episodes within the past year). Other interpersonal influence motives that have been endorsed include to be noticed and to get revenge on someone (Laye-Gindhu & Schonert-Reichl, 2005). Although these motives are not the most commonly endorsed reasons, they do appear to represent salient functions of self-injury for some individuals.

In contrast to utilizing self-injury to gain attention from or manipulate others, the interpersonal boundaries model states that self-injury functions to establish the boundary between the self and others (Klonsky, 2007). Individuals self-injuring for such a function are thought to experience insecure maternal attachment and an inability to individuate from their mothers; therefore, self-injury represents a way to separate themselves from other people and assert their identity. As reviewed by Klonsky (2007), only two studies have investigated this function of self-injury, and both have demonstrated only modest support, with less than a third of participants in both studies reporting such functions.

Drawing on aspects of Linehan's (1993) theory of BPD, the self-punishment model suggests that individuals learn from their early environments, particularly invalidating family environments, to punish themselves and self-injure in response to self-directed anger. This model has received much attention in the literature and has received strong support in a number of

studies. For example, in the Laye-Gindhu and Schonert-Reichl (2005) study self-dislike, feeling like a failure, and self-directed anger were reported by 70%, 64%, and 63% of the sample, respectively. In a European study of self-harm (Scoliers et al., 2009), nearly half of adolescents reported they self-harmed to punish themselves and, among women with BPD, self-punishment motives received the highest endorsement among 17 possible self-harm reasons in one study (Shearer, 1994, as cited in Klonsky, 2007) and were endorsed by 63% of the sample in another (Brown et al., 2002). Chapman and Dixon-Gordon (2007) reported that anger was a common emotional antecedent for self-injurious behaviours in a sample of female inmates with borderline personality traits, and suggest this might reflect the notion of anger directed inward, self-blame, and self-loathing, although the measure used in this study did not distinguish the type of anger (i.e., outward or inward) experienced by participants. Furthermore, in a test of an expanded self-punitiveness model, Flett, Goldstein, Hewitt, and Wekerle (2012) demonstrated associations between self-injury and trait perfectionism, self-criticism, and overgeneralization (i.e., the tendency to make a global negative appraisal of the self), as well as characterological and body shame, although these associations held only for females and were demonstrated using correlations that were generally small in magnitude.

Finally, the sensation-seeking and sexual/sadomasochism models have received less empirical support in the literature, and less theoretical attention has been devoted to such motives. For example, only 13% of the sample in the Laye-Gindhu and Schonert-Reichl (2005) study reported thinking that 'self-injury would be fun' as a motive. Within an adolescent psychiatric sample less than 10% reported excitement as a reason for self-injury (Nixon, Cloutier, & Aggarwal, 2002) and among women with BPD such functions were endorsed by less than 5% (Shearer, 1994, as cited in Klonsky, 2007). The sexual/sadomasochism model, although

no longer often discussed in the current literature, posits that self-injury functions as a way of gaining sexual gratification or an attempt of the individual to punish oneself for sexual feelings or to control sexual development. As reported by Messer and Fremouw (2008), the small body of evidence for this model comes from case studies or methodologically flawed descriptive studies, which makes it difficult to draw any conclusions of support for a sexual model of NSSI.

In sum, anti-dissociation, interpersonal-influence, sensation-seeking, and interpersonal boundaries theories of the function of NSSI have received varied, although generally modest, support in the empirical literature. The self-punishment model has received more theoretical and research attention than these other models and there is strong evidence for this function of NSSI (Klonsky, 2007). Compared to these models there has been a greater focus on emotion regulation models of NSSI, which will be explored in greater detail in the following section.

1.5.1 Emotion regulation model.

The emotion regulation or experiential avoidance model of NSSI has received the most research attention and empirical support in the literature to date. The Experiential Avoidance Model (EAM) outlined by Chapman, Gratz, and Brown (2006) proposed that self-injury is maintained through negative reinforcement and avoidance of unwanted or overwhelming affect. To elaborate on this behavioural model further, Chapman and colleagues outlined a sequence of events beginning with a stimulus, such as a negative life event, which results in an emotional reaction, such as sadness, that the individual is unable to tolerate and seeks to avoid. Engaging in self-injurious behaviours, then, serves to decrease emotional arousal and provides the individual with temporary relief from the affective state. Over time, and with repeated self-injury following the stimulus event, this negative reinforcement cycle results in self-injury becoming a conditioned, automatic response to unwanted or intolerable affective states.

Chapman and colleagues (2006) went on to discuss the factors that might place an individual at heightened risk for a tendency towards experiential avoidance, that is, why some individuals will be more likely to try and escape or avoid unwanted emotional states, rather than utilizing healthy coping strategies. The authors suggested that a tendency toward experiential avoidance might be related to biological systems such as the behavioural inhibition system (BIS), which is activated by aversive stimuli and involves avoidance behaviour. Although the BIS is most often associated with passive avoidance behaviour, it is also possible that this system is related to the active avoidance behaviour characterized by NSSI. Chapman and colleagues also discussed the hypothesis that increased levels of physiological arousal (particularly aversive arousal) in response to emotional events might be related to increased experiential avoidance. More specifically, higher arousal or reactivity is related to greater difficulty regulating emotions and this may result in individuals evaluating their emotions as overwhelming, leading them to engage in behaviours aimed at avoiding the emotions. Further, and related to experiencing greater emotional arousal, the authors also suggested that individuals who engage in NSSI may experience a lower distress tolerance for emotional arousal and as such are more likely to experience emotions as distressful or aversive.

Other authors have also discussed the emotion regulation functions of NSSI. For example, difficulties in emotion regulation are thought to be a core process in BPD (Linehan, 1993) and to be related to many symptoms of this disorder, including self-injurious behaviours. Linehan (1993) also discussed the role that early environments might play in the development of emotion dysregulation and self-injury. Early experiences of abuse or neglect, or early invalidating environments in general, might fail to teach the individual how to effectively manage emotions and tolerate distress. As the individual has not learned healthy ways to cope

with distress, self-injury is then used as a maladaptive coping strategy that functions to both quickly alleviate current distress and to prevent overwhelming emotions in the future (i.e., avoidance). As reviewed by Gratz (2003) it has also been suggested that, in addition to early invalidating experiences, high emotional reactivity and intensity likely also contribute to the development of emotion dysregulation, because higher emotional intensity is more challenging to regulate (consistent with the discussion by Chapman et al., 2006). It is then the interaction of these factors that contributes to emotion dysregulation and increases the risk for engaging in NSSI, utilized as an effective way for the individual to manage intolerable emotions.

1.5.2 Empirical evidence for emotion regulation.

Support has been demonstrated for the relation between emotion regulation and health-risk behaviours generally, as well as NSSI specifically. Difficulties with effective emotion regulation, and the related process of rumination, has been associated with other problematic behaviours such as substance use and smoking, disordered eating, risky sexual behaviours, and aggression (Kingston, Clarke, & Remington, 2010; Selby, Anestis, & Joiner, 2008). Reviewing the literature regarding the functions of self-injury, Klonsky (2007) outlined the empirical support for emotion regulation/experiential avoidance models and stated that the reviewed studies have found strong support for this model, with motives that include terminating negative emotions, relief, and emotional control. Among female inmates with borderline personality traits, Chapman, Specht, and Cellucci (2005) found that thought suppression, or the propensity to attempt to avoid aversive thoughts, was related to frequency of self-harming behaviours, although this was no longer significant after controlling for borderline personality traits, likely due to the shared variance between thought suppression and these traits. Although not assessing for borderline personality traits, Najmi, Wegner and Nock (2007) reported support for the

association between thought suppression and the presence and frequency of NSSI, such that individuals with a greater tendency to try to suppress aversive thoughts were more likely to self-injure in an attempt to reduce negative emotions. The authors also reported preliminary evidence for a model in which thought suppression mediated the relation between emotional reactivity and NSSI; interestingly the mediational role was not significant regarding suicide attempt, which provides further evidence for the distinct qualities of suicidal versus non-suicidal self-injurious behaviours. In other clinical samples (i.e., individuals without a personality disorder diagnosis), commonly endorsed reasons for NSSI include those that function to manage stress, reduce depression, to feel more relaxed, and to distract from painful feelings (Klonsky, 2007).

Among community adolescents, (Laye-Gindhu & Schonert-Reichl, 2005) some of the most commonly endorsed antecedents or motives for self-injury involved feeling unhappy, depressed, like a failure, and to gain relief from tension or stress. Similarly examining the emotional antecedents and consequences surrounding NSSI, recent studies have reported consistent findings, such that individuals who engage in NSSI report feelings such as anger, depression, anxiety, loss of control and stress before injury, followed by less fear and more relief and calmness following injury (Claes, Klonsky, Muehlenkamp, Kuppens, & Vandereycken, 2010; Gordon et al., 2010; Kakhnovets, Young, Purnell, Huebner, & Bishop, 2010). In other words, research has demonstrated NSSI to be associated with decreases in the arousal/intensity of emotion and improvements in valence/pleasantness of emotion (Klonsky, 2009). Preliminary research further suggests that individuals who report current NSSI experience less acceptance of such negative emotional responses, coupled with greater impulse control difficulties, compared with individuals with a past history of remitted NSSI (Anderson & Crowther, 2012). Extending these findings further, the experience of relief of negative emotions might be more often

experienced by individuals who repeatedly engage in NSSI, as individuals who report self-injuring only once have been found to experience more anger following the behaviour. Such results suggest that individuals who experience the negatively reinforcing properties of relief are more likely to continue self-injuring versus those who experience negative emotions (Kakhnovets et al., 2010). Additional work is needed to more explicitly examine the individual differences that might predispose individuals to experiencing either positive or negative emotional consequences following NSSI.

In contrast, a recent study by Williams and Hasking (2010) investigated the role of coping strategies, emotion regulation, and alcohol use on engagement in NSSI in a sample of community participants. These authors reported that although there was a correlational relation between emotion regulation and self-injury, emotion regulation was no longer a significant predictor in regression analyses. Results of the regression analyses indicated that emotion-focused and avoidant coping strategies, alone and in interaction with general psychological distress and alcohol use, did significantly predict self-injury. These authors interpret the non-significant findings regarding emotion regulation in light of the significant correlations among the emotion regulation strategy of suppression and the coping strategies assessed, with a particularly high correlation with emotion-focused coping. The shared variance among these theoretically similar constructs might have contributed, in part, to the non-significant findings and future research is important to try and disentangle these constructs and determine their unique contributions to self-injury.

Support for the emotion regulation function of NSSI in combination with the influence of negative environments has also been demonstrated, although some studies have found mixed results. For example, in a sample of female university students, Gratz (2006) found that the

interaction of early experiences of childhood maltreatment (as indicated by a composite measure of abuse, neglect, and parental overprotection/ psychological control), greater emotional inexpressivity, and higher levels of emotional intensity/reactivity significantly predicted engagement in self-injurious behaviours. Further, although the maltreatment composite predicted engagement in NSSI, it was not independently a significant predictor of NSSI frequency, which Gratz suggested lends support to the hypothesis that it is the interaction of these risk factors that heightens the risk for repeated self-injury. Looking at the interaction among emotion regulation and negative interpersonal relationships more generally, Adrian et al. (2011) found structural equation modeling support for a mediational relation between both family and peer relational problems, and a direct effect of family relational problems on NSSI as well as on negative peer experiences. Such results provide evidence that both family and peer relationships influence effective emotion management as well as self-injurious and other health-risk behaviours and, as such, later sections will also explore these relational influences in greater detail.

Extending the findings of Gratz (2006), Gratz and Roemer (2008) further investigated the role of emotion dysregulation, again among female university students. In this study, the authors found that overall levels of emotion dysregulation significantly predicted NSSI status, although emotion dysregulation did not mediate the relationship among the other risk factors (e.g., childhood maltreatment and emotional inexpressivity) and NSSI. The authors then explored the particular components of emotion dysregulation that contribute to engagement in NSSI. More specifically, limited access to emotion regulation strategies and lack of emotional clarity were significant predictors of self-injury, and limited access to emotion regulation strategies partially mediated the relationship between early experiences of childhood maltreatment and self-injury status. These findings support the hypothesis (e.g., Linehan, 1993) that invalidating

environments influence later engagement in self-injury via a negative impact on the development of effective emotion regulation.

Although studies such as those reviewed above lend support for the role of both invalidating environments and emotion dysregulation in the development of self-injury, as well as the possible mediational relation between components of emotion dysregulation, early experiences, and self-injury, other studies have reported mixed findings. For example, Heath and colleagues (2008) reported that difficulties in emotion regulation significantly distinguished between those who engaged in NSSI and those who did not, regardless of the frequency of NSSI. The domains of emotion dysregulation especially relevant to engagement in NSSI were: limited access to effective emotion regulation strategies (consistent with findings from Gratz & Roemer, 2008), as well as difficulties engaging in goal-directed behaviours or controlling impulsive behaviours when experiencing negative emotions. However, these researchers reported no differences between the NSSI and control groups on measures of attachment or childhood trauma (emotional, physical, and sexual abuse, and emotional and physical neglect). These discrepant findings with past research might be related to the generally low severity of NSSI engaged in by their sample. In other words, in previous research supporting the role of early invalidating experiences (Gratz, 2006; Gratz & Roemer, 2008) the samples were characterized by a greater proportion of individuals engaging in repeated self-injury than in the Heath and colleagues (2008) sample, in which the majority of participants engaged in mild self-injury. These findings might also be due to variability regarding the influence of trauma. The relation between experiences of abuse/neglect and NSSI will be explored in greater detail in a later section.

A significant limitation throughout much of the literature is the reliance on retrospective self-reports regarding the affective states surrounding episodes of self-injury. Using recent

methodological developments, researchers have begun to investigate the occurrence of NSSI in real-time using Ecological Momentary Assessment (EMA). Arney, Crowther, and Miller (2011), Nock, Prinstein, and Sterba (2009) and Muehlenkamp et al. (2009) have explored the proximal events surrounding self-injury by asking participants to record their experiences in palmtop computers over a period of one to two weeks, at various intervals throughout the day or in response to self-injurious thoughts or behaviours. Using this innovative approach, Nock and colleagues (2009) reported additional support for an emotional regulation model of self-injury, with 85-90% of NSSI episodes occurring over the two-week period reported as serving intrapersonal reinforcement functions, such as in response to feeling rejected, anger and self-hatred, and numb, although feeling sad decreased the likelihood of engaging in the behaviour following NSSI ideation.

Likewise, Muehlenkamp and colleagues (2009) demonstrated an increase in negative affect and decrease in positive affect before engaging in NSSI. Although the results of their research supported an increase in positive affect following NSSI, negative affect did not decrease, contrary to predictions based on the affect regulation model. The results of Arney and colleagues (2011) might provide insight into such results; specifically, although they also demonstrated an increase in negative affect before self-injury and a decrease in some negative affective states following it, they noted that feelings of guilt were not quickly extinguished. Using a different approach within a general population of participants, Bresin, Gordon, Bender, Gordon, and Joiner (2010) demonstrated a decrease in both positive and negative affect following laboratory-induced pain, which was moderated by emotional reactivity such that greater reactivity resulted in a greater decrease in negative affect. Although positive affect was not investigated, Weinberg and Klonsky (2012) have also demonstrated decreases in negative

affect among self-injurers compared to control participants following high levels of self-administered shock.

In light of the reviewed research, one goal of Studies 2 and 3 of this project is to further examine the association between emotional factors and NSSI. Specifically, the EAM (Chapman et al., 2006) is a central component of the model examined in this project, such that the influence of emotion regulation difficulties on NSSI engagement is assessed within the context of a more comprehensive model also addressing the influence of interpersonal relationships (discussed in detail in subsequent sections). In addition, although the influence of emotion regulation has been well examined in the literature, there has been much less emphasis on the role of emotional reactivity. Therefore, Studies 2 and 3 of this project also included this factor, and it was hypothesized that increased reactivity contributes to increased emotion dysregulation that, in turn, increases risk for NSSI engagement. Finally, as discussed by Nock and colleagues (2008), although broad measures of temperament exist, of which emotional reactivity can be conceptualized as a component, as well as specific measures of affect intensity, the Emotional Reactivity Scale (ERS) is the only brief, comprehensive measure of emotion sensitivity, intensity, and persistence. Although initial evidence for the reliability and validity of the ERS was demonstrated among a sample of primarily female adolescents (Nock et al., 2008) little is known regarding the psychometric properties of this measure among older participants. As such, the focus of Study 1 of this project was to examine the validity and factor structure of the ERS among university students, for the purpose of informing the most appropriate use of this measure within the comprehensive model assessed in Studies 2 and 3 (see Chapter 2 for further discussion).

1.6 Psychophysiology of Non-suicidal Self-injury

As with much of the earlier literature, a significant proportion of the research regarding the psychophysiology and biological markers of self-injury has focused on this behaviour as it occurs in individuals with BPD. Growing from the observation that a number of individuals with BPD have previous experiences of abuse, studies have demonstrated that early trauma alters the areas of the brain responsible for processing pain (Ballard, Bosk, & Pao, 2010). As such, one focus of this growing body of work is exploring pain perception among those who self-injure, and how the experience of physical pain alters emotional pain. This line of research also seeks evidence for the affect regulation/experiential avoidance model of NSSI. Inconsistencies regarding the experience of pain have been noted using retrospective self-report methodology, with some studies finding support for the desensitization hypothesis (Joiner, 2005), such that acts of self-injury are associated with the absence or decreased perception of physical pain (Franklin, Hellsel & Prinstein, 2011; Nock & Prinstein, 2005). Others have offered support for the experience of more physical pain with repeated injury (Gordon et al., 2010) or, similarly, less physical pain associated with a lower number of episodes and use of fewer methods of injury (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Therefore, researchers have moved toward exploring the experience of pain and physiological reactivity using alternative methodologies.

Individuals with BPD do appear to experience higher pain thresholds and lower pain ratings in response to stimulation, which might further increase when one has a desire to self-injure. This decreased sensitivity has been demonstrated with various modalities, including cold/heat pain, chemical and mechanical physical stimuli (e.g., Ballard et al., 2010; Magerl, Burkart, Fernandez, Schmidt, & Treede, 2012; Schmahl et al., 2006). Likewise, among

individuals with a recent history of NSSI (of whom 37.2% endorsed relevant levels of BPD pathology); greater physical pain tolerance has been preliminarily shown to vary as a function of mood state, such that greater tolerance was found under conditions of interpersonal distress, but not under neutral emotional conditions (Gratz et al., 2011). Using the cold pressor test as a proxy for self-injury, Russ and colleagues (1992) found that individuals with BPD who experienced no physical pain during self-injury reported decreased depression, anxiety, and anger following the pressor test relative to pain-BPD and control groups, suggesting possible implication of systems involved in both mood and pain, such as the endogenous opioid system (EOS). Self-injury might be one manifestation of an underlying dysfunction in the EOS, serving as an attempt to create an endorphin rush from the reward systems of the brain (Bandelow, Schmahl, Falkai, & Wedekind, 2010).

Research has demonstrated that individuals with a self-injury history show increased arousal in the limbic regions of the brain in response to both negative and neutral affective stimuli (Niedtfeld et al., 2010). Results have also shown altered activation in the orbitofrontal and dorsolateral prefrontal cortex, and decreased activation in the mid-cingulate, anterior cingulate, and amygdala during tasks such as imagining cognitive and affective reactions to triggering events, acts of self-injury, or during the experience of physical heat stimuli (Kraus, et al., 2009; Schmahl et al., 2006). Similarly, adolescents engaged in NSSI display reduced secretion of cortisol in response to a psychosocial stress activity (Kaess et al., 2012). This attenuated cortisol response, interpreted as a signal of hyporesponsiveness of the hypothalamic-pituitary-adrenocortical (HPA) axis, was hypothesized as contributing to a maladaptive stress response among individuals with a history of NSSI. Further, the opioids β -endorphin and met-

enkephalin have also been associated with self-injury and might be related to the self-reported analgesic effects of injury performed in response to distress (Stanley, et al., 2010).

Results regarding the influence of serotonin regulation have been mixed, with some studies finding support for reduced peripheral serotonin levels among self-injurers (Crowell et al., 2005; Stanley, Winchel, Molcho, Simeon, & Stanley, 1992), and other studies finding no such association using CSF measures (Stanley et al., 2010). This pattern might suggest that, although serotonergic dysfunction has been implicated in suicidal self-injury, the opioid system could play a more dominant role in self-injury without suicidal intent (Stanley & Siever, 2010). Finally, the results regarding impaired executive functions (EFs) have also been mixed, with some studies finding no differences in EFs and impulsivity between self-injurers and controls (Janis & Nock, 2009; Ohmann et al., 2008). Others have reported differences in working memory and impulsivity, which might vary as a function of the severity of self-injury (Fikke, Melinder, & Landro, 2011), as well as differences in decision-making among those currently engaged in self-injury, but not among individuals who have ceased the behaviour (Oldershaw et al., 2009). Such patterns of results provide increasing insight into the potential underlying factors contributing to emotional hyperactivity, altered pain perception, difficulties regulating emotional and cognitive responses, as well as dysfunctions in impulse control.

In order to investigate the psychophysiological effects of self-injury, one methodological approach has been to record the physiological reactions of participants while they imagine events leading up to, during, and following the behaviour. Earlier studies showed that following personalized guided imagery scripts of an episode of self-injury, individuals demonstrated a reduction in physiological reactivity, as indicated by measures such as heart rate, respiration, skin conductance level, and finger pulse amplitude (Brain, Haines, & Williams; 1998; Haines,

Williams, Brain, & Wilson, 1995; Brain, Haines, & Williams, 2002). These researchers also found a lag between the reduction in physiological activity and the subsequent reduction in psychological distress, which appears particularly relevant for individuals who have ceased self-injury versus those who continue to engage in the behaviour. Such results suggest that previous self-injury might be viewed as more anxiety-provoking and distressing, and individuals who maintain the behaviours hold a more positive appraisal of the physiological reductions as being caused directly by injury and, as such, experience concomitant psychological relief rather than distress (Brain et al., 1998). Reductions in physiological reactivity appear similar for those who self-injure once versus those who continue the behaviour, suggestive of similar physiologically-based reinforcement properties. In contrast, frequent self-injurers report greater reduction in negative affect and increased feelings of relief, and one-time injurers report greater fear throughout imagery scripts (Brain et al., 2002), a finding which supports a negative reinforcement model that self-injury might be initially performed for the physiological reduction and over time becomes increasingly psychologically reinforcing as well.

Using similar methodological paradigms, empirical work has sought to further explore the influence of NSSI on physiological reactivity. For example, respiratory sinus arrhythmia, an index of parasympathetic-linked cardiac activity related to individual differences in emotion regulation, is reduced during both baseline measures and during negative mood induction in self-injurers versus controls (Crowell et al., 2005). Similarly, during tasks which experimentally induce distress, self-injurers demonstrate altered prepulse inhibition (i.e., a measure of information processing; PPI), increased physiological reactivity during stress, as well as poor distress tolerance (Nock & Mendes, 2008; Franklin et al., 2010), which further points toward affective and cognitive dysregulation, with PPI data supporting the hypothesis that individuals

who self-injure might experience deficits in some aspects of executive functioning. Overall, although the literature regarding the psychophysiological and biological characteristics of individuals who engage in self-injury is in the formative stages, the results obtained to date are largely consistent with the dominant emotional regulation/experiential avoidance model and provide intriguing direction for elucidating the etiological and reinforcing qualities of NSSI.

1.7 Environmental/Social Influences on Non-Suicidal Self-Injury

In addition to the aforementioned intrapersonal factors that have been proposed to explain the functions of NSSI, theorists and researchers have also explored the relations among media exposure and the family and peer environments (e.g., attachment, group identification) in the development of suicidal and non-suicidal self-injurious behaviours. The following sections will review selected literature in these areas.

1.7.1 Influence of the media.

The apparent increase of NSSI among adolescents and young adults in recent years suggests a cultural trend, and self-injury should not be considered as distinct from the culture and time period in which it occurs. Indeed, in addition to individual, family, and peer community factors involved in NSSI, the popular media also appear to play a role in suicidal and non-suicidal self-injury. As discussed previously, self-injury has been studied for decades (e.g., Hoyt, 2003), although public awareness and media attention began to increase dramatically only in the 1990s, which researchers speculate might have some relation to a number of celebrities revealing their personal experiences with self-injury (Whitlock, Lader, & Conterio, 2007). Today, a number of popular celebrities, such as Johnny Depp, Angelina Jolie, Marilyn Manson, and Christina Ricci, have publically discussed their struggles with NSSI. Further, there has also been

an increase in the number of movies and television shows that have raised issues related to these behaviours (Whitlock et al., 2007).

Interest in exploring media effects on self-injurious behaviours was sparked after so-called imitative suicides following the suicide of the hero in Goethe's *The Sorrows of Young Werther*, published in 1774 (Berman, 1988), although empirical work did not begin until the 1970s (Stack, 2003). A considerable amount of international research has now been dedicated to exploring the impact of fictional and non-fictional media coverage on subsequent copycat suicidal behaviours, a phenomenon referred to as the Werther effect (Trewavas, Hasking, & McAllister, 2010), although the methodological quality of these studies varies considerably. In particular, only more recent investigations have directly assessed whether individuals actually had exposure to the media-depicted suicide. Early investigations of the impact of four made-for-television movies yielded conflicting results, with Gould and Shaffer (1986) reporting a significant increase in suicides in New York and surrounding area in the two weeks following the broadcast of these programs. In a replication of this study, Phillips and Paight (1987) found no evidence for such an increase in Pennsylvania and California. In another large-scale replication study, involving medical offices serving approximately one-fifth of the United States population, Berman (1988) also found no support for the hypothesis that the fictional depictions of suicide in the television movies increased real-life suicidal behaviours. However, he did find partial support for an imitation hypothesis, such that following these broadcasts there were increases in youth suicides using the same methods as modeled by the characters on television.

In a meta-analysis of 42 studies investigating the influence of the media on suicide, Stack (2003) noted that stories that covered celebrity suicides (e.g., Marilyn Monroe, prominent politicians) were 14 times more likely to produce imitative effects than stories about non-

celebrities; stories covering real-life suicides were four times more likely to produce a copycat effect than fictional stories. In another review, Gould, Jamieson, and Romer (2003) noted that modeling of suicidal behaviours following non-fictional news stories of suicide is directly related to the amount, duration, and prominence (e.g., glorified or sensationalized stories) of media coverage, in a dose-response relationship. In addition, although the evidence is strongest for modeling after non-fictional/celebrity accounts of suicide, some research has also demonstrated dramatic increases in suicides following fictional media broadcasts. In general, although some of the earlier research produced conflicting results, the current consensus is that the media can indeed produce suicide contagion effects (e.g., Gould & Jamieson et al., 2003) and that these effects may be most pronounced in young people (e.g., Hawton & Williams, 2001; Strasburger, 2009). Demonstrations of suicide attempt and completion following celebrity suicides has also been supported internationally, such as a recent study in South Korea (Jeong et al., 2012).

Although there has been very little research to date investigating the impact of the media on NSSI, there is preliminary evidence for this influence among some individuals. For example, in their investigation of adolescents' reasons for starting and continuing to self-injure, Deliberto and Nock (2008) found that 13.3% of their sample got the idea to self-injure from the media. In a study involving self-poisoning or self-injuring young adults (a sample which likely included both suicidal and non-suicidal motives), Zahl and Hawton (2004) completed semi-structured interviews with participants in order to explore the harmful or beneficial effects of media presentations of self-injury. The authors found that, of the 12 participants who were interviewed, 11 were able to recall a media story about suicide, and over half of these participants reported that the media story had affected their behaviour in some way. Although most of these participants reported that they self-injured after viewing a media story (many using the same

method as portrayed), one participant did report that a story had prompted him/her to seek therapeutic help. The authors also found that television or movie stories of self-injury were more often recalled, and assumed to have had a greater influence on participants, than those in newspapers or magazines. Such an influence of fictional media is in contrast to the overall findings related specifically to suicide where non-fictional media stories appear to produce the greatest contagion effects (e.g., Gould & Jamieson et al., 2003). Zahl and Hawton (2004) suggested this finding might be related to the younger age of participants (17 to 25 years old) in their study and an increased preference for fictional media in general among this age group.

Recent discussions of the media influence on NSSI among adolescents and young adults have often focused on the use of the Internet. Research suggests that individuals with a recent history of suicidal and/or non-suicidal self-injurious behaviours are more likely to develop close interpersonal relationships with others whom they meet online and are more likely to interact with others in internet chat rooms (Mitchell & Ybarra, 2007). For many adolescents and young adults the Internet has become a primary socialization tool (e.g., *Facebook*, instant messaging, *My Space*, et cetera) and is likely to be the first resource young people turn to in order to gather information and support regarding self-injury (Whitlock et al., 2007). Research specifically addressing this trend indicates that many individuals use the internet as a source of information and advice about self-injury (Prasad & Owens, 2001), both from NSSI forums and from general websites such as *Yahoo! Answers* (Lewis, Rosenrot, & Messner, 2012), highlighting the need for further investigation regarding the accuracy of information available to internet users.

There has also been a dramatic increase in the number of self-injury forums and discussion boards that are now readily available. In 2005 Whitlock and colleagues (2007) documented over 400 active self-injury message boards on the internet; just one year later the

authors documented over 500 such websites. Although self-injury websites and forums have often been condemned as triggering or pro-self-injury, users of such sites believe them to be a community of empathy and understanding, utilize them as a means of coping with distress, and can display a great deal of knowledge about appropriate and helpful ways to support other members (Baker & Fortune, 2008; Smithson et al., 2011). Whitlock and colleagues (2007) also noted that self-injury websites can be a source of therapeutic comfort for individuals who are struggling with shame and isolation. Indeed, in a survey of self-injury forum members Johnson, Zastawny, and Kulpa (2010) found that 55.8% of users reported a decrease in their self-injury since joining support forums.

However, there remains concern that such websites might exacerbate self-injurious behaviours for some individuals. In their examination of internet self-injury discussion boards Whitlock, Powers, and Eckenrode (2006) noted that such websites might expose individuals to a subculture where NSSI is normalized, via the inclusion of access to advice on how to hide injuries and scars, and the sharing of different techniques for self-injury. In an investigation of the nature of questions about NSSI online, Lewis, Rosenrat and colleagues (2012) found that questions about scar concealment were the third most commonly asked type of question, although this accounted for only 11.11% of the questions. The most commonly asked category of question in this study was in regard to seeking acceptance or validation for NSSI experiences (30.56%). These results also found cause for concern in that responses to such questions were sometimes completely invalidating, which might enhance feelings of isolation. Such findings point to the need for future research to examine the impact of pejorative or hostile responses from other internet users on those who self-injure.

In addition to membership in NSSI communities, recent research has begun to investigate other unique activities individuals who self-injure might engage in online. For example, *YouTube* is one of the most frequently visited websites on the internet and in 2010 over 5000 NSSI videos had been uploaded to this popular website (Lewis, Heath, St. Denis, & Noble, 2011), which has likely increased substantially since then. NSSI videos are both easily accessible and frequently viewed, with the authors finding an average of over 23,000 views per video and an average of over 200 viewer comments per video. Examining the content of such videos, Lewis and colleagues (2011) reported that the most frequently viewed videos were often neutral in purpose and portrayed educational or melancholic tones. Although only 7% of the videos they examined actively encouraged NSSI, few actively discouraged NSSI as well (26%) and many of the videos were posted without a trigger warning despite showing either pictures of self-injury or displaying a live act of NSSI, most frequently skin-cutting. Alarming, a later evaluation of the top five videos found that the majority tended to depict a high severity of NSSI, with open wounds, embedding, gushing blood, and acute scarification (Duggan, Heath, Lewis, & Baxter, 2012). However, a recent qualitative investigation found that viewers tend to regard NSSI images as soothing and serve to alleviate NSSI, rather than having the intuitive triggering effect (Sternudd, 2012). Regarding the comments posted to NSSI videos, these most frequently take the form of self-disclosure of one's own self-injury experiences, although mention of recovery, treatment, or a desire for recovery were uncommon (Lewis, Heath, Sornberger, & Arbuthnott, 2012). Furthermore, comments about methods and strategies, such as wound cleaning and concealment, and mention that viewers found the video triggering were uncommon. Such results suggest that although a direct NSSI triggering effect from videos may not be particularly common, the lack of a recovery theme and the potential glamorization of NSSI through artistic expression may be

more salient for the normalization and maintenance of the behaviour among individuals online. Similarly, NSSI groups on the popular social media websites *Facebook* and *MySpace* have been found to be generally supportive and educational, and also including videos, photos, and artistic content, with more groups identified as having a mixed or neutral message, rather than actively encouraging the behaviour (Duggan et al., 2012).

Overall, there is little empirical investigation into the influence of the media on NSSI. However, given research supporting the influence of the media, as well as support for contagion effects (described below), the easy access of a virtual subculture of self-injurers certainly requires increased research and clinical attention. As many users of self-injury websites and discussion forums subjectively rate them as beneficial (Baker & Fortune, 2008; Whitlock, et al., 2006), appropriately monitored websites (e.g., for “triggering” material) may provide valuable therapeutic benefits to supplement psychotherapy for individuals struggling with self-injury. As cautioned by Strasburger (2009), clinicians and researchers alike must keep in mind the impact of media exposure on health-risk behaviours. Indeed, the media and the overall culture of a community influence the familial environment and, perhaps especially, the peer group of individuals who engage in NSSI.

1.7.2 Influence of the family environment.

As introduced above, the role of the family environment, especially the influence of early invalidating experiences, has been implicated in the development of both difficulties in emotion regulation as well as suicidal and non-suicidal self-injury. Morris and colleagues (2007) argued that there is both a direct relation between the family environment and general psychosocial adjustment, as well as a mediational relation whereby the family environment affects adjustment via the influence of emotion regulation abilities. They proposed that the family environment

exerts its influence in three ways: through modeling and social referencing, through parenting practices related to emotion management, and through factors such as the attachment relationship and family expressiveness. More specifically, social modeling has long been demonstrated as a means through which people learn behaviours (Bandura, 1977) and one way that children and adolescents learn about emotions and emotion regulation is through observation of their parents' emotional reactions in different situations. In the future children then use this emotional knowledge to determine how they should react in similar situations (Denham, Mitchell-Copeland, Strandberg, Auerbach & Blair, 1997; Morris et al., 2007). In a related process, in novel circumstances children and adolescents learn about emotions and emotion regulation through social referencing, or turning to others for information about how they should respond. As Morris and colleagues (2007) noted, it is likely that as children age they will look to both parents and peers for this emotional information and to learn how to respond in stressful situations.

The second broad factor through which parents influence adjustment and emotion regulation is through emotion-related parenting practices. Gottman, Katz, and Hooven (1996) proposed a theory of meta-emotion philosophy, referring to the thoughts and feelings parents have about their own emotions and their children's emotions. They posit that parents' own meta-emotion philosophy directly affects their emotion-coaching towards their children. For example, parents who are accepting of their own emotions are aware of the emotions of their children, and see their children's emotions as an opportunity for teaching and helping the child problem-solve. In contrast, when parents are emotionally dismissing and uncomfortable with emotions, they also tend to dismiss emotional expression in their children. Eisenberg and colleagues (1998) also discussed how parents' emotion-coaching might influence children's emotion regulation through

their reactions to negative and positive emotions. When parents react in a punitive way to children's emotional displays, it teaches children to avoid emotions, rather than try to understand them, appropriately express negative emotions, and explore effective coping and problem-solving strategies.

Third, the emotional climate of the family, such as emotional expressiveness and attachment relationships, has been proposed to influence adjustment and emotion regulation in children. For example, Morris and colleagues (2007) stated that early secure attachment in children has been demonstrated to predict later effective emotion regulation, and early insecure attachment is related to higher anxiety and hostility. The authors went on to note that negative parenting (e.g., psychological control, lack of sensitivity), which might contribute to insecure attachment, is also associated with poor emotion regulation abilities. In terms of emotional expressiveness in the family, there is evidence that parental expression of positive emotions (e.g., being warm and supportive; utilizing effective emotion-coaching) is related to more emotional security and less externalizing problems, and expression of negative emotions tends to be related with poorer adjustment in children (e.g., Eisenberg et al., 2001). Finally, expressed emotion, or the negative emotional climate within the family, is related to a number of negative outcomes, such as schizophrenia, depression, and disruptive disorders, although no studies have directly assessed the relation between family expressed emotion and children's emotion regulation (Morris et al., 2007).

1.7.3 The family environment and non-suicidal self-injury.

The NSSI literature is still very much in its infancy, although research investigating the family environment in the development of NSSI has begun to incorporate the literature addressing emotion socialization and emotion regulation abilities (of note, some of the literature

reviewed in the previous section discussing the evidence for emotion regulation is also directly applicable here, but will not be repeated; e.g., Gratz, 2006; Gratz & Chapman, 2007; Gratz & Roemer, 2008). As reviewed by Fliege and colleagues (2009), a number of studies have found associations between NSSI and parental psychopathology, divorce, separation from a parent, and childhood experiences of abuse and neglect. In addition, higher rates of suicidal behaviours and ideation, violence, and alcohol and drug abuse have been reported among parents of non-suicidal self-injurers (Deliberto & Nock, 2008), similar to the results found for suicidal behaviours.

A recent area of increased attention in the literature investigates the role of the emotional environment of the family, emotion socialization, and quality of the parent-child relationship in the development of NSSI. Within a sample of adolescent inpatients, Sim and colleagues (2009) explored the associations between early invalidating environments, emotion regulation, and NSSI. Participants completed measures of emotion coping (i.e., functions of their self-injury) and emotional awareness and expression, as well as a measure assessing the quality of the family environment (experiences of emotional abuse and neglect). Compared to control participants, those in the NSSI group reported greater experiences of early invalidating family environments, poorer emotional awareness, and reluctance to express emotions. Using structural equation modeling, a statistical technique still quite novel within this literature, the authors found that poor emotion regulation abilities partially mediated the relation between early invalidating family experiences and later self-injury, although this model was only significant for females. These results suggest that, at least for females, difficulties in expressing and identifying emotions, within the context of early experiences where parents were dismissive or punishing of emotions, creates difficulties in learning how to manage negative emotions in adaptive ways; then, NSSI is used as a maladaptive coping strategy during negative experiences.

In a related study, Buckholdt and colleagues (2009) investigated the relationship among parental emotion socialization, emotion regulation, and NSSI in a sample of college students. Parent responses to emotion were assessed in five domains: reward, punishment, neglect, overriding, and magnification. In addition, participants completed measures assessing difficulties in monitoring, evaluating, and modifying emotions. Parental responses of punishment and neglect of sadness significantly contributed to engaging in NSSI; in other words, individuals who reported NSSI came from families where the expression of sadness was punished or not tolerated by parents. In addition, responses of punishment were related to greater difficulties in regulating emotions, and the specific domain of difficulties evaluating emotions mediated the relation between parental punishment and neglect of sadness and NSSI. The results of this study provide further support for the mediational role of difficulties in emotion regulation, as well as for the importance of the emotional environment of the family in the development of NSSI utilized as a coping strategy.

In addition to emotion socialization and the emotional climate of the family, research has also begun to explore how specific aspects of the parent-child relationship, such as attachment and parenting style, contribute to NSSI. For example, Hilt, Nock, Lloyd-Richardson, and Prinstein (2008) found that, although adolescent participants who engaged in self-injury reported lower overall relationship quality with their parents when compared to control participants, those who self-injured also reported an increase in the quality of the relationship with their fathers over an 11-month follow-up period, a pattern not demonstrated among control participants. The authors interpret this preliminary finding to suggest that one function of NSSI might be for positive social reinforcement, specifically within paternal relationships.

Kimball and Diddams (2007) have explored the hypothesis that emotion regulation skills would mediate the relation between current attachment and NSSI among college students. Affect regulation was assessed by exploring five different strategies that individuals might engage in to cope with negative emotions: activities, contemplative strategies (e.g., talk yourself into a calmer state), oral passivity/somatic (e.g., eating), interpersonal behaviours, and sexual and aggressive fantasies and behaviours (e.g., reckless behaviours). Adult attachment style was assessed using a self-report measure according to the traditional attachment types of secure, anxious, and avoidant. Using structural equation modeling, the authors analyzed a trimmed model including the avoidant and anxious attachment types and maladaptive affect regulation strategies (oral passivity/somatic and sexual and aggressive behaviour); in other words, secure attachment and adaptive affect strategies (activities, contemplative strategies, and interpersonal behaviours) were removed from the model after initial analyses revealed these variables were not a good fit. The final trimmed model was significant, suggesting that poor affect regulation skills partially mediate the relation between negative attachment styles and engagement in self-injury in young adulthood. In addition, the authors suggested that the finding that secure attachment was not a good fit in the model is suggestive that attachment might function as both a risk or resiliency factor for NSSI, with secure attachment serving as protective. However, gender differences in the model, concerning emotion regulation as a mediator in particular, were not explored and, as suggested by the Sim et al. (2009) study, the model might have emerged as non-significant for males, although further research is still needed to examine these possible gender differences.

Finally, Bureau and colleagues (2010) examined the association between young adults' perception of the relationship with their parents and NSSI. More specifically, participants completed self-report measures assessing the following domains of parenting: failed protection

(i.e., the parent is unavailable when needed), anger in response to the parent's failure to respond, and fear in response to the lack of care and protection. In addition, measures were completed to assess a number of domains of the attachment relationship with parents, including overprotection/control, care, and the domains of the Inventory of Parental and Peer Attachment (IPPA; Armsden & Greenberg, 1987): trust, communication, and alienation. Briefly, the results of this study indicated that participants who had self-injured within the last six months also described relationships with their parents characterized by feelings of failed protection and fear, more control by their parents, and increased feelings of alienation. They also described their parents as less caring and trustful and more difficult to communicate with. The authors reported gender differences in the findings, as multivariate analyses revealed that the relationship dimensions were no longer significantly related to self-injury when only males were included in the analyses, suggesting that interpersonal factors may be of particular importance for females. Participants did not complete the separate IPPA subscales for both their mother and father, precluding a more detailed gender analyses.

In sum, an increasing amount of research has suggested that familial history and negative family environments contribute to the development of suicidal and non-suicidal self-injurious behaviours. In addition, evidence is also emerging for the role of parental emotion socialization and quality of the parental relationship (e.g., attachment) in the development of emotion regulation skills as well as self-injurious behaviour. A few studies have demonstrated the mediational quality of emotion regulation abilities, such that individuals with poor emotion regulation ability, within the context of invalidating family environments, may be especially at risk for self-harm. The existing research regarding the familial environment and NSSI was used to inform the current project in a number of ways. First, studies exploring the association among

emotional and familial variables have focused rather exclusively on domains of emotion dysregulation, in contrast to exploring the earlier stage of Chapman and colleagues' (2007) theorized path – emotional reactivity. The research that has included measures of reactivity has also focused on early experiences of abuse/neglect (see next section). The current project extends this research by using an overall measure of the parent-child relationship, as well as a measure of emotional reactivity. The current project also extends similar existing research by examining multiple domains of emotion regulation within the context of parental relationship influence, separately assessing both the maternal and paternal relationship in association with emotion reactivity, emotion regulation, and NSSI, and by including the influence of peer relationship factors in the model (see section 1.7.5). Based on the reviewed literature, in addition to providing support for the EAM (Chapman et al., 2006), it was hypothesized that negative parental relationships would demonstrate a direct influence on poor peer relationship quality, increased emotional reactivity and dysregulation, and NSSI, as well as a mediational relation with NSSI via emotion dysregulation.

1.7.4 The role of abuse and neglect in NSSI.

As introduced earlier, one area of focus in the literature has been exploring the relation between experiences of abuse/neglect and engagement in NSSI. The results previously reviewed have been mixed, with Gratz (2006) and Gratz and Roemer (2008) finding support for a relation, and Heath and colleagues (2008) not. Other researchers investigating this issue have also yielded mixed findings. For example Glassman, Weierich, Hooley, Deliberto, and Nock (2007) examined the influence of five different forms of childhood trauma on NSSI during adolescence: physical, sexual and emotional abuse, and physical and emotional neglect. The results demonstrated that not all forms of abuse/neglect predicted NSSI, with emotional and sexual

abuse showing the strongest relation. Weierich and Nock (2008) also explored the five different forms of trauma and found a significant relation with sexual abuse that was mediated by post-traumatic stress symptoms of re-experiencing and avoidance/numbing, and Croyle and Waltz (2007) demonstrated a relation with emotional abuse. In contrast to results such as these, Weismore and Esposito-Smythers (2010) did not find significant effects for either sexual or physical abuse after controlling for gender and internalizing disorders. Interestingly, these authors did find that a history of assault (i.e., physical or sexual assault in which the perpetrator was a non-relative and not in a caretaking position) was associated with NSSI for adolescents who scored highest on cognitive errors such as personalizing and catastrophizing, suggesting that these faulty cognitive styles might represent risk factors for NSSI.

The findings of Weismore and Esposito-Smythers (2010) are consistent with a recent meta-analysis (Klonsky & Moyer, 2008) of 45 samples that revealed a relatively small relation between sexual abuse and NSSI. When analyzing studies that statistically controlled for other risk factors such as depression, hopelessness, BPD, and family environment variables the association was even smaller, or negligible. A longitudinal study by Nada-Raja and Skegg (2011) might help clarify inconsistent findings in the literature when a direct relation between abuse and NSSI is investigated. The authors analyzed data from a larger health and development study which assessed potential NSSI predictors such as childhood sexual abuse, adult physical or sexual assault, posttraumatic symptoms, and mental health disorders. Their results suggested that childhood sexual abuse only indirectly predicts later NSSI, and that this effect is mediated through increases in anxiety disorders among men and adult experiences of physical and/or sexual abuse among women. Likewise, a recent review of the literature (Maniglio, 2011) based on research from 65, 851 participants concluded that "child sexual abuse should be considered a

general, non-specific risk factor for suicidal and non-suicidal behaviours" (pg. 37); generally small to moderate effect sizes across studies were found. The review indicated that other biological or psychosocial factors, such as dysfunctional family environments, mental health disorders, and personality characteristics, might better account for NSSI among individuals who have been sexually victimized as children, rather than the abuse itself having a direct causal role in later self-injury. In other words, childhood sexual abuse might best be considered as conferring additional risk for NSSI as conceptualized in multifactorial models, which include biological, psychological and social risk factors.

Additional research is required to further examine the relation between abuse/neglect and NSSI as well as to explore potential moderators that may explain some of the variability observed in existing research. For example, extending the findings of Weismoore and Esposito-Smythers (2010), research could explore the effect of relationship to the perpetrator in predicting later self-injury, such as a potential differential impact of abuse committed by family members, other caregivers, peers, romantic partners, or strangers. To this end, Levesque et al. (2010) found preliminary support for intimate partner violence, defined as physical, psychological, and sexual violence, as a risk factor for NSSI. An individual's age at the time of experiencing abuse, as well as more severe or repeated abuse might also explain some of this variability; abuse that is severe and occurs repeatedly might yield larger associations with NSSI. Further research is also required to elucidate the impact of various forms of abuse and neglect as the existing evidence suggests that some abuse experiences might be more of a risk factor for self-injury than others. Future empirical and meta-analytic studies will help to clarify the role of emotional, physical, and sexual abuse as well as experiences of neglect. As discussed by Maniglio (2011), it is difficult to make conclusions regarding the causal role of childhood sexual abuse in the etiology

of NSSI as the literature is generally characterized by studies with significant methodological problems, including poor sampling methods, lack of appropriate comparison groups, insufficient control for moderators and confounders, and the reliance on cross-sectional research.

1.7.5 Importance of peer relationships.

There is a large body of evidence indicating that peer group identification is related to a number of negative outcomes and health-risk behaviours. For example, identification or association with deviant subcultures (e.g., “burnouts,” “druggies,” “rebels,” etc...) or peers who engage in health-risk behaviours during adolescence is related to outcomes such as the use of alcohol and other drugs, risky sexual behaviour, low social acceptance, violence, depression, suicidality, and low self-esteem (Downs & Rose, 1991; La Greca, Prinstein, & Fetter, 2001; Madge et al., 2011; Prinstein, Boergers, & Spirito, 2001; Sussman, Dent, & McCullar, 2000). There is also evidence that parenting practices, such as parental monitoring, and the parent-child relationship are related to the peer crowds with whom adolescents identify (e.g., Brown, Mounts, Lamborn, & Steinberg, 1993; Rodgers-Farmer, 2000). As such, parental relationships might contribute to NSSI as described in preceding sections, and/or indirectly via peer relationships. Parenting styles that are considered indulgent (i.e., low in demands/rule-setting yet highly responsive) have been demonstrated to be related to identification with the “partier/fun-culture” in males, and adolescents who are from uninvolved homes (low in both demands and responsiveness) are overrepresented in the “partier” and “druggie” crowds (Durbin, Darling, Steinberg, & Brown, 1993); both of these crowds are characterized by involvement in health-risk behaviours such as alcohol and drug use. Adolescents who describe their parents as lower on authoritativeness (i.e., being undemocratic) have also been reported to be more likely to identify with “rebel” crowds and to score lower on measures of positive attributional style and higher on

negative attributional style, compared to adolescents who report belonging to a “studious” group (Heaven, Ciarrochi, Vialle, & Cechavicuite, 2005). Of note, individuals with negative attributional styles (i.e., attributing failures to internal, global, and stable causes) are also at increased risk of experiencing negative psychological outcomes, such as depression and hopelessness (e.g., Jacobs, Reinecke, Gollan, & Kane, 2008).

There has been increased attention to social modeling factors involved in the development and maintenance of self-injurious behaviours, including the effects of contagion (where self-injurious behaviour in one individual might trigger this behaviour in others) and differences in subculture or peer group identification. For example, de Leo and Heller (2008) analyzed data from four large, multi-centre European studies, involving both adolescent and adult samples, which assessed suicidal behaviours and included self-report measures of the individual’s exposure to suicidal behaviour in social models. The authors found that exposure to suicidal behaviours among friends was a significant risk factor for participants' own suicidal behaviour. The authors discussed social identity theory, which states that if an individual is more similar to the social model, he/she will be more likely to imitate the model’s behaviour. Therefore, the authors suggested that suicidal behaviour may be modeled within social groups, leading to this behaviour becoming characteristic for the group. However, the intent to die involved in participants’ behaviour was not distinguished in this article, making it unclear whether this risk factor is specific to suicide or is relevant to NSSI as well.

Much of the research on contagion of self-injury has been conducted within clinical samples, and has largely not made a distinction regarding suicidal intent. For example, among adolescents in a community treatment center, Rosen and Walsh (1989) found support for contagion of self-harm, although the suicidal intent of these behaviours was not specified. In this

study, most acts of contagion involved dyads or small groups, with a small number of patients being at the centre of most incidents, acting as leaders in the modeling of such behaviour. Taiminen and colleagues (1998) also reported on self-harm contagion among adolescent inpatients and reported the same results, in other words, that acts of contagion (without distinguishing intent to die) generally involved dyads or small groups, with a few patients being involved in many of the acts of contagion. These authors also suggested that, in some cases, suicidal behaviour might function as a way of bonding with others, as five out of six patients who were interviewed regarding their self-harm reported that it was clearly influenced by other patients. Finally, in a commentary regarding an episode of self-injury contagion in a junior high school, Fennig, Carlson, and Fennig (1995) reported that most of the adolescents involved did not demonstrate any major psychopathology, and that all belonged to a “popular” group with high academic achievement, which is inconsistent with the more-often discussed deviancy model for NSSI.

In particular, Adler and Adler (2005, 2007) argued that, at least for some individuals, NSSI might be better understood as a chosen deviant behaviour, rather than fitting within the traditional medical or psychopathological framework. Utilizing qualitative data analysis techniques, these authors noted that an increasing number of individuals who engaged in NSSI described belonging to alternative or counterculture subgroups, and some reported that they began to self-harm in response to unhappiness in their social relationships with peers. Others have likewise observed that members of an online community tended to engage in discourses to normalize the behaviour as a way to deal with distress and establish their identity as "authentic cutters" who are "unique, wise, and strong" in contrast to "ordinary" and "boring" people (Franzen & Gottzen, 2011; p. 285).

Further, a number of individuals report initially learning about self-injury from their peers or through the media (e.g., Adler & Adler, 2007; Hodgson, 2004). In a study of self-injury among university students, Heath, Ross, Toste, Charlebois, and Nedecheva (2009) found these behaviours to be highly socially influenced; for example, when asked where they first learned about NSSI, nearly 44% of the sample indicated they were first exposed to these behaviours through social factors (friends or the media). Further, 74% reported that they had at least one friend who also engaged in NSSI, nearly 18% reported that they engaged in NSSI in front of friends, and many participants (52% of the sample) used at least some of the same methods of self-injury as their friends. Similar findings have been reported by Muehlenkamp, Hoff, Licht, Azure, and Hasenzahl (2008) who found that, among college students, those who were exposed to NSSI in others were more likely to engage in NSSI themselves compared to individuals without exposure to the behaviour. Wilcox and colleagues (2002) also found that 68% of their sample had disclosed their NSSI to a friend. These results suggest that, in certain peer groups, NSSI might become normalized and function as a shared experience among the group, or as a way to gain a sense of belonging, or even intimacy (Walsh, 2006).

Researchers have begun to investigate the specific adolescent subcultural groups in which suicide and NSSI might be most common and might serve as a specific risk-factor for engaging in this behaviour. Martin (2006) discussed a cluster of suicides among students in Australia who all identified themselves as belonging to the “Emo” subgroup, a group which he described as thinking of themselves as “emotional or depressed, preferred mixing with their own group, and had particular preferences in music” (p. 2). He went on to note, anecdotally, that there also appears to be an increased prevalence of skin-cutting behaviour among youths who self-identify as “Emo,” that youths who are struggling with depression or other mental health concerns might

gravitate to such social subgroups, and that identifying with the “Emo” subculture might serve as a particular risk factor for engaging in self-injurious behaviours. Young, Sweeting, and West (2006) conducted a study investigating this hypothesis that NSSI is more prevalent among certain subcultures of adolescents. In this study, 1258 participants were followed from the age of 11 to 19 years, with information collected on self-injury, suicide attempts, and substance use. Participants were also asked to rate how much they personally identified with a variety of youth subcultures. The results indicated that current identification with the “Goth” subculture was strongly associated with a lifetime history of self-harm, with a 47% prevalence rate for self-injury involving cutting or scratching among this group. Other factors that predicted self-harm included female gender, having divorced parents, smoking and drug use, and prior depression; when these factors were controlled for, Goth identification was still the strongest predictor of self-harm.

These preliminary discussions and empirical results suggest that peer-group identification is related to health-risk behaviours in general and engagement in self-injurious behaviours in particular, although the mechanisms for this relation remain unclear. In other words, it is yet to be determined whether group membership increases the likelihood of self-injury, or if individuals who self-injure are more likely to associate with certain peer groups. In a novel experimental paradigm that partially addresses this issue, Sloan, Berman, Zeigler-Hill, Greer, and Mae (2006) examined the influence of group norms on self-aggressive behaviour. Participants in this study were led to believe they were working with others on a task assessing how electrical shock affects reaction time. In fact, the other “participants” were audio-tapes of confederates used to experimentally manipulate group norms for the level of electric shock that would be received for a slow reaction time. In other words, the “group” established a level of

self-aggression in the form of shock before the participant was asked to state what shock level he/she intended to receive for slow reaction time. Results of the experimental manipulation demonstrated that self-aggression was indeed influenced by the establishment of group norms, even in the absence of direct exposure to a model, as participants never observed the confederates completing the task or administering shock. Although this study did not directly assess NSSI, the results are suggestive that associating with a peer group in which self-injury is normative might influence an individuals' engagement in this behaviour. Regardless of the direction of the relation, identification with certain subcultures might represent a specific risk factor for engaging in NSSI.

As a preliminary test of some of the identified gaps in the literature, Prinstein and colleagues (2010) conducted two longitudinal evaluations investigating the impact of both didactic best friendships in young grade school students, and larger friendship cohorts in a young adolescent clinical sample. They found that among dyads, after controlling for symptoms of depression, best friends' independent reports of their own self-injury did predict participants' own NSSI over time, which was moderated by age and gender; in other words, the effect was found for younger females. Among the clinical sample, the results revealed evidence for both selection and socialization effects, such that participants' NSSI at baseline was associated with their perception of self-injury ideation and/or behaviour among their closest peers (i.e., selection processes) and that this perception increased participants' own NSSI over the follow-up period (i.e., socialization processes). The authors concluded that, particularly for younger females, both peer socialization and selection effects appear to represent a risk factor for NSSI over-and-above other risks such as depression, although the exact mechanism for this effect remains unclear (e.g., conformity, behavioural reinforcement).

In addition to the notion that NSSI might represent a shared group experience or a way of bonding within some peer groups, researchers have begun to preliminarily investigate the role of peer victimization and peer status. For example, Heilbron and Prinstein (2010) found that among male adolescents overt peer victimization was associated with an increased risk of NSSI; however, among females overtly victimized adolescents were less likely to engage in NSSI and more likely to experience suicidal ideation. In an examination of the direct and mediational effects of emotional regulation and interpersonal difficulties, Adrian et al. (2011) found that relational problems with peers served to indirectly increase the risk for NSSI via emotion regulation. It is suggested that, for some individuals, negative interactions with peers lead to intense internal distress and, without healthy coping mechanisms, such individuals might turn to NSSI to manage their emotional reactions (i.e., consistent with emotion regulation models). Similarly, Claes, Houben, Vandereycken, Bijttebier, and Muehlenkamp (2010) found that high school students who engaged in NSSI reported fewer positive relationships with their peers and also rated themselves lower on self-esteem, intelligence, and physical attractiveness than their non-self-injuring peers. In contrast, however, Heilbron and Prinstein (2010) found that adolescents who engaged in NSSI received higher preference and reputation-based status ratings from their peers; this is consistent with Fennig et al. (1995) who found that self-injurers reported they were “popular” among their groups. Such a pattern of results might suggest that adolescents who view that they do not “fit in” with the majority of their peers might be more likely to be attracted to groups in which self-injury is normalized and, as such, they experience acceptance, higher social ratings, and feelings of maturity (Prinstein et al., 2010) within such groups. This hypothesis is also supported by the mediational effect found above, such that adolescents who are most vulnerable to NSSI due to difficulties in emotional dysregulation are more likely to

have negative peer relationships or experience perceived peer rejection, leading them to seek out like-minded peers. However, future research is needed in order to directly test such hypotheses and to better elucidate factors related to the peer group and social interactions that may represent specific risk factors for NSSI. In addition to experiences of general interpersonal difficulties and victimization, preliminary research among gay, lesbian, bisexual, and transgender (GLBT) individuals has also demonstrated that interpersonal trauma, sexual discrimination, and victimization related to sexual orientation are associated with engagement in NSSI (House, Van Horn, Coppeans, & Stepleman, 2011; Liu & Mustanski, 2012). Few studies have specifically examined NSSI among GLBT individuals and additional research is needed to investigate risk and protective factors for NSSI in this population.

The reviewed anecdotal discussions and empirical results suggest that peer-group identification is related to health-risk behaviours in general and engagement in self-injurious behaviour in particular, although additional research is needed to understand how such mechanisms work within broader models. Another purpose of the current project, therefore, was to address some of the gaps in the current literature regarding the importance of the peer group. In particular, the existing literature incorporating both parental and peer relationships factors has focused nearly exclusively on suicidal behaviours and ideation; therefore, the current project extends this work by examining both parental and peer influences on NSSI. Based on existing work, it was hypothesized that peer groups might influence NSSI in a way similar to parental relationships, both directly and in a mediational relation via emotion regulation. Second, although preliminary discussions suggest that identification with more deviant subcultures represents a risk factor for NSSI, little empirical work has examined this association. Thus, an aim of the current project was to further investigate the potential association between various

subcultures and NSSI. Finally, although theoretical work is beginning to incorporate both individual and social factors into models of NSSI (e.g., Nock, 2010), to my knowledge no studies to date have investigated a comprehensive framework assessing the influence of, and interactions among, emotional reactivity and regulation, paternal, maternal, and peer relationship factors. By including measures of each of these variables, the current project represents an important contribution to, and extension of, the current literature.

1.8 General Summary and Overall Research Objectives

Clinical and research attention on NSSI has increased considerably in recent years, although the focus of this literature has largely been directed at intrapersonal theories and models, including factors such as psychopathological correlates, coping styles, and emotion regulation. Empirical work has demonstrated comorbidities between NSSI and disorders such as depression, anxiety disorders, substance abuse, and previous experiences of abuse or neglect, and there is also a case for considering NSSI as a separate clinical syndrome in its own right. There have been a number of theories proposed to explain the functions of NSSI, including anti-dissociation, interpersonal boundaries, and sensation-seeking models, and research has demonstrated generally modest support for these models. Self-punishment and emotion regulation theories of NSSI have received considerably more research attention and support. In particular, an accumulating body of research has implicated emotion regulation difficulties in individuals who self-injure and some research has found emotion regulation to mediate the relation between self-injury and factors such as childhood maltreatment, early invalidating environments, and parental emotion socialization factors (e.g., punishment of emotion).

In addition to intrapersonal explanations and models, interpersonal factors such as media exposure and the quality of family and peer environments have also been explored in the NSSI

literature. Theoretical work has suggested that the family environment exerts its influence in three broad ways: through modeling and social referencing, through emotion-related parenting practices, and through factors such as the parent-child attachment relationship. Research exploring these factors has indeed demonstrated that familial history of suicidal behaviours, parental psychopathology, childhood emotional abuse or neglect, parental punishment or neglect of emotion, and poor parent-child relationships are related to later self-injury. Further, research has long demonstrated that peer group affiliation is related to a number of health-risk behaviours (e.g., risky sexual behaviour, drug and alcohol use) and a small body of work is beginning to explore factors of the peer environment (e.g., social modeling, contagion) in the development and maintenance of NSSI. For example, it has been suggested that engagement in NSSI might become accepted and normative, and even perhaps serve as a means of bonding, within certain peer groups. Although largely theoretical, there is some evidence that identification with deviant subcultures (such as “Goth” or “Emo”) might be related to NSSI, although in one case of self-injury contagion, all the students involved were affiliated with the “popular” group, and more work is needed in this area before conclusions regarding subcultural identification can be made. Therefore, the relation between identification with various subcultural groups and NSSI was examined as part of the current project, with associations expected between more deviant, or less mainstream, groups and NSSI.

In light of the above discussions, the overall purpose of the current research was to examine the role of both intrapersonal and interpersonal factors, uniquely and in combination, in the development of NSSI in participant samples composed primarily of young adults (see Studies 2 and 3). To date, although theoretical models have begun to integrate individual factors (such as emotion regulation, psychopathology, etc.) and social/familial factors into more comprehensive

models of NSSI (see Nock, 2010), empirical work in the area has been limited. As such, the current project provides an examination of parental and peer influences on NSSI within the context of the Experiential Avoidance Model (Chapman et al., 2006). More specifically, the current project utilizes multivariate statistical modeling, a technique that is fairly novel within the NSSI literature, to examine the intra- and interpersonal factors in both a university sample and among members of online forum groups. The use of multivariate modeling allows for the empirical examination of the direct and mediational relations among emotion reactivity, emotion regulation, and parental and peer relationships, in order to assess whether the associations among these variables remain consistent in different participant populations of varying NSSI severity. As previously discussed (Section 1.5.2), an additional aim of the current research was to provide further psychometric evidence for a recently developed measure of emotional reactivity (i.e., the Emotion Reactivity Scale; Nock et al., 2008) using a larger sample and an older cohort of participants than the original validation study (see Chapter 2 for additional discussion and rationale).

Chapter 2. General Methods for Studies 1 and 2

2.1 Study 1 Purpose and Hypotheses

The current research utilized the Emotion Reactivity Scale (ERS; Nock et al., 2008), a relatively new measure designed to address the need for a brief and comprehensive measure of multiple domains of emotional reactivity. The development of the ERS was based on a definition of emotional reactivity or vulnerability reflecting the individuals' emotional experience "(a) in response to a wide array of stimuli (i.e., emotion sensitivity), (b) strongly or intensely (i.e., emotion intensity), and (c) for a prolonged period of time before returning to baseline level of arousal (i.e., emotion persistence)" (p. 107). As discussed by Nock and colleagues, although broader measures of temperament and personality exist, of which emotion reactivity can be conceptualized as a subcomponent, as well as more focused measures of singular components of emotional reactivity, prior to the ERS no comprehensive measure of the domains of sensitivity, intensity, and persistence had been developed.

The development study of the ERS (Nock et al., 2008) demonstrated initial reliability and validity, and subsequent studies using the measure have also demonstrated good reliability and construct validity (e.g., Bresin et al., 2010; Dour et al., 2011; Jenkins & Schmitz, 2012). However additional research is required for the examination of the underlying factor structure of this measure. In particular, the developers of the ERS had anticipated a three-factor solution to assess the three aforementioned domains. Exploratory factor analysis of the ERS, however, revealed that the measure might be better understood as tapping into a single broad construct of emotional reactivity; in other words, a unitary one-factor solution. Although the researchers did find that statistically the results converged on a three-factor solution, the first accounted for almost half of the total variance, the items loadings on each factor reflected similar item content,

and the factors were highly intercorrelated. The sample in the initial validation study was composed of primarily female adolescents and young adults aged 12 to 19 years, and reported on a final sample of 87 participants, a smaller sample size than is recommended by some researchers for exploratory factor analysis (Comrey & Lee, 1992). Furthermore, as with the development of any measure, it is important to replicate results demonstrating factor structure, reliability, and validity using a different sample for generalizability of results.

Given that the statistical results presented by Nock and colleagues (2008) were divergent from the theoretically-driven hypotheses regarding factor structure, as well as sample size and generalizability considerations, the current study sought to provide a replication and extension of the psychometric evaluation of the ERS. Specifically, an older cohort of participants (i.e., over 18 years of age) and a sample consistent with Comrey and Lee's (1992) recommendation for a "good" size when conducting factor analysis was recruited in order to replicate the results of the factor structure, reliability, and construct validity of the ERS. It was hypothesized that, consistent with the initial results, the data would statistically converge on a three-factor solution, although a one-factor solution would provide a more meaningful and parsimonious interpretation of the data. It was also hypothesized that the single factor, as well as each of the three theoretical subscales, would demonstrate good scale-score reliability, reported as $\alpha = .94$ full scale; $\alpha = .88$, $.86$, and $.81$ for sensitivity, arousal/intensity and persistence, respectively, in the initial validation study. In further support of the convergent construct validity and consistent with hypotheses from the Experiential Avoidance Model (Chapman et al., 2006), it was expected that the ERS would be positively correlated with greater difficulties regulating emotions. In addition, individuals who report engaging in NSSI were expected to also report significantly higher emotion reactivity than individuals without a history of these behaviours. In light of the

aforementioned body of research demonstrating an association among quality of parental and peer relationships with emotional difficulties, it was further hypothesized that the ERS would negatively correlate with the IPPA; in other words that greater emotional reactivity would be related to poorer self-reported quality of both parental and peer relationships. Finally, as greater emotional reactivity is considered a central feature in a number of psychological disorders (e.g., Nock, et al., 2008), the ERS was also hypothesized to show a positive relationship with a history of mental health concerns and psychological treatment.

2.2 Participants

Four hundred and two participants were recruited from undergraduate introductory psychology courses ($n = 271$; 68.3%) and from the broader community at the University of Saskatchewan ($n = 126$; 31.7%) to complete an online packet of self-report questionnaires, which are described in detail below (see Measures). Participants who were recruited through introductory psychology courses received research credits (i.e., extra course credit) in exchange for participation; participants recruited through the larger university community did not receive any reimbursement for their participation. Responses were initially screened for extensive missing data on the variables of interest, which resulted in the removal of five participants from all subsequent analyses; therefore, the final sample consisted of 397 participants.

The final sample comprised 300 females (75.6%) and 97 males (24.4%) who ranged in age from 18 to 48 years, with a mean age of 20 years ($SD = 2.79$). Participants were predominantly Caucasian ($n = 332$; 83.6%), with 8.6% self-identified as Asian, 3% as Aboriginal, 2.5% as biracial/multiracial and 2.1% identified other ethnic backgrounds. In regard to marital status, 90.9% of participants were single/never married, 8.6% were married or living with someone as if married, and 0.5% were separated.

2.3 Measures

2.3.1 Demographic information.

Participants first completed a questionnaire to capture basic demographic information such as age, gender, ethnicity, and alcohol and drug use. In addition, participants were queried regarding their primary paternal and maternal figures, family structure (e.g., whether biological parents were still married or divorced, years lived with primary paternal/maternal figures), and knowledge of parental psychopathology. Participants were also asked questions regarding their own experiences with mental health concerns and treatment utilization.

2.3.2 Emotion regulation¹.

Individual levels of emotion regulation and dysregulation were assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a comprehensive and widely-used measure that has been validated with young adults and adolescents (e.g., Weinberg & Klonsky, 2009). The DERS is a 36-item self-report measure that assesses six domains of emotion regulation: non-acceptance of emotional responses (e.g., “when I’m upset, I feel guilty for feeling that way”), lack of emotional awareness (e.g., "I am attentive to my feelings”), limited access to emotion-regulation strategies (e.g., "when I’m upset, I believe I will end up feeling very depressed”), difficulties engaging in goal-directed behaviour when emotionally aroused (e.g., "when I’m upset, I have difficulty concentrating”), impulse-control difficulties (e.g., "when I’m upset, I lose control over my behaviours”), and lack of emotional clarity (e.g., "I have no idea how I’m feeling”).

In addition to the subscale scores, the DERS also provides an overall assessment of emotion regulation difficulties. Participants respond on a Likert-scale from 1 to 5 (from 1 =

¹ When self-report questionnaires are relied on for data collection, modern method bias/common method variance (MMB/CMV) is a potential concern. Therefore, exploratory factor analyses were run on all measures. The results indicated multi-factorial solutions, suggesting that MMB/CMV is not a significant concern

almost never/0-10% of the time to 5 = almost always/90-100% of the time) with higher scores indicating more difficulties regulating emotions (a number of questions employ reverse-coding rules before calculating a total score and the subscale scores). The DERS has demonstrated good scale-score reliability ($\alpha = .93$ full scale; with values of $\alpha > .80$ for each subscale), as well as good test-retest reliability and construct validity, and adequate predictive validity (Gratz & Roemer, 2004; Weinberg & Klonsky, 2009). In the present study, the DERS total score and subscales demonstrated good scale-score reliability (Ponterotto & Ruckdeschel, 2007): total score Cronbach's $\alpha = .94$, 95% CI [.93, .95], limited access to emotion-regulation strategies $\alpha = .88$, 95% CI [.87, .90], non-acceptance of emotional responses $\alpha = .89$, 95% CI [.87, .90], impulse-control difficulties $\alpha = .87$, 95% CI [.84, .89], difficulties engaging in goal-directed behaviour when emotionally aroused $\alpha = .89$, 95% CI [.87, .91], lack of emotional awareness $\alpha = .81$, 95% CI [.78, .84], and lack of emotional clarity $\alpha = .80$, 95% CI [.77, .83].

The DERS was chosen due to its demonstrated reliability and validity among participant samples similar to the individuals recruited for Studies 1 and 2 of the current project (i.e., university students). The DERS was initially developed among a sample of university students, a sample that included individuals who had engaged in NSSI, and is a commonly used measure in the NSSI literature. Further, use of the DERS provides an examination of multiple domains of emotion regulation, thus allowing for a more comprehensive assessment of the construct compared to other existing measures (Gratz & Roemer, 2004).

2.3.3 Emotional reactivity.

The Emotion Reactivity Scale (ERS; Nock, Wedig, Holmberg, & Hooley, 2008) is a relatively new self-report measure that was developed to address the lack of existing measures available to provide a brief and comprehensive assessment of emotion reactivity. The ERS

comprises 21 questions answered on a 0 to 4 Likert-scale (0 = not at all like me to 4 = completely like me), which assess three aspects of emotional reactivity. Specifically, the ERS assesses the domains of sensitivity (e.g., “I tend to get upset very easily”), arousal/intensity (e.g., “when I experience emotions, I feel them very strongly/intensely”) and persistence (e.g., “when I am angry/upset, it takes me much longer than most people to calm down”). In a preliminary study (Nock et al., 2008), the ERS full-scale demonstrated good scale-score reliability ($\alpha = .94$), as did the theoretically predicted subscales: sensitivity $\alpha = .88$, arousal/intensity $\alpha = .86$, and persistence $\alpha = .81$. Of note, although the 3-factor structure was predicted a priori, the initial validation study (Nock et al., 2008) found support for a unidimensional emotional reactivity construct and subsequent researchers have reported the full-scale score, pending additional investigation into the underlying factor structure of this measure (e.g., Bresin et al., 2010; Dour, Cha, & Nock, 2011; Jenkins & Schmitz, 2012).

In the validation study, the ERS demonstrated good construct validity, positively associating with measures of self-injury, behavioral inhibition, depression, frustration, fear, and aggression, as well as mood, anxiety, and eating disorders, but negatively correlating with measures addressing attention, behavioral activation, and inhibitory control (Nock et al., 2008). Further, scores on the ERS have been demonstrated to be associated with positive and negative affect following acts of self-injury (Bresin et al., 2010; Jenkins & Schmitz, 2012). In the current study, the ERS total score demonstrated good scale-score reliability ($\alpha = .94$, 95% CI [.93, .95]), as did the theoretically-predicted subscales: sensitivity $\alpha = .89$, 95% CI [.87, .91], arousal/intensity $\alpha = .87$, 95% CI [.85, .89], persistence $\alpha = .79$, 95% CI [.75, .82].

As with the DERS, the ERS was chosen for the current project due to its demonstrated reliability and validity among participants who have engaged in NSSI, as well as its use as a brief

and comprehensive measure of emotion reactivity, as opposed to broader measures of temperament or more focused measures assessing emotion intensity (Nock et al., 2008). As the ERS was initially validated among a primarily adolescent sample, inclusion of the measure in the current project further allowed for an examination of its psychometric properties among an older cohort (Chapter 3).

2.3.4 Quality of parental and peer relationships.

The perceived quality of relationships with both parents and peers was assessed using the Inventory of Parent and Peer Attachment (IPPA; Arnsden & Greenberg, 1987), which is designed to assess these attachment relationships during adolescence and young adulthood. The original IPPA consisted of two sections (parents and peers) and has since been modified (e.g., Petroff, 2008) to include three sections: mother, father, and peers; the latter form was utilized for the current study. More specifically, each section of the IPPA consists of 25 Likert-scale questions (1 = almost never true to 5 = almost always or always true) assessing three subscales of the relationship: trust, communication, and alienation (reverse-scored).

The subscales for both parent and peer sections have demonstrated adequate to good scale-score reliability (ranging from $\alpha = .72$ for peer alienation to $\alpha = .91$ for parent trust and communication, and peer trust). In a study using the modified IPPA, alphas of .89 and .88 were reported for the mother and father total subscales (Papini, Roggman, & Anderson, 1991), and the measure has also demonstrated good test-retest reliability (Bureau et al., 2010). As reviewed by Lopez and Gover (1993) regarding the validity of the IPPA, the measure has been found to significantly correlate with reported levels of family support, conflict and cohesiveness, and IPPA parent and peer scores have been significant predictors of self-esteem, life-satisfaction, depression, and anxiety. Further, less secure parental attachment is related to depression, suicidal

ideation, and hopelessness (Lopez & Gover, 1993). The authors of the IPPA have advised against scoring of the subscales until further research is done on the factor structure (Armsden & Greenberg, 2009); therefore the total scores for mother, father, and peer were utilized in the current study. The reliability estimates for the current study were good and are as follows: mother $\alpha = .84$, 95% CI [.81, .86], father $\alpha = .82$, 95% CI [.79, .84], and peer $\alpha = .83$, 95% CI [.80, .85].

In addition to the psychometric properties of the IPPA, the measure was chosen for the current study to allow for a comparable method of assessing both parental and peer relationships, rather than utilizing two different measures. Further, the IPPA allowed for the assessment of both maternal and paternal relationships separately, rather than a single evaluation of combined parental relationships. The reliability and validity of the IPPA scales has also been demonstrated among college students.

2.3.5 Peer group identification.

The current research took an approach similar to that of Moran (2009) to assess affiliation with a number of different groups/subcultures. Specifically, participants were presented with a list of different groups, such as Athletes, Academics, Emo, Goth, Partier, and Gamer, and asked to rate how much they currently identify with each group, and how much they identified with each group during adolescence (from 0 = not at all to 100 = very much). This approach was deemed to be more desirable for the current study than utilizing other established self-report measures, such as the Peer Crowd Questionnaire (e.g., La Greca et al., 2001). The Peer Crowd Questionnaire (PCQ) is based on extensive prior research and has participants indicate (in a yes/no format) whether they identify with the following groups: Jocks, Burnouts, Brains, Populars, Alternatives, and None/Average. Although the PCQ is a well-established and widely-

used measure, it (or a measure similar to it) was not chosen for the current study because existing measures a) do not allow for identification with more than one group, b) do not allow for varying levels of identification with different groups and, rather, force a dichotomous yes/no answer, and c) do not allow for assessment of the subcultural groups of particular interest to NSSI, namely Goth and Emo. It is important to allow for varying levels of identification with more than one group as social identity theory states that individuals possess multiple social identities and it is quite reasonable to expect that young adults will identify differently with a number of groups (Moran, 2009).

The identification measure developed by Moran (2009) and adapted (i.e., by assessing both current and past identification) for this study follows from previous work noting that the strength of an individual's identification with a social group is "the key factor by which social identities vary within the individual" (p. 70). As such the approach taken in the current study did not additionally assess factors such as accessibility to a social group (i.e., the extent that the group views the individual to be an actual member). The initial list of peer groups for this measure (Moran, 2009) was generated by asking university students which groups they would consider a prototypical smoker or non-smoker to belong to, as the focus of Moran's research was the relation between social identity and smoking. Responses were then coded and collapsed into categories (e.g., nerds, geeks, and dorks were all collapsed into the Nerd category). The list of subcultures assessed in the current study was as follows: artists/artsy, athletes/jocks, emo, academic, musician, popular/cool, preppy, goth, indie, techie, nerd, theater/drama, straightedge, misfit/outsider, gamer, skater, non-conformist, religious, goody-goodie, hippie, rebel, partier, hipster, and average/regular.

2.3.6. Non-suicidal self-injury.

Engagement in NSSI was assessed using the Deliberate Self-Harm Inventory (DSHI; Gratz, 2001), a 17-item, behaviourally-based, self-report measure using the definition of NSSI as: the deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage to occur (Gratz, Conrad, & Roemer; p. 130). This measure was developed with university students and has also been modified and adapted for use with adolescents (Lundh, Karim, & Quilisch, 2007). The DSHI examines the presence of 16 different self-injurious behaviours (e.g., skin cutting, burning, intentional bruising, etc.), with the final question assessing the presence of any additional self-injurious behaviours. For each behaviour endorsed by participants, follow-up questions assess the age of onset, frequency, length of time since last episode, duration of engaging in the behaviour, and whether or not medical attention or hospitalization was ever required.

The full DSHI has demonstrated good scale-score reliability ($\alpha = .82$) with item total correlations ranging from .12 to .65; 13 items yielded item-total correlations over .33 (Gratz, 2001). In the validation study, no participant endorsed the use of acid or bleach; removal of these items did not significantly impact scale-score reliability ($\alpha = .83$). The DSHI was also demonstrated to positively relate to other measures of self-injury, borderline personality organization, and history of suicide attempts. Further, the DSHI has demonstrated adequate test-retest reliability and discriminant validity (Gratz, 2001; Lamb 2005). In the current study, reliability estimates of the DSHI were consistent with past research, with $\alpha = .80$, 95% CI [.77, .83].

The DSHI was chosen due to its demonstrated good reliability and validity among samples similar to the individuals recruited for Studies 1 and 2 of the current project. Further, the

operational definition of NSSI as assessed by the DSHI is consistent with the conceptualization used in the current project. The DSHI is a commonly used measure in the literature and allowed for an examination of a wide-range of NSSI behaviours of varying severity, as well as follow-up items to assess factors such as age of onset and duration.

2.4 Procedure

During the recruitment phase potential participants from both introductory psychology courses and the broader university community were told:

Researchers in the Department of Psychology are looking for volunteers to participate in a research study on relationships, emotional functioning, and coping strategies (i.e., non-suicidal self-injury). You are invited to participate whether or not you have had a personal experience with self-injury.

You will be asked to complete a confidential and anonymous online survey that will take approximately 30 minutes. This research will contribute to improving our understanding of factors related to self-injury. If you are currently having difficulty not harming yourself in some way or are distressed by this topic, it is advised that you do not participate in the study.

Participants were then provided with a link to the online survey containing a consent form, a debriefing form (see Appendix A), and the questionnaire packet (see Appendix B). The consent form further detailed the purpose of the study as well as outlining standard issues of confidentiality, storage of data, and right to withdraw participation. Participants were again advised not to participate if they were having difficulty not harming or were distressed by the topic of self-injury. A list of resources (e.g., websites, self-help books) was also provided in the event that the questionnaire caused distress among any participants. No negative effects of

participation were reported to the researchers. Following completion of the study measures, participants were provided with a debriefing form containing a more detailed discussion of relevant background literature.

Chapter 3. Study 1 Results and Discussion

3.1 Results

3.1.1 Data analysis plan.

The purpose of the current study was to provide a replication and extension of the original ERS validation study (Nock et al., 2008) and to examine the relation between the ERS and additional variables. As such, an exploratory factor analysis, using principle axis factoring, was performed in order to investigate the underlying factor structure, or common variance, among the ERS items (Henson & Roberts, 2006). As the factors were theoretically hypothesized to be correlated, an oblique rotation, specifically oblimin, was chosen (Costello & Osborne, 2005). Finally, in order to examine the convergent validity of the ERS, correlations were computed among the ERS total score, the DERS total score and subscales, the IPPA scales, mental health history, treatment utilization, and history of NSSI (i.e., number of methods of self-injury).

3.1.2 Data cleaning, assumptions, and transformation.

Prior to conducting analyses, the data were screened for miscoded variables, outliers, and significant skewness and kurtosis. Many of the independent variables were significantly skewed and/or kurtotic (i.e., Z-score of $> +/- 3.29$); therefore a number of transformations were performed in order to correct the normality violations. In most cases, applying a square root or logarithmic transformation resulted in acceptable levels of skewness and kurtosis. Normality for the DERS implication subscale was achieved through an inverse transformation, and the mother, father, and peer IPPA scores required a square root and reflection transformation.

Regarding the NSSI items, there were a number of outliers reporting an extreme frequency of self-injury episodes. Rather than deleting these cases, and also minimizing

influence of the extreme scores, a category of "over 200 episodes or too many to count" was created to collapse extreme scores into. Further, and as expected, both the overall frequency of self-injury and the total forms of self-injury were significantly negatively skewed; this violation of normality was not corrected through the use of a number of transformations, although a square root transformation performed the best and was retained for analyses. As noted by Tabachnick and Fidell (2007), however, when utilizing factor analysis to inspect the relation among observed variables, "assumptions regarding the distributions of variables are not in force" (p. 613).

In terms of potential univariate outliers, two cases were identified within the DERS clarity subscale and two within the peer scale of the IPPA. However, these were not identified as extreme outliers or disconnected for the sample distribution (i.e., were marginally larger than 3.29 and were close in value to scores below this cut-off). In order to avoid unnecessary deletion of data, these scores were retained for analysis. Using Mahalanobis distance, three potential multivariate outliers were identified, again which were marginally so. As Tabachnick and Fidell (2007) caution that Mahalanobis distance (and related tests) are not perfectly reliable and should be used with caution, due to the potential to produce false positives, these cases were not initially deleted. Rather, the potential univariate and multivariate outliers were removed from the dataset and analyses were re-run. This procedure resulted in a nearly identical pattern of results for both the factor analysis and the relation among the ERS and other study variables; therefore in order to maximize sample size all cases were retained and the following results report on the full sample, with their inclusion.

Finally, in regard to additional assumptions necessary for conducting a factor analysis Comrey and Lee (1992) suggested that a sample size of 100 is poor, 200 is fair, 300 is good, and 500 is very good. Therefore, the current sample of 397 can be considered good. Of note, such

"rules of thumb" regarding sample size are arbitrary and not universally agreed on. For example, with well-defined factors and high communalities (i.e., consistently over .6), smaller samples can be acceptable (MacCallum, Widaman, Zhang, & Hong, 1999). The Kaiser-Meyer-Olkin's measure of sampling adequacy was 0.927, indicating the size of the partial correlations among the variables was appropriate for conducting a factor analysis.

3.1.3 Descriptive statistics.

The basic demographic profile of the participants has been previously outlined (see Chapter 2, Method). Cases with missing data were omitted from analysis (i.e., a missing listwise procedure for missing data was utilized), resulting in a final sample of 376 participants. Means, standard deviations, and ranges of the study variables are presented in Table 1. Of note, additional study variables that were assessed (e.g., NSSI prevalence and onset) will be presented in a subsequent section, as they were tested in relation to an intra- and inter-personal model of NSSI, and were not included in the factor analysis.

Table 1. Means and Standard Deviations of Study Variables (University)

Variable	Mean	SD	Minimum	Maximum
ERS total	25.82	16.08	0.00	77.00
DERS total	79.69	20.80	35.00	144.00
DERS strategies	16.26	6.16	8.00	37.00
DERS acceptance	13.21	5.23	6.00	30.00
DERS impulse	10.79	4.26	6.00	25.00
DERS goals	14.88	4.76	5.00	25.00
DERS awareness	14.22	4.25	6.00	30.00
DERS clarity	10.54	3.39	5.00	22.00
Mother total	87.27	12.86	39.00	107.00
Father total	82.21	13.07	33.00	106.00
Peer total	89.97	10.75	41.00	112.00
Forms of NSSI	1.03	1.96	0	12

Note. SD = Standard deviation

3.1.4 Factor structure and reliability of emotion reactivity scale.

Using the default criterion of eigenvalues greater than one for factor retention, the initial factor analysis produced a solution yielding four factors underlying the ERS items. Specifically, the initial solution produced the following eigenvalues: Factor 1 = 9.7, Factor 2 = 1.9, Factor 3 = 1.3, Factor 4 = 1.1. As noted by Costello and Osborne (2005) and Hensen and Roberts (2006), although this is the default, and most commonly-used criterion for factor retention, it is also among the least accurate method and often over-estimates the number of factors to retain. Therefore alternative procedures were also employed in order to examine the underlying factor structure of the ERS. Using the scree test, the point of inflection indicated the presence of one underlying factor, as there was a clear change in slope between the first and second factors in the plot. Further, the first factor accounted for the greatest amount of variance (46.18%) in the scores.

As the reliability of the above estimation procedures is low, parallel analysis and Velicer's MAP test were also utilized (O'Connor, 2000). Specifically, parallel analysis extracts eigenvalues from random data sets with the same number of cases and variables as the actual data. The random eigenvalues are then compared to the actual values and factors are retained if the eigenvalues from the actual data are greater than the randomly-generated values. For the current study, using a 95% confidence interval and 100 random data sets, parallel analysis indicated the presence of two factors for retention. Finally, the MAP test involves conducting a principle components analysis followed by examination of partial correlation matrices. In this approach factors are retained as long as the variance in the correlation matrix is systematic variance. Using this approach, four components/factors were indicated for retention. Inspection

of the un-rotated factor matrix indicated that none of the items uniquely loaded on any factors other than the first, suggesting the presence of a single underlying factor.

As the preceding discussion highlights, the various procedures utilized to examine the appropriate number of factors for retention produced differing results, with one, two, or four factors being suggested for retention. Further, although the initial validation study had predicted a priori that three factors would underlie the ERS (i.e., sensitivity, arousal/intensity, and persistence), Nock and colleagues (2008) offered support for a unity factor. Therefore for the current study, in addition to the initial four-factor solution that was produced, one, two, and three-factor solutions were also forced, and will be considered in turn in the following sections.

3.1.4.1 Four-factor solution.

In the initial four-factor solution, the first factor accounted for 44.28% of the total variance in the scores, with the remaining factors accounting for 7.39%, 4.2%, and 3.32%, respectively. The factor correlation matrix (see Table 2) indicated that factor 3 did not correlate with the other three factors, although the remaining factors demonstrated moderate to strong intercorrelations.

Table 2. *ERS Four-Factor Correlation Matrix*

Factor	1	2	3	4
1	-			
2	.557	-		
3	.087	.089	-	
4	-.655	-.460	.019	-

The pattern matrix outlining the distribution of item loadings across the four factors is shown in Table 3. As demonstrated, all the items that did load onto factor 3 showed poor loading values and also cross-loaded with other factors which, in addition to the finding that factor 3 did

not correlate with the other factors, suggests that this factor might not be meaningful. Furthermore, although a number of the remaining items demonstrated fair to excellent² factor loadings, the distribution of items across factors was not consistent with the theoretical predictions. For example, although factor 1 contained all four items from the hypothesized persistence subscale, one item from the sensitivity subscale and two items from the arousal/intensity subscale also loaded. Likewise, factors 2 and 4 were both composed of items from the sensitivity and arousal/intensity subscales, with some items demonstrating low loading values. In sum, although the 4-factor solution accounted for a considerable amount of variance and demonstrated a simple pattern matrix with no items loading greater than 0.45 on more than one factor, the finding that factor 3 might not represent a true factor and that the item loadings did not perform consistently with theoretical predictions suggests that this solution is not the most appropriate.

3.1.4.2 Three-factor and two-factor solutions.

Turning next to the theoretically hypothesized 3-factor solution, the first factor accounted for 44.1% percent of the total variance in the scores, with factors 2 and 3 accounting for 7.24%, 4.08%, respectively. In the 2-factor solution, factor 1 accounted for 43.89% of the variance and factor 2 accounted for 6.98%. In addition to factor 1 accounting for the largest proportion of variance, it also correlated very strongly with the other two factors ($>.50$), and factors 2 and 3 were moderately correlated ($-.36$). The pattern matrix for the distribution of items in the 3-factor solution is shown in Table 4. As with the four-factor solution, the three-factor solution did not produce the theoretically predicted factors, as factor 1 is composed of a mix of items from the sensitivity and persistence subscales, and factors 2 and 3 are composed of a mix of items from

² Using the following cut-off criteria: excellent = .71, very good = .63, good = .55, fair = .45 and poor = .32; from: Tabachnick and Fidell (2007)

the sensitivity and arousal/intensity subscales (i.e., at the .45 cut-off for item loading). Furthermore, the 2-factor solution also demonstrated a high correlation between the factors (.630), with both factors containing a mix of items from the theoretically-predicted subscales; two items from the persistence subscale did not load on either factor at the .45 cut-off, however. Overall, the high inter-factor correlation, the amount of variance accounted for by the first factor, the lack of theoretical consistency, and the finding that items from the theoretical Factor 1 are dispersed through the factors demonstrated here, suggest the presence of one underlying factor.

Table 3. *ERS Four-Factor Pattern Matrix*

	Factor			
	1	2	3	4
ERS1	.763	-.061	-.035	.050
ERS11	.666	.292	.064	.135
ERS8	.645	.041	-.042	-.075
ERS10	.625	-.034	.149	-.047
ERS7	.569	-.081	-.010	-.180
ERS20	.565	.318	-.056	.017
ERS4	.424	.031	-.120	-.215
ERS16	-.092	.892	.055	.018
ERS15	.079	.796	-.110	.047
ERS17	.109	.631	-.059	-.064
ERS12	.062	.586	.362	-.082
ERS19	.126	.490	-.241	-.324
ERS21	.199	.459	.026	-.182
ERS14	.141	.424	.383	-.241
ERS13	.140	.343	.367	-.272
ERS5	-.024	.021	-.012	-.861
ERS18	.018	.012	.044	-.760
ERS6	.037	.155	-.369	-.701
ERS2	.165	-.107	.224	-.699
ERS9	.138	.120	.103	-.626
ERS3	.130	.141	-.383	-.534

Table 4. *ERS Three-Factor Pattern Matrix*

	Factor		
	1	2	3
ERS10	.697	-.010	.047
ERS1	.599	-.009	-.060
ERS11	.577	.320	.068
ERS7	.560	-.065	-.180
ERS8	.551	.067	-.150
ERS2	.547	-.106	-.338
ERS14	.485	.409	.068
ERS13	.483	.331	.042
ERS20	.431	.335	-.114
ERS9	.418	.096	-.403
ERS4	.351	.035	-.300
ERS16	-.080	.883	-.019
ERS15	-.058	.779	-.140
ERS17	.051	.622	-.165
ERS12	.349	.565	-.165
ERS21	.247	.452	-.172
ERS6	-.035	.110	-.870
ERS3	-.015	.110	-.750
ERS5	.272	-.016	-.640
ERS18	.312	-.016	-.528
ERS19	.015	.462	-.504

3.1.4.3. One-factor solution.

Given the aforementioned concerns with the 2, 3, and 4-factor solutions (i.e., percentage of variance accounted for, theoretical predictions, high correlations among factors) the results of the current study suggest that a 1-factor solution might be more appropriate, consistent with the results from the initial validation study. More specifically, in their study Nock and colleagues (2008) found that the first factor accounted for 43.4% of the variance, "the three factors derived were indistinguishable from each other in item content, and the factors were highly correlated" (p. 110). They further reported that within the 1-factor solution each of the ERS items demonstrated factor loadings greater than .40, with loadings comparable to those found in the current study, which ranged from good to excellent (see Table 5). The results of the current study

indicate that the ERS might be best understood as a unidimensional measure. The results of the current study also provided replication of the reliability of the ERS, both in terms of the total score and the subscales. More specifically, the ERS total score demonstrated good scale-score reliability ($\alpha = .94$, 95% CI [.93, .95]), as did the theoretically-predicted subscales: sensitivity $\alpha = .89$, 95% CI [.87, .91], arousal/intensity $\alpha = .87$, 95% CI [.85, .89], persistence $\alpha = .79$, 95% CI [.75, .82]. This is nearly identical with the results reported by Nock and colleagues (2008): total score $\alpha = .94$; sensitivity $\alpha = .88$, arousal/intensity $\alpha = .86$, persistence $\alpha = .81$.

Table 5. Comparison of Current 1-Factor Solution and Original Validation Study

	Current Study	Nock et al., 2008
	Factor 1	Factor 1
ERS9	.755	.79
ERS19	.754	.73
ERS20	.731	.68
ERS5	.710	.86
ERS11	.703	.65
ERS21	.702	.55
ERS6	.701	.73
ERS14	.691	.59
ERS18	.664	.57
ERS2	.658	.68
ERS8	.656	.69
ERS13	.651	.61
ERS17	.647	.63
ERS15	.645	.72
ERS3	.635	.75
ERS12	.611	.44
ERS16	.605	.53
ERS7	.583	.62
ERS4	.569	.66
ERS10	.568	.52
ERS1	.568	.75

3.1.5. Relation of emotion reactivity scale to other study variables.

In addition to providing a further examination of the factor structure of the ERS, the present study sought to examine convergent validity through the relation of the ERS to measures of like constructs (i.e., emotional dysregulation) and other variables theoretically hypothesized to be related to emotional reactivity. More specifically, from the experiential avoidance model of NSSI (Chapman et al., 2006), greater difficulties in emotional reactivity are expected to contribute to greater emotional regulation difficulties; as such, a positive relation among these variables was expected. Given the relation between negative interpersonal relationships and emotional problems, the ERS was also hypothesized to demonstrate a negative relation with the scales of the IPPA. Finally, as greater emotional reactivity is considered a central feature in a number of psychological disorders (e.g., Nock, et al., 2008), the ERS was also hypothesized to show a positive relation with a history of NSSI, mental health concerns and psychological treatment.

Given the large number of comparisons being conducted, a Bonferroni correction was utilized, resulting in an adjusted alpha value of .001 (i.e., $.05/49$ or the number of comparisons being conducted). The results of the correlational analyses largely supported the predicted relations, in the expected direction. As shown in Table 6, the ERS demonstrated mainly moderate to large correlations with the total score on the DERS, as well as the DERS subscales, supporting the theoretical relation between these constructs, as well as construct validity for the ERS as a measure of dysregulated emotional experiences. Only the lack of emotional awareness subscale of the DERS did not significantly correlate with the ERS; this subscale also demonstrated smaller correlations with the DERS total and other subscale scores. Such a pattern is consistent with findings from other studies reported in the literature (e.g., Heath, et al., 2008),

which have reported smaller or non-significant associations between the lack of emotional awareness subscale and NSSI; however others have found this relation (e.g., Gratz & Roemer, 2008).

In addition to the expected relation between the measures assessing emotional difficulties, it was also hypothesized that the ERS would be positively associated with the assessed measures of NSSI, psychopathology, and mental health treatment utilization. Results of the correlational analyses provide support for this hypothesis (Table 7), with small to moderate associations between the ERS, history of and number of NSSI episodes, history of and number of mental health concerns, and treatment for a mental health concern.

Finally, it was hypothesized that greater emotional reactivity would be associated with more negative peer and parental relationships; as such a negative correlation was expected between the ERS and the mother, father, and peer subscales of the IPPA (i.e., lower scores on the IPPA indicate a more negative relationship). This hypothesis was not supported in the current study, as small and nonsignificant correlations were found (Table 8).

Table 6. *Intercorrelations Between ERS and DERS (University)*

	1	2	3	4	5	6	7	8
1. ERS total	-							
2. DERS total	.61*	-						
3. DERS strategies	.64*	.88*	-					
4. DERS acceptance	.48*	.77*	.62*	-				
5. DERS impulse	.59*	.76*	.70*	.48*	-			
6. DERS goal-directed	.47*	.70*	.59*	.44*	.49*	-		
7. DERS clarity	.42*	.75*	.57*	.50*	.50*	.32*	-	
8. DERS awareness	.09	.55*	.31*	.27*	.33*	.19*	.52*	-

* $p < .001$

Table 7. *Intercorrelations Between ERS and Mental Health Variables (University)*³

	1	2	3	4	5	6
1. ERS total	-					
2. History of NSSI	.26*	-				
3. Number of NSSI methods	.28*	.89*	-			
4. Mental Health History	.38*	.35*	.37*	-		
5. Number of mental health concerns	.39*	.40*	.46*	.78*	-	
6. History of treatment	.26*	.24*	.27*	.54*	.55*	-

* $p < .001$

Table 8. *Intercorrelations Between ERS and IPPA (University)*

Variable	1	2	3	4
1. ERS total	-			
2. IPPA mother subscale	-.02	-		
3. IPPA father subscale	-.15 ^a	.53*	-	
4. IPPA peer subscale	-.11 ^a	.27*	.09	-

^a Both the father and peer subscales were significant ($p < .01$ and $.05$, respectively) before applying the Bonferroni correction

* $p < .001$

³ Comparisons with dichotomous variables utilized point-biserial analyses, while those with continuous variables utilized the Pearson's r correlation coefficient.

3.2 Discussion

3.2.1 Overview.

The primary purpose of the current study was to provide a psychometric evaluation and re-validation of the Emotion Reactivity Scale (ERS; Nock et al., 2008), a self-report measure designed as an assessment of emotional sensitivity, arousal/intensity, and persistence. The ERS was developed by the original authors in response to a lack of existing measures available for the comprehensive assessment of these three facets of emotional reactivity. The original validation of the ERS (Nock et al., 2008) involved an examination of the factor structure, reliability, and validity of the measure among a sample of adolescents and young adults (primarily female adolescents) from the community and local psychiatric clinics. Therefore an aim of the current study was to examine the psychometric properties of the ERS among a sample of university students, primarily young adults. An examination of the factor structure of the ERS within a sample of university students was needed in order to inform the most appropriate use of the measure in the subsequent studies of this project (i.e., utilizing subscale scores or the full scale score). Furthermore, the original validation was completed with a smaller sample size than is recommended by some researchers for exploratory factor analysis (Comrey & Lee, 1992); therefore the current study also provided an assessment of the factor structure underlying the ERS within a larger sample. An additional aim of Study 1 was therefore to extend the preliminary evidence regarding the utility of the ERS within the NSSI literature.

The following sections discuss the current findings regarding the psychometric properties of the ERS, beginning with an examination of the factor structure of the measure. Data on the reliability of the ERS are reviewed, as well as support for the validity of this measure through its relation to other like constructs and theoretically related variables.

3.2.2 Factor structure and reliability.

Contrary to hypotheses, results demonstrated that the initial factor analysis converged on a solution indicating four factors underlying the ERS items, based on the default criterion of examination of the eigenvalues. Several additional methods were used to provide a preliminary examination of the number of factors best reflected in the ERS. These additional methods yielded differing results, with one, two, and four factors suggested for retention. Further, although Nock and colleagues (2008) provided support for a one-factor solution, it was hypothesized a priori that the ERS would demonstrate three factors reflecting the sensitivity, arousal/intensity, and persistence subscales of the measure. Therefore in the current study one, two, and three-factor solutions were forced and examined in addition to the initial four-factor solution.

Inspection of the various potential factor solutions suggested that the ERS might best be considered a unidimensional measure of emotion reactivity. More specifically, within the four-factor solution, the third factor was shown to not correlate with the other factors and also demonstrated poor item loading values, indicating that this factor might not be true or meaningful. In regard to the three and two factor solutions, the results demonstrated that the first factor in both solutions accounted for the majority of variance and the factors were highly correlated with one another. Further, the results of the multi-factor solutions indicated that many items that were hypothesized to belong to a particular subscale were dispersed throughout the factors. In other words, the multi-factor solutions were not consistent with theoretical predictions. Taken together, the current results suggested that the more parsimonious one-factor solution is preferred.

The supported factor structure in the current study is consistent with that of Nock and colleagues' (2008) original validation of the ERS among a younger sample of both individuals in the community and psychiatric clinic patients. More specifically, the original study also found that although the factor analysis did converge on the hypothesized three-factor solution, the first factor accounted for the majority of the variance, the factors were highly intercorrelated, and the factors were not distinguishable from each other in terms of item content (i.e., subscale items were spread throughout the factors). The current study further replicated results from the original validation work regarding the reliability of the ERS, such that good scale-score reliability was demonstrated for the ERS total score, as well as for the three theoretical facets of emotion reactivity.

Evidence for the reliability and unidimensional structure of a translation of the ERS has also been recently demonstrated and provides further support for the findings of the current study (Claes, Smits, & Bijttebier, 2013). Specifically, Claes and colleagues (2013) reported on a psychometric evaluation of the Dutch version of the ERS among a large sample of high school students in Belgium. The results reported by the authors closely mirror both the findings of the original validation of the ERS (Nock et al., 2008) and the results of the current study. Specifically, through confirmatory factor analysis, both one- and three-factor solutions were found to be reasonable models for the data, although nested models analysis indicated that the one-factor solution performed significantly better. The authors provide additional evidence for the high intercorrelations among the subscales, further supporting the one-factor structure. Finally, Claes and colleagues' (2013) Dutch validation study also demonstrated good scale-score reliability of the ERS and produced item factor loadings similar to those found in the current

study and in the original validation work, with all items demonstrating good to excellent factor loading in the one-factor solution.

Taken together, the current study and the existing literature offer converging evidence regarding the reliability and one-factor structure of the ERS. Analyses in the current study investigating the validity of the ERS therefore report only on the associations between the total score and other variables of interest. Further, the subsequent studies of this project examining the role of emotion reactivity within an intra- and interpersonal model of NSSI also utilize the ERS as a unidimensional measure rather than reporting on subscale influences.

3.2.3 Convergent validity.

In addition to replicating the factor structure and reliability of the ERS, a further purpose of the current study was to provide information regarding the validity of the measure. To this aim, the relation between the ERS total score and measures of emotional dysregulation, parental and peer relationships, NSSI, mental health concerns, and history of psychological treatment were examined. As hypothesized, the ERS demonstrated moderate to large correlations with both the DERS total score and many of the DERS subscales, with lack of access to emotion regulation strategies demonstrating the strongest correlation. In contrast, the lack of emotional awareness subscale was not significantly correlated with the ERS. Such a pattern has also been demonstrated in the existing NSSI literature, such that lack of access to emotion regulation strategies appears to be a particularly salient domain of emotion regulation (Gratz & Roemer, 2008). Others have also found that lack of emotional awareness was not associated with NSSI (Sim et al., 2009). The current results regarding the association between the ERS and other emotional facets are also consistent with existing studies utilizing the ERS that have found associations between emotion reactivity and positive and negative affect following self-injury

(Jenkins & Schmitz, 2012) and decreases in negative affect following laboratory induced pain (Bresin et al., 2010).

As high emotional reactivity is theorized to be central to a number of psychological difficulties (e.g., Nock et al., 2008), it was hypothesized that the ERS would positively correlate with participants' reported mental health and psychological treatment history. Further, given the central role of emotional concerns in NSSI it was hypothesized that the ERS would also positively correlate with a history of self-injurious behaviours as well as number of self-injury methods. Consistent with hypotheses, the ERS total score was significantly correlated with participants' reported mental health history, number of endorsed mental health concerns, and history of psychological treatment. The ERS total score was also significantly correlated with both history of NSSI and number of self-injury methods. Such an association is consistent with the existing literature such that emotional reactivity, as measured by the ERS, has been shown to relate to mood, anxiety, and eating disorders, as well as NSSI and pathological skin-picking (Claes et al., 2013; Nock et al., 2008; Snorrason et al., 2010).

Finally, drawing from literature indicating that interpersonal relationships can influence one's emotional functioning (e.g., Adrian et al., 2011), it was hypothesized that the ERS would demonstrate a negative correlation with parental and peer relationship quality, as measured by the IPPA (i.e., more negative relationships associated with greater emotion reactivity). Contrary to hypotheses, no significant associations were found between the ERS and maternal, paternal, or peer relationship quality. The predominating focus in the existing literature has been on the association between interpersonal relationships and emotion regulation, rather than directly examining the impact of relationship quality on emotion reactivity. However, the current findings are consistent with a conceptualization of emotion reactivity as an aspect of heritable

temperament (Nock et al., 2008; Rettew & McKee, 2005), and an influence of interpersonal relationships on emotion regulation would be expected through processes such as modeling and socialization of emotion. In other words, the lack of significant association found in the current study does not necessarily indicate lack of validity of the ERS, which is supported by the aforementioned results regarding emotion regulation, mental health, and NSSI as well as the results of other studies utilizing the ERS. The association between these different domains of emotional experience and interpersonal relationships is further explored in the subsequent studies through their inclusion in a model of NSSI.

3.2.4 Conclusions.

Overall, the results of the current study indicate that the ERS is a reliable and valid self-report measure of emotion reactivity. In contrast to a priori hypotheses, the results demonstrated that the ERS might best be used as a unidimensional measure, rather than utilizing the theoretically hypothesized subscales assessing sensitivity, arousal/intensity, and persistence of emotional experiences. This is consistent with both the original validation of the ERS and a recent psychometric evaluation of the Dutch translation. It is therefore recommended that researchers including the ERS report on the total score, rather than utilizing the theoretical subscales. The results provide support for the validity of the ERS through the positive associations with measures of emotion regulation, mental health concerns and psychological treatment history, and engagement in NSSI. Of note, evidence for the divergent validity of the ERS has been demonstrated in previous research, such that mostly small and nonsignificant associations were found between the ERS and measures of responsiveness to reward, drive, fun-seeking, and theoretically unrelated domains of temperament (i.e., affiliation/surgency; Nock et al., 2008).

Chapter 4. Study 2 Results and Discussion

4.1 Purpose and Hypotheses

Based on the previously reviewed literature, the overall purpose of this study was to explore the direct and indirect influences of both intrapersonal and interpersonal factors on NSSI through the examination of a model integrating emotional regulation and reactivity, as well as parental and peer variables (see Figure 1 for proposed model). First, studies exploring the association among emotional and familial variables have focused rather exclusively on domains of emotion dysregulation, in contrast to exploring the earlier stage of Chapman and colleagues' (2006) theorized path – emotional reactivity. The research that has included measures of reactivity has focused on early experiences of abuse/neglect; the current study extended this research by using an overall measure of the parent-child relationship, as well as a measure of emotional reactivity. The current study is similar to the work of Kimball and Diddams (2007), who investigated affect regulation as a mediator between adult attachment and NSSI. Kimball and Diddams (2007) used a measure that focused specifically on emotion regulation strategies (largely behavioural) that individuals use to deal with negative emotions. However, the current study utilized a more comprehensive measure of emotion regulation (i.e., DERS; Gratz & Roemer, 2004). This extends the work by Kimball and Diddams (2007) by assessing both difficulties in behavioural regulation strategies as well as other important domains of emotion regulation, such as non-acceptance of emotions and lack of emotional awareness. The current study also extended the previous literature by assessing both the maternal and paternal relationship within the overall model.

In addition to replicating and extending the literature regarding emotional and familial variables, the current study sought to test a more comprehensive model of NSSI by including

variables related to the peer environment, including relationship quality and subcultural identification. First, research has demonstrated that experiences of peer victimization and low peer status are related to engagement in NSSI and suicidal behaviours. Research has also demonstrated a mediational relationship with emotion regulation difficulties, such that individuals who experience poor peer relationships might be particularly at risk for NSSI in the context of difficulties in emotion regulation and a lack of healthy strategies for coping with internal distress. The research also suggests that factors of the parental relationship (e.g., parental monitoring and emotion socialization) might contribute to the quality of relationships with peers and to the type of peer group an individual identifies with. The current study extended this line of work by testing these direct and mediational influences using a more general measure of peer relationship quality, as opposed to experiences of overt victimization. As such, the current study is also a replication and extension of the work by Adrian and colleagues (2011), which examined the role of emotional dysregulation, parental and peer relationships, and NSSI in a relatively small sample of psychiatrically hospitalized adolescent females.

Finally, preliminary anecdotal and empirical evidence suggests that NSSI might represent a chosen deviant behaviour, or even a way of bonding, among certain subcultural groups in which the behaviour is normalized. This may be particularly true for groups who experience rejection from the dominant culture and who do not "fit in" (i.e., more deviant groups). Much of the work regarding contagion of self-injury has been conducted with inpatient samples and often has not made a distinction regarding the intent to die motivating these behaviours. The current study sought to extend this work by examining the relation between NSSI and a number of different subcultural groups using a community sample and focusing exclusively on non-suicidal acts.

In light of these considerations the objectives and hypotheses of the current study were:

Objective 1: To test a comprehensive model of NSSI that simultaneously examines the influence of individual emotional variables, interpersonal relationships, and subculture. Specifically, the current study sought to examine the overall fit of the hypothesized model in addition to tests of the direct and mediational paths among the factors of interest.

Objective 2: To replicate and extend the results of research exploring the associations among emotional reactivity and regulation in engagement in NSSI, including investigating the role of these factors as mediators and assessing the relative influence of various domains of emotion regulation.

- A. It was hypothesized that greater emotional reactivity would predict greater difficulties regulating emotions, which in turn would be associated with engagement in NSSI.
- B. The direct effect of emotion regulation would be a significant predictor of NSSI status; the mediational relationship among emotion regulation and interpersonal variables would also significantly contribute to NSSI status.

Objective 3: To replicate and extend the results of research exploring the importance of parent-child relationships, including the evaluation of both the paternal and maternal relationship.

- A. Taking into account the influence of emotional reactivity and emotion regulation, parental relationships will significantly contribute to the prediction of NSSI status (i.e., the direct path from parental relationships to NSSI will be significant).
- B. It was also hypothesized that there will be a significant mediational relation among poor parental relationships and emotional reactivity in the prediction of emotion dysregulation, which in turn will predict NSSI. In other words, that parental relationship quality will contribute to both emotional reactivity and dysregulation, indirectly contributing to NSSI.

C. Poor parental relationships would contribute to poor peer relationship quality.

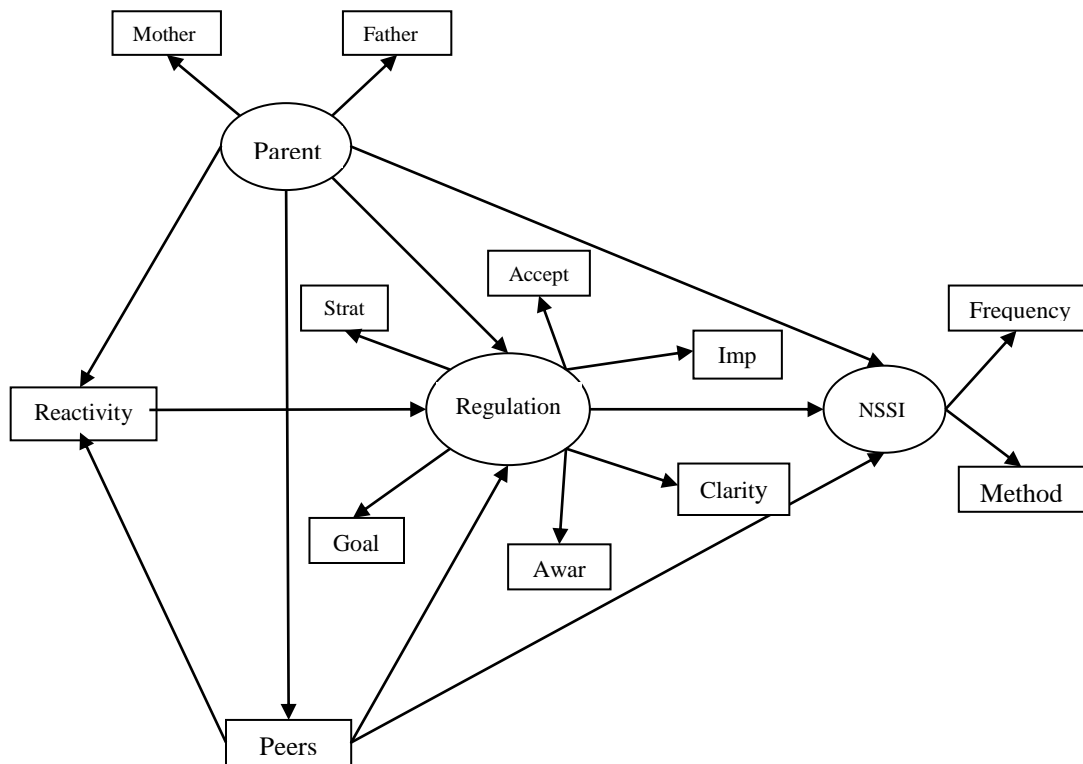
Objective 4: To extend the current literature by examining how the quality of relationships with peers and identification with certain subcultural peer groups are related to NSSI.

A. Identification with "deviant" subcultures (i.e., Goth or Emo) will be a stronger predictor of NSSI than identification with more "mainstream" groups (e.g., academics, jocks).

B. Poor quality of peer relationships will predict engagement in NSSI.

C. Poor peer relationships were also hypothesized to contribute to greater emotional reactivity and dysregulation and, as such, also indirectly contribute to NSSI.

Figure 1. Proposed Intra- and Interpersonal Model of NSSI



Note. Strat = limited access to emotion regulation strategies; Accept = Non-acceptance of emotional responses; Imp = impulse control difficulties; Clarity = lack of emotional clarity; Awar = lack of emotional awareness; Goal = difficulties engaging in goal-directed behavior

4.2 Results

4.2.1 Data analysis plan.

The purpose of Study 2 was to replicate and extend previous work in the literature by providing a comprehensive test of both intrapersonal and interpersonal factors in NSSI; therefore Structural Equation Modelling (SEM) was chosen to allow for the simultaneous test of these variables. Specifically, SEM allows for an overall test of the fit or adequacy of a theoretical model, as well as a test of the path relationships, both direct and indirect (i.e., mediation) among the variables. The SEM analyses were conducted using EQS 6.2 for Windows. In addition to the overall SEM analysis, descriptive statistics were examined and preliminary analyses were conducted to examine the relation between NSSI and demographic, parental, personal mental health, and substance use variables.

Chi-square analyses were conducted to examine group differences in categorical variables, whereas t-tests were conducted for continuous variables, which were also supplemented by the non-parametric Mann-Whitney-U test. The latter was chosen as many of the dependent variables violated the normality assumption (i.e., significant skew and/or kurtosis), with some additionally violating the assumption of heterogeneity of variances between the two groups. As Wiedermann and Alexandrowicz (2007) stated the t-test, "is quite robust for non-normal data with homogenous variances" (pg. 6) whereas the U-test might provide a more robust significance test in the case of assumption violations; therefore both were computed. There were no differences in the outcomes of these tests and therefore the parametric t-tests are reported. Although subculture was initially conceptualized to be included in the overall SEM model, due to concerns with response bias (see below) preliminary correlations were instead conducted to examine these relations.

4.2.2 Data cleaning, assumptions, and transformations.

Please refer to Chapter 3, Results for a general discussion of assumptions (e.g., normality, transformation, outliers). In regard to assumptions specific to conducting SEM analyses, the determinant of the variance-covariance matrix indicated that multicollinearity was not a problem in the data set. Regarding the potential for a specification error, the histogram of the standardized residuals did not demonstrate a tail, with most of the values centered around zero (92.3% of the residuals). The average of the off-diagonal absolute standardized residuals was small (.047), suggesting the model is an adequate fit to the data. Finally, large sample sizes are recommended for conducting SEM analyses; one general rule of thumb is a ratio of 10:1 for participants to parameters, with a minimum sample of 200 (Hoe, 2008; Lei & Wu, 2007). The number of free parameters in the model was 31; as such the sample size of 397 is deemed sufficient to conduct the SEM. Further, the total number of degrees of freedom, as calculated by p^* minus the number of parameters, where p^* is $p(p+1)/2$, and p is the number of measured variables is: $12(13)/2 = 78$. Therefore 78 minus 31 equals 47 degrees of freedom remaining to test the model (i.e., the model was likely to be over-identified). Additionally, one parameter for each latent variable was fixed as a marker variable to avoid identification problems. The model was re-run with different fixed parameters in order to provide an accurate estimate of each path (i.e., estimates provided in the model are those of the paths which were allowed to freely vary, not the fixed parameters). No special problems, such as warnings about linear dependency, were encountered during the analysis.

4.2.3 Descriptive statistics.

The basic demographic profile of the participants has been previously outlined (see Chapter 2, Method). Briefly, the final sample was comprised of 300 females (75.6%) and 97

males (24.4%) recruited from the University of Saskatchewan. Participants predominantly self-identified as Caucasian (83.6%) and single/never married (90.9%). Descriptive statistics for the variables included in Study 1 have been previously reported, and are reproduced in Table 9. Inter-correlations among the study variables are presented in Table 10. In addition to the aforementioned emotional and interpersonal variables, participants were queried regarding additional parental information; personal substance use, mental health disorders, treatment history, NSSI engagement; and subcultural identification.

Table 9. Means and Standard Deviations for ERS, DERS, and IPPA (University)

Variable	Mean	SD	Minimum	Maximum
ERS total	25.82	16.08	0.00	77.00
DERS total	79.69	20.80	35.00	144.00
DERS strategies	16.26	6.16	8.00	37.00
DERS acceptance	13.21	5.23	6.00	30.00
DERS impulse	10.79	4.26	6.00	25.00
DERS goals	14.88	4.76	5.00	25.00
DERS awareness	14.22	4.25	6.00	30.00
DERS clarity	10.54	3.39	5.00	22.00
Mother total	87.27	12.86	39.00	107.00
Father total	82.21	13.07	33.00	106.00
Peer total	89.97	10.75	41.00	112.00

Note. SD = Standard deviation

Table 10. Inter-correlations Among Study Variables (University)

	1	2	3	4	5	6	7
1. DERS total	-						
2. ERS total	.61*	-					
3. IPPA Mother total	-.23*	-.02	-				
4. IPPA Father total	-.28*	-.15 ^a	.53*	-			
5. IPPA Peer total	-.27*	-.11 ^b	.27*	.09	-		
6. NSSI forms	.30*	.28*	-.09	-.13 ^a	-.02	-	
7. NSSI frequency	.31*	.28*	-.06	-.08	-.04	.92**	-

^a Variables significant at $p < .01$ before Bonferroni correction

^b Variable significant at $p < .05$ before Bonferroni correction

* $p < .001$

Regarding additional parental variables, the majority of participants reported that their parents were still married ($n = 300$; 75.6%), with 16.4% reporting their parents as divorced or separated, 5.3% never married, and 2.5% widowed. In terms of maternal relationships more specifically, the majority of participants ($n = 390$; 98.2%) identified their biological mother as their primary maternal figure, with 98.7% of the sample indicating that their primary maternal figure was still living. Participants had lived with their primary maternal figure for an average of 18.27 years ($SD = 2.15$), with a range of four to twenty-five years. Given the previously described association between parental mental health concerns and personal mental health and NSSI history, participants were also asked, to the best of their knowledge, whether their primary maternal figure had a history of psychopathology or mental health concerns. Ninety-two participants ($n = 23.2\%$) indicated the presence of one or more mental health concerns experienced by their primary maternal figure, 68.3% noted no such history, and 8.6% were unsure. A more detailed description is provided in Table 11.

Table 11. *Mental Health Concerns of Parental Figures (University)*

	Maternal Figure		Paternal Figure	
	n	%	n	%
Depression	68	17.1	37	9.3
Bipolar disorder	7	1.8	2	0.6
Excessive worry or anxiety	35	8.9	13	3.3
Panic attacks	21	5.3	4	1.0
Alcohol abuse	18	4.6	32	8.0
Other substance abuse	2	0.6	5	1.3
Eating disorder	2	0.6	0	0
Suicidal thoughts	7	1.8	8	2.1
Psychotic disorder	1	0.3	0	0
Other	2	0.6	2	0.6

Note. Percentages represent the entire sample

The majority of participants also reported their primary paternal figure as their biological father ($n = 370$; 93.2%) and reported their father as still living ($n = 384$; 96.7%). Participants had lived with their primary paternal figure for an average of 16.94 years ($SD = 4.28$). Finally, participants were also queried regarding mental health concerns experienced by their paternal figures; seventy individuals indicated their paternal figure had such as history (17.6%), 71.8% noted no paternal mental health history, and 10.3% were unsure whether or not their paternal figure had struggled with mental health concerns. The specific concerns experienced by paternal figures are also detailed in Table 11.

Participants were queried regarding their own experiences with substance use, mental health and treatment history, and engagement in self-injury. Three-hundred and twenty-eight (82.6%) participants reported currently engaging in alcohol use, with more than a third (38.3%) reporting that they would drink alcohol once or twice a month. Less frequent use (i.e., less than once a month) was reported by 18.1% of the sample; 14.9% reported weekly alcohol use, 11.3% reported two to three times per week and 1.8% reported four to six times per week. No participant endorsed drinking alcohol every day. The average number of drinks consumed during a sitting was 4.56 ($SD = 3.0$), with a range of one to eighteen drinks. Regarding non-prescription illicit drug use, 15.4% ($n = 61$) reported the use of one or more drugs, with approximately half of these individuals reporting a low frequency of use (i.e., less than once a month; 48.4%). Nineteen individuals reported engaging in drug use at least once a week.

In terms of participants' personal experiences with mental health difficulties, 39.5% ($n = 157$) endorsed a history of one or more concerns (specific mental health experiences are listed in Table 12). Fewer participants endorsed seeking treatment for a mental health concern, with 19.9% of the sample reporting any form of treatment history. Specifically, 16.4% reported seeing

a counsellor or psychologist, 11.3% reported receiving medication, 2.6% had engaged in group counselling, 1.1% had a history of hospitalization, and one individual had received an alternative form of mental health treatment.

In regard to engagement in NSSI, 141 participants (35.5%) reported past or current engagement in one or more methods of self-injury. In terms of frequency, of individuals with a NSSI history 12.1% reported only one previous NSSI act, 9.9%, 9.9%, and 2.8% reported engaging in two, three, or four episodes of self-injury, respectively. Twenty-two individuals reported between five and nine episodes (15.6%), with the remainder of participants reporting ten or more episodes (49.6%). Twenty-four individuals (17%) reported engaging in over 100 episodes, including 19 individuals (13.5%) reporting over 200 or "too many to count." A substantial proportion of participants reported engaging in only one form of NSSI ($n = 51$; 36.2%). Approximately half of participants engaged in between two and five forms ($n = 72$; 51%), and 12.7% engaged in over five methods of self-injury. The prevalence rates for specific forms of NSSI are presented in Table 13. The most common methods of NSSI in the sample included: skin-cutting, severe skin-scratching, preventing wounds from healing, sticking needles in the skin, punching oneself and head-banging. Of note, only six participants endorsed interfering with wound healing as the only method of NSSI, which is considered by some researchers to be a more mild form of self-injury compared to methods such as skin cutting or burning (e.g., Buser, Buser, & Kearney, 2012; Wilcox et al., 2012). The average age of onset for NSSI was 12.85 years old ($SD = 3.72$) and participants with a history had been engaging in NSSI for an average of 4.07 years ($SD = 4.25$).

Table 12. *Personal Mental Health Concerns (University)*

	Personal History	
	n	%
Depression	107	27
Bipolar disorder	3	0.8
Excessive worry or anxiety	84	21.2
Panic attacks	45	11.5
Alcohol abuse	14	3.6
Other substance abuse	12	3.2
Eating disorder	10	2.8
Suicidal thoughts	48	12.2
Psychotic disorder	1	0.3
Other	5	1.4

Note. Percentages represent the entire sample

Table 13. *Forms of NSSI (University)*

	NSSI History	
	n	%
Skin-cutting	62	44.0
Burning skin with cigarette	12	8.5
Burning skin with lighter/match	20	14.2
Carving words into skin	29	20.6
Carving pictures into skin	21	14.9
Severe skin-scratching	46	32.6
Severe skin-biting	27	19.1
Rubbing sandpaper on skin	8	5.7
Dripping acid on skin	3	2.1
Used bleach/cleaner on skin	4	2.8
Stuck needles in skin	41	29.1
Rubbed glass on skin	5	3.5
Intentionally broken bones	1	0.7
Head-banging	32	22.7
Punching oneself	35	24.8
Preventing wounds from healing	45	31.9
Other ^a	18	12.8

Note. Percentages represent participants who endorsed engaging in NSSI

^aIncludes friction burns, burning skin with heated metal, self-strangling, punching walls, whipping self, and severe hair-pulling

4.2.4 Preliminary analyses.

Preliminary analyses were conducted to compare participants without a history of NSSI (no-NSSI group) to those with such a history (NSSI group) on demographic, parental, substance use, and mental health variables. There was a significant age difference, $t(394) = 2.178, p = .03, d = .227,$ ⁴ such that those in the no-NSSI group were somewhat younger; of note the mean difference between the groups was 0.63 years and, as such, although the difference is statistically significant, it might not represent a clinically meaningful finding. There were no significant differences regarding gender, marital status, or ethnicity between the two groups. There were also no significant differences between the groups regarding current alcohol consumption, as well as the frequency of alcohol use, and the amount of alcohol drank per sitting. However, the groups did differ on current illegal drug use, $\chi^2(1, N = 397) = 17.38, p < .001, \phi = .209,$ such that those who endorsed NSSI were also more likely to report drug use. There were no differences regarding the frequency of drug use.

Regarding the paternal variables, there were no significant differences between the groups regarding parental marital status or the number of years spent living with their primary paternal or maternal figures. Individuals in the NSSI group, however, were more likely to report a history of mental illness for both their primary paternal and maternal figure, $\chi^2(2, N = 397) = 7.02, p = .03, \phi = .133,$ and $\chi^2(2, N = 397) = 13.44, p = .001, \phi = .184,$ respectively. Similarly, individuals with a history of NSSI were also more likely to report personal experiences with mental health difficulties, $\chi^2(1, N = 397) = 48.12, p < .001, \phi = .351,$ and reported a greater number of mental health concerns compared to those without a history of NSSI, $t(179.42) = 7.19,$

⁴ Using the following cut-offs: d .2 - small effect size, .5 medium, and .8 large. For ϕ : .1 - small, .3 - medium, .5 large; Cohen, 1992.

$p < .001$, $d = .90$. Finally, those with a history of NSSI were also more likely to report seeking treatment for a mental health concern, $\chi^2(1, N = 397) = 22.22$, $p < .001$, $\phi = .237$.

The groups were also compared on their responses to the DERS, ERS, and IPPA, as the NSSI group was expected to score higher on the emotional measures, indicating more difficulties with emotion dysregulation and reactivity, and to score lower on the peer and parental variables, indicating a poorer quality to these relationships. Indeed, individuals with a history of NSSI scored significantly higher on the DERS, $t(395) = 5.54$, $p < .001$, $d = .58$, and the ERS, $t(393) = 5.22$, $p < .001$, $d = .55$. However, there were no significant differences between the NSSI and non-NSSI groups regarding the mother, father, or peer subscales of the IPPA.

Finally, current and peer subcultural identification was not included in the final model and instead correlations were conducted to examine the potential relation between subcultures and NSSI. These variables were excluded from the final model due to an extensive amount of missing data for certain items and a large variability in the number of participants who responded to each item. For example, although 376 and 334 participants responded to items assessing their level of "average" and "athlete" identification during adolescence, respectively, only 175 participants responded to the "emo" item, and only 129 responded to the "goth" item (both of which are particular subcultures of interest to the present study). Given concerns over the generalizability of such data, preliminary analyses were conducted to identify potential subcultures of interest for exploration in future research. As hypothesized, although few relations were found overall among NSSI frequency and identification with specific peer groups during adolescence, more deviant groups did demonstrate a significant relationship. More specifically, identification during adolescence with the Emo, ($r = .251$, $p = .001$), Goth ($r = .349$, $p < .001$), Misfit ($r = .243$, $p < .001$), Non-Conformist ($r = .244$, $p < .001$) and Rebel ($r = .183$, $p = .003$)

subcultures demonstrated small to moderate relations with NSSI. In addition, the Indie ($r = .173$, $p = .015$) and Hippie ($r = .183$, $p = .012$) subcultures also demonstrated a small relationship with NSSI.

A similar pattern of association was found among current identification with the various subcultures and NSSI frequency, with the same subcultural groups demonstrating a significant association. Specifically, the Emo ($r = .157$, $p = .030$), Goth ($r = .218$, $p = .010$), Misfit ($r = .161$, $p = .007$), Non-Conformist ($r = .237$, $p < .001$) and Rebel ($r = .146$, $p = .015$) subcultures were significantly related to NSSI, although the strength of the associations were small. The Indie ($r = .141$, $p = .027$) and Hippie ($r = .233$, $p < .001$) groups were also found to demonstrate a small significant relationship. Furthermore, it was also hypothesized that more mainstream groups would either be unrelated to NSSI, or demonstrate a negative correlation. The preliminary correlational analyses found that groups such as Preppy, Popular, Academic, and Religious indeed demonstrated negative, albeit small and statistically non-significant, relationships with NSSI. The correlations between variables not reported here can be found in Appendix C.

4.2.5 Test of intrapersonal and interpersonal model of NSSI.

4.2.5.1 Model fit.

The overall chi-square test of the model fit was significant, $\chi^2 (47, N = 356) = 195.35$, $p < .001$; however this test is sensitive to sample size⁵ and, as such, is not the best indication of overall model fit. Therefore, additional fit indices were used to evaluate the fit of the model. Consistent with the recommendation by Hu and Bentler (1999) both a residual-based fit index and a comparative fit index were examined. The Comparative Fit Index (CFI) values range from zero to one, with values over .95 indicating a good model fit. The standardized Root Mean

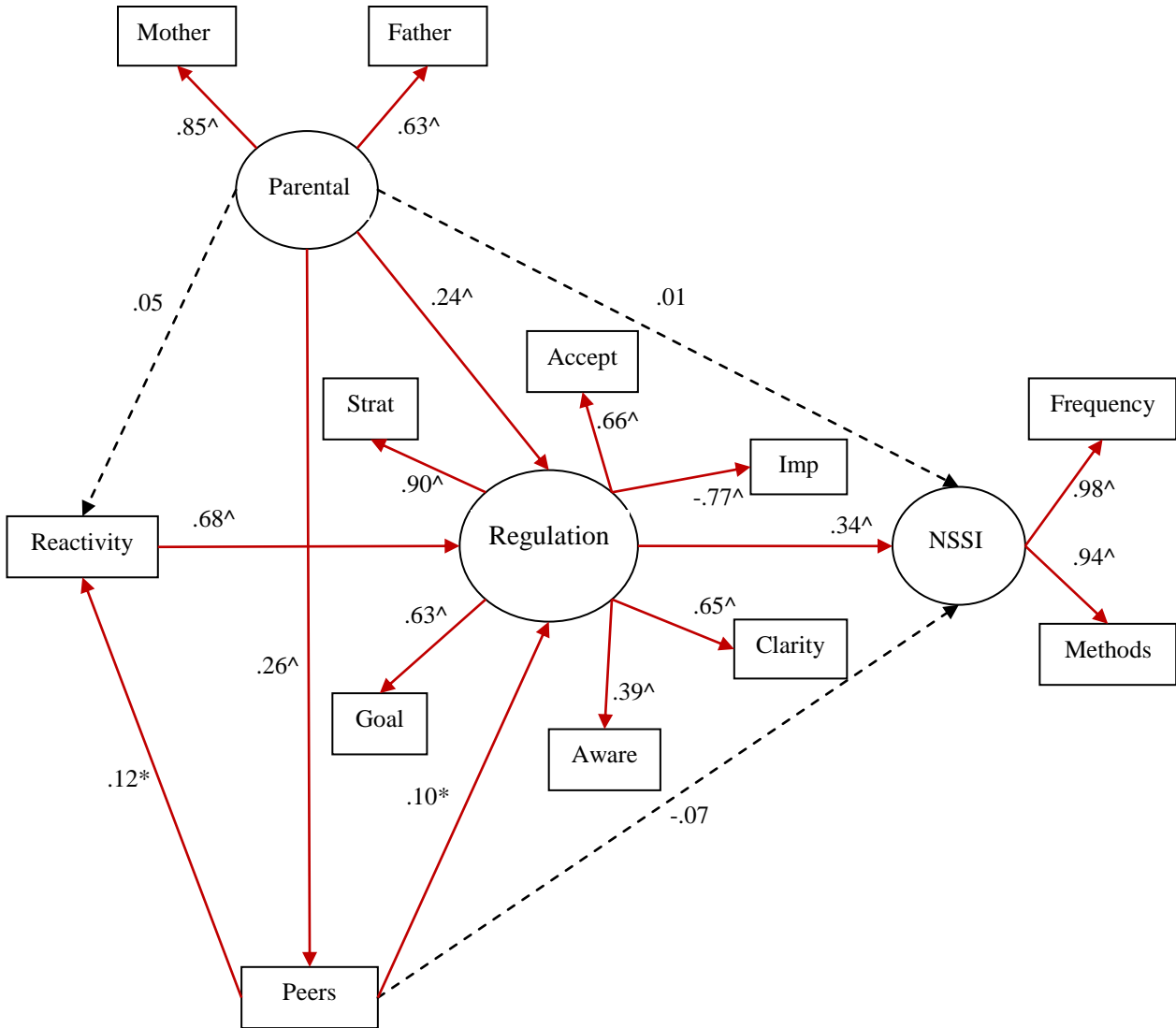
⁵ Cases with missing data were deleted from analysis (i.e., missing listwise procedure was used). Analyses were replicated using missing data estimation procedures, resulting in the same pattern of results as is reported here.

Square Residual Index (sRMR) also ranges from zero to one, however smaller (i.e., less than .06) values indicate a good model fit (Hu & Bentler, 1999; Tabachnick & Fidell, 2007). In the current study, the CFI value was .93 and the sRMR value was .06; further a CFI value of .93 was also found using robust fit statistics (i.e., due to the skewed distribution of the NSSI variable). The chi-square to degrees of freedom ratio was 4.16. Although there is no universally agreed cut-off for interpreting model fit based on this ratio, some researchers have suggested that a 5:1 ratio is a useful rule of thumb for evaluating model fit (Hinkin, 1995).

4.2.5.2 Relation among intra- and interpersonal factors in NSSI.

The parameter path estimates examining the relation among the study variables are shown in Figure 1. The results demonstrated support for an Experiential Avoidance Model of NSSI such that increased emotional reactivity predicted more difficulties in emotion regulation (unstandardized coefficient = 0.06, standardized coefficient = .68, $p < .001$) which, in turn, predicted engagement in self-injury (unstandardized coefficient = 3.36, standardized coefficient = .34, $p < .001$). In terms of parental relationships, the results demonstrated that lower quality of relationship with parents predicted more difficulties in emotion regulation (unstandardized coefficient = .03, standardized coefficient = .24, $p < .001$), but not increased emotional reactivity (of note, the parental variables were transformed for normality such that higher scores on the IPPA indicated lower quality of relationships). Likewise, poor peer relationships predicted both more difficulties in emotion regulation (unstandardized coefficient = .01, standardized coefficient = .1, $p < .01$) and greater emotional reactivity (unstandardized coefficient = 0.2, standardized coefficient = 0.12, $p < .05$).

Figure 2. SEM Model of Intrapersonal and Interpersonal Predictors of NSSI (University)



Note. Strat = limited access to emotion regulation strategies; Accept = Non-acceptance of emotional responses; Imp = impulse control difficulties; Clarity = lack of emotional clarity; Aware = lack of emotional awareness; Goal = difficulties engaging in goal-directed behavior

Note. Significance tests using robust statistics

* $p < .05$; ** $p < .01$; [^] $p < .001$

Table 14. *R-Squared Values for Latent Variable Indicators (University)*

	Strat	Accept	Imp	Clarity	Aware	Goal	Mother	Father	Freq	Forms
R ²	.81	.44	.60	.42	.15	.40	.72	.40	.89	.96

Note. Strat = limited access to emotion regulation strategies; Accept = Non-acceptance of emotional responses; Imp = impulse control difficulties; Clarity = lack of emotional clarity; Aware = lack of emotional awareness; Goal = difficulties engaging in goal-directed behavior

As hypothesized, poorer parental relationships also predicted poorer peer relationships (unstandardized coefficient = 0.24, standardized coefficient = .26, $p < .001$). Contrary to the hypotheses, a direct relation between parental and peer variables with NSSI was not supported. Rather, the results demonstrated support for the hypothesized mediational relation among interpersonal and emotional variables. More specifically, the results suggest that negative parental and peer relationships exert their influence on NSSI via the mediating effects of difficulties in emotion regulation, rather than relationship quality in itself having a direct effect on these behaviours.

Estimates for the reliability of the measured variables as indicators of the latent variables are presented in Table 14. As demonstrated, both frequency of injury and number of methods used are reliable indicators of NSSI status. In terms of parental relationships, the results suggest that maternal relationship quality is a more reliable indicator of the latent factor, accounting for a greater proportion of variance in overall parental relationship quality. Finally, the subscales of the DERS also demonstrated variability in the proportion of variance that was accounted for by the underlying factor. Specifically, limited access to emotion regulation strategies accounted for the highest proportion of the underlying DERS factor, although lack of emotional awareness does not appear to be a reliable indicator of overall emotion regulation difficulties. The estimates of the remaining subscales ranged from .40 to .60.

Post-hoc analyses were also run to examine modifications to the model that might improve the overall fit. No paths were removed based on the Wald Test as it only recommended the non-significant, but theoretically hypothesized, paths (e.g., the direct paths between interpersonal variables and NSSI). The Lagrange Multiplier Test for adding parameters was also conducted with the suggested paths that would result in a statistically significant change to the CFI value being: paternal relationship to the DERS factor, maternal relationship to the DERS factor, and lack of emotional awareness to the latent parental factor. Although the fit would have been statistically improved with the addition of these paths, the model was not improved in a practical sense, with the CFI increasing from .93 to only .94. Therefore, no parameters were removed or added based on these tests.

Finally, although the results demonstrated that lack of emotional awareness was a significant indicator of the emotional regulation latent factor, it also demonstrated the lowest value for the path estimates (of the DERS indicators) and the r-squared value suggested that it is not a reliable indicator, with value of only 0.15. This result is consistent with that found by Heath and colleagues (2008) where lack of emotional awareness was the only subscale of the DERS that was not significantly different between individuals with a history of NSSI and individuals without. Likewise, Gratz and Roemer (2008) found that after controlling for demographic and other risk factors, the limited access to emotional regulation strategies and lack of emotional clarity subscales of the DERS remained significant predictors of NSSI, while lack of emotional awareness did not. Based on these findings, a modified full model was tested with the removal of lack of emotional awareness.

The overall chi-square test of the modified model was significant $\chi^2 (37, N = 367) = 87.16, p < .001$. The CFI value after the modification increased to 0.97 and the sRMR decreased

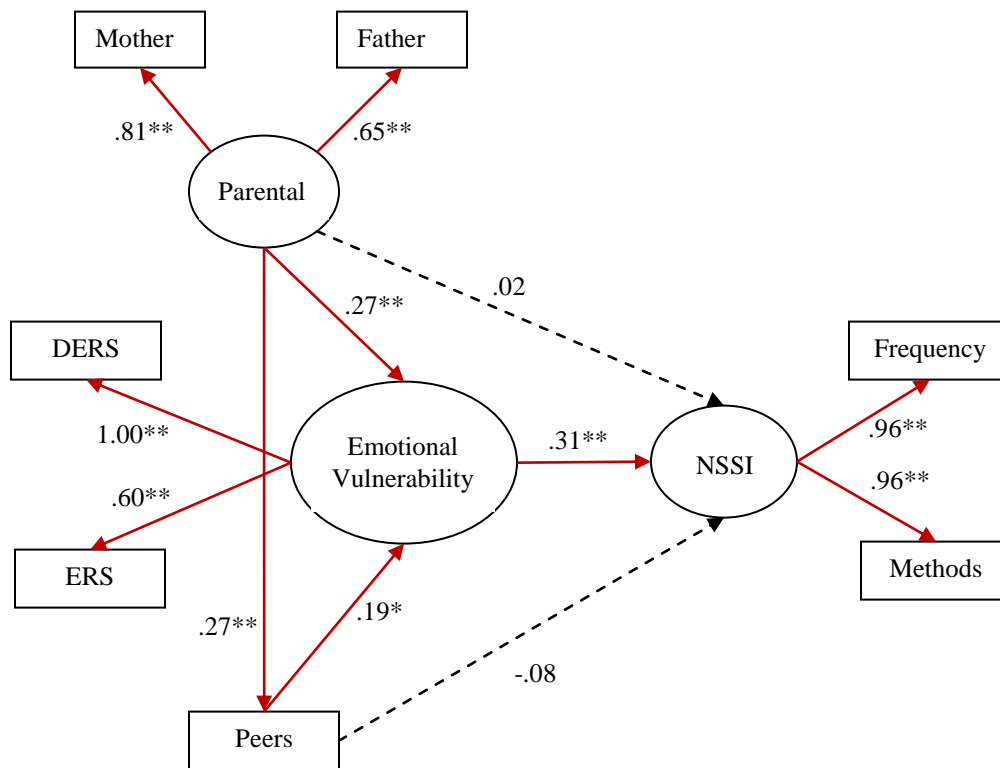
to 0.04; the CFI using robust statistics was 0.98. The chi-square to degrees of freedom ratio was 2.36. The parameter estimates and significance values of the original full model presented in Figure 2 did not meaningfully change after the removal of the lack of emotional awareness subscale. Although a chi-square difference test could not be conducted as the models are non-nested, the AIC values were compared for descriptive information, with smaller values indicating a better fitting model. The AIC value for the full model was 101.35, and the AIC value for the modified model was 13.16, suggesting an improved model.

4.2.5.3 Reduced model of NSSI.

As the fit indices for the original first model before the modification suggested an adequate although not strong fit, a third model was examined which tested the hypothesis that both emotional reactivity and dysregulation represent an underlying emotional vulnerability factor. This model was chosen due to the weaker than hypothesized or non-significant relations between the interpersonal variables and the emotional factors when the latter are considered distinct (although related) factors. Therefore, a reduced model was examined with emotional vulnerability as a latent factor with the Emotion Reactivity Scale (ERS) and Difficulties in Emotion Regulation Scale (DERS) total scores serving as measured indicators of the factor. In this reduced model, 92.8% of the residuals were centered around zero and the determinant of the matrix suggested that multicollinearity was not a problem. The average off-diagonal standardized residual was small (.036), suggesting a good fit to the data. Finally, the total number of degrees of freedom (p^* minus the number of parameters, where p^* is $p(p+1)/2$, and p is the number of measured variables) is: $7(8)/2 = 28$. Therefore 28 minus 19 (i.e., parameters to be tested) equals 9 degrees of freedom remaining to test the model.

The overall chi-square for the reduced model was significant, $\chi^2(9, N = 390) = 44.31$, $p < .001$; the CFI for the reduced model was .97 and the sRMR was .05, both indicating a strong model fit; the CFI value when using robust statistics to account for normality concerns with the NSSI variable was .97 as well. The chi-square to degrees of freedom ratio was 4.9. The AIC of the reduced model was 26.31, compared to 101.35 in the full model. In addition to indicating a stronger fit to the data, the reduced model demonstrated the same pattern of relationships as the full model (see Figure 2). More specifically, although the direct paths from parental and peer relationships were not significant, more negative family relationships predicted more difficulties with underlying emotional vulnerability (unstandardized coefficient = .27, standardized coefficient = .27, $p < .001$), as did more negative peer relationships (unstandardized coefficient = .20, standardized coefficient = .19, $p < .01$). In turn, increased emotional vulnerability predicted engagement in NSSI (unstandardized coefficient = .39, standardized coefficient = .31, $p < .001$). Consistent with the full model of NSSI, these results suggest that negative interpersonal relationships increase the risk for self-injury via emotional difficulties, in this case conceptualized as an underlying emotional vulnerability construct that encompasses both emotional reactivity and dysregulation.

Figure 3. *Reduced Intrapersonal and Interpersonal Model of NSSI (University)*



Note. Significant tests using robust statistics
 $*p < .01$; $**p < .001$

4.3 Discussion

4.3.1 Overview.

The primary purpose of this study was to investigate a model of various factors that might place individuals at risk for engaging in non-suicidal self-injury through the examination of emotional, parental, and peer variables. Prior theoretical and empirical work suggests that experiences of interpersonal invalidation, particularly within parental relationships, and emotional dysregulation and reactivity are important predictors of NSSI. The existing literature further points to the importance of negative peer relational quality, and the potential for NSSI to represent a sort of chosen deviant behaviour among particular peer groups or subcultures. As such, the primary goal of the current study was to provide a comprehensive test of the direct and mediating influences of these intra- and inter-personal factors in relation to NSSI to more fully understand the development and/or maintenance of these behaviours.

The following sections will present the notable findings of the current study, beginning with a discussion of the demographic composition and NSSI experiences of participants. Preliminary findings regarding the potential role of subculture are presented, as this variable was excluded from the final model due to response rate limitations. Next, an examination of the original full model and the reduced model is presented, including an exploration of this study's convergent and divergent findings with the existing literature.

4.3.2 Demographic information.

Regarding basic composition, the sample consisted primarily of females (75.6%), the majority self-identifying as Caucasian (83.6%), with a mean age of 20 years old (range 18 to 48). The majority of the sample (68.3%) was recruited through introductory psychology courses, with the remainder recruited from the broader university community (program of study unspecified).

The gender distribution in the current sample is closely aligned with self-reported gender among psychology majors at the University of Saskatchewan during the terms of data collection (77.79% female), although it represents a greater proportion of females when compared to the overall student population (57.97% female; University of Saskatchewan, 2011). The age, gender, and ethnic composition of the sample is also generally consistent with similar research conducted among university students (e.g., Gratz et al., 2002; Heath et al., 2009).

In terms of personal history with NSSI engagement, 35.5% of the total sample reported current or past use of one or more methods of self-injury. Although this estimated lifetime prevalence rate is higher than some estimates within college populations (e.g., Buckholdt et al., 2009), it is consistent with others (Gratz et al., 2002). The most commonly-endorsed methods of NSSI are also consistent with previous literature, with the three most common behaviours endorsed being skin-cutting, severe skin-scratching and preventing wounds from healing, followed by carving words or pictures into the skin and severe scratching. As noted previously, some authors have argued that including the behaviour of preventing wounds from healing might overestimate prevalence rates (e.g., Buser et al., 2012; Wilcox et al., 2012), and might contribute to variable prevalence estimates. In the current study, however, only six participants (.02%) endorsed preventing wounds from healing as their only NSSI method and thus did not significantly contribute to an estimation of prevalence.

The average age of NSSI onset of 12.85 years is also consistent with the existing literature, with onset being most commonly reported as during early or middle adolescence (Favazza & Conterio, 1989; Nock, 2010). Although the average duration of NSSI is not as frequently reported in published research, the average of 4.07 years found in the current study is comparable to a 3-year average duration reported by Buckholdt and colleagues (2009), also

derived from a sample of post-secondary students. Although also not as commonly reported in detail as overall prevalence rates are, the frequency and number of methods of NSSI utilized by the current sample are comparable to findings in the existing literature. For example, Arney et al. (2011) found a mean of 3.78 forms of NSSI and Glenn et al. (2011) found that half of their sample engaged in two or more NSSI methods, both within college samples. The current finding that 51% of participants engaged in between two and five NSSI methods is also fairly consistent with Buckholdt and colleagues' (2009) finding that 62% of individuals reported between two and five methods. Gratz and colleagues (2011) found identical findings regarding the highest severity of NSSI among their college sample, also reporting that 17% of individuals had engaged in over 100 episodes. Overall, the current sample appears consistent with the literature based on college/university samples, and includes a range of severity of NSSI experiences.

In terms of group comparisons on demographic variables of interest, the current results did not find a significant gender difference between the NSSI and no-NSSI groups. This lack of gender difference regarding the prevalence of NSSI has been reported in community samples (e.g., Buckholdt et al., 2009; Bureau et al., 2010; Gratz et al., 2011), in contrast to perceptions that NSSI is more common in females. More specifically, although earlier literature reported greater NSSI among females, perhaps drawing from the BPD literature or the fact that women are over-represented/sampled within the research, evidence in recent studies has noted little, if any, gender difference in prevalence. The current study found no significant group differences regarding frequency and amount of current alcohol use, although individuals with a history of NSSI were more likely to report current drug use. Individuals who self-injure are more likely to regularly misuse drugs (Cummings et al., 2006), with recent research specifically highlighting marijuana use as a predictive risk factor (Moller, Tait, & Byrne, 2013). Although some studies

have also found higher levels of problematic alcohol use among individuals who self-injure (e.g., Moller et al., 2013), other studies suggest that it might be certain subgroups of self-injurers who are more at-risk for alcohol abuse. For example, Bracken-Minor, McDevitt-Murphy, and Parra (2012) found that a subgroup reporting multiple functions of their NSSI and more anxious symptomology were at increased risk for problematic alcohol use compared to other groups such as experimental NSSI, mild NSSI, and suicidal groups. MacLaren and Best (2010) found that problematic alcohol use was associated with increased NSSI severity, defined by higher frequency and multiple NSSI methods. As such, the lack of group differences regarding alcohol use in the current study might be related to overall comparisons obscuring more fine-grained group differences. In regard to queried parental and personal mental health variables, the current findings provide a replication of previous research (e.g., Cumming et al., 2006; Fliege et al., 2009). Specifically, individuals with a history of NSSI were more likely to report a history of mental illness for both their primary maternal and paternal figure. Individuals in the NSSI-group were also more likely to endorse personal experiences with mental health concerns, a greater number of concerns, and were more likely to have sought mental health treatment.

Providing preliminary support for the role of the examined emotional variables, individuals in the NSSI group were found to score higher on both the DERS and ERS, compared to those in the no-NSSI group. This finding indicates that individuals with a history of self-injury reported both greater difficulties with emotion regulation as well as greater emotional reactivity. In contrast to hypotheses, there were no significant differences between the groups regarding perceived quality of relationships with maternal or paternal figures, or with peers. This finding suggests the lack of direct influence from the interpersonal variables on NSSI status. As this is reflective of descriptive findings, however, it does not inform hypotheses regarding the potential

mediational influences of parental and peer relationships. Therefore, these hypotheses will be further discussed through an examination of the model in subsequent sections.

4.3.3 Subcultural factors.

Preliminary analyses were conducted to examine the potential relation between various subcultures and NSSI. The subcultural variables were excluded from the overall model due to concerns with extensive missing data on some items. The approach to assessing subcultural identification was based on a dissertation examining social identity and cigarette smoking in adolescence (Moran, 2009). As previously discussed, this approach was chosen over other alternatives due to limitations with existing measures. Specifically, existing peer group measures often force dichotomous yes/no identification (rather than varying degrees), are limited in the groups they assess, and do not allow for identification with multiple groups. In the development of the approach utilized in the current study, Moran (2009) first ran a pre-test with college students to identify groups prototypically associated with "smoking" or "not smoking." The responses were then coded and collapsed into groups; for example, nerd, geek, and dork collapsed into "Nerd." Moran's (2009) resulting categories (with the modification of current versus adolescent identification) as well as her approach of asking participants to rate from 0 - 100 how much they identified with each group, were used for the current study. In contrast to the current response rate concerns, Moran (2009) did not note potential bias or under-response using the measure, and stated that this approach indeed provided a more detailed way of assessing the strength of identification with a social category.

There are some factors that might have contributed to the missing data for a number of the queried subcultures. First, participants might have equated leaving an answer blank with a response of "0 or not at all" regarding their identification with a group. However, the trend of

missing answers was noticed early in the data collection and the instructions were then modified to instruct participants to answer "0" if they did not identify with a group, rather than leave the response blank. Second, Moran (2009) conducted the initial pre-test to illicit the peer groups with students from a southwestern university in the United States. The resulting list was then administered to middle adolescents across the United States, although specific information on geographic location was not collected. Thus, the differences in demographic composition of the samples might have contributed to the data loss such that participants in the current study might not have been familiar with all the listed groups. Related to this, the current approach did not operationally define subgroups for participants, which might have resulted in some participants not responding as they were unsure what was meant by a specific group label. However, in the original use of the measure, Moran (2009) also did not provide descriptions of the groups and did not experience the same concern with data loss. Social factors might have also influenced the lack of responding, particularly as groups such as Average or Athlete were commonly responded to although the Emo and Goth groups were not. The anonymous nature of an online questionnaire, however, assists in reducing such potential desirable responding (Joinson, 1999). Further, social desirability factors would be expected to also influence responding to the NSSI items, and data loss due to response rate was not a concern regarding responses to the DSHI in the current study. It is unclear which of these potential factors, or combination of such, contributed to the data loss in the current study, although future work exploring the potential influence of subcultural identification will benefit from modifications to this approach to increase the methodological rigor of investigation.

With the aforementioned response limitations in mind, the current results provide a preliminary examination of the potential role of subculture in NSSI. In regard to adolescent

identification, Emo and Goth subcultural identification demonstrated the strongest relation to lifetime history of self-injury, although these relations were small to moderate in magnitude. Also consistent with hypotheses that more deviant, or less mainstream, groups might be related to NSSI, the Misfit, Non-conformist and Rebel groups also demonstrated small to moderate relationships. Furthermore, although the strength of the relationship was smaller, participants' current identification with the same groups was again associated with lifetime NSSI. Unexpectedly, the results also showed that both current and adolescent identification with the Indie and Hippie groups demonstrated a small magnitude of association with NSSI. Finally, also as hypothesized, more mainstream groups (e.g., Popular, Academic, Religious) demonstrated a negative, although small and statistically non-significant, relation with NSSI.

Although little attention has been paid to the role of subcultural identification, the current results and the preliminary study by Young and colleagues (2006) suggest this is an area for further investigation. Specifically, the latter study found that 53% of individuals in their sample who identified with the Goth subculture had self-injured at some point in their lives. The significant association remained after adjusting for other correlated subcultures (e.g., Punk) and risk factors (e.g., depression). Anecdotal evidence further points to the potential importance of the Emo subculture (Martin, 2006), with Definis-Gojanovic, Gusic, and Sutlovic (2009) stating that "in recent years the media has [sic] linked the Emo scene closely with [suicidal] self harm, but there have been no scientific analyses on this topic" (p. 173). The current findings do appear consistent with such observations, although more stringent empirical work will be necessary to elucidate this connection further. Furthermore, an information resource from the UCLA Centre for Mental Health in Schools (2009) stated that "concern has been raised that members of this [Emo] subgroup tend to be overly emotional, feel misunderstood, engage in self-harming

behaviour; they also often are targets for bullies... practitioners suggest that the group seems less likely to seek help for mental health concerns" (p. 3). Such a statement also suggests that individuals from the Emo or similar subcultures (e.g., the Emo group has been described as a more modern form of Goth; UCLA, 2009) experience deregulated emotional experiences, feelings of disconnection from the mainstream peer group, and overt peer victimization. All of these factors have been identified as risk markers for NSSI, although the direction of relation remains unclear, such as whether individuals with such traits, or who feel marginalized, are attracted to like-minded subgroups such as Goth/Emo, or whether processes within the subculture itself contribute to NSSI risk. Young and colleagues (2006) reported that among participants with high Goth identification and a NSSI history, 41.6% had injured themselves before identification with the group, 16.6% after, and 33.3% around the same time. Although any causal relation cannot be interpreted from this finding, those who had injured before might provide support for the hypothesis that individuals with a NSSI history might gravitate towards such groups. The finding that a substantial proportion of participants also reported first injuring at around the same time as group identification might also support the notion that group processes (e.g., normalization of NSSI, group bonding) might be a salient contributing factor.

4.4.4 Examination of the Model.

The results indicated that the overall model examined in the current study was an acceptable fit for the prediction of lifetime engagement in NSSI. The results largely supported the hypotheses regarding the role of emotional dysregulation and reactivity, parental relationships, and peer relationships.

4.4.4.1 Emotional factors.

The results of the model test indicated that greater emotional reactivity predicted greater difficulties with emotion regulation that, in turn, predicted a combined indicator of NSSI capturing both frequency and number of methods used. This finding is consistent with previous research demonstrating that emotion regulation functions are the most commonly endorsed motives for NSSI (e.g., Klonsky, 2007), as well as the Experiential Avoidance Model (EAM; Chapman et al., 2006). More specifically, this finding supports the notion that individuals might engage in NSSI in order to avoid unwanted or intolerable negative emotions, with self-injurious behaviours providing an immediate, albeit temporary and maladaptive, relief from the negative affective state. Individuals who have more difficulties effectively regulating their emotions in a healthy way, then, might be at greater risk for utilizing maladaptive coping strategies such as NSSI. Further, Chapman and colleagues (2006) speculated that factors such as a lowered distress tolerance and increased levels of reactivity might contribute to greater difficulties with emotion regulation and, in turn, increase the likelihood of an individual engaging in experiential avoidance behaviours. Although the role of emotional reactivity has received less research attention, the current study did demonstrate that emotional reactivity was predictive of greater emotion dysregulation that, in turn, conferred risk for the experiential avoidance behaviour of NSSI. In addition to providing support for the EAM, the current findings regarding emotional reactivity are also consistent with preliminary empirical investigations of this domain of emotional experience. For example, Gratz (2006) found that greater emotional intensity/reactivity combined with emotional inexpressivity predicted engagement in NSSI (although not independently) among a sample of female college students. Jenkins and Schmitz (2012) found that greater emotional reactivity (as measured by the ERS) predicted both positive

and negative affect following an act of NSSI, although they did not measure changes in affect associated with NSSI. Similarly, Snorrason, Smári, and Ólafsson (2010) found that individuals engaged in pathological skin-picking reported both greater emotional reactivity and emotion dysregulation compared to a control group. The authors further found that emotion dysregulation mediated the relation between emotion reactivity and skin-picking.

4.4.4.2 Parental relationships.

In regard to the role of perceived quality of parental relationships, the current results demonstrated some support for the hypotheses. As predicted, the overall quality of parental relationships (as measured by perceived trust, communication, and alienation) was a significant predictor of both difficulties in emotion regulation, as well as perceived quality of relationships with peers. The results did not provide support for the impact of parental relationships on emotional reactivity. The results also did not demonstrate the hypothesized direct path from parental relationships to engagement in NSSI. This pattern of findings provides support for a mediational pathway, such that parental relationships might exert their influence on engagement in NSSI indirectly via difficulties with emotion dysregulation. The current results regarding the mediational role of emotion dysregulation are consistent with existing literature (e.g., Adrian et al., 2010; Sim et al., 2009) and indicate that individuals with emotion regulation difficulties are particularly at risk for NSSI in the context of invalidating family environments.

Contrary to hypotheses, the current study did not find support for a direct relation between family environments characterized by more alienation and less trust and communication, and NSSI. The available literature has also demonstrated mixed support for the direct influence of the family environment on NSSI. For example, Sim et al. (2009) and Gratz (2006) found support for a direct relationship, although the results of Adrian and colleagues

(2010) and Buckholdt et al. (2009) provide evidence more supportive of a full mediation model. Such results might be due to methodological differences in existing studies, as well as differences in the specific aspects of the family environment being measured. In other words, when emotion regulation difficulties are not measured in a study, and thus not statistically controlled for, there might appear to be a direct impact of negative parental relationships. Further, the pattern of findings in the available literature might also suggest that more traumatic events such as physical and emotional abuse and neglect might have more of a direct relationship to NSSI, and more general invalidating environments (e.g., attachment difficulties, poor emotion socialization) might be better understood within the mediational model.

In support of such a hypothesis, Sim and colleagues (2009) found that a composite measure of emotional neglect and abuse did demonstrate a direct relation with NSSI, which was also partially mediated by maladaptive emotion regulation. Similarly, Gratz (2006) found that childhood maltreatment (i.e., physical/sexual abuse, parental emotional neglect, and parental overprotection/psychological control) was an independent predictor of NSSI, as was the interaction of childhood maltreatment and emotional difficulties. In contrast, Buckholdt and colleagues (2009) found that negative emotion socialization by parents (i.e., neglect and punishment of emotions) was fully mediated by difficulties regulating emotions in the prediction of NSSI. Finally, in their structural equation model Adrian and colleagues (2010) found results quite similar to the current study. More specifically, emotion dysregulation mediated the relation between family relational problems (i.e., family cohesion/conflict, and punishing emotion socialization) and NSSI, although the direct path was only marginally significant ($p = 0.08$). Such a pattern suggests that perhaps the more salient negative events of abuse (physical, sexual,

emotional) and neglect have a direct impact, and more subtle aspects of the family environment such as attachment and emotional socialization exert their influence only indirectly.

Further, the current findings did not provide support for the hypothesis that quality of parental relationships would impact overall levels of emotional reactivity. It might be that relationship quality, as well as modeling and socialization of emotion, are more salient contributing factors to emotional dysregulation, and other characteristics from parents (i.e., heritable traits) contribute more to emotional reactivity. If emotional reactivity is conceptualized as an aspect of heritable temperament (e.g., Rettew & McKee, 2005), it might be more directly impacted by biological factors, although emotional dysregulation is impacted by both biological and environmental/relational factors. In other words, there might be a direct link between parents and emotion reactivity, but it is not captured by a measure of the interpersonal relationship, which is more directly related to the modeling and socialization of emotion and thus emotion regulation. Further, the relation between high levels of heritable emotional reactivity and later difficulties in emotion regulation might be particularly important when there is a poor goodness of fit between an individual's reactivity and the family environment (Shiner et al., 2012; Zeidner, Matthews, Roberts, & MacCann, 2003). More specifically, individuals with more difficult emotional temperament/greater emotional reactivity, in the context of a family environment that is unable to support it, might be more likely to experience negative social feedback from their parents, such as punishment of emotional expression. Such negative feedback might then both interrupt further learning of emotional regulation strategies and negatively impact the perceived quality of the relationship. As emotional reactivity in general, and its relationship to parental characteristics more specifically, is under-examined in the NSSI literature, more work is needed

to fully understand the interplay among emotional reactivity, emotional regulation, and the family environment.

Inspection of the indicators of the composite parental variable suggests that quality of maternal relationships may be a more reliable indicator (than paternal relationships) of the impact of parental relationship quality in the prediction of NSSI. Although very few studies examining NSSI have separately analyzed maternal and paternal relationships, research on emotion socialization might offer insight into such a finding. In particular, researchers have demonstrated that mothers tend to be more involved in the emotional lives of their children and adolescents, and that fathers tend to be more punitive in response to emotional displays (e.g., Eisenberg, Fabes, & Murphy, 1996; Garside & Klimes-Dougan, 2002; Klimes-Dougan et al., 2007). It appears to be the normative experience that much emotion socialization and modeling takes place within the context of the maternal relationship and that it might be more common to experience punitive or dismissing responses within the paternal relationship. Therefore such expected paternal reactions might not have as much of an impact on individuals' emotional development and later emotion regulation difficulties. In contrast, alienation and a lack of trust and communication within the maternal relationship is a greater violation of gender role differences in emotional development and, as such, the negative impact might be more salient. Gratz and colleagues (2002), however, reported findings contrary to those found in the current study, such that insecure paternal attachment, but not maternal, was a significant predictor of NSSI among female participants, but not male. Among males, physical separation from a parent, typically the father, was the strongest predictor, however. Of course, the aforementioned hypothesis is speculative and highlights the need for researchers to examine separately the contribution of maternal and paternal relationships in NSSI.

The current results did demonstrate support for the hypothesized direct path between the perceived quality of parental relationships and the perceived quality of peer relationships, and provides an extension of previous research. Specifically, some support for a direct link between parental and peer relationship quality has been demonstrated among psychiatrically hospitalized adolescent girls with a history of NSSI (Adrian et al., 2010). The current study demonstrates support for this relation among a university sample of primarily young adults. Although little research to date has directly investigated this association within the context of NSSI, the findings of the present study suggest that parental interpersonal difficulties contribute to negative peer relationships. Such an association may be developed through factors such as limited modeling of social competence or interference with the development of a healthy self-concept (e.g., Adrian et al., 2010). The influence might also be through parenting styles that contribute to negative attributional styles and identification with more "rebel" peer groups (Heaven et al., 2005) and perhaps experiences of rejection within the dominant peer group. Further then, in the context of the current model, and as discussed in greater detail below, such difficulties in peer interpersonal relationships might compound with parental relationships to increase the risk of NSSI through increased emotion dysregulation.

4.4.4.3 Peer relationships.

In regard to peer relationships, the current results demonstrated that perceived relationship quality predicted both greater emotional reactivity and difficulties in emotion regulation, although not NSSI. As with parental relationships, this pattern suggests that peer relationships contribute to NSSI indirectly via emotional factors. Although few studies have directly investigated the role of peer relationships in NSSI, the current results are consistent with existing preliminary findings. Adrian and colleagues (2010) found some support for a

mediational role via emotion regulation among a sample of psychiatrically hospitalized adolescent girls. More specifically, peer relational problems, as measured by overt victimization, relational victimization, and negative friendship interactions, contributed to emotion dysregulation (marginally significant) which, in turn, contributed to engagement in NSSI. Although the authors originally hypothesized there would also be a direct link between peer relational problems and NSSI, this pathway was not reported on in the final model and was presumably not significant, as with the findings in the current study. Other researchers have also demonstrated an association between peer factors and NSSI, including the impact of peer victimization (Heilbron & Prinstein, 2010), as well as self-injury functioning as a means of social reinforcement among peer victimized adolescents (Hilt & Cha et al., 2008). Similarly, Prinstein and colleagues (2010) demonstrated support for both socialization and peer selection effects regarding peer influence on NSSI. The authors found that, for female adolescents, participants' own engagement in NSSI at baseline was associated with their perception of these behaviours among their peers. In regard to socialization effects, perceptions of friends' NSSI thoughts and behaviours was also associated with increases in participants' own NSSI over time.

A limitation of the existing literature regarding peer effects is that it has focussed on inpatient and community samples of adolescents. Therefore the current study extends the literature by demonstrating that peer relationship quality is influential in the ongoing refinement of emotional regulation skills among a university sample of primarily young adults. For individuals experiencing interpersonal distress among their peer group or who do not perceive themselves as having peer interpersonal support, and who lack healthy emotional coping strategies, NSSI might then be used as a way of coping with this distress. Due to the cross-sectional nature of the current study, however, it is unclear whether interpersonal difficulties

precede engagement in NSSI, NSSI contributes to negative peer relationships, or a combination of both effects. Some preliminary evidence among adolescents suggests the counter-intuitive notion that engagement in NSSI might be associated with higher peer status, at least among particular subgroups of peers (Heilbron & Prinstein, 2010; Prinstein et al., 2010). Such a relation would be consistent with the preliminary findings of the current study that NSSI was positively related to identification with more deviant subcultures. Self-injury being associated with higher peer status would also be consistent with observations from others that NSSI might become normalized in some peer groups and might function as a way to gain a sense of belonging to the group (Walsh, 2006). As discussed by Adler and Adler (2005, 2007), an increased number of individuals in their qualitative investigations have described belonging to alternative or counterculture peer groups, with some reporting beginning to self-injure in response to distress in their interpersonal relationships. Taken together, existing literature and theoretical speculations, as well as the results of the current study, might indicate that individuals who self-injure might experience negative peer relationships or rejection from the dominant or more mainstream peer group, and might also gain more acceptance and support from subgroups in which NSSI is accepted and normalized. As the role of peer relationships in NSSI is a new and developing field of exploration, however, such a hypothesis has yet to be tested.

4.4.5 Model Modifications.

Examination of the indicators of emotion dysregulation suggested that limited access to emotional regulation strategies might be of particular importance in the prediction of NSSI. In contrast, lack of emotional awareness performed particularly poorly as a reliable indicator of regulation difficulties, which might suggest that this factor plays less of a role in NSSI behaviours. Therefore, the full model was modified by removing the lack of emotional

awareness subscale and re-tested. The results demonstrated that this modified model was a significant improvement over the original. Previous research has also found different levels of support for the domains of emotion dysregulation, as measured by the DERS. The findings of Gratz and Roemer (2008) highlight the importance of limited access to emotion regulation strategies, as this was the only subscale of the DERS that was found to predict, as well as partially mediate, the relation between childhood maltreatment and NSSI. Lack of emotional clarity was also demonstrated to predict NSSI, but the mediational relationship was not found. Likewise, Heath and colleagues (2008) also found limited access to strategies especially relevant to engagement in NSSI, followed by difficulties controlling impulsive behaviours and difficulties engaging in goal-directed behaviour when experiencing negative emotions. The latter study further found that lack of emotional awareness was not significantly different between participants with and without a NSSI history.

The particular relevance of limited emotion regulation strategies is consistent with the conceptualization of NSSI as a maladaptive coping strategy used to decrease intolerable emotions in the absence of more healthy strategies. Limited access to alternative coping strategies might assist in distinguishing between individuals with deregulated emotional experiences who self-injure and those who do not. This finding also has implications for treatment of NSSI, such that interventions targeted at strengthening an individual's coping strategy repertoire might be particularly effective, although additional research is also needed to explore the salience of this domain of emotion regulation. Preliminary results obtained through a re-validation of the DERS do support the importance of access to strategies, as this was the only subscale to remain significantly associated with NSSI after controlling for the other domains of emotion regulation, gender, and psychopathology (Perez, Venta, Garnaat & Sharp, 2012).

The results regarding emotional awareness in this research and the aforementioned studies reporting null results are surprising given the theoretical association between these factors (e.g., Gratz, 2007). Further, prior research has demonstrated an association between NSSI and alexithymia, specifically greater difficulty in identifying emotions (Borrill, Fox, Flynn & Roger, 2009). It might be that difficulty identifying emotions is more aligned with the lack of emotional clarity subscale of the DERS (versus emotional awareness), which did not perform as poorly as an indicator of emotion dysregulation in the current study. An alternative hypothesis for this finding across studies is that it is not the lack of emotional awareness per se that confers risk for NSSI, but that the individual is intolerant of the negative emotions of which he/she is aware, with the greater risk for self-injury lying in such non-acceptance of emotional experience. In contrast, Sim and colleagues (2009) did find a relationship between lack of emotional awareness and NSSI, indicating additional research is needed to clarify the role of this domain of emotion regulation. Future research could employ a more comprehensive assessment of emotional awareness, such as through utilization of the Level of Emotional Awareness Scale (LEAS; e.g., Ciarrochi, Caputi & Mayer, 2003), which assesses emotional awareness in both self and others.

As the results indicated that the original full model provided an adequate, although not strong fit, a final reduced model was also tested. In the reduced model, both emotional reactivity and emotional dysregulation were conceptualized to be indicators of an underlying factor reflecting emotional vulnerability as risk for NSSI. Such a conceptualization was drawn from Linehan's biosocial model (Crowell, Beauchaine, & Linehan, 2009; Linehan, 1993). In her model, emotional difficulties/dysregulation are described under a broad construct which includes: 1) heightened emotional sensitivity; 2) inability to regulate intense emotional

responses; and 3) a slow return to baseline (Crowell et al., 2009). Applying this aspect of the biosocial model to the variables examined in the current study, emotion dysregulation, as measured by the DERS, maps on to Linehan's second factor. Further, emotional sensitivity/intensity and persistence, assessed by the ERS, are reflective of Linehan's first and third factors, respectively. The results indicated that overall the reduced model was an improvement compared to the original full model in the prediction of NSSI. Furthermore, the reduced model demonstrated the same pattern of relationships among emotional vulnerability and the interpersonal factors. Specifically, in the reduced model parental and peer relationships significantly predicted greater emotional difficulties that, in turn, predicted engagement in NSSI. The direct paths from parent and peer relationships to NSSI were not significant, again indicating support for the mediational impact of interpersonal relationships via emotional difficulties. Finally, the results demonstrated that the DERS performed as a more reliable indicator of the underlying emotional vulnerability construct.

The results of the reduced model suggest that it might be the combined influence of both high emotional reactivity and emotion dysregulation, rather than their influence when considered more in isolation, that confers the greatest risk for NSSI. Indeed, as discussed by Gratz (2007), although emotional reactivity is a risk factor for difficulties in emotion regulation, the relation between these factors is not direct, and most research indicates that emotional reactivity on its own is not associated with more pathological outcomes. Furthermore, preliminary research also suggests that emotional reactivity is not a direct risk for NSSI, but rather increases risk when considered in combination with other factors such as emotional inexpressivity and experiences of maltreatment during childhood (Gratz, 2006). Such a hypothesis is consistent with the aforementioned discussion that individuals who experience greater emotional reactivity, within

the context of invalidating interpersonal relationships that interfere with the continued fine-tuning of emotion regulation skills, are at greatest risk for turning to NSSI as a coping strategy. In addition, these results suggest that emotional reactivity may be a necessary but not sufficient risk factor for NSSI, and that emotion dysregulation, particularly the lack of healthy strategies to deal with such reactivity, is the more salient, specific risk factor. This hypothesis is also supported by the current findings in that composite emotion regulation factors emerged as a more reliable indicator of the latent emotional vulnerability factor than did the emotional reactivity measure. The overall findings of the current study are clear in indicating that NSSI is a multiply determined behaviour that involves dynamic and complex interactions among factors. Although factors such as emotional reactivity or negative interpersonal relationships might not, in and of themselves, directly contribute to NSSI, the greater risk appears to lie in the reciprocal associations among the examined variables and the contribution of such factors to increased emotional dysregulation.

4.4.6 Conclusions.

The results of the current study provide an important contribution to the NSSI research base. The results demonstrate both a replication and extension of a number of findings in the current literature, and provide additional information regarding important etiological and/or maintenance factors that contribute to NSSI. Further, the current study provides a more comprehensive examination of both intrapersonal and interpersonal factors, using statistical model tests that are relatively recent and novel within the NSSI literature.

The current study provides additional support for the important role of emotion regulation as a function of self-injury. Specifically, individuals with greater difficulties regulating their emotional experiences were found to be more likely to engage in NSSI. Support was also

demonstrated for the particular relevance of a limited access to emotion regulation strategies subcomponent of emotion regulation. Such a pattern is consistent with the notion that NSSI is used as a maladaptive coping strategy in the face of intolerable emotions and when the individual does not have access to healthy coping skills.

This study also advances the literature by examining the role of emotional reactivity within the broader model. As hypothesized, greater emotional activity was associated with greater difficulties in emotion regulation. Consistent with preliminary evidence that emotional reactivity is not, in itself, associated with more pathological outcomes, the association between reactivity and the interpersonal variables was weaker or non-significant compared to emotion regulation. Further, the results of a modified model suggested that the combination of both emotional risk factors might be particularly relevant in the understanding of NSSI behaviours.

In regard to interpersonal factors, the current results suggest that negative parental and peer relationships might not directly impact engagement in NSSI. Rather, the influence of interpersonal relationships appears to be indirect, acting on NSSI via the impact of relationships on emotion regulation. Such a pattern replicates findings regarding the mediational role of relationships in the existing literature, which to date has largely focussed on experience of abuse, neglect, or victimization. The aforementioned patterns among the emotional and relational variables have been previously demonstrated in a sample of adolescent girls (Adrian et al., 2010). The current study represents the first to include measures of emotional reactivity, emotion regulation, and general measures of parent and peer relationships in regard to NSSI among a sample of primarily young adults. Thus, the results extend existing literature by demonstrating that such variables remain important considerations following adolescence. As the onset of NSSI is most commonly reported to be during adolescence, such results appear to suggest that

emotional and interpersonal factors contribute both to the initiation of NSSI, as well as its maintenance into adulthood.

Finally, the current study significantly contributes to the literature by providing the first examination of how current and past identification with various subcultural groups might be associated with engagement in NSSI. Although response rate concerns precluded any fine-tuned examination of the subcultural variables, the results do provide preliminary evidence and point to the need for further investigation. More specifically, the results suggest that identification with more deviant groups, or those departing from the mainstream peer group, might represent a risk factor for NSSI. Such a hypothesis is consistent with a preliminary empirical study and anecdotal evidence. The nature of the potential association between NSSI and subculture is likely to be complex and involve many additional factors which go beyond those assessed in the current study.

Chapter 5. Study 3 Results and Discussion

5.1 Purpose and Hypotheses

The results of Study 2 demonstrated support for a number of the hypotheses, including support for the original proposed model, as well as a reduced model examining an underlying emotional vulnerability construct and a model in which lack of emotional awareness might not be as salient as other components of emotion dysregulation. This support was demonstrated among a sample of university students with a NSSI prevalence rate of 35.5%; participants who endorsed a history of NSSI reported generally mild to moderate self-injury, with approximately half of participants reporting between one and nine previous episodes and a substantial proportion of participants engaging in one or two forms of NSSI. Therefore, the overall purpose of Study 3 was to provide a replication of these results among a different sample of participants. To achieve this objective, a sample was sought in which all participants had a current or previous history of NSSI. Additionally, in order to attempt to obtain a sample composed of individuals with a more severe history of self-injury, a population that is rather unique to NSSI research was chosen - members of online self-injury support forums.

The hypotheses for the current study were informed by the results from Study 2, and it was anticipated that the same pattern of results would be demonstrated among online self-injury forum members. It was hypothesized that the original model would provide an overall adequate to good fit to the data and that the direct and mediational paths would be consistent with those obtained from the university sample. Specifically, in addition to the overall model fit it was hypothesized that:

- A. Greater emotional reactivity would predict greater difficulties regulating emotions, which in turn would be associated with engagement in NSSI.

- B. The direct effect of emotion regulation would be a significant predictor of NSSI status; emotion regulation would also be a significant mediator with the interpersonal variables.
- C. There would be a mediational relation regarding parental relationships and emotional variables. In other words, that parental relationship quality would be significantly related to emotion dysregulation, thereby indirectly contributing to NSSI.
- D. Likewise, it was hypothesized that the direct path from parental relationship quality to NSSI would be non-significant.
- E. Poor parental relationships would contribute to poor peer relationship quality.
- F. The results would also demonstrate a mediational relation regarding peer relationships and emotional variables, such that peer relationship quality would be significantly related to emotional dysregulation and, in turn, NSSI.
- G. Consistent with parental relationship quality, it was hypothesized that the direct path between peer relationship quality and NSSI would be non-significant.

Although the results of Study 2 were able to offer only preliminary evidence regarding subcultural identification due to response rate concerns, the subcultural variables were retained for the current study and it was anticipated that there would be a higher response rate to these items, due to the more diverse sample available through online forum recruitment. It was again hypothesized that identification with deviant subcultures (i.e., Goth or Emo) would be a stronger predictor of NSSI than identification with other groups which might be considered more mainstream (e.g., Academics, Preppy).

5.2 Method

5.2.1 Participants.

One hundred and eighty-five participants were recruited from online mental health and self-injury forums to complete an online packet of self-report questionnaires⁶. Participants did not receive any reimbursement for their participation. Responses to the questionnaires were initially screened for extensive missing data on the variables of interest, which resulted in seven participants being removed from subsequent analyses; therefore, the final sample consisted of 178 participants.

The final sample consisted of 159 females (89.3%) and 16 males (three participants had missing data) and ranged in age from 18 to 56 years, with a mean of 21.6 years ($SD = 5.99$). Participants were predominantly Caucasian ($n = 164$; 92.1%), with 3.9% self-identified as biracial/multiracial and 3.9% identified with other ethnic backgrounds. The majority of the sample was single/never married ($n = 155$; 87.1%), with 6.2% identified as living with someone as if married, 3.9% married, and 2.8% separated or divorced.

5.2.2 Measures.

Participants completed the same packet of questionnaires that was used in Study 2 (detailed in Chapter 2, Measures); as the questionnaires have been discussed in detail previously, they will only be briefly re-introduced here. Participants first completed a questionnaire gathering basic demographic information such as age, gender, ethnicity, and alcohol and drug use. Participants also provided information regarding their primary paternal and maternal figures, family structure (e.g., biological parents still married or divorced, years lived with primary paternal/maternal figure), and any known history of parental psychopathology. Participants also

⁶ Specific forums are not named due to ethical considerations and maintaining the anonymity of participants

responded to questions regarding their own experiences with mental health concerns and treatment utilization.

5.2.2.1 Emotional variables.

Participants' levels of emotion regulation and dysregulation was assessed using the Difficulties in Emotional Regulation Scale (DERS; Gratz & Roemer, 2004), a reliable and valid 36-item self-report measure which assesses six domains of emotion regulation (e.g., nonacceptance of emotions, limited access to emotion-regulation strategies), as well as providing an overall assessment of regulation difficulties. In the current study, the DERS total score and subscales demonstrated good scale-score reliability: total score Cronbach's $\alpha = .94$, 95% CI [.93, .95], limited access to emotion-regulation strategies $\alpha = .89$, 95% CI [.86, .91], non-acceptance of emotional responses $\alpha = .91$, 95% CI [.88, .93], impulse-control difficulties $\alpha = .89$, 95% CI [.87, .92], difficulties engaging in goal-directed behaviour when emotionally aroused $\alpha = .89$, 95% CI [.86, .91], lack of emotional awareness $\alpha = .84$, 95% CI [.81, .88], and lack of emotional clarity $\alpha = .89$, 95% CI [.86, .91] (Ponterotto & Ruckdeschel, 2007).

Levels of emotional reactivity were assessed using the Emotion Reactivity Scale (ERS; Nock, Wedig, Holmberg, & Hooley, 2008), a 21-item self-report measure designed to provide an overall estimate of emotional reactivity, as well as three domains of sensitivity, arousal/intensity, and persistence of emotional experiences. As discussed previously, although these three domains of reactivity were predicted a priori, the original validation study and Study 1 found support for a one-factor structure and subsequent researchers have reported on the full scale score until additional research into the factor structure can be conducted (e.g., Bresin et al., 2010; Dour et al., 2011; Jenkins & Schmitz, 2012). Therefore, the full scale score was also used for analysis in the present study. The ERS total score demonstrated good scale-score reliability ($\alpha = .94$, 95%

CI [.93, .95]), as did the theoretically-predicted subscales: sensitivity $\alpha = .89$, 95% CI [.87, .92], arousal/intensity $\alpha = .87$, 95% CI [.84, .90], persistence $\alpha = .82$, 95% CI [.78, .86].

5.2.2.2 Parental and peer relationships.

Participants' perceived quality of relationships with both their primary paternal/maternal figures and peers was assessed using the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987), a reliable and valid self-report measure. The IPPA consists of three sections (mother, father, peer) with 25 questions per section. Although the IPPA can also provide subscales assessing the domains of trust, communication, and alienation in relationships, the authors have suggested using only the total scores until additional research into the factor structure of the measure can be completed; therefore this approach was taken in the present study. The sections demonstrated good reliability estimates: mother $\alpha = .84$, 95% CI [.80, .87], father $\alpha = .83$, 95% CI [.79, .86], and peer $\alpha = .86$, 95% CI [.83, .89].

Participants were also asked to rate how much they currently identify with various subcultural groups, as well as how much they identified with these groups during adolescence. The approach in the current study modeled that of an unpublished dissertation (Moran, 2009), which presented a list of various groups and asked participants to rate (from 0 = not at all to 100 = very much) their level of identification with all of the groups. The subcultural groups included, among others: Athletes, Emo, Goth, Academic, Misfit, Religious, and Gamer. The current study adapted the Moran (2009) approach by assessing identification at the two time points, as well as including the Emo subculture.

5.2.2.3 Non-suicidal self-injury.

The Deliberate Self-Harm Inventory (DSHI; Gratz, 2001) was used to assess participants' experiences with NSSI. The DSHI is a reliable and valid 17-item, behaviourally-based self-report

measure that assesses 16 different forms of NSSI, as well as querying "other" self-injurious behaviours. In addition to assessing the frequency of NSSI, the DSHI also provides information regarding onset, duration, length of time since last self-injurious episode, and severity of self-injury (i.e., whether hospitalization or medical treatment was required). In the current study, scale-score reliability of the DSHI was acceptable, with $\alpha = .74$, 95% CI [.67, .79].

5.2.3 Procedure.

Participants were recruited through six online mental health discussion and support forums. All forums were initially screened for level of activity among members (e.g., number of members, number of active discussions or "threads"), as well as level of moderation of posts and activity by senior members. When permitted by the websites, the study ad was placed directly into self-injury discussion boards ($n = 2$). Two websites had dedicated research sections where the study was advertised and the remaining two websites requested that the study ad be placed into a general chat section. In order to obtain permission to place the study ad on the website, individual moderators who were indicated to be responsible for self-injury or research sections of the website were contacted. Moderators were informed of the purpose of the research, provided a link to the study website and, a copy of the REB ethics approval, if requested. After permission to post to the website, a thread containing the following was created:

Researchers in the Department of Psychology from the University of Saskatchewan are looking for volunteers to participate in a research study on relationships, emotional functioning, and coping strategies (i.e., non-suicidal self-injury). We are looking for individuals over 18 years of age with a personal history of self-injury to participate.

You will be asked to complete a confidential and anonymous online survey that will take approximately 30 minutes. This research will contribute to improving our understanding

of factors related to self-injury. If you are currently having difficulty not harming yourself in some way or are distressed by this topic, it is advised that you do not participate in the study.

The results of the study will also be available to those who are interested - if you would like a summary of the results please post on this thread or send a personal message. Also, please feel free to post or send a personal message if you have any questions or concerns about the study. All participation is greatly appreciated.

Participants were then provided with a link to the online survey containing both a consent and debriefing form (Appendix A) and the questionnaire packet (Appendix B). No negative effects of participation were reported to the researchers. Following data collection and analysis, participants, as well as individuals who did not participate but indicated an interest in the research, were sent a summary of the results via personal message. A summary of the results was also posted to the website to provide information to the larger forum community, which was approved by moderators before posting.

5.3 Results

5.3.1 Data analysis plan.

As the purpose of Study 3 was to examine the intrapersonal and interpersonal model of NSSI among a participant sample specifically selected for their history of NSSI engagement, data analysis followed the same procedure as Study 2. Specifically, structural equation modeling (SEM) was used in order to provide a comprehensive test of the model, as well as a simultaneous test of the direct and indirect relations among the study variables. The SEM analyses were again conducted using EQS 6.2 for Windows. As with Study 2, although subculture was intended to be included in the overall model, concerns with missing data resulted in the omission of subculture from the model, and instead preliminary correlations were conducted to examine the relation with NSSI. Finally, due to the severity of NSSI among the online sample (described below) preliminary analyses were also conducted to compare this sample to the university sample collected for Study 2 on variables such as demographic, parental, personal mental health, and substance use.

5.3.2 Data cleaning, assumptions, and transformations.

Prior to analysis, the data were screened for miscoded variables, outliers, and significant skewness and kurtosis. Most of the independent variables did not demonstrate a significant degree of skewness or kurtosis and therefore data transformation was not required on these variables. However, the NSSI variable was both significantly positively skewed and kurtotic and a number of extreme outliers were identified with very high frequencies of self-injury. Rather than deleting these cases, and also attempting to minimize the influence of these scores, these variables were re-coded into a high frequency category. Specifically, three categories were created: "over 1000 or too many to count," "over 2000 or too many to count," and "over 5000 or

too many to count." The "over 5000" category was most successful in reducing skewness and kurtosis, although a logarithmic transformation was also required to reduce non-normality to acceptable levels. In addition, a square root transformation was necessary to correct the normality violation for the NSSI onset and duration variables. A square root and reflect transformation was also necessary for the peer subscale of the IPPA. No extreme univariate (using Z-score of +/- 3.2) or multivariate (using Mahalanobis distance) outliers were detected.

In terms of assumptions specific to SEM analyses, in the test of the full model the determinant of the variance-covariance matrix was not close to zero, indicating that multicollinearity was not a concern. The average off-diagonal absolute standardized residual was .086, and although not excessively large suggested a possible problem with model fit. Likewise, in the histogram of the standardized residuals only 67.6% of the residuals were symmetrical and centered around zero, indicating a possible specification or third variable problem. In the test of the reduced model, the determinant again was not close to zero and the average off-diagonal absolute residual was small (.066). In the reduced model, 77.7% of the standardized residuals were centered around zero, again suggesting that a variable or path was not modeled well. Both models were likely to be over-identified, with 70 and 22 degrees of freedom available to test the full and reduced models, respectively. One parameter for each latent variable was fixed as a marker variable to reduce identification problems. The model was re-run with different fixed parameters in order to provide an accurate estimate of each path (i.e., estimates provided in the model are those of the paths which were allowed to freely vary, not the fixed parameters).

Importantly, using the rule of thumb of 10:1 for participants to parameters (Hoe, 2008), the size of the online sample is considered small for the testing of the models (although it is closer to this guideline for the reduced model) and therefore reduced power might have

influenced the results. The sample size is acceptable, however, based on a guideline that samples be at least five times the number of parameters (Lei & Wu, 2007). Of note, Adrian and colleagues (2011) conducted a similar SEM analysis of family and peer relational problems, as well as emotion dysregulation, in the predication of NSSI among adolescent girls. Their model was comparable in terms of parameter estimates to the full model in the current study and the authors reported support for their model using a sample size of only 99 participants. As such, when a model is a good fit to the data smaller sample sizes might be acceptable. As noted previously (Chapter 3), such "rules of thumb" regarding sample size are arbitrary and not universally agreed on. In the current study, the smaller sample size might have resulted in insufficient power to detect some differences.

5.3.3 Descriptive statistics.

As stated previously, the final sample consisted of 159 females (89.3%) and 16 males (9%) who ranged in age from 18 to 56 years, with a mean of 21.6 years ($SD = 5.99$). Participants were predominantly Caucasian ($n = 164$; 92.1%) and single/never married ($n = 155$; 87.1%). Descriptive statistics for the interpersonal and emotional measures are presented in Table 15. Inter-correlations among the study variables are presented in Table 16.

Regarding parental demographic variables, 58.4% of participants ($n = 104$) reported that their parents were still married, 9% indicated that their parents had never been married, 29.8% reported coming from divorced or separated families, and 2.8% experienced the death of a parent. One hundred and seventy participants (95.5%) identified their biological mother as their primary maternal figure and 92.1% indicated that their primary maternal figure was still alive. Participants had lived with their primary maternal figure for an average of 18.23 years ($SD = 3.83$), with a range of zero to thirty-six years. In terms of mental health, 51.1% of participants

indicated that, to the best of their knowledge, their primary maternal figure had a history of one or more mental health concerns; 33.7% indicated no such history and 15.2% reported that they were unsure. A more specific description of the mental health concerns reported is provided in Table 17.

Table 15. Means and Standard Deviations (Online)

Variable	Mean	SD	Minimum	Maximum
ERS total	49.68	14.45	4.00	83.00
DERS total	120.32	23.60	53.00	179.00
DERS strategies	27.62	7.06	9.00	40.00
DERS acceptance	20.27	6.36	6.00	30.00
DERS impulse	18.44	5.61	7.00	30.00
DERS goals	18.78	4.35	8.00	25.00
DERS awareness	19.36	5.19	6.00	30.00
DERS clarity	16.02	4.54	5.00	25.00
Mother total	73.68	14.45	33.00	104.00
Father total	69.42	14.11	37.00	102.00
Peer total	85.22	14.12	40.00	110.00

Note. SD = Standard deviation

Table 16. Inter-correlations Among Study Variables (Online)

	1	2	3	4	5	6	7
1. DERS total	-						
2. ERS total	.54*	-					
3. IPPA Mother total	-.21 ^a	.03	-				
4. IPPA Father total	-.22 ^a	-.05	.33*	-			
5. IPPA Peer total	-.05	-.03	.09	-.14	-		
6. NSSI forms	.34*	.17 ^b	-.08	-.17 ^b	.05	-	
7. NSSI frequency	.20 ^a	.08	-.12	-.13	.07	.46*	-

^a Variables significant at $p < .01$ before Bonferroni correction

^b Variables significant at $p < .05$ before Bonferroni correction

* $p < .001$

The majority of participants also identified their biological father as their primary paternal figure ($n = 157$; 88.2%) and 93.3% reported that their primary paternal figure was still living. Participants had lived with their primary paternal figure for an average of 15.8 years ($SD = 6.06$), with a range of zero to 28 years. Sixty-one participants (34.3%) indicated that their primary paternal figure had a history of mental health concerns, 42.7% indicated no such history, and 22.5% were unsure. The specific mental health concerns experienced by paternal figures are also presented in Table 17.

Table 17. *Mental Health Concerns of Parental Figures (Online)*

	Maternal Figure		Paternal Figure	
	n	%	n	%
Depression	72	40.4	41	23.3
Bipolar disorder	17	9.5	4	2.3
Excessive worry or anxiety	48	27.1	18	10.2
Panic attacks	16	9.0	6	3.4
Alcohol abuse	14	7.9	24	13.5
Other substance abuse	8	4.4	13	7.3
Eating disorder	2	1.1	0	0
Suicidal thoughts	34	19.1	14	7.9
Psychotic disorder	4	2.3	3	1.8
Other	4	2.3	3	1.8

Note. Percentages represent the entire sample

In addition to parental demographic variables, participants were asked to respond to questions regarding their personal experiences with substance use, mental health and treatment history, and NSSI history. One hundred and fourteen participants (64%) reported current alcohol use, with approximately one third (33.3%) reported alcohol use less than once a month and an additional third (34.2%) reporting that they drank once or twice a month. Twenty-five participants (20.8%) reported weekly alcohol use, 10.8% indicated drinking two to three times per week and only one participant (0.8%) reported daily alcohol use. Participants reported

consuming an average of 4.45 standard drinks (SD = 3.97) per sitting with a range of one to 29 drinks. As this variable was positively skewed due to the influence of a few participants reporting high levels of alcohol consumption per sitting, these extreme variables were re-coded into a "10 drinks or more" category for subsequent group analyses. In terms of illicit drug use, 21.3% of participants ($n = 38$) reported current use with approximately half of these individuals (48.7%) indicating that they used drugs less than once a month. Ten participants (25.6%) reported using weekly or once/twice a month. Ten additional participants reported more frequent use (25.7%), ranging from two to three times per week to daily drug use.

Regarding participants' own mental health experiences, nearly all (97.2%) endorsed experiencing one or more mental health concerns (specific experiences are listed in Table 18). Participants reported a mean of 3.65 (SD = 1.38) mental health concerns, with a range of one to seven. Approximately three-quarters of the sample (76.4%) reported a history of any form of mental health treatment. More specifically, 60.1% reported medication use, 71.9% reported seeing a counselor or psychologist, 24.8% had engaged in group counseling, 28.2% had been hospitalized for a mental health concern, and one participant (0.6%) reported engaging in an alternative form of treatment.

Table 18. *Personal Mental Health Concerns (Online)*

	Personal History	
	n	%
Depression	129	72.5
Bipolar disorder	35	19.7
Excessive worry or anxiety	129	72.5
Panic attacks	101	56.8
Alcohol abuse	21	11.8
Other substance abuse	19	10.7
Eating disorder	20	11.2
Suicidal thoughts	142	79.8
Psychotic disorder	28	15.8
Other ^a	28	15.8

Note. Percentages represent the entire sample

^aIncludes 15 participants (8.4%) who reported Borderline Personality Disorder

Table 19. *Forms of NSSI (Online)*

	NSSI History	
	<u>n</u>	<u>%</u>
Skin-cutting	174	97.8
Burning skin with cigarette	49	27.5
Burning skin with lighter/match	96	53.9
Carving words into skin	115	64.6
Carving pictures into skin	78	43.8
Severe skin-scratching	153	86.0
Severe skin-biting	60	33.7
Rubbing sandpaper on skin	25	14.0
Dripping acid on skin	9	5.1
Used bleach/cleaner on skin	18	10.1
Stuck needles in skin	119	66.9
Rubbed glass on skin	40	22.5
Intentionally broken bones	13	7.3
Head-banging	73	41.0
Punching oneself	91	51.1
Preventing wounds from healing	131	73.6
Other ^a	61	34.3

^aIncludes friction burns, burning skin with heated metal, self-strangling, punching walls, whipping self, breaking windows to cut hands, swallowing razors, implanting objects in skin, and severe hair-pulling

As participants for the current study were specifically recruited for their history of NSSI, 100% reported engaging in self-injury using one or more method. Participants reported engaging in NSSI at a wide range of frequencies, ranging from a minimum of twelve episodes to a maximum of over five thousand episodes. Only 17.4% of the sample reported engaging in fewer than 100 NSSI episodes, and 8.9% reported over 5000 previous episodes. The mean number of NSSI episodes was reported to be approximately 940 (SD = 1419) although this number is distorted due to re-coding the highest frequencies into an "over 5000" category (i.e., this mean underestimates the true mean). Participants further reported a history of engaging in an average of 7.39 forms of self-injury, with the majority (51.3%) engaging in between six and ten different forms. Additionally, the average age of onset for NSSI was reported as 11.64 years (SD = 3.62) with an average duration of NSSI of 8.29 years (SD = 4.82). The prevalence rates for specific forms of NSSI are provided in Table 19. Some of the most common methods of self-injury

included: skin-cutting, severe skin-scratching, preventing wounds from healing, sticking needles into skin, and carving words into skin.

5.3.4 Subculture and NSSI.

As with Study 2, there was variability in the response rates to the subcultural identification items, both for current and adolescent identification, and some of the items were responded to by few participants. For example, although 160 and 152 participants responded to the questions assessing their Academic and Misfit subcultural identification during adolescence, respectively, only 98 responded to the item regarding Goth identification. Therefore, given concerns regarding the generalizability of the results, subcultural identification was again removed from the final model and instead preliminary correlations were conducted to examine the relation between subculture and NSSI (complete correlation tables can be found in Appendix D).

Regarding adolescent subcultural identification, correlational analyses revealed very few significant associations with NSSI. There were no significant relations between any of the various subcultural groups and the frequency of self-injury. There were, however, some significant associations found when the subcultural groups were correlated with the number of forms or methods of self-injury that participants had engaged in. More specifically, identification during adolescence with some deviant groups such as Misfit ($r = .17, p = .039$), Non-Conformist ($r = .25, p = .006$), Hippie ($r = .28, p = .006$), Rebel ($r = .25, p = .006$) and Hipster ($r = .32, p = .007$) groups was positively correlated with number of NSSI methods. No significant relations were found for the hypothesized subcultural groups (i.e., Goth and Emo), for either NSSI frequency or forms.

The same pattern of findings was observed for current subcultural identification, with few significant relations being demonstrated. Current identification with the Misfit group was the only subculture with a significant relation to NSSI frequency ($r = .17, p = .028$). Identification with the Misfit ($r = .15, p = .048$), Non-Conformist ($r = .24, p = .006$), Hippie ($r = .24, p = .012$), and Rebel ($r = .18, p = .043$) groups was positively correlated with the number of methods of self-injury. Again, no significant relations were found for the hypothesized Goth and Emo subcultural groups.

5.3.5 Intrapersonal and interpersonal model of NSSI.

5.3.5.1 Model fit.

The overall chi-square test of the model was significant $\chi^2(70, N = 148) = 197.29, p < .001^7$, and the chi-square/df ratio was 2.82. Following the recommendation by Hu and Bentler (1999), an additional residual-based fit index and a comparative fit index were also examined. The Comparative Fit Index (CFI) values range from zero to one, with values over .95 indicating a good model fit. The standardized Root Mean Square Residual Index (sRMR) also ranges from zero to one; however smaller (i.e., less than .06) values indicate a good model fit (Hu & Bentler, 1999; Tabachnick & Fidell, 2007). In the current study the CFI value was .793 and the sRMR value was .109, indicating that the model was a poor fit for the data. Of note, onset and duration of self-injury were added as NSSI indicators in the model due to the uniqueness of NSSI experiences reported among the sample. In addition, due to the small number of male participants, analyses were re-run with the inclusion of only female participants. The analysis with only female participants demonstrated the same pattern of results as those found with the

⁷ Cases with missing data were deleted from analysis (i.e., missing listwise procedure was used). Analyses were replicated using missing data estimation procedures, resulting in the same pattern of results as is reported here.

full sample (i.e., fit indices, path estimates, significance of path estimates); therefore, in order to maximize sample size, results based on the full sample are reported.

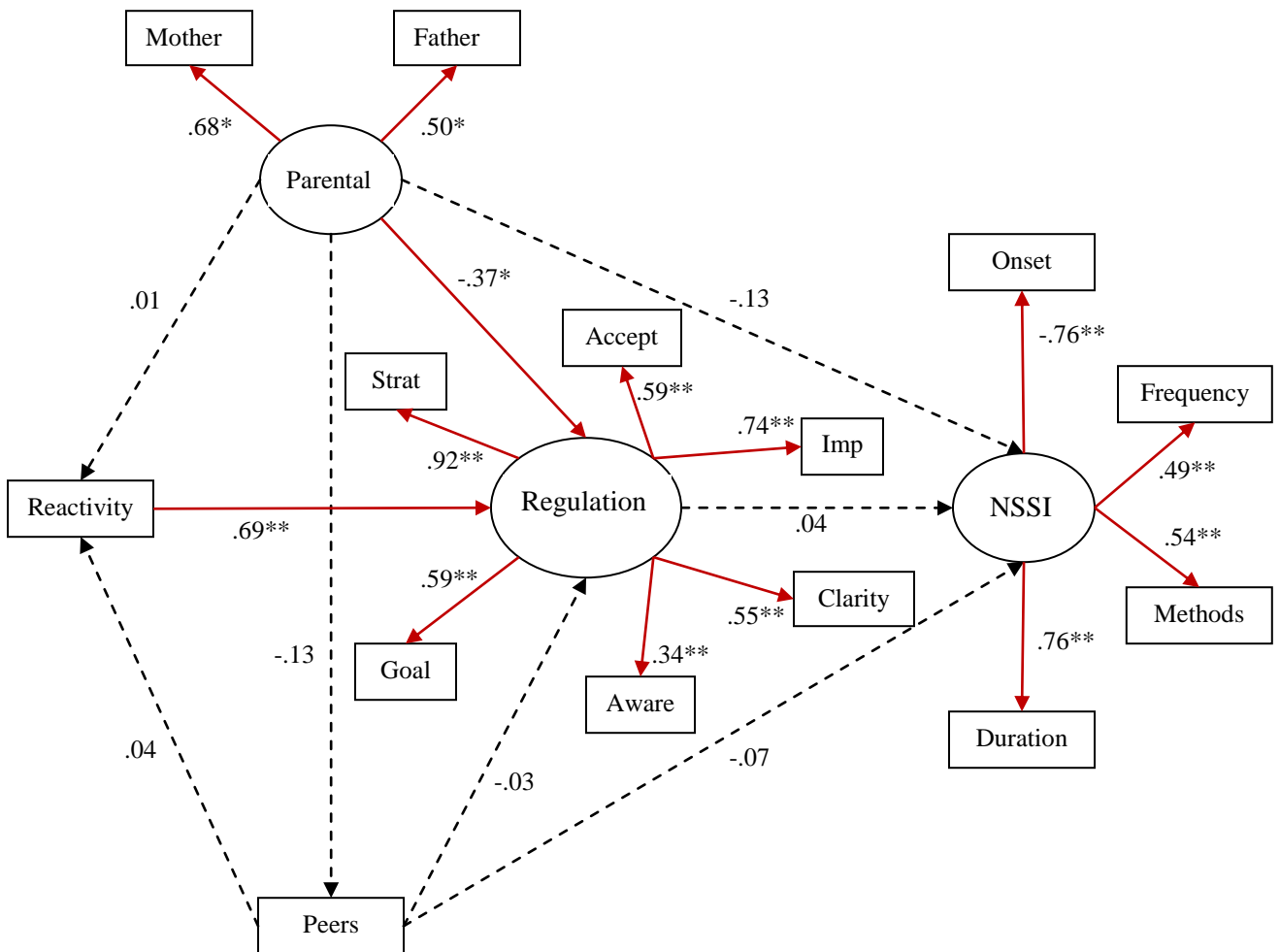
5.3.5.2 Relation among intra- and interpersonal factors in NSSI.

The parameter path estimates examining the relation among the study variables are shown in Figure 3. As shown, the results did not demonstrate support for many of the hypothesized relations among the variables. More specifically, the results indicated that neither parental or peer relations predicted greater emotional reactivity, and peer relationships also did not predict greater difficulties with emotional dysregulation. Poor parental relationships, however, did predict greater difficulties in emotional dysregulation (unstandardized coefficient = .25, standardized coefficient = $-.37$, $p < .05$), consistent with the results found in Study 2. Further, and as hypothesized from the Experiential Avoidance Model, greater emotional reactivity predicted greater difficulties in emotional dysregulation (unstandardized coefficient = .25, standardized coefficient = $.69$, $p < .001$). However, the hypothesis that greater emotional dysregulation would then, in turn, predict engagement in NSSI was not supported. As the path between emotional dysregulation and NSSI was not significant, the results therefore also did not support a mediation model whereby poor parental and/or peer relationships influence NSSI engagement via emotional difficulties. Finally, the direct paths from parental and peer relationships were also non-significant.

Estimates for the reliability of the measured variables as indicators of the latent factors are presented in Table 20. As shown, onset and duration of self-injury emerged as more reliable predictors of the NSSI latent factor than did the frequency of self-injury or the number of methods employed. Consistent with Study 2, maternal relationship quality was also a more reliable indicator of the parental latent factor than paternal relationship quality. Also consistent

with Study 2, the lack of emotional awareness subscale of the DERS performed particularly poorly as a reliable indicator of overall emotional regulation, and the limited access to emotion regulation strategies was the strongest predictor. The remaining subscales performed variably, with reliability estimates ranging from .30 to .55. Of note, only the limited access to emotion regulation strategies subscale of the DERS performed above the .70 cut-off suggested for a reliable indicator.

Figure 4. SEM Model of Intrapersonal and Interpersonal Predictors of NSSI (Online)



Note. Strat = limited access to emotion regulation strategies; Accept = Non-acceptance of emotional responses; Imp = impulse control difficulties; Clarity = lack of emotional clarity; Aware = lack of emotional awareness; Goal = difficulties engaging in goal-directed behavior

* $p < .01$; ** $p < .001$

Table 20. *R-Squared Values for Latent Variable Indicators (Online)*

	Strat	Accept	Imp	Clarity	Aware	Goal	Mother	Father	Freq	Meth	Onset	Dur
R ²	.86	.35	.55	.30	.11	.35	.47	.25	.24	.29	.57	.58

Note. Strat = limited access to emotion regulation strategies; Accept = Non-acceptance of emotional responses; Imp = impulse control difficulties; Clarity = lack of emotional clarity; Aware = lack of emotional awareness; Goal = difficulties engaging in goal-directed behavior; Freq = NSSI frequency; Meth = NSSI methods; Dur = NSSI duration

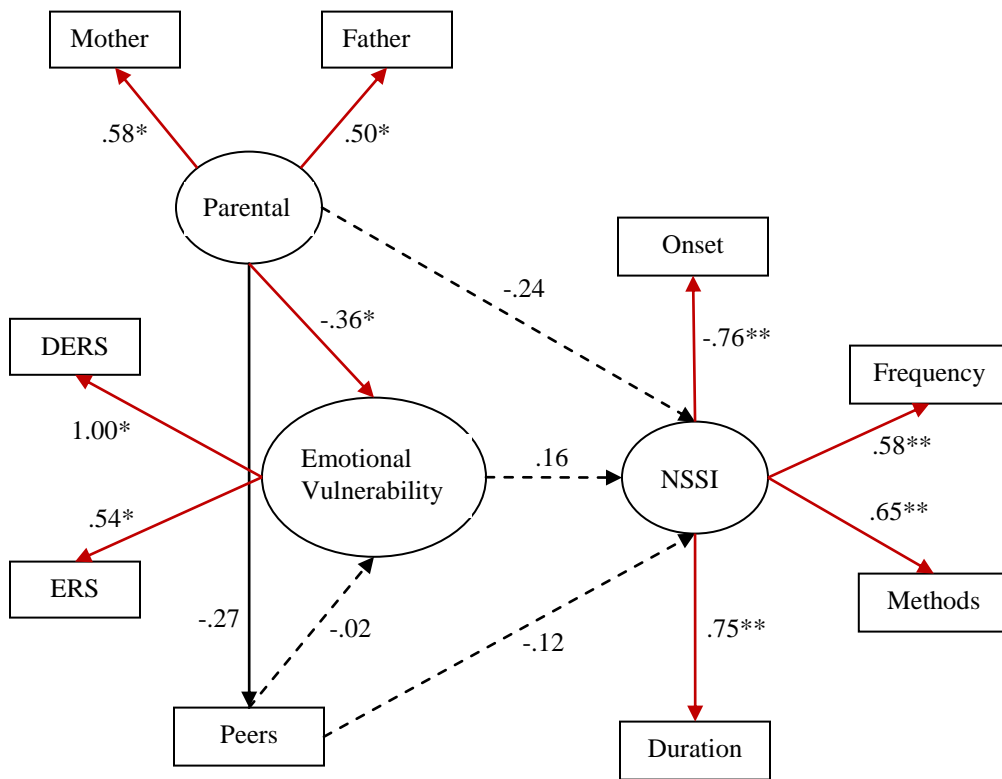
As the results demonstrated that the overall model was a poor fit for the data and few of the hypothesized relations among the variables were supported, post-hoc analyses were conducted to examine model modifications that might improve the model. No modifications were made based on the results of the Wald Test as this test simply suggested the removal of the non-significant paths that were theoretically hypothesized to show a relation (e.g., the removal of paths from the ERS to latent family factor, removal of the path from the DERS to NSSI). The Lagrange Multiplier Test was also conducted to examine potential parameter additions to the model. In this case, the test suggested the addition of a direct path from NSSI methods to the DERS latent factor, as well as direct paths from a number of the DERS subscales to the parental factor. However, there is no theoretical rationale for specific indicators of NSSI to be more greatly influenced by emotional dysregulation, nor for specific domains of emotional dysregulation being predicted by parental relationship quality. The predicted CFI value after the addition of the proposed parameters was also not greatly improved and continued to indicate the model was a poor fit for the data; thus no additional parameters were added to the model.

5.3.5.3 Reduced model of NSSI.

The results of Study 2 suggested that a reduced model of NSSI, in which emotional reactivity and regulation are conceptualized as representing an underlying emotional vulnerability factor, provided an improved fit to the data. Therefore, this reduced model was also tested among the online sample of participants to examine whether a different conceptualization

of the relation among emotional factors would improve the model (Figure 4). Regarding model fit of this re-conceptualization, the overall chi-square was significant $\chi^2(22, N = 164) = 38.29, p = .017$, and the chi-square/df ratio was 1.74. The CFI for the reduced model was .84 and the sRMR was .08, indicating that the reduced model among the online participant sample was also a poor fit to the data.

Figure 5. *Reduced Intrapersonal and Interpersonal Model of NSSI (Online)*



* $p < .05$; ** $p < .01$

Inspecting the parameter estimates for the relations among the variables, the pattern was consistent with the results found in the full model with the online sample of participants. Although lower quality of parental relationships predicted increased emotional difficulties, as conceptualized as the underlying emotional vulnerability factor (unstandardized coefficient = .98, standardized coefficient = $-.36$, $p < .05$), none of the remaining hypothesized relations were significant. Specifically, the quality of parental relationships was not predictive of the quality of peer relationships, and peer relationships did not contribute to underlying emotional difficulties. The direct paths from both parental and peer relations to engaging in NSSI were also not significant. Finally, the results also did not provide support for the mediational model because although parental relationships was predictive of emotional difficulties, emotional difficulties was not, in turn, predictive of NSSI engagement.

5.3.6 Preliminary post-hoc group comparisons.

As the previous results demonstrated, although the full model was adequate and the reduced model was a good fit within the sample comprised of university students, both models demonstrated a poor fit within the online sample. Further, individuals in the online sample demonstrated an overall more severe pattern of self-injurious behaviours, as demonstrated by the extreme frequency of the behaviour, as well as the high number of different forms of NSSI endorsed by participants, including behaviours that are seldom endorsed in the literature (e.g., intentionally breaking bones, rubbing acid on skin, swallowing razors, etc.). As such, the results might suggest that the model tested in the current study does not adequately capture the factors involved in the development or maintenance of NSSI among individuals with a severe history of these behaviours. In other words, individuals engaged in such severe self-injurious behaviours might differ from those who engage in more mild or moderate self-injury. In order to provide a

preliminary exploration of this hypothesis, post-hoc comparisons were conducted to compare individuals in the online sample ($n = 178$) with individuals from the university sample ($n = 141$) who endorsed a history of NSSI (i.e., representing a more mild/moderate group). Chi-square analyses were conducted to examine categorical variables, whereas t-tests were conducted for continuous variables, which were also supplemented by the non-parametric Mann-Whitney-U test. As discussed in Study 2, the U-test was also computed as it might provide a more robust significance test in the case of assumption violations (Wiedermann & Alexandrowicz, 2007), and many of the dependent variables in the current study violated the normality assumption (i.e., significant skew and/or kurtosis), with some additionally violating the assumption of heterogeneity of variance. Therefore, both were computed, and in cases where the results differed the outcome of the U-test is reported.

There was a significant difference regarding gender between the two groups ($\chi^2(1, N = 316) = 15.26, p < .001, \phi = .22^8$), such that there was a greater number of female participants within the online sample. There were no significant differences found regarding participant age (using the U-test) or marital status. Fewer individuals in the online sample reported current alcohol use ($\chi^2(1, N = 317) = 18.36, p < .001, \phi = .24$), and among those who did endorse drinking alcohol, a greater proportion of those in the online sample reported drinking less than once a month ($\chi^2(5, N = 243) = 17.69, p = .003, \phi = .27$). There were no significant differences regarding the amount of alcohol consumed per sitting, current drug use, or frequency of current drug use.

In terms of parental variables, a greater proportion of participants in the online sample reported coming from families with divorced or separated parents ($\chi^2(3, N = 318) = 12.79, p =$

⁸ Using the following cut-offs: d .2 - small effect size, .5 medium, and .8 large. For ϕ .1 - small, .3 - medium, .5 large; Cohen, 1992.

.005, $\phi = .20$). A greater number of individuals in the online sample also reported that their primary maternal figure was no longer living ($\chi^2(1, N = 319) = 8.99, p = .002, \phi = .17$). Further, participants in the online sample were more likely to endorse a history of mental health concerns for both their primary maternal ($\chi^2(2, N = 319) = 17.17, p < .001, \phi = .23$) and paternal figures ($\chi^2(2, N = 318) = 15.43, p < .001, \phi = .22$). No significant differences were found in terms of years residing with either the primary maternal or paternal figure.

A greater number of individuals in the online sample also endorsed a history of their own mental health concerns ($\chi^2(1, N = 317) = 64.57, p < .001, \phi = .45$), and reported experiencing a greater number of mental health concerns, $t(268.03) = -11.61, p < .001, d = 1.33$. Specifically, individuals in the online group reported experiencing an average of 3.63 mental health concerns (SD = 1.4) and individuals from the university group with a history of NSSI reported an average of 1.55 mental health concerns (SD = 1.69). More individuals in the online sample reported struggling with Borderline Personality Disorder ($\chi^2(1, N = 317) = 12.29, p < .001, \phi = .20$), Bipolar Disorder ($\chi^2(1, N = 316) = 25.32, p < .001, \phi = .28$), psychotic disorders, ($\chi^2(1, N = 317) = 8.06, p = .005, \phi = .16$), and suicidal ideation ($\chi^2(1, N = 317) = 99.10, p < .001, \phi = .56$). These individuals were also more likely to have sought one or more forms of treatment for a mental health concern ($\chi^2(1, N = 318) = 60.71, p < .001, \phi = .45$).

Significant differences were also found between the online group and individuals in the university group who endorsed NSSI regarding the interpersonal, emotional, and NSSI measures. Individuals in the online group reported higher total scores on both the ERS ($t(307.97) = -9.52, p < .001, d = 1.07$) and DERS ($t(315) = -12.84, p < .001, d = 1.46$), indicating greater difficulties with emotional reactivity and regulation. Likewise, individuals in the online group reported lower scores on all subscales of the IPPA: mother, $t(316) = 7.72, p < .001, d = .87$; father, $t(313) =$

7.21, $p < .001$, $d = .82$; peer, $t(308.90) = 3.25$, $p = .001$, $d = .37$. These results indicate that individuals in the online group reported an overall lower quality of relationship in all three of these interpersonal domains. In addition to the extreme frequency of NSSI among the individuals in the online sample, these individuals also reported a younger age of onset ($M = 11.64$, $SD = 3.63$) than the university group ($M = 12.85$, $SD = 3.72$), $t(315) = 2.92$, $p = .004$, $d = .33$. The individuals in the online group also reported a longer duration of NSSI ($M = 8.29$; $SD = 4.82$) than the university group ($M = 4.07$, $SD = 4.25$), $t(316) = -8.16$, $p < .001$, $d = .84$. Finally a significant difference was also found regarding the number of methods of NSSI engaged in by the groups, with the online group reporting an average of 7.39 methods ($SD = 3.11$) and the university group reporting an average of 2.90 ($SD = 2.33$), $t(316.05) = -14.75$, $p < .001$, $d = 1.6$.

5.4 Discussion

5.4.1 Overview.

The primary purpose of this study was to provide a replication and extension of the results found in Study 2. More specifically, the current study sought to examine the fit of the previously examined intra- and inter-personal model of NSSI within a different sample of individuals. To achieve this aim, adult participants were recruited from various online self-injury communities and completed the same questionnaires utilized in the previous study. Recruiting individuals from online forums, all of whom had engaged in NSSI, allowed for a test of the hypothesized model among a sample of individuals with a more severe NSSI history than is seen in the current literature. An additional purpose of the current study was to provide a further examination of the potential risk factor of subcultural identification.

The following sections outline the notable findings of the current study, beginning with a discussion of the demographic and descriptive information obtained. Participants' experiences with NSSI are then discussed and contrasted with NSSI experiences that are typically reported in the current literature. As with Study 2, response rate limitations precluded the addition of subcultural factors into the final model; therefore preliminary correlational results are discussed. An examination of the original full model, as well as the previously tested reduced model, is presented and alternative hypotheses are offered regarding the divergent results.

5.4.2 Demographic and descriptive information.

The final sample comprised primarily females (89.3%) who predominantly self-identified as Caucasian (92.1%). Participants ranged in age from 18 to 56 years, with a mean age of 21.6 years. The gender distribution is generally consistent with existing community and college/university adult studies, such that most NSSI research either focuses exclusively on

females or reports on samples of which the significant majority are female. Although there have been few quantitative investigations conducted with online NSSI samples to date, the gender distribution of the current study does appear consistent with existing research. For example, Johnson and colleagues' (2010) online sample consisted of 83.6% female participants; the authors further reported an age range of 16 to 60 years, similar to that found in the current study. Franzen and Gottzen (2011) also reported that their online sample consisted primarily of females, although a specific percentage was not provided.

In regard to other demographic factors of interest, a high proportion of participants indicated that their primary maternal (51.1%) and paternal (34.3%) figures had a history of mental illness. This pattern is consistent with existing research indicating that individuals with a history of NSSI also report higher rates of mental health concerns among their family members (e.g., e.g., Cumming et al., 2006; Fliege et al., 2009). In regard to specific concerns, depression, excessive worry or anxiety, and suicidal thoughts were reported as the most common concerns among primary maternal figures. Depression, alcohol abuse, and excessive anxiety were reported as the most common concerns among primary paternal figures. A substantial proportion (7.9%) also reported a history of suicidal thoughts among their primary paternal figures.

In regard to personal mental health history, a very high proportion of participants (97.2%), endorsed one or more current or past mental health concerns. The most commonly endorsed difficulties included suicidal thoughts, followed by depression, excessive worry or anxiety, and panic attacks. A high proportion of individuals also reported previous mental health treatment involvement, with three-quarters of the sample indicating a history of one or more forms of treatment. Most reported a history of seeing a counsellor or psychologist, followed by

medication use. Notably, approximately a third of participants also reported being previously hospitalized for a mental health concern.

Preliminary inspection of the inter-correlations among the study variables indicated that there were few significant associations among the variables. As expected, paternal and maternal relationship quality, emotion reactivity and regulation, and NSSI frequency and forms demonstrated moderate to strong correlations with each other. However, the only additional significant correlation found was between emotion regulation total scores and number of NSSI forms engaged in. This preliminary test did not suggest strong support for the hypotheses of the current study, which is explored in greater detail through examination of the model fit in a subsequent section.

In regard to NSSI, as participants were recruited specifically for their personal experience with self-injury, all reported a history of such behaviours. Participants reported a wide range of NSSI frequencies, from a minimum of twelve episodes to a maximum of over five thousand. Of note, most of the sample reported a history of quite severe self-injury, with less than a fifth of the sample reporting fewer than 100 past episodes and nearly 10% reporting over 5000 episodes. Although it is unlikely that participants could accurately report on the true number of NSSI episodes at such a high frequency, such a finding indicates that the present sample, on the whole, reported a rate of self-injurious behaviours that has not yet been seen in the current literature. Further, the average duration of NSSI engagement found in the current study was 8.29 years. Although not frequently reported on, this duration appears longer than that found in existing research (e.g., 3 years reported by Buckholdt et al., 2009) and is approximately double the duration of NSSI found in Study 2 of this project. The average age of onset for NSSI in the current study was reported as 11.64 years, which appears consistent with literature that reports an

average age of NSSI onset during early to middle adolescence (Favazza & Conterio, 1989; Nock, 2010).

The additional information collected regarding NSSI experiences also sets the current sample apart from the extant literature. Specifically, in the current study participants reported engaging in an average of approximately seven different forms of NSSI, with the majority engaging in between six to ten. These frequencies are higher than previously reported in existing studies, which have found that the majority of individuals report between two and five forms (Armev et al., 2011; Buckholdt et al., 2009; Glen et al., 2011). Nearly all participants in the current study reported a history of skin-cutting, with over half of the sample additionally endorsing a history of: severe skin-scratching, preventing wounds from healing, sticking needles in the skin, carving words into skin, burning skin, and punching oneself. More severe self-injurious behaviours such as rubbing sandpaper on skin, using bleach/acid on skin, and intentionally breaking bones, behaviours that are rarely reported on in the current literature, were endorsed by a notable minority of individuals in the current study. Furthermore, approximately a third of individuals reported on additional forms of NSSI, including: friction burns, burning skin with heated metal, self-strangling, punching walls, whipping self, breaking windows to cut hands, swallowing razors, implanting objects in skin, and severe hair-pulling. To my knowledge, such a range and severity of NSSI forms has not been previously documented in the literature.

5.4.3 Subcultural factors.

As with Study 2, the subcultural variables were excluded from the final model due to response-rate limitations. As previously discussed, a number of factors might have contributed to the variable response rates. For example, social desirability influences might have impacted participants' responses regarding more deviant subcultures such as Goth. However, such

influences might also be expected to impact responses to mental health and NSSI variables, and both were reported at very high rates in the current study. As with Study 2, participants might have equated leaving an item blank with a response of "0 or not at all". However, the instructions did include a prompt to provide an answer to all items, rather than leave the item blank if the individual did not identify with a group. As the current approach did not provide definitions for the various subcultures (consistent with Moran, 2009), participants might not have provided responses when they were unsure of what was meant by a specific group label. Although it is unclear which specific influence, or combination of such, contributed to the low response rates for some items, this concern further calls for the development of more methodologically rigorous methods for examining levels of identification with various subcultures.

In light of the response limitations, therefore, only a preliminary test of the potential role of subculture was completed. In contrast to hypotheses, and the results found in Study 2, very few significant correlations were found. In regard to identification during adolescence, none of the subcultural groups demonstrated a significant association with NSSI frequency. Adolescent identification with the Misfit, Non-Conformist, Hippie, Rebel, and Hipster groups did demonstrate small to moderate associations with the number of methods of NSSI used. Of note, there were no significant associations among the Goth and Emo groups with either NSSI methods or frequency. A similar pattern of findings was demonstrated for current subcultural identification. There were no significant associations found for the Goth and Emo groups of interest, and only identification with the Misfit group was related to NSSI frequency. Again, identification with the Misfit, Non-Conformist, Hippie, and Rebel groups demonstrated small associations with NSSI methods. Although the current results did not provide support for the specific hypothesis that greater identification with the Goth and Emo groups would be associated

with NSSI engagement, the results do provide some additional support that identification with more deviant or less mainstream subcultures might serve as a risk factor for NSSI. Of course, this finding does need to be interpreted both in light of the response rate concerns and the overall small associations that were found.

5.4.4 Model examination.

The results indicated that the overall model was a poor fit for the data and did not provide an adequate representation for the prediction of lifetime NSSI engagement. In regards to the direct and indirect relations among the intrapersonal and interpersonal variables examined, the current results did not provide support for many of the hypotheses. As hypothesized, the results did demonstrate that more negative parental relationships were predictive of greater difficulties in emotion regulation. Likewise, greater levels of emotion reactivity were also associated with greater emotion dysregulation. Inconsistent with the hypotheses and existing literature, no other significant associations among the variables were found. In other words, neither negative interpersonal relationships nor difficulties in emotion regulation, either directly or indirectly, was predictive of NSSI.

As with Study 2, the current results demonstrated that lack of access to emotion regulation strategies appeared as the most reliable indicator of emotion regulation difficulties. Likewise, lack of emotional awareness performed the most poorly as a reliable indication of emotion regulation, as measured by the DERS. This result is consistent with previous research suggesting that lack of access to emotion regulation strategies might be a particularly salient factor within the context of self-injury (e.g., Gratz & Roemer, 2008; Heath et al., 2008). Informed by the results of Study 2, a reduced model in which both emotion reactivity and emotion regulation are conceptualized as indicators of an underlying emotional vulnerability

factor was also tested in the current study. The results demonstrated that this model was also a poor fit for the prediction of NSSI among the current sample. In this reduced model, only negative parental relationships was predictive of greater difficulties in underlying emotional vulnerability. The overall null findings of the current study are surprising given the support for the tested variables in the existing literature, as well as support for both the original and reduced models found in Study 2. Therefore, the subsequent sections focus on exploring a number of hypotheses that might assist in informing the results.

5.4.5 Preliminary group comparisons.

As mentioned in the preceding discussion, the current sample of online forum participants stands out as unique in regard to their experiences with NSSI when contrasted with the more mild/moderate NSSI experiences reported in the extant literature. Post-hoc comparisons were completed to examine if the current sample differed from individuals who participated in Study 2 who also had a history of NSSI. Of note, although all participants completed an identical online questionnaire packet, they were recruited from different sources. Therefore, the group comparisons presented here are considered preliminary and, rather than providing concrete conclusions regarding group differences, are used to inform hypotheses for future research. The results of the group comparisons did suggest that individuals from the online forum communities differed from individuals in the university sample with a history of NSSI in a number of important ways. Although there were no differences regarding drug use, fewer individuals in the online sample reported current alcohol use, compared to the university sample. Individuals in the online sample who did endorse alcohol use also reported less frequent drinking, again compared to those who endorsed drinking in the university sample. In regards to parental factors, individuals from the online sample were more likely to report coming from families with

divorced or separated parents, and reported more mental health concerns among both their primary maternal and primary paternal figures. Individuals in the online group were also more likely to have personal histories with mental health concerns, reported a greater number of concerns, and a greater proportion had previously sought treatment. In regard to specific experiences, more individuals from the online group reported struggling with Borderline Personality Disorder, Bipolar Disorder, psychotic disorders, and suicidal ideation. In regard to the emotional and interpersonal variables assessed, the results also demonstrated a number of group differences. Specifically, individuals in the online group reported greater difficulties with both emotional reactivity and emotion regulation, and reported more negative relationships with their primary paternal and maternal figures as well as with their peers.

Overall, the preliminary group comparisons suggest that in addition to experiencing a more severe history of NSSI overall, individuals recruited from the online forum communities also presented with more severe backgrounds in other domains. Taken together with the null findings of the model examination in the current study, such findings might suggest that the hypothesized intra- and inter-personal model is no longer adequate in the prediction of NSSI among such a severe group. In other words, the model tested in the current study might fail to capture the factors most relevant for the development and maintenance of severe NSSI.

5.4.6 Alternative hypotheses.

One alternative hypothesis to account for the current null findings regarding emotion regulation might be that the functions of self-injury change over time, particularly when self-injury is engaged in for many years at a high frequency, as was demonstrated in the current sample. In other words, earlier on in the behaviour self-injury might be utilized more to serve emotion regulation functions, but over time an individual might develop a sort of dependence on

self-injury that goes beyond this function alone. By way of example, consider an individual who initially begins drinking alcohol for the purpose of easing anxiety in social situations. Alcohol initially serves an immediate, although unhealthy and short-term, solution for coping with such anxiety. However the individual does not develop healthy and adaptive strategies for coping in social situations, which might lead to increased alcohol use. Over time the individual's alcohol use might increase, and tolerance might develop to the anxiety-relieving effects of the alcohol. As a result, consumption increases and dependence on alcohol might follow. A similar process might be involved in severe NSSI, such that individuals develop an increased tolerance for, and dependence on, self-injury over time. Such a hypothesis would be consistent with the findings of the current study that individuals from the online sample had engaged in NSSI for a significantly longer period of time than those in the university sample (i.e., allowing more time for an addictive process or dependence to develop). This hypothesis would also be consistent with the use of significantly more methods of NSSI, such that individuals might develop increased tolerance to certain methods that leads to utilizing many different forms of self-injury to achieve the same result. An increased tolerance for NSSI might also be reflected in the overall very high frequency rates reported by the current sample.

To date few studies have directly investigated an addiction hypothesis of NSSI. In an examination of the addiction model among inpatient and partially hospitalized adolescents, Victor, Glenn, and Klonsky (2012) investigated the role of cravings in relation to NSSI. Specifically, the authors modified a questionnaire assessing cravings for substance use to reflect cravings for NSSI; both versions of the questionnaire were completed by participants with a history of NSSI, substance use, or both. The authors found that overall craving scores for NSSI were significantly lower than those for substances, and that NSSI was specifically craved during

times of negative emotions, whereas substances were craved more broadly. Victor and colleagues interpreted this pattern of findings to better reflect an emotion regulation function of self-injury, rather than an addictive model. In other words, it was argued that in an addictive model cravings for NSSI would be more consistent across mood states.

In contrast, Nixon and colleagues (2002) took a more comprehensive approach to the assessment of various potential addictive features of NSSI. The authors found that both urges to self-injure and actual acts of self-injury were associated with a number of addictive properties, again among a sample of inpatient and partially hospitalized adolescents. More specifically, the authors queried for addictive features of self-injury by adapting DSM-IV symptoms for substance dependence. Nixon and colleagues reported that nearly all (97.6%) participants endorsed at least three symptoms of dependence in relation to their NSSI, and 81% identified with five or more items. Of note, a diagnosis of substance dependence would require that an individual experience three or more dependence symptoms over the preceding 12 months (APA, 2000). By extension, participants in the Nixon and colleagues study reported features of NSSI that appear quite consistent with an addictions model. Furthermore, the authors reported that individuals who endorsed more severe self-injurious behaviours (i.e., head-banging or bone-breaking) also endorsed more addictive features, consistent with the current hypothesis that addictive features of NSSI might increase with severity of the behaviour. Although the overall frequency of NSSI acts was not reported, the majority of participants endorsed urges to self-injure almost daily (78.6%) with 88.9% of females and 50% of males reporting episodes of NSSI from at least once a week to daily. Nixon and colleagues (2002) queried specifically about thoughts/acts of NSSI over the previous six months; therefore it is unclear whether this level of

severity would persist over a longer period of time, or is more associated with acute mental health distress (i.e., the circumstances which resulted in participants' hospitalization).

Although these studies appear to offer mixed findings regarding the potential role of an addictive process in NSSI, methodological and sample differences might have contributed to such a pattern. For example, no participants in the Victor and colleagues study (2012) endorsed the more severe behaviours of head-banging and bone-breaking and generally reported lower frequencies of all NSSI behaviours. As such, participants in this study might be considered a more mild/moderate self-injury group versus those in the Nixon and colleagues (2002) study, who also demonstrated more support for an addictive role. Furthermore, the latter study provided a more comprehensive assessment of addictive processes, including the role of tolerance, injury despite resulting negative consequences, associated interpersonal problems, and recurrence of tension when stopping NSSI (i.e., similar to withdrawal symptoms). Thus, support for an addictions model was demonstrated in a stronger test of such a model that is more analogous to substance dependence symptoms. Indeed, although cravings are often associated with substance dependence, cravings are not a diagnostic criterion (APA, 2000) and might play a less of a central role in conceptualizing NSSI as a behavioural addiction. The preceding discussion does indicate that research is sorely needed to examine the role of addiction/dependence among adults with a long-standing history of severe NSSI.

A similar hypothesis related to the notion that individuals with more severe and long-standing NSSI might utilize such behaviours for functions well beyond affect regulation might be informed by a functional model of self-injury (e.g., Nock & Prinstein, 2004, 2005; Nock, 2008). Although there is strong support in the existing literature that the majority of individuals engage in NSSI for affect regulation purposes (e.g., Klonsky, 2007), a substantial number of

individuals also utilize self-injury for additional reasons, such as social functions. It might be that individuals with more severe NSSI experiences utilize self-injury for a greater number of functions, perhaps with no particular function predominating. As with the preceding addiction discussion, individuals might initially use NSSI to regulate emotions and over time the behaviour might generalize to serve multiple functions, depending on an individual's needs at a particular point in time or situation.

A functional model proposes four broad functions of NSSI that can serve automatic (i.e., personal) or social purposes and are associated with negative or positive reinforcement contingencies (Nock & Prinstein, 2004). To elaborate, automatic-negative reinforcement functions would be consistent with an affect regulation model and the use of NSSI to relieve intrapersonal tension or reduce other negative emotions. In contrast, automatic-positive reinforcement focuses on the use of NSSI to generate feelings (e.g., to feel relaxed) rather than remove/lessen feelings. Social-negative reinforcement purposes reflect the use of NSSI to escape from or avoid interpersonal demands (e.g., avoiding punishment from others). Finally, in social-positive reinforcement NSSI is used to gain attention or help from others. Previous research among adolescent inpatients has demonstrated these four broad functions of NSSI to be moderately to strongly correlated with one another (Nock & Prinstein, 2005); research has also demonstrated that individuals might utilize these functions to varying degrees. Again in a sample of adolescent inpatients, Nock and Prinstein (2004) found that approximately half of their sample utilized NSSI to end negative feelings (i.e., emotion regulation/automatic-negative reinforcement). Although approximately a third utilized NSSI for automatic-positive reinforcement purposes, fewer participants reported engaging in NSSI for positive or negative social purposes. These findings were again demonstrated among a sample that appears more

consistent with mild/moderate NSSI history (e.g., approximately half had engaged in fewer than 19 NSSI acts over the previous 12 months, with none reporting severe self-injurious acts such as head-banging or breaking bones).

Although speculative, it might be that as severity of NSSI increases, so too does the rate of utilizing NSSI for purposes beyond affect regulation/automatic-negative reinforcement, and perhaps particularly for social purposes. Such a hypothesis that social functions increase in salience, and perhaps eclipse an emotion regulation function, might be especially true among the current sample of online forum members. For example, although individuals might initially join an online community to seek support and to better understand their NSSI, some online communities might also serve to reinforce and foster continued engagement in NSSI (e.g., Adler & Adler, 2008). Thus, although online support can assist some individuals in decreasing or ceasing self-injury, for others continued NSSI might also serve the purpose of maintaining membership in communities that are viewed as supportive and provide a sense of identity (Adler & Adler, 2008; Franzen & Gottzen, 2011).

Finally, no significant associations were found in the current study regarding the impact of peer relationship quality on either the emotional variables or NSSI. It might be that the approach used in the current study to examine peer relationship quality fails to capture the unique interpersonal experiences of individuals who are actively involved with online support forums. For example, although the IPPA assesses the domains of trust, communication, and alienation in relationships, a measure additionally assessing factors such as validation and support of NSSI experiences might better capture relationships online. Furthermore, it is unclear whether participants would have responded to the peer items in relation to their online peer group, the "real life" or physical world peer group, or a combination of both. As discussed by

Adler and Adler (2008) there is evidence that relationships function differently online versus in the physical world for individuals who self-injure. Adler and Adler's observations have been drawn from an extensive qualitative data set involving participant observation of online groups, over 80 in-depth interviews, and over 10,000 postings to online groups and bulletin boards. Throughout their work, the authors observed individuals who engaged in self-injury beginning to turn to the internet in the late 1990s and early 2000s. They noted that such individuals "felt confused and alone, unable to find counterparts in the solid world" (pg. 37). Thus, the internet offered a new avenue for both information about self-injury and for interpersonal support. Adler and Adler (2008) described individuals who self-injure as "loners" who are now able to utilize the internet as a means of forming a supportive subculture. Indeed, many people in the online communities Adler and Adler (2008) examined described how it was often easier to develop relationships online, that these relationships intensified faster than physical world relationships, and that being able to speak honestly about NSSI encouraged trust, understanding, and intimacy in these online relationships. Finally, most conversation within online communities focused on self-injury, with only some discussion of other, everyday events.

As the nature of online versus physical world relationships differs, then it might also be hypothesized that these relationships might not influence emotional factors or NSSI in the same way. To illustrate, consider the IPPA questionnaire used to assess quality of peer relationships in the current study: an assessment of trust, communication, and alienation within peer relationships. The IPPA instructs individuals to respond based on their closest friendships, and the friendship group might involve a much broader community for individuals involved in online forums. Participants in the current study might be indeed quite isolated or alienated from their physical world close friends, or might lack close physical friendships altogether. At the same

time, as Adler and Adler (2008) have found, they might also have a number of online friendships characterized by a sense of trust and communication. In regard to these online peers, participants might feel accepted and perceive that their online community is a place to be open and honest, but mostly in terms of NSSI experiences rather than other everyday stressors. Following from the preceding discussion, it might be the positive nature of online relationships that contributes directly to NSSI (e.g., reinforcement of NSSI, sense of group belonging) rather than the hypothesized influence of negative relationships.

Taken together, the nature of the peer group for individuals involved in online communities appears quite complex. It might be that negative physical world friendships contribute to the originally hypothesized pattern, such that peer relationships contribute indirectly to NSSI via emotion regulation. In contrast, positive online friendships could be hypothesized to influence NSSI in different ways. For example, maintaining a sense of belonging and reinforcement from the group might contribute directly to increased NSSI engagement. At the same time, discussions with members about each others' NSSI and coping might serve indirectly to reduce NSSI, via learning additional emotion regulation strategies. Such complexity in the differing direct and indirect influences from both online and physical world peers would obscure a clear picture of the nature of peer relationships in the current study. As researchers are only recently beginning to examine the nature of online experiences for individuals who self-injure, clearly much more work is needed to understand how these cyber subcultures might influence NSSI, both in negative and positive ways. As more people turn to the internet for information and support, the nature of the peer group might need to be re-conceptualized to reflect both those in the physical world and the intense relationships forged among individuals who might never meet in person.

Chapter 6. General Discussion for Studies 1, 2, and 3

6.1 Summary

The current studies examined the role of intrapersonal and interpersonal factors in non-suicidal self-injury. First, although a considerable amount of research attention has focused on emotion regulation in the context of NSSI, fewer studies have examined the influence of emotional reactivity. Increased emotional reactivity might contribute to increased difficulties regulating emotions in response to aversive experience, and might, in turn, increase the likelihood of engaging in the experiential avoidance behaviour of NSSI (e.g., Chapman et al., 2006). The Emotion Reactivity Scale (ERS; Nock et al., 2008) is a self-report measure designed to assess an individual's subjective experience of emotion reactivity and was originally validated on a sample of adolescents and young adults, including a subset with a history of engaging in NSSI. Although the original validation work suggested that the ERS was a reliable and valid measure of emotion reactivity, examination of the underlying factor structure was inconsistent with theoretical hypotheses. More specifically, although Nock and colleagues hypothesized a three-factor solution reflecting sensitivity, arousal/intensity, and persistence of emotional experience, the results suggested that the ERS might best be considered a unidimensional measure.

Study 1 was undertaken to examine the underlying factor structure of the ERS among a larger sample of primarily young adults. This approach allowed for an assessment of the most appropriate use of the ERS in the subsequent studies examining the role of emotional reactivity within a more comprehensive model of NSSI. The results of Study 1 provided additional support for the reliability and validity of the ERS. In regard to factor structure, the results of Study 1 paralleled that of the original validation work (Nock et al., 2008) as well as a recent

psychometric evaluation of a Dutch translation of the ERS (Claes et al., 2013) and supported the use of the ERS as a unidimensional measure. Therefore, subsequent studies of this project utilized the total score of the measure rather than examining the three theoretically hypothesized subscales.

The focus of Study 2 was to replicate and extend existing research through the examination of a model of emotional and interpersonal factors in relation to NSSI. The obtained results were largely consistent with hypotheses and illustrate the importance of both personal and social factors in the development and/or maintenance of self-injurious behaviours. More specifically, the results found support for the Experiential Avoidance Model (EAM; Chapman et al., 2006) of self-injury such that higher emotional reactivity was predictive of greater difficulties in emotion regulation that, in turn, conferred risk for engaging in self-injury. Although the results did not provide support for a direct relationship between NSSI and negative parental and peer relationships, support for a mediational relationship was found. In other words, negative parental and peer relationships were both found to relate to greater difficulties in emotion regulation. Thus, these results suggest that interpersonal relationships exert their influence on NSSI indirectly through their impact on maladaptive emotion regulation.

Although the results indicated that the original model was an adequate fit for the data it did not demonstrate a strong fit; therefore, model modifications were explored. First, the results suggested that lack of emotional awareness performed as a particularly poor indicator of difficulties in emotion regulation, a finding that has also been demonstrated in some previous research (Sim et al., 2009). A modified model was therefore tested in which this subscale was removed from analysis. Second, drawing from the conceptualization of emotional difficulties in the biosocial model (Linehan, 1993) a reduced model was tested that combined the influence of

both difficulties in emotion reactivity and regulation into an underlying indicator of emotional vulnerability. Both modified models were significantly improved in the prediction of NSSI.

Furthermore, the results of Study 2 offered an examination of the potential influence of subcultural identification on engagement in NSSI that expands on existing preliminary work in this area (Young et al., 2006). Although response rate concerns prevented the inclusion of subcultural variables into the final model, correlation analyses did provide support for the hypothesis that identification with more deviant subcultures might serve as a risk factor for engagement in NSSI. More specifically, it was shown that both adolescent and current identification with Goth and Emo groups demonstrated small to moderate associations with history of NSSI. It was demonstrated that identification with Misfit, Non-Conformist, and Rebel groups was also associated with a history of engaging in self-injury. Also consistent with hypotheses, the results found that identification with more mainstream groups (e.g., Popular, Academic) was not associated with NSSI.

As the results of Study 2 demonstrated support for the hypothesized model among a sample of university students, Study 3 was conducted to examine the generalizability of the model within a different sample. Contrary to the results of Study 2 and the reported support for the examined variables in the existing literature, results demonstrated that the model was a poor fit among a sample of individuals with a history of NSSI recruited from online self-injury forums. Although initially surprising, an examination of the participants in the online sample begins to provide some preliminary hypotheses regarding the divergent results. In particular, the members of the online communities reported a level of severity of NSSI that stands out as unique when compared to the reported experiences of individuals in the extant literature. The severe nature of participants' NSSI histories was reflected in an alarmingly high overall frequency rate,

long duration of NSSI, the use of many NSSI methods, use of self-injury methods that are not often endorsed, such as rubbing acid on skin and intentionally breaking bones, as well as reporting on many additional methods of self-injury not reflected in the DSHI (e.g., self-strangling, implanting objects in skin). In addition to a greater level of NSSI severity, individuals from the online communities reported more parental and personal mental health concerns, greater rates of psychological treatment involvement, greater difficulties in regard to both emotion reactivity and emotion dysregulation, and more negative interpersonal relationships. It was hypothesized that the factors examined in the current model, which have demonstrated support among samples of individuals with more mild/moderate NSSI histories, might no longer adequately capture the processes involved in the development, maintenance, and escalation of severe NSSI.

If it is indeed the case that individuals with such severe NSSI histories represent a unique group when compared to the extant literature, alternative hypotheses might need to be explored to better understand their experiences. It is hypothesized that although individuals might initially begin self-injuring for purposes of emotion regulation, as these behaviours escalate in frequency and severity individuals might develop a dependence on NSSI that eclipses emotional functions alone. In other words, examining an addiction model of NSSI among individuals with severe histories might assist in further informing the current results. Drawing from a functional model of NSSI (e.g., Nock & Prinstein, 2004, 2005; Nock, 2008); it might also be that individuals who engage in severe NSSI utilize these behaviours for a more broad range of functions, such that emotion regulation is no longer the predominant function as it is for individuals with more mild/moderate NSSI histories. The current results do require replication within different samples of individuals reporting severe histories of NSSI. Indeed, the observed findings might be specific

to individuals who engage in severe NSSI and are also members of online communities, rather than generalize to individuals with severe self-injury histories more broadly. Such an observation would be consistent with the hypothesis that the method used to examine interpersonal relationships in the current study might not adequately capture the complexity of the peer group for individuals involved in online communities and that alternative approaches might be needed to understand the influence of both physical world and online peers on NSSI engagement. Although the results of Study 3 are preliminary, they suggest that individuals with severe NSSI histories, perhaps particularly those who are members of online communities, represent a currently understudied population and highlight a number of important directions for future research.

6.2 Limitations

The present findings should be interpreted in light of several limitations. First, all three studies utilized self-report measures to gain information on emotion, interpersonal relationships, and history of NSSI. It might be difficult for individuals to access or interpret their inner emotional experiences in order to report on them in a questionnaire format. It might further be difficult for individuals to answer questions assessing their level of emotion reactivity or dysregulation when they are not experiencing such states. In regard to responses to the DSHI, utilizing a self-report measure of NSSI is likely to be influenced by retrospective bias, and it might be challenging for individuals to accurately reflect on the number of episodes or methods of self-injury they have utilized. Difficulties with accurate reporting of NSSI might be particularly true if the individual has stopped self-injuring, if a greater length of time has passed since injury, or if individuals report a higher number of episodes. Similarly, responses to questionnaires assessing the quality of interpersonal relationships might also be sensitive to

retrospective bias or a bias based on levels of emotional distress. For example, individuals with greater emotional difficulties might perceive their relationships to be more negative than others would due to a negative attentional bias. However this potential bias is not likely to have greatly impacted the results as an individual's subjective satisfaction with or perception of their relationships is likely as, or more, influential than how others might objectively view the relationship (Felce & Perry, 1995).

In a related limitation, variables assessing factors such as personal and parental mental health histories were primarily descriptive in the current project, rather than included as covariates in the models. The rationale for this decision was two-fold. First, only the major variables of interest were included in the models due to power considerations and limiting the number of parameters tested; the primary focus of the project was to provide an initial test of this model among samples of university students and online forum members. Second, it is important for research to assess such personal and parental mental health factors in a more methodologically rigorous way before assessing their contribution in comprehensive models. Indeed, reported mental health histories of parental figures in the current study might be an underestimate, as only more severe mental health difficulties might have been noticed by, or discussed with, participants. For example, both participants and maternal and paternal figures could be invited to participate in research in which diagnostic interviews are completed to determine mental health history in a more objective manner. Given the alarmingly high rates of mental health concerns reported in Study 3, as well as research indicating higher rates of mental disorders among individuals who self-injure, it will be important for future research to examine the influence of such concerns within broader models.

Self-report measures are additionally susceptible to social desirability factors, which might have impacted fully accurate responding. Although it is not possible to determine the exact nature of such an impact in the current project, the high prevalence rate reported among the university sample and the severity of experiences reported among the online sample suggest that participants (in general) were not minimizing their negative experiences. Further, the current project was completed as both a confidential and anonymous online questionnaire, which is likely to reduce the influence of socially desirable responding (Joinson, 1999). Should the current results have been impacted by social desirability factors, the results of Study 2 regarding NSSI prevalence and the associations among variables might, as such, be considered conservative. Furthermore, given the reported severity of NSSI among the online sample, it is unlikely that participants were able to accurately recall the frequency of their injury, particularly for participants who reported hundreds or thousands of NSSI episodes. The severity of NSSI was also reflected in the number of methods used, age of onset, and duration, which may however be easier to accurately recall. Indeed, obtaining an accurate specific number of NSSI episodes at such a level of severity is likely not possible. The very high rates of reported NSSI and mental health concerns among the online sample suggest that individuals were not trying to minimize their negative experiences. In contrast, it might be that for some individuals there was a tendency to over-report concerns. For example, Franzen and Gottzen (2011) reported that individuals involved in an online community discussed their identity as a "cutter" that is uniquely different from the general population. A desire to communicate this uniqueness might have contributed to over-reporting of NSSI in order to stand apart from the "ordinary and boring" population (Franzen & Gottzen, p. 285), at least for some individuals.

The potential for a selection bias during the recruitment phase is an additional limitation of the current project. Participants were fully informed about the nature and purpose of the study during the recruitment and informed consent phases and were encouraged to not participate if they were distressed by self-injury or having a difficult time not injuring themselves. As such, individuals in the university sample might have been more inclined to participate if they did have a history of self-injury, due to their personal experiences with the topic of research, compared to individuals without such a history. Furthermore, participants who were currently heavily engaged in NSSI might have chosen not to participate due to the distressing and potentially triggering nature of the study. Likewise, individuals who were more comfortable or familiar with the research process might have been more likely to participate. In regard to the online communities, sites did differ in their familiarity with research studies, with some sites having little experience with the research process to others that had dedicated sections for studies and clearly established procedures for researchers. Individuals who were more accustomed to seeing studies advertised in their community might therefore have been more inclined to participate. As with the impact of social desirability, there is no way of knowing how much recruitment bias might have been introduced into the present study.

A further limitation of the current project is the utilization of a cross-sectional research design. As participants responded to the questionnaire packet at only one point in time, conclusions cannot be made regarding causality or reciprocal relations among the variables. For example, although the results of Study 2 support the hypothesis that negative interpersonal relationships were predictive of greater difficulties in emotion regulation, the direction of this association is not clear. The previously reviewed literature regarding the family suggests that parental relationships might directly contribute to emotional difficulties, and that there might

also be a bidirectional relationship. There is support that parental relationships have a direct impact on emotional functioning (e.g., through modeling and socialization of emotions), and also that greater emotional difficulties negatively impact the parental relationships. Although there is less literature to draw on regarding peers, it is likely that the association functions in a similar manner, such that emotionally dysregulated individuals might have more difficulty establishing close friendships, and that emotional difficulties might negatively impact friendships that are formed.

Likewise, due to the cross-sectional nature of the current project, conclusions cannot be drawn with certainty regarding the temporal sequence between NSSI and the other variables of interest. The extant literature does suggest the direction of the tested pathways in the current model, such that greater emotional reactivity leads to greater emotional dysregulation, which confers risk for NSSI, as well as for the mediational influence of relationship quality via emotional factors. However, the relation among these factors is also likely to be complex, with factors contributing to each other in multiple ways. For example, individuals who are emotionally dysregulated, in the context of negative interpersonal relationships and invalidating environments, might turn to NSSI as a way of coping with such distress. As the individual does not learn healthy coping strategies and as NSSI is strengthened via negative reinforcement following each episode, it could be that such individuals then become increasingly emotionally dysregulated over time. Similarly, when parents or peers learn of an individual's NSSI, further damage to the relationship might ensue (e.g., if others are distressed or unable to deal with this behaviour) or, conversely, the quality of the relationships might increase (e.g., if others reach out with support).

The results of Study 3 suggested that participants in the sample represent a unique group in regard to their NSSI that has been understudied in the existing literature. Due to the cross-sectional nature of the study, conclusions cannot be made regarding the temporal sequence between online community membership and severe NSSI. It might be that individuals engaged in severe NSSI seek out online support systems, that features of the online community might contribute to the escalation of NSSI behaviours (e.g., through group bonding or reinforcement of NSSI), or a combination of both influences. As with the extant literature, there is a need for much more research utilizing longitudinal designs to more fully understand the development, maintenance, and escalation of self-injurious behaviours.

The current project utilized reliable and valid measures of emotional concerns, interpersonal relationships, and self-injurious behaviours, although there were concerns regarding the method used to assess subcultural identification, as discussed previously. Such response-rate concerns limited the current project to preliminary correlational analyses regarding these variables. Although the original dissertation that developed this approach (Moran, 2009) did not report on similar concerns, additional research using more methodologically sound assessment measures is called for.

Although the model test represents an extension of existing intrapersonal/interpersonal studies conducted primarily among female adolescents, support for the model in Study 2 was drawn from a university sample, primarily of younger individuals and introductory psychology students. Although previous research does support that NSSI is a prevalent and serious concern among university students, the sample likely differs from the broader community and, as such, the ability to generalize the current results to a general adult sample is limited. Indeed, beyond descriptive information (e.g., prevalence), there is a paucity of research examining NSSI causes

and correlates among general adult community samples in comparison to adolescent, clinical, or university populations, which certainly points to a gap in the current literature. Likewise, the results of Study 3 might also not generalize to other populations, such as adults in the general community who engage in severe NSSI. There might be important individual differences between individuals with severe NSSI who choose to seek out support online versus those who do not. Furthermore, participants in Study 3 were predominantly female with only 16 male participants in the sample. Therefore, the results might not be reflective of the experiences of males with severe NSSI histories. It will be important for future research to replicate the current findings among different populations of severe self-injurers before any firm conclusions about generalizability can be made.

A related limitation is that the current project recruited individuals from only six online communities out of the many hundreds of such communities (Whitlock et al., 2007). A number of factors influenced which communities were chosen. First, many online communities explicitly forbid recruitment for research on their sites. Second, of those that did allow research, sites were chosen based on the number of members and the amount of engagement from members, such as the number of active discussion threads (i.e., to increase the number of individuals exposed to the recruitment advertisement). Third, sites were chosen that had a clearly identified moderator to communicate with and who was available to assist with recruitment. It is unclear if participants in the online sample are representative of members of online NSSI communities more generally and, as such, the current results might not generalize beyond the select communities.

Finally, comparisons between individuals in the online sample and those from Study 2 with a history of NSSI indicated that members of the online communities differed in a number of important ways in addition to a greater severity of NSSI (e.g., more mental health concerns,

greater emotion reactivity and dysregulation, more negative interpersonal relationships). It is noted again that such comparisons are considered preliminary as the compared groups were recruited from two different samples. A more methodologically sound way of assessing potential group differences would be to recruit individuals with a range of NSSI severity from within the same population. As previously discussed, the existing literature is dominated by studies exploring characteristics of individuals with mild/moderate NSSI histories, which limits our full understanding of the full spectrum of these behaviours.

6.3 Future Research

A limitation of both the current project and the extant literature is the reliance on self-report, cross-sectional research methodologies. As such, increased attention paid to alternative methodologies is certainly warranted. As previously discussed, although cross-sectional data provides important information regarding the association among the examined variables, it precludes making definitive conclusions regarding causality or complex reciprocal relationships among factors over time. As NSSI is gaining increased attention as a significant clinical concern among both adolescent and young adult populations, large-scale longitudinal studies would benefit from the inclusion of more detailed assessment of NSSI history and functions. Ideally, longitudinal designs would follow individuals beginning before engagement in NSSI to better elucidate factors that directly contribute to initiating self-injury and to examine how emotional and interpersonal factors are further impacted after self-injury. Utilizing a prospective design might be particularly informative in elucidating factors involved in the escalation of self-injurious behaviours. A prospective design would also be useful in informing the hypothesis that membership in online communities might expose individuals to alternative coping and recovery

strategies and also act to reinforce NSSI, thereby serving either to increase or decrease these behaviours.

The current project examined more global difficulties with emotional reactivity and regulation, rather than specifically examining how emotions are regulated by an act of NSSI. Future research should incorporate an examination of whether certain emotions are typically dysregulated compared to others, which might inform treatment efforts, such as targeting dysregulated self-directed anger versus sadness or loneliness. For example, research could include measures of affective states experienced by individuals before, during, and after NSSI and examine affective change within the context of positive or negative interpersonal relationships. Future research should also incorporate this more fine-grained analysis of the emotion regulation function of NSSI within more comprehensive models. Although there is more existing literature regarding the regulation of negative affect before and after an episode of NSSI, there is also a need to examine the regulation of positive affect (e.g., Gratz, 2006). Recent methodological advances in the NSSI literature have provided a method of examining such positive and negative affect regulation beyond that of traditional self-report. Ecological Momentary Assessment (EMA; Arney et al., 2011; Nock et al.; Muehlenkamp et al., 2010) involves providing participants with electronic devices to enable the recording of their experiences as they happen. Such an approach would provide a way for future researchers to examine emotion regulation before and after NSSI in real-time and would offer a more rigorous assessment of emotion regulation/experiential avoidance in the context of more comprehensive models.

Although the current study focussed on the emotional functions of NSSI, existing research supports the notion that self-injury can serve multiple functions, both between and

within individuals (e.g., Klonsky, 2007). Therefore, future research should also examine how other motives of NSSI might interact with and contribute to emotional and interpersonal difficulties. For example, among individuals who experience negative parental and/or peer relationships, it might also be expected that at least some episodes of NSSI are related to social functions (e.g., seeking support, pleas for help, influencing others). An interesting area of future empirical exploration would be to incorporate both intrapersonal and social functions of NSSI, serving both positive and negative reinforcement purposes into more complex and comprehensive models of other proximal and distal risk factors (e.g., Nock, 2009).

Although the literature supports the observation that NSSI can serve multiple functions, there is a paucity of research examining whether different forms of self-injury serve different functions for an individual. Drawing from clinical experience, I have worked with clients who described engaging in more visual forms of self-injury (e.g., cutting forearms, head-banging) for social functions, such as having their needs met by others. The same clients have further described engaging in other, more hidden or less obvious forms of NSSI (e.g., cutting thighs, punching walls or self) to serve self-punishment, or tension reduction/emotion regulation purposes. Developing a better understanding of such complexities in the functions of NSSI would have important treatment implications. For example, treatment targeted at emotion regulation skills might reduce NSSI engaged in for emotional purposes, but might be less effective in reducing NSSI for social purposes within the same individual. For the latter, treatment efforts targeted at developing interpersonal communication and assertiveness skills might be more effective.

Similarly, few studies have examined individual differences that might distinguish subgroups of individuals who engage in self-injury, which is also likely to have implications for

treatment. Future research might benefit from the utilization of novel statistical techniques such as latent class analysis to explore factors that might distinguish such subgroups. For example, little is known regarding individual differences for those who begin engaging in NSSI during early or middle adolescence versus those who first self-injure during adulthood. Little is also known about differences among individuals who, for example, quickly discontinue NSSI, engage in injury on only a sporadic basis, or who frequently self-injure over many years. Identifying characteristics that might distinguish between such subgroups of individuals who self-injure might aid in the identification of both risk and protective factors (e.g., features of individuals who discontinue quickly). Identification of differences among subgroups might also better inform more individualized treatment efforts. For example, an individual who sporadically engages in NSSI for emotional purposes might benefit from shorter-term targeted intervention, and treatment with an individual who has been self-injuring for many years is likely to require a more intensive and comprehensive approach.

Related to the aforementioned limitation regarding the method used to assess subcultural identification, future research would benefit from a more rigorous examination of this under-examined potential risk factor. For example, future research could conduct focus groups among participant groups of interest in attempt to better understand the low response rate found in the current study. Focus group discussions could also be utilized to develop a list of relevant subcultures among the population of study (similar to that of Moran, 2009) as well as to operationally define what is meant by identification with a group as well as definitions of the various subcultures. Existing measures do not appear to have kept pace with new and emerging subcultures (such as Emo and Hipster) and, as such, future research would benefit from the development of new measures to assess subcultural identification. In light of the aforementioned

concern that many existing measures do not allow identification with multiple subcultures, as well as force dichotomous yes/no responses, such measures would benefit from a more dimensional approach.

Although the original model tested in Study 2 was adequate, and both modified models appeared stronger in the prediction of NSSI, not all the variance in NSSI engagement was accounted for. Given the complex nature of NSSI initial engagement, maintenance, escalation, and discontinuation, future models will likely need to become increasingly complex to incorporate the rapidly expanding literature. For example, more complex models should also incorporate biological factors that might represent a predisposition or vulnerability for NSSI engagement. Future research efforts will also benefit from the use of more multivariate statistical techniques in order to better model and understand this complex behaviour.

In regard to the model test among online forum members, although the results suggest that the sample represents an understudied population in the NSSI literature it will be important to replicate these findings, including replication within a larger sample of participants. It will also be important to examine the influence of emotional and interpersonal variables among different populations of individuals with severe NSSI histories. In other words, future research should examine if individuals who seek support from online communities differ in important ways from those who do not. The overall null findings regarding the adequacy of the model in Study 3 might not extend to individuals who engage in severe NSSI who do not become involved in online communities.

The extant literature's focus on individuals with more mild/moderate NSSI histories limits an understanding of the experiences of individuals with such severe self-injurious behaviours and the current results might suggest that explanatory models relevant for one group

might not be as relevant for the other. Future research would therefore benefit from specifically recruiting individuals with such a high frequency of NSSI to examine the individual differences that might distinguish these groups. Future research should examine whether it is indeed the case that individuals with more severe NSSI utilize these behaviours to achieve a greater number or variety of functions. It might be that self-injury generalizes and becomes a more pervasive way of dealing with multiple life concerns in addition to affect regulation. As the emotion regulation/experiential avoidance model might not adequately capture the extent of NSSI functions for individuals with severe histories, a test of this hypothesis could involve a direct examination of the functional model of NSSI (e.g., Nock & Prinstein, 2004, 2005; Nock, 2008) within this population.

Additionally, future research should utilize alternative research designs beyond self-report to examine how the functions of NSSI might differ among a more severe group. As discussed previously, using EMA methodology participants could be provided with an electronic device that would allow them to report on their NSSI experiences in real-time. Data obtained from such an approach would begin to provide information about the relative rates of episodes of NSSI serving emotional versus social purposes. EMA would also be useful in elucidating other factors that might distinguish individuals with severe NSSI. For example, there is some support that urges occur at a higher frequency than actual NSSI episodes (e.g., Martin et al., 2011), at least among individuals with mild/moderate histories. It might be the case for such a severe group that urges might be more likely to lead to actual injury, and thus be one factor contributing to a higher prevalence rate.

Future research would also benefit from the use of more qualitative research designs to draw from the personal stories of individuals with severe NSSI histories. Such an approach

would also be useful in uncovering factors that might be overlooked in the current literature and which might contribute to the escalation of self-injury. As the results of the current study might be unique to the experiences of individuals with severe NSSI who utilize online communities, returning to such internet forums in future research is likely to provide interesting and important information to advance our understanding of this population. First, analyzing the content of the conversations among members on message boards would be fruitful in developing themes of their discussions regarding NSSI. Such an analysis would provide detailed information about what online members perceive as contributing to their beginning to self-injure, their personal narratives about it, triggers, functions, and attempts to reduce or eliminate NSSI. As individuals involved in such communities might differ from those populations typically studied in the extant literature, such an analysis might also be useful in gaining information that goes beyond the existing knowledge base derived largely from community, university, and clinical populations regarding the development and maintenance of self-injury. Furthermore, analyzing message boards for themes in members' conversations might also inform the previously proposed hypotheses, such as the potential for NSSI to represent a behavioural addiction. During the recruitment phase of the current study, I noted conversation threads that referenced concerns about being addicted to self-injury as well as many conversations about wanting to stop but being unable to. A detailed analysis of such conversations might provide a more thorough examination of a potential behavioural addiction model and inform hypotheses for follow-up investigations, such as exploring which features of addiction are most applicable to self-injurious behaviours (e.g., salience of increased tolerance and difficulties stopping versus cravings for self-injury).

Analyzing the themes of forum message board conversations would also aid in developing follow-up interviews with online participants who have a history of severe NSSI. Depending on the guidelines of particular websites, researchers might be able to utilize unique and creative aspects of such forums to aid in information gathering. For example, a specific discussion thread could be formed to allow ongoing interaction between researchers and site members. Such a discussion thread could then function as a sort of focus group with a potentially large number of individuals. Personal messaging features further allow for an evolving interview format, such that new questions can be raised and followed-up on depending on participants' responses. For example, it might be assumed that individuals with severe NSSI did not begin these behaviours at such a high frequency of multiple methods - in their personal experience what has contributed to the escalation? Are these factors different than what initially prompted them to begin self-injuring (i.e., does the function of self-injury evolve and change)? Do individuals with severe NSSI view these behaviours as more uncontrollable now than earlier on or when engagement was less frequent? Or perhaps for some individuals NSSI becomes a preferred way of coping after being strengthened and reinforced over a period of many years. In a related question, it would be interesting to explore participants' responses for themes of ambivalence, which might assist in informing future treatment efforts such as Motivational Interviewing (MI) approaches. Briefly, MI involves both exploring and overcoming ambivalence regarding negative behaviours, and enhancing an individual's readiness and motivation for change (e.g., Miller & Rollnick, 2002). Overall, as the results of the current study suggest that important individual differences distinguish individuals with severe self-injurious behaviours from those with more mild/moderate experiences, at least among forum members, listening to

the personal narratives of individuals with such experiences is likely to provide researchers with greater insight into this understudied population.

References

- Adler, P.A., & Adler, P. (2005). Self-injurers as loners: The social organization of solitary deviance. *Deviant Behavior, 26*, 345-378. doi: 10.1080/016396290931696
- Adler, P.A., & Adler, P. (2007). The demedicalization of self-injury. *Journal of Contemporary Ethnography, 36*(5), 537-570. doi: 10.1177/089124160730168
- Adrian, M., Zeman, J., Erdley, C., Lisa, L., & Sim, L. (2011). Emotional dysregulation and interpersonal difficulties as risk factors for nonsuicidal self-injury in adolescent girls. *Journal of Abnormal Child Psychology, 39*(3), 389-400. doi: 10.1007/s10802-010-9465-3
- Allen, C. (1995). Helping with deliberate self-harm: Some practical guidelines. *Journal of Mental Health, 4*, 243-250. doi: 10.1080/09638239550037523
- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association.
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition. Washington, DC: American Psychiatric Association.
- Anderson, N.L., & Crowther, J.H. (2012). Using the experiential avoidance model of non-suicidal self-injury: Understanding who stops and who continues. *Archives of Suicide Research, 16*, 124-134. doi: 10.1080/13811118.2012.667329
- Andover, M.S., Pepper, C.M., & Gibb, B.E. (2007). Self-mutilation and coping strategies in a college sample. *Suicide and Life-Threatening Behavior, 37*(2), 238-243. Retrieved from <http://web.ebscohost.com>
- Andover, M.S., & Gibb, B.E. (2010). Non-suicidal self-injury, attempted suicide, and suicidal intent among psychiatric patients. *Psychiatry Research, 178*, 101-105. doi: 10.1016/

psychres.2010.03.019

- Armey, M.F., & Crowther, J.H. (2008). A comparison of linear versus non-linear models of aversive self-awareness, dissociation, and non-suicidal self-injury among young adults. *Journal of Consulting and Clinical Psychology, 76*(1), 9-14. doi: 10.1037/0022-006X.76.1.9
- Armey, M.F., Crowther, J.H., & Miller, I.W. (2011). Changes in ecological momentary assessment reported affect associated with episodes of nonsuicidal self-injury. *Behavior Therapy, 42*, 579-588. doi: 10.1016/j.beth.2011.01.002
- Armsden, G.C., & Greenberg, M.T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427-454. doi: 10.1007/BF02202939
- Armsden, G.C., & Greenberg, M.T. (2009, August). *Inventory of parent and peer attachment (IPPA)*. Retrieved from <http://prevention.psu.edu/pubs/documents/IPPAmanual0809.pdf>.
- Baker, D., & Fortune, S. (2008). Understanding self-harm and suicide websites: A qualitative interview study of youth adult website users. *Crisis, 29*(3), 118-122. doi: 10.1027/0227-5910.29.3.118
- Baetens, I., Claes, L., Willem, L., Muehlenkamp, J., & Bijttebier, P. (2011). The relationship between non-suicidal self-injury and temperament in male and female adolescents based on child- and parent-report. *Personality and Individual Differences, 50*, 527-530. doi: 10.1016/j.paid.2010.11.015
- Ballard, E., Bosk, A., & Pao, M. (2010). Invited commentary: Understanding brain mechanisms of pain processing in adolescents' non-suicidal self-injury. *Journal of Youth and Adolescence, 39*, 327-334. doi: 10.1007/s10964-009-9457-1

- Bandelow, B., Schmahl, C., Falkai, P., & Wedekind, D. Borderline personality disorder: A dysregulation of the endogenous opioid system? *Psychological Review*, *117*(2), 623-636. doi: 10.1037/a0018095
- Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Berman, A.L. (1988). Fictional depiction of suicide in television films and imitation effects. *The American Journal of Psychiatry*, *145*(8), 982-986. Retrieved from proquest.umi.com
- Borrill, J., Fox, P., Flynn, M., & Roger, D. (2009). Student who self-harm: Coping style, rumination, and alexithymia. *Counselling Psychology Quarterly*, *22*(4), 361-372. doi: 10.1080/09515070903334607
- Bracken-Minor, K.L., McDevitt-Murphy, M.E., & Parra, G.R. (2012). Profiles of non-suicidal self-injurers and associated patterns of alcohol use. *Journal of Psychopathology and Behavioral Assessment*, *34*, 552-563. doi: 10.1007/s10862-012-9306-5
- Brain, K.L., Haines, J., & Williams, C.L. (1998). The psychophysiology of self-mutilation: Evidence of tension reduction. *Archives of Suicide Research*, *4*, 227-242. doi: 10.1023/A:1009692507987
- Brain, K.L., Haines, J., & Williams, C.L. (2002). The psychophysiology of repetitive self-mutilation. *Archives of Suicide Research*, *6*, 199-210. doi: 10.1080/13811110290100354
- Brausch, A.M., & Gutierrez, P.M. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence*, *39*, 233-242. doi: 10.1007/s10964-009-0482-0
- Bresin, K., Gordon, K.H., Bender, T.W., Gordon, L.J., & Joiner, T.E. (2010). No pain, no change: Reductions in prior negative affect following physical pain. *Motivation and Emotion*, *34*, 280-287. doi: 10.1007/s11031-010-9168-7

- Brown, B.B., Mounts, N., Lamborn, S.D., & Steinberg, L. (1993). Parenting practices and peer group affiliation in adolescence. *Child Development, 64*, 467-482. Retrieved from <http://www.jstor.org>
- Brown, M.Z., Comtois, K.A., & Linehan, M.M. (2002). Reasons for suicide attempts and nonsuicidal self-injury in women with Borderline Personality Disorder. *Journal of Abnormal Psychology, 111*(1), 198-202. doi: 10.1037//0021-843X.111.1.198
- Brown, S.A. (2009). Personality and non-suicidal deliberate self-harm: Trait differences among a non-clinical population. *Psychiatry Research, 169*, 28-32. doi: 10.1016/j.psychres.2008.06.005
- Brown, S.A., & Williams, K. (2007). Past and recent deliberate self-harm: Emotion and coping strategy differences. *Journal of Clinical Psychology, 63*(9), 791-803. Retrieved from <http://www3.interscience.wiley.com>
- Buckholdt, K.E., Parra, G.R., & Jobe-Shields, L. (2009). Emotion regulation as a mediator of the relation between emotion socialization and deliberate self-harm. *American Journal of Orthopsychiatry, 79*(4), 482-490. doi: 10.1037/a0016735
- Bureau, J., Martin, J., Freynet, N., Poirier, A.A., Lafontaine, M., & Cloutier, P. (2010). Perceived dimensions of parenting and non-suicidal self-injury in young adults. *Journal of Youth and Adolescence, 39*, 484-494. doi: 10.1007/s10964-009-9470-4
- Buser, T.J., Buser, J.K., & Kearney, A. (2012). Justice in the family: The moderating role of social self-efficacy in the relationship between nonsuicidal self-injury and interactional justice from parents. *The Family Journal: Counseling and Therapy for Couple and Families, 20*(2), 147-156. doi: 10.1177/1066480712441575
- Cawood, C.D., & Huprich, S.K. (2011). Late adolescent nonsuicidal self-injury: The roles of

- coping style, self-esteem, and personality pathology. *Journal of Personality Disorders*, 25(6), 765-781. doi: 10.1521/pedi.2011.25.6.765
- Chaney, S. (2011). "A hideous torture on himself": Madness and self-mutilation in Victorian Literature. *Journal of Medical Humanities*, 32, 279-289. doi: 1007/s10912-011-9152-6
- Chapman, A.L., Specht, M., & Cellucci, T. (2005). Borderline personality disorder and deliberate self-harm: Does experiential avoidance play a role? *Suicide and Life-Threatening Behavior*, 35(4), 388-399. Obtained from <http://web.ebscohost.com>
- Chapman, A.L., Gratz, K.L., & Brown, M.Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy*, 44, 371-394. doi:10.1016/j.brat.2005.03.005
- Chapman, A.L., & Dixon-Gordon, K. (2007). Emotional antecedents and consequences of deliberate self-harm and suicide attempts. *Suicide and Life-Threatening Behavior*, 37(5), 543-552. Retrieved from <http://web.ebscohost.com>
- Ciarrochi, J., Caputi, P., & Mayer, J.D. (2003). The distinctiveness and utility of a measure of trait emotional awareness. *Personality and Individual Differences*, 34, 1477-1490. doi: 10.1016/S0191-8869(02)00129-0
- Claes, L., Vandereycken, W., & Vertommen, H. (2004a). Personality traits in eating-disordered patients with and without self-injurious behaviors. *Journal of Personality Disorders*, 18(4), 399-404. Retrieved from <http://guilfordjournals.com>
- Claes, L., Vandereycken, W., & Vertommen, H. (2007). Self-injury in female versus male psychiatric patients: A comparison of characteristics, psychopathology, and aggression regulation. *Personality and Individual Differences*, 42, 611-621. doi: 10.1016/j.paid.2006.07.021

- Claes, L., Houben, A., Vandereycken, W., Bijttebier, P., & Muehlenkamp, J. (2010). Brief report: The association between non-suicidal self-injury, self-concept and acquaintance with self-injurious peers in a sample of adolescents. *Journal of Adolescence*, *33*, 775-778. doi: 10.1016/j.adolescence.2009.10.012
- Claes, L., Klonsky, E.D., Muehlenkamp, J., Kuppens, P., & Vandereycken, W. (2010). The affection-regulation function of nonsuicidal self-injury in eating-disordered patients: Which affect states are regulated? *Comprehensive Psychiatry*, *51*(4), 386-392. doi: 10.1016/j.comppsy.2009.09.001
- Claes, L., Muehlenkamp, J., Vandereycken, W., Hamelinck, L., Martens, H., & Claes, S. (2010). Comparison of non-suicidal self-injurious behavior and suicide attempts in patients admitted to a psychiatric crisis unit. *Personality and Individual Differences*, *48*, 83-87. doi: 10.1016/j.paid.2009.09.001
- Claes, L., Smits, D., & Bijttebier, P. (2013). The Dutch version of the Emotion Reactivity Scale: Validation and relation with various behaviors in a sample of high school students. *EJPA*. Advance online publication. doi: 10.1027/1015-5759/a000171
- Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, *112*(1), 155-159. Obtained from <http://www.ncbi.nlm.nih.gov/pubmed>
- Costello, A.B. & Osborne, J.W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation*, *10*(7), 1-9. Retrieved from <http://pareonline.net>
- Crowell, S.E., Beauchaine, T.P., McCauley, E., Smith, C.J., Stevens, A.L., & Sylvers, P. (2005). Psychological, autonomic, and serotonergic correlates of parasuicide among

- adolescent girls. *Development and Psychopathology*, 17, 1105-1127. doi: 10.1017/S0954579405050522
- Crowell, S.E., Beauchaine, T.P., & Linehan, M.M. (2009). A biosocial developmental model of borderline personality: Elaborating and extending Linehan's theory. *Psychological Bulletin*, 135(3), 495-510. doi: 10.1037/a0015616
- Croyle, K.L., & Waltz, J. (2007). Subclinical self-harm: Range of behaviors, extent, and associated characteristics. *American Journal of Orthopsychiatry*, 77(2), 332-342. doi: 10.1037/0002-9432.77.2.332
- Cumming, S., Covic, T., & Murrell, E. (2006). Deliberate self-harm: Have we scratched the surface? *Behaviour Change*, 23(3), 186-199. Retrieved from: <http://www.swetswise.com>.
- de Leo, D., & Heller, T. (2008). Social modeling in the transmission of suicidality. *Crisis*, 29(1), 11-19. doi: 10.1027/0227-5910.29.1.11
- Deliberto, T.L., & Nock, M.K. (2008). An exploratory study of correlates, onset, and offset, of non-suicidal self-injury. *Archives of Suicide Research*, 12, 219-231. doi: 10.1080/13811110802101096
- Denham, S.A., Mitchell-Copeland, J., Strandberg, K., Auerbach, S., & Blair, K. (1997). Parental contributions to preschoolers' emotional competence: Direct and indirect effects. *Motivation and Emotion*, 21, 65-86. doi: 10.1023/A:1024426431247
- Definis-Gojanovic, M., Gugic, D., & Sutlovic. (2009). Suicide and emo youth subculture - A case analysis. *Collegium Antropologicum*, 33,(Suppl. 2), 173-175. Retrieved from <http://www.ncbi.nlm.nih.gov>
- Dennis, M.S., Wakefield, P., Molloy, C., Andrews, H., & Friedman, T. (2007). A study of self-

- harm in older people: Mental disorder, social factors and motives. *Aging & Mental Health*, 11(5), 520-525. doi: 10.1080/13607860601086611
- Dougherty, D.M., Mathias, C.W., Marsh-Richard, D.M., Prevetie, K.N., Dawes, M.A., Hatzis, E.S.,... Nouvion, S.O. (2009). Impulsivity and clinical symptoms among adolescents with non-suicidal self-injury with or without attempted suicide. *Psychiatry Research*, 169, 22-27. doi: 10.1016/j.psychres.2008.06.011
- Dour, H.J., Cha, C.B. & Nock, M.K. (2011). Evidence for an emotion-cognition interaction in the statistical prediction of suicide attempts. *Behaviour Research and Therapy*, 49, 294-298. doi:10.1016/j.brat.2011.01.010
- Downs, W.R., & Rose, S.R. (1991). The relationship of adolescent peer groups to the incidence of psychological problems. *Adolescence*, 26, 473-492. Retrieved from web.ebscohost.com
- Duggan, J.M., Heath, N.L., Lewis, S.P., & Baxter, A.L. (2012). An examination of the scope and nature of non-suicidal self-injury online activities: Implications for school mental health professionals. *School Mental Health*, 4, 56-67. doi: 10.1007/s12310-011-9065-6
- Durbin, D.L., Darling, N., Steinberg, L., & Brown, B.B. (1993). Parenting style and peer group membership among European-American adolescents. *Journal of Research on Adolescence*, 3(1), 87-100. doi: 10.1111/1532-7795.ep11325007
- Eisenberg, N., Fabes, R.A., & Murphy, B.C. (1996). Parents' reactions to children's negative emotions: Relations to children's social competence and comforting behavior. *Child Development*, 67, 2227-2247. doi: 10.1111/j.1467-8624.1996.tb01854.x
- Eisenberg, N., Cumberland, A., & Spinrad, T.L. (1998). Parental socialization of emotion. *Psychological Inquiry*, 9(4), 241-273. doi: 10.1207/s15327965pli0904_1

- Eisenberg, N., Losoya, S., Fabes, R.A., Guthrie, I.K., Reiser, M...Padgett, S.J. (2001). Parental socialization of children's dysregulated expression of emotion and externalizing problem. *Journal of Family Psychology, 15*(2), 183-205. doi: 10.1037//0893-3200.15.2.183
- Esposito-Smythers, C., Goldstein, T., Birmaher, B., Goldstein, B., Hunt, J., Ryan, N., ... Keller, M. (2010). Clinical and psychosocial correlates of non-suicidal self-injury within a sample of children and adolescents with bipolar disorder. *Journal of Affective Disorders, 125*, 89-97. doi: 10.1016/j.jad.2009.12.029
- Favazza, A. (1998). The coming of age of self-mutilation. *Journal of Nervous and Mental Disease, 185*(5), 259-268. doi: 10.1097/00005053-199805000-00001
- Favazza, A. (2009). A cultural understanding of nonsuicidal self-injury. In M. Nock (Ed.), *Understanding nonsuicidal self-injury*. Washington, DC: American Psychological Association.
- Favazza, A., & Conterio, K. (1989). Female habitual self-mutilators. *Acta Psychiatr Scand, 79*, 283-289. doi: 10.1111/j.1600-0447.1989.tb10259.x
- Felce, D., & Perry, J. (1995). Quality of life: Its definition and measurement. *Research in Developmental Disabilities, 16*(1), 51-74. doi: 0891-4222(94)00028-X
- Fennig, S., Carlson, G.A., & Fennig, S. (1995). Contagious self-mutilation. *J Am Acad Child Adolesc Psychiatry, 34*(4), 402-403. Retrieved from <http://ovidsp.tx.ovid.com>
- Fikke, L.T., Melinder, A., & Landro, N.I. (2011). Executive functions are impaired in adolescents engaging in non-suicidal self-injury. *Psychological Medicine, 41*, 601-610. doi: 10.1017/S00332917100001030
- Flett, G.L, Goldstein, A.L., Hewitt, P.L., & Wekerle, C. (2012). Predictors of deliberate self-

- harm behavior among emerging adolescents: An initial test of a self-punitiveness model. *Current Psychology*, 31, 49-64. doi: 10.1007/s12144-012-9130-9
- Fliege, H., Lee, J., Grimm, A., & Klapp, B.F. (2009). Risk factors and correlates of deliberate self-harm behaviour: A systematic review. *Journal of Psychosomatic Research*, 66, 477-493. doi: 10.1016/j.jpsychores.2008.10.013
- Franklin, J.C., Hessel, E.T., Aaron, R.V., Arthur, M.S., Heilbron, N., & Prinstein, M.J. (2010). The functions of non-suicidal self-injury: Support for cognitive-affective regulation and opponent processes from a novel psychophysiological paradigm. *Journal of Abnormal Psychology*, 119(4), 850-862. doi: 10.1037/a0020896
- Franklin, J.C., Hessel, E.T., & Prinstein, M.J. (2011). Clarifying the role of pain tolerance in suicidal capability. *Psychiatry Research*, 189, 362-367. doi: 10.1016/j.psychres.2011.08.01
- Franzen, A.G., & Gottzen, L. (2011). The beauty of blood? Self-injury and ambivalence in an internet community. *Journal of Youth Studies*, 14(3), 279-294. doi: 10.1080/13676261.2010.533755
- Garside, R.B., & Klimes-Dougan, B. (2002). Socialization of discrete negative emotions: Sex differences and links with psychological distress. *Sex Roles*, 47, 115-128. doi: 10.1023/A:1021090904785
- Giletta, M., Scholte, R.H.J., Engels, R.C.M.E., Ciairano, S., & Prinstein, M.J. (2012). Adolescent non-suicidal self-injury: A cross-national study of community samples from Italy, the Netherlands, and the United States. *Psychiatry Research*, 197, 66-72. doi: 10.1016/j.psychres.2012.02.009
- Glassman, L.H., Weierich, M.R., Hooley, J.M., Deliberto, T.L., & Nock, M.K. (2007). Child

- maltreatment, non-suicidal self-injury, and the mediating role of self-criticism. *Behaviour Research and Therapy*, 45, 2483-2490. doi: 10.1016/j.brat.2007-04-002
- Glenn, C.R., & Klonsky, D. E. (2010). A multimethod analysis of impulsivity in nonsuicidal self-injury. *Personality Disorders: Theory, Research, and Treatment*, 1(1), 67-75. doi: 10.1037/a0017427
- Glenn, C.R., Blumenthal, T.D., Klonsky, D.E., & Hajcak, G. (2011). Emotional reactivity in nonsuicidal self-injury: Divergence between self-report and startle measures. *International Journal of Psychophysiology*, 80, 166-170. doi: 10.1016/j.jpsycho.2011.02.016
- Goldstein, A.L., Flett, G.L., Wekerle, C., & Wall, A. (2009). Personality, child maltreatment, and substance use: Examining correlates of deliberate self-harm among university students. *Canadian Journal of Behavioural Science*, 41(4), 241-251. doi: 10.1037/a0014847
- Gordon, K.H., Selby, E.A., Anestis, M.D., Bender, T.W., Witte, T.K. Braithwaite, S.,... Joiner, T.E. (2010). The reinforcing properties of repeated deliberate self-harm. *Archives of Suicide Research*, 14, 329-341. doi: 10.1080/13811118.2010.524059
- Gould, M., & Shaffer, D. (1986). The impact of suicide in television movies: Evidence of imitation. *New England Journal of Medicine*, 315, 690-694.
- Gould, M., Jamieson, P., & Romer, D. (2003). Media contagion and suicide among the young. *American Behavioral Scientist*, 46(9), 1269-1284. doi: 10.1177/0002764202250670
- Gottman, J.M., Katz, L.F., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology*, 10, 243-268. doi: 10.1037/0893-3200.10.3.243

- Gratz, K.L. (2001). Measurement of deliberate self-harm: Preliminary data on the deliberate self-harm inventory. *Journal of Psychopathology and Behavioral Assessment*, 23(4), 253-263. doi: 10.1023/A:1012779403943
- Gratz, K.L. (2003). Risk factors for and functions of deliberate self-harm: An empirical and conceptual review. *Clin Psychol Sci Prac*, 10, 192-205. doi: 10.1093/clipsy/bpg022
- Gratz, K.L. (2006). Risk factors for deliberate self-harm among female college students: The role and interaction of childhood maltreatment, emotional inexpressivity, and affect intensity/reactivity. *American Journal of Orthopsychiatry*, 76(2), 238-250. doi: 10.1037/0002-9432.76.2.238
- Gratz, K.L. (2007). Targeting emotion dysregulation in the treatment of self-injury. *Journal of Clinical Psychology: In Session*, 63(11), 1091-1103. doi: 10.1002/jclp.20417
- Gratz, K.L., Conrad, S.D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry*, 72(1), 128-140. doi: 10.1037//0002-9432.72.1.128
- Gratz, K.L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26, 41-54. doi: 10.1023/B:JOBA.0000007455.08539.94
- Gratz, K.L., & Chapman, A.L. (2007). The role of emotional responding and childhood maltreatment in the development and maintenance of deliberate self-harm among male undergraduates. *Psychology of Men and Masculinity*, 8(1), 1-14. doi: 10.1037/1524-9220.8.1.1
- Gratz, K.L., & Roemer, L. (2008). The relationship between emotion dysregulation and

- deliberate self-harm among female undergraduate students at an urban commuter university. *Cognitive Behaviour Therapy*, 37(1), 14-25. doi: 10.1080/16506070701819524
- Gratz, K.L., Hepworth, C., Tull, M.T., Paulson, A., Clarke, S., Remington, B., & Lejuez, C.W. (2011). An experimental investigation of emotional willingness and physical pain tolerance in deliberate self-harm: The moderating role of interpersonal distress. *Comprehensive Psychology*, 52, 63-74. doi: 10.1016/j.comppsy.2010.04.009
- Guerry, J.D., & Prinstein, M.J. (2010). Longitudinal prediction of adolescent nonsuicidal self-injury: Examination of a cognitive vulnerability-stress model. *Journal of Clinical Child and Adolescent Psychology*, 39(1), 77-89. doi: 10.1080/15374410903401195
- Haines, J., Williams, C.L., Brain, K.L., & Wilson, G.V. (1995). The psychophysiology of self-mutilation. *Journal of Abnormal Psychology*, 104, 471-489. doi: 10.1037/0021-843X.104.3.471
- Hall, B., & Place, M. (2010). Cutting to cope – A modern adolescent phenomenon. *Child: Care Health and Development*, 36(5), 623-629. doi: 10.1111/j.1365-2214.2010.01095.x
- Hamza, C.A., Stewart, S.L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review*, 32, 482-495. doi: 10.1016/j.cpr.2012.05.003
- Hankin, B.J., & Abela, J.R.Z. (2011). Nonsuicidal self-injury in adolescence: Prospective rates and risk factors in a 2 1/2 year longitudinal study. *Psychiatry Research*, 186, 65-70. doi: 10.1016/j.psychres.2010.07.056
- Hasking, P.A., Coric, S.J., Swannell, S., Martin, G., Thompson, H., & Frost, A.D.J. (2010). Brief report: Emotion regulation and coping as moderators in the relationship between

- personality and self-injury. *Journal of Adolescence*, 33, 767-773. doi: 10.1016/j.adolescence.2009.12.006
- Hawton, K., & Williams, K. (2001). The connection between media and suicidal behavior warrants serious attention. *Crisis*, 22(4), 137-140. doi: 10.1027//0227-5910.22.4.137
- Hawton, K., Rodham, K., Evans, E., & Weatherall. (2002). Deliberate self harm in adolescents: Self report survey in schools in England. *BMJ*, 325, 1207-1211. doi: 10.1136/bmj.325.7374.1207
- Hawton, K., & James, A. (2005). Suicide and deliberate self harm in young people. *BMJ*, 330, 891-894. doi: 10.1136/bmj.330.7496.891
- Hawton, K., & Harriss, L. (2008). The changing gender ratio in occurrence of deliberate self-harm across the lifecycle. *Crisis*, 29(1), 4-10. doi: 10.1027/0227-5910.29.1.4
- Heath, N.L., Toste, J.R., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling*, 30(2), 137-156. Retrieved from <http://web.ebscohost.com>
- Heath, N.L., Ross, S., Toste, J.R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioural Science*, 41(3), 180-186. doi: 10.1037/a0015732
- Heaven, P.C.L., Ciarrochi, J., Vialle, W., & Cechavacuite, I. (2005). Adolescent peer crowd self-identification, attributional style and perceptions of parenting. *Journal of Community & Applied Social Psychology*, 15, 313-318. doi: 10.1002/casp.823
- Heilbron, N., & Prinstein, M.J. (2010). Adolescent peer victimization, peer status, suicidal ideation, and nonsuicidal self-injury. *Merrill-Palmer Quarterly*, 56(3), 388-419. doi: 10.1353/mpq.0.0049

- Henson, R.K., & Roberts, J.K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological Measurement, 66*(3), 393-416. doi: 10.1177/0013164405282485
- Hilt, L.M., Cha, C.B., & Nolen-Hoeksema, S. (2008). Nonsuicidal self-injury in young adolescent girls: Moderators of the distress-function relationship. *Journal of Consulting and Clinical Psychology, 76*(1), 63-71. doi: 10.1037/0022-006X.76.1.63
- Hilt, L.M., Nock, M.K., Lloyd-Richardson, E.E., & Prinstein, M.J. (2008). Longitudinal study of non-suicidal self-injury among young adolescents: Rates, correlates, and preliminary test of an interpersonal model. *Journal of Early Adolescence, 28*(3), 455-469. doi: 10.1177/0272431608316604
- Hinkin, T.R. (1995). A review of scale development practices in the study of organizations. *Journal of Management, 21*(5), 967-988. Retrieved from <http://web.uta.edu>
- Hintikka, J., Tolmunen, T., Rissanen, M., Honkalampi, K., Kylma, J. & Laukkanen, E. (2009). Mental disorders in self-cutting adolescents. *Journal of Adolescent Health, 44*, 464-467. doi: 10.1016/j.jadohealth.2008.10.003
- Hjelmeland, J., Hawton, K., Nordvik, H., Bille-Brahe, U., De Leo, D., Fedete, S.,... Wasserman, D., (2002). Why people engage in parasuicide: A cross-cultural study of intentions. *Suicide and Life-Threatening Behavior, 32*(4), 380-393. Retrieved from: <http://www.atypon-link.com>
- Hodgson, S. (2004). Cutting through the silence: A sociological construction of self-injury. *Sociological Inquiry, 47*(2), 162-179. doi: 10.1111/j.1475-682X.2004.00085.x
- Hoe, S.L. (2008). Issues and procedures in adopting structural equation modeling technique. *Journal of Applied Quantitative Methods, 3*(1), 76-83. Retrieved from: <http://jaqm.ro>

- Hoff, E.R., & Muehlenkamp, J.J. (2009). Nonsuicidal self-injury in college students: The role of perfectionism and rumination. *Suicide and Life-Threatening Behavior, 39*(6), 576- 587. doi:10.1521/suli.2009.39.6.576
- Hoffman, R.M., & Kress, V.E. (2010). Adolescent nonsuicidal self-injury: Minimizing client and counselor risk and enhancing client care. *Journal of Mental Health Counseling, 32*(4), 342-347. Retrieved from: <http://www.amhca.org/news/journal.aspx>
- House, A.S., Van Horn, E., Coppeans, C., & Stepleman, L.M. (2011). Interpersonal trauma and discriminatory events as predictors of suicidal and nonsuicidal self-injury in gay, lesbian, bisexual, and transgender persons. *Traumatology, 17*(2), 75-85. doi: 10.1177/1534765610395621
- Hoyt, W.D. (2003). *Self-harm among college students: An epidemiological and qualitative analysis* (Doctoral dissertation). Available from ProQuest Dissertations and Theses Database. (UMI No. 3063996)
- Hu, L.T., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structural analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55. doi: 10.1080/10705519909540118
- Jacobs, R.H., Reinecke, M.A., Gollan, J.K., & Kane, P. (2008). Empirical evidence of cognitive vulnerability for depression among children and adolescents: A cognitive science and developmental perspective. *Clinical Psychology Review, 28*, 759-782. doi:10.1016/j.cpr.2007.10.006
- Jacobson, C.M., & Gould, M. (2007). The epidemiology and phenomenology of non-suicidal self-injurious behavior among adolescents: A critical review of the literature. *Archives of Suicide Research, 11*, 129-147. doi: 10.1080/13811110701247602

- Jacobson, C.M., Muehlenkamp, J.J., Miller, A.L., & Turner, J.B. (2008). Psychiatric impairment among adolescents engaging in different types of deliberate self-harm. *Journal of Clinical Child & Adolescent Psychology, 37*(2), 363-375. doi: 10.1080/15374410801955771
- Janis, I.B., & Nock, M.K. Are self-injurers impulsive?: Results from two behavioral laboratory studies. *Psychiatry Research, 169*, 261-267. doi: 10.1016.j.psychres.2008.06.041
- Jenkins, A.L., & Schmitz, M.F. (2012). The roles of affect dysregulation and positive affect in non-suicidal self-injury. *Archives of Suicide Research, 16*(3), 212-225. doi: 10.1080/13811118.2012.695270
- Jeong, J., Shin, S.D., Kim, H., Hong, Y.C., Hwang, S.S., Lee, E.J. (2012). The effects of celebrity suicide on copycat suicide attempt: A multi-centre observational study. *Social Psychiatry and Psychiatric Epidemiology, 47*, 957-965. doi: 10.1007/s00127-011-0403-7
- Joiner, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press
- Joinson, A. (1999). Social desirability, anonymity, and internet-based questionnaires. *Behavior Research Methods, Instruments, & Computers, 31*, 433-438. doi: 10.3758/BF03200723
- Johnson, G.M., Zastawny, S., & Kulpa, A. (2010). E-message boards for those who self-injure: Implications for e-health. *International Journal of Mental Health and Addictions, 8*, 566-569. doi: 10.1007/s11469-009-9237-x
- Kaess, M., Hille, M., Parzer, P., Maser-Gluth, C., Resch, F., & Brunner, R. (2012). Alterations in the neuroendocrinological stress response to acute psychosocial stress in adolescents engaging in nonsuicidal self-injury. *Psychoneuroendocrinology, 37*, 157-161. doi: 10.1016/j.psyneuen.2011.05.009
- Kakhnovets, R., Young, H.L., Purnell, A.L., Huebner, E., & Bishop, C. (2010). Self-reported

- experience of self-injurious behavior in college students. *Journal of Mental Health Counseling*, 32(4), 309-323. Retrieved from: <http://www.amhca.org>
- Kerr, P.L., & Muehlenkamp, J.J. (2010). Features of psychopathology in self-injuring female college students. *Journal of Mental Health Counseling*, 32(4), 290-308. Retrieved from: <http://www.amhca.org/news/journal.aspx>
- Kimball, J.S., & Diddams, M. (2007). Affect regulation as a mediator of attachment and deliberate self-harm. *Journal of College Counseling*, 10(1), 44-53. Retrieved from <http://web.ebscohost.com>
- Klimes-Dougan, B., Brand, A.E., Zahn-Waxler, C., Usher, B., Hastings, P.D., Kendziora, K., & Garside, R.B. (2007). Parental emotion socialization in adolescence: Differences in sex, age, and problem status. *Social Development*, 16(2), 326-342. doi: 10.1111/j.1467-9507.00387.x
- Kingston, J., Clarke, S., & Remington, B. (2010). Experiential avoidance and problem behavior: A mediational analysis. *Behavior Modification*, 34(2), 145-163. doi: 10.1177/0145445510362575
- Klonsky, D.E. (2007). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review*, 27, 226-239. doi: 10.1016/j.cpr.2006.08.002
- Klonsky, D.E. (2009). The functions of self-injury in young adults who cut themselves: Clarifying the evidence for affect-regulation. *Psychiatry Research*, 166, 260-268. doi: 10.1016/j.psychres.2008.02.008
- Klonsky, D.E. (2011). Non-suicidal self injury in United States adults: Prevalence, sociodemographics, topography, and functions. *Psychological Medicine*, 41, 1981-1986. doi: 10.1017/S0033291710002497

- Klonsky, D.E., & Moyer, A. (2008). Childhood sexual abuse and non-suicidal self-injury: Meta-analysis. *The British Journal of Psychiatry*, *192*, 166-170. doi: 10.1192/bjp.bp.106.030650
- Klonsky, D.E., May, A.M., & Glenn, C.R. (2013). The relationship between nonsuicidal self-injury and attempted suicide: Converging evidence from four samples. *Journal of Abnormal Psychology*, *122*(1), 231-237. doi: 10.1037/a0030278
- Kraus, A., Valerius, G., Seifritz, E., Ruf, M., Bremner, J.D., Bohus, M., & Schmahl, C. (2009). Script-driven imagery of self-injurious behavior in patients with borderline personality disorder. A pilot fMRI study. *Acta Psychiatrica Scandinavica*, *121*, 41-51. doi: 10.1111/j.1600-0447.2009.01417.x
- La Greca, A.M., Prinstein, M.J., & Fetter, M.D. (2001). Adolescent peer crowd affiliation: Linkages with health-risk behaviors and close friendships. *Journal of Pediatric Psychology*, *26*(3), 131-143. Retrieved from <http://jpepsy.oxfordjournals.org>
- Lamb, T.F. (2005). *A systematic review of deliberate self-harm assessment instruments* (Doctoral Dissertation). Available from ProQuest Dissertations and Theses Database. (UMI No. 3191655)
- Laye-Gindhu, A., & Schonert-Reichl, K.A. (2005). Nonsuicidal self-harm among community adolescents: Understanding the “whats” and “whys” of self-harm. *Journal of Youth and Adolescence*, *34*(5), 447-457. doi: 10.1007/s10964-005-7262-z
- Lei, P., Wu, Q. (2007). Introduction to structural equation modeling: Issues and practical considerations. *Educational Measurement, Issues and Practice*. *26*(3), 33-43. Retrieved from: <http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291745-3992>
- Levesque, C., Lafontaine, M., Bureau, J., Cloutier, P., & Dandurand, C. (2010). The influence of

- romantic attachment and intimate partner violence on non-suicidal self-injury in young adults. *Journal of Youth and Adolescence*, 39, 474-483. doi: 10.1007/s10964-009-9471-3
- Lewis, S.P., Heath, N.L., St. Denis, J.M., & Noble, R. (2011). The scope of nonsuicidal self-injury on YouTube. *Pediatrics*, 127, e552-e557. doi: 10.1542/peds.2010-2317
- Lewis, S.P., Heath, N.L., Sornberger, M.J., & Arbuthnott, A.E. (2012). Helpful or harmful? An examination of viewers' responses to nonsuicidal self-injury videos on YouTube. *Journal of Adolescent Health*, 51(4), 380-385. doi: 10.1016/j.jadohealth.2012.01.013
- Lewis, S.P., Rosenrot, S.A., & Messner, M.A. (2012). Seeking validation in unlikely places: The nature of online questions about non-suicidal self-injury. *Archives of Suicide Research*, 16, 263-272. doi: 10.1080/13811118.2012.695274
- Linehan, M.M. (1993). *Cognitive-behavioral treatment for borderline personality disorder*. New York: Guildford Press.
- Liu, R.T., & Mustanski, B. (2012). Suicidal ideation and self-harm in lesbian, gay, bisexual, and transgender youth. *American Journal of Preventive Medicine*, 42(3), 221-228. doi: 10.1016/j.amepre.2011.10.023
- Lopez, F.G., & Gover, M.R. (1993). Self-report measures of parent-adolescent attachment and separation-individuation: A selective review. *Journal of Counseling and Development*, 71(5), 560-569. Retrieved from <http://proquest.umi.com>
- Lundh, L., Karim, J., & Quilisch, E. (2007). Deliberate self-harm in 15-year-old adolescents: A pilot study with a modified version of the Deliberate Self-Harm Inventory. *Scandinavian Journal of Psychology*, 48, 33-41. doi: 10.1111/j.1467-9450.2006.00567.x
- MacCallum, R.C., Widaman, K.F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, 4(1), 84-99. Retrieved from <http://psychology.ucdavis.edu>

- MacLaren, V.V., & Best, L.A., (2010). Nonsuicidal self-injury, potentially addictive behaviors, and the Five Factor Model in undergraduates. *Personality and Individual Differences, 49*, 521-525. doi: 10.1016/j.paid.2010.05.019
- Madge, N., Hewitt, A., Hawton, K., de Wilde, E., Corcoran, P., Fekete, S.,... Ystgaard, M. (2008). Deliberate self-harm within an international community sample of young people: Comparative findings from the Child and Adolescent Self-harm in Europe (CASE) study. *Journal of Child Psychology and Psychiatry, 49*(6), 667-677. doi: 10.1111/j.1469-7610.2008.01879.x
- Madge, N., Hawton, K., McMahon, E.M., Corcoran, P., De Leo, D., Jan de Wilde, E.,... Arensman, E., (2011). Psychological characteristics, stressful life events and deliberate self-harm: Findings from the Child & Adolescent Self-harm in Europe (CASE) study. *European Child and Adolescent Psychiatry, 20*, 499-508. doi: 10.1007/s00787-011-0210-4
- Magerl, W., Burkart, D., Fernandez, A., Schmidt, L.G., & Treede, R-D. (2012). Persistent antinociception through repeated self-injury in patients with borderline personality disorder. *Pain, 152*, 575-584. doi: 10.1016/j.pain.2011.11.021
- Mangnall, J., & Yurkovich, E. (2008). A literature review of deliberate self-harm. *Perspectives in Psychiatric Care, 44*(3), 175-184. doi: 10.1111/j.1744-6163.2008.00172.x
- Maniglio, R. (2011). The role of child sexual abuse in the etiology of suicide and non-suicidal self-injury. *Acta Psychiatr Scand, 124*, 30-41. doi: 10.1111/j.1600-0447.2010.01612.x
- Martin, G. (2006). On suicide and subcultures. *Australian e-Journal for the Advancement of Mental Health, 5*(3), 1-5. Retrieved from: <http://amh.e-contentmanagement.com/archives>
- Martin, J., Bureau, J-F., Cloutier, P., & Lafontaine, M-F. (2011). A comparison of invalidating

- family environment characteristics between university students engaging in self-injurious thoughts & actions and non-self-injuring university students. *Journal of Youth and Adolescence*, 40, 1477-1488. doi: 10.1007/s10964-011-9643-9
- McCloskey, M.S., Look, A.E., Chen, E.Y., Pajoumand, G., & Berman, M.E. (2012). Nonsuicidal self-injury: Relationship to behavioral and self-rating measures of impulsivity and self-aggression. *Suicide and Life-Threatening Behavior*, 42(2), 197-209. doi: 10.1111/j.1943-278X.2012.00082.x
- Messer, J.M., & Fremouw, W.J. (2008). A critical review of explanatory models for self-mutilating behaviors in adolescents. *Clinical Psychology Review*, 28, 162-178. doi: 10.1016/j.cpr.2007.04.006
- Miller, W.R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change*. New York, NY: Guilford Press.
- Mitchell, K.J., & Ybarra, M.L. (2007). Online behavior of youth who engage in self-harm provides clues of prevention intervention. *Preventative Medicine*, 45, 392-396. doi: 10.1016/j.ypmed.2007.05.008
- Moller, C.I., Tait, R.J., & Byrne, D.G. (2013). Self-harm, substance use and psychological distress in the Australian general population. *Addiction*, 108(1), 211-220. doi: 10.1111/j.1360-0443.2012.04021.x
- Moran, M.B. *The role of social identity in adolescent smoking behavior* (Doctoral Dissertation). Available from ProQuest Dissertations and Theses Database. (UMI No. 3368611)
- Morris, A.S., Silk, J.S., Steinberg, L., Myers, S.S., & Roberson, L.R. (2007). The role of the family context in the development of emotion regulation. *Social Development*, 16(2), 361-388. doi: 10.1111/j.1467-9507.2007.00389x

- Muehlenkamp, J.J. (2005). Self-injurious behaviour as a separate clinical syndrome. *American Journal of Orthopsychiatry*, 75(2), 324-333. doi: 10.1037/0002-9432.75.2.324
- Muehlenkamp, J.J., & Gutierrez, P.M. (2004). An investigation of differences between self-injurious behavior and suicide attempts in a sample of adolescents. *Suicide and Life-Threatening Behavior*, 34, 12-22. doi: 10.1521/suli.34.1.12.27769
- Muehlenkamp, J.J., Hoff, E.R., Licht, J., Azure, J.A., & Hasenzahl, S.J. (2008). Rates of non-suicidal self-injury: A cross-sectional analysis of exposure. *Current Psychology*, 27, 234-241. doi: 10.1007/s12144-008-9036-8
- Muehlenkamp, J.J., Engel, S.G., Wadeson, A., Crosby, R.D., Wonderlich, S.A., Simonich, H., & Mitchell, J.E., (2009). Emotional states preceding and following acts of non-suicidal self-injury in bulimia nervosa patients. *Behaviour Research and Therapy*, 47(1), 83-87. doi: 10.1016/j.brat.2008.10.011
- Muehlenkamp, J.J., & Kerr, P.L. (2010). Untangling a complex web: How non-suicidal self-injury and suicide attempts differ. *The Prevention Researcher*, 17(1), 8-10. Retrieved from: <http://www.tpronline.org/index.cfm>
- Muehlenkamp, J.J., & Brausch, A.M. (2012). Body image as a mediator of non-suicidal self-injury in adolescents. *Journal of Adolescence*, 35, 1-9. doi:10.1016/j.adolescence.2011.06.010
- Nada-Raja, S., & Skegg, K. (2011). Victimization, posttraumatic stress disorder symptomology, and later nonsuicidal self-harm in a birth cohort. *Journal of Interpersonal Violence*, 26(18), 3667-3681. doi: 10.1177/0886260511403757
- Najmi, S., Wegner, D.M., & Nock, M.K. (2007). Thought suppression and self-injurious thoughts and behaviors. *Behaviour Research and Therapy*, 45, 1957-1965. doi: 10.1016/

j.brat.2006.09.014

- Niedtfeld, I., Schulze, L., Kirsch, P., Herpetz, S.C., Bohus, M., & Schmahl, C. (2010). Affect regulation and pain in borderline personality disorder: A possible link to the understanding of self-injury. *Biological Psychiatry*, *68*, 383-391. doi: 10.1016/j.biopsych.2010.04.015
- Nixon, M.K., Cloutier, P.F., & Aggarwal, S. (2002). Affect regulation and addictive aspects of repetitive self-injury in hospitalized adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*, 1333-1341. doi: 10.1097/00004583-200211000-00015
- Nock, M.K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science*, *18*(2), 78-83.
- Nock, M.K. (2010). Self-injury. *Annual Review of Clinical Psychology*, *6*, 339-363. doi: 10.1146/annurev.clinpsy.121208.131258
- Nock, M.K., & Prinstein, M.J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology*, *72*, 885-890. doi: 10.1037/0022-006X.72.5.885
- Nock, M.K., & Prinstein, M.J. (2005). Contextual features and behavioral functions of self-mutilation among adolescents. *Journal of Abnormal Psychology*, *114*(1), 140-146. doi: 10.1037/0021-843X.114.1.140
- Nock, M.K., Joiner, T.E., Gordon, K.H., Lloyd-Richardson, E., & Prinstein, M.J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research*, *144*, 65-72. doi: 10.1016/j.psychres.2006.05.010
- Nock, M.K., & Kessler, R.C. (2006). Prevalence of and risk factors for suicide attempts versus

- suicide gestures: Analysis of the National Comorbidity Survey. *Journal of Abnormal Psychology, 115*(3), 616-623. doi: 10.1037/0021-843X.115.3.616
- Nock, M.K., & Mendes, W.B. (2008). Physiological arousal, distress tolerance, and social problem-solving deficits among adolescent self-injurers. *Journal of Consulting and Clinical Psychology, 76*(1), 28-38. doi: 10.1037/0022-006X.76.1.28
- Nock, M.K., Wedig, M.M., Holmberg, E.B., & Hooley, J.M. (2008). The emotion reactivity scale: Development, evaluation, and relation to self-injurious thoughts and behaviors. *Behavior Therapy, 39*, 107-116. doi:10.1016/j.beth.2007.05.005
- Nock, M.K., Prinstein, M.J., & Sterba, S.K. (2009). Revealing the form and function of self-injurious thoughts and behaviors: A real-time ecological assessment study among adolescents and young adults. *Journal of Abnormal Psychology, 118*(4), 816-827. doi: 10.1037/a0016948
- O'Connor, B.P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers, 32*(3), 396-402. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>
- Ohmann, S., Schuch, B., Konig, M., Blass, S., Fliri, C., & Popow, C. (2008). Self-injurious behavior in adolescent girls. Association with psychopathology and neuropsychological functions. *Psychopathology, 41*(4), 226-235. doi: 10.1159/000125556
- Oldershaw, A., Grima, E., Jollant, F., Richards, C., Simic, M., Taylor, L., & Schmidt, U. (2009). Decision making and problem solving in adolescents who deliberately self-harm. *Psychological Medicine, 39*, 95-104. doi: 10.1159/000125556
- Oude Voshaar, R.C., Cooper, J., Murphy, E., Steeg, S., Kapur, N., & Purandare, N.B. (2011). First episode of self-harm in older age: A report from the 10-year prospective Manchester

- Self-Harm Project. *Journal of Clinical Psychiatry*, 72(6), 737-743. doi: 10.4088/JCP.10m06501
- Papini, D.R., Roggman, R.L., & Andersen, J. (1991). Early-adolescent perceptions of attachment to mother and father: A test of the emotional-distancing and buffering hypotheses. *Journal of Early Adolescence*, 11, 258-275. doi: 10.1177/0272431691112006
- Perez, J., Venta, A., Garnaat, S., & Sharp, C. (2012). The difficulties in emotion regulation scale: Factor structure and association with nonsuicidal self-injury in adolescent inpatients. *Journal of Psychopathology and Behavioural Assessment*, 34, 393-404.
- Petroff, L.L. (2008). *Stress, adult attachment, and academic success among community college students* (Doctoral Dissertation). Available from ProQuest Dissertations and Theses Database. (UMI No. 3338830)
- Phillips, D.P., & Paight, D.J. (1987). The impact of televised movies about suicide: A replicative study. *New England Journal of Medicine*, 317, 809-811.
- Ponterotto, J.G., & Ruckdeschel, D.E. (2007). An overview of coefficient alpha and a reliability matrix for estimating adequacy of internal consistency coefficients with psychological research measures. *Perceptual and Motor Skills*, 105(3), 997-1014. doi: 10.2466/PMS.105.3.997-1014.
- Prasad, V., & Owens, D. (2001). Using the internet as a source of self-help for people who self-harm. *Psychiatric Bulletin*, 25, 222-225. doi: 10.1192/pb.25.6.222
- Prinstein, M.J., Boergers, J., & Spirito, A. (2001). Adolescents' and their friends' health-risk behavior: Factors that alter or add to peer influence. *Journal of Pediatric Psychology*, 26(5), 287-298. doi: 10.1093/jpepsy/26.5.287
- Prinstein, M.J., Heilbron, N., Guerry, J.D., Franklin, J.C., Rancourt, D., Simon, V., & Spirito, A.

- (2010). Peer influence and nonsuicidal self-injury: Longitudinal results in community and clinically-referred adolescent samples. *Journal of Abnormal Child Psychology*, 38, 669-682. doi: 10.1007/s10802-010-9423-0
- Rettew, D.C., & McKee, L. (2005). Temperament and its role in developmental psychopathology. *Harvard Review of Psychiatry*, 13(1), 14-27. doi: 10.1080/10673220590923146
- Rodgers-Farmer, A.Y. (2000). Parental monitoring and peer group association: Their influence on adolescent substance use. *Journal of Social Science Research*, 27(2), 1-18. doi: 10.1300/J079v27n02_01
- Rosen, P.M., & Walsh, B.W. (1989). Patterns of contagion in self-mutilation epidemics. *The American Journal of Psychiatry*, 146(5), 656-658. Retrieved from <http://proquest.umi.com>
- Russ, M.J., Roth, S.D., Lerman, A., Kakuma, T., Harrison, K.,...Mattis, S. (1992). Pain perception in self-injurious patients with borderline personality disorder. *Biological Psychiatry*, 32, 501-511. doi: 10.1016/0006-3223(92)90218-O
- Safer, D.J. (1997). Self-reported suicide attempts by adolescents. *Annals of Clinical Psychiatry*, 9(4), 263-269. doi: 10.1023/A:1022364629060
- Schmahl, C., Bohus, M., Esposito, F., Treede, R., Salle, F., Greffrath, W.,... Seifritz, E. (2006). Neural correlates of antinociception in borderline personality disorder. *Archives of General Psychiatry*, 63, 659-667. Retrieved from <http://archpsyc.ama-assn.org>
- Scoliers, G., Portzky, G., Madge, N., Hewitt, A., Hawton, K., de Wilde, E.,... van Heeringen, K. (2009). Reasons for adolescent deliberate self-harm. A cry of pain and/or a cry for help?

- Findings from the child and adolescent self-harm in Europe (CASE) study. *Social Psychiatry & Psychiatric Epidemiology*, 44, 601-607. doi: 10.1007/s00127-008-0469-z
- Selby, E.A., Anestis, M.D., & Joiner, T.E. (2008). Understanding the relationship between emotional and behavioral dysregulation: Emotional cascades. *Behaviour Research and Therapy*, 46, 593-611. doi: 10.1016/j.brat.2008.02.002
- Selby, E.A., Connell, L.D., & Joiner, T.E. (2010). The pernicious blend of rumination and fearlessness in non-suicidal self-injury. *Cognitive Therapy and Research*, 34, 421-428. doi: 10.1007/s10608-009-9260-z
- Selby, E.A., Bender, T.W., Gordon, K.H., Nock, M.H., & Joiner, T.E. (2011). Non-suicidal self-injury (NSSI) disorder: A preliminary study. *Personality Disorders: Theory, Research, and Treatment*, 3(2), 167-175. doi: 10.1037/a0024405
- Shiner, R.L., Buss, K.A., McClowry, S.G., Putnam, S.P., Saudino, K.J., & Zentner, M. (2012). What is temperament now? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives*, 6(4), 436-444. doi: 10.1111/j.1750-8606.2012.00254.x
- Sim, L., Adrian, J., Zeman, J., Cassano, M., & Friedrich, W.N. (2009). Adolescent deliberate self-harm: Linkages to emotion regulation and family emotional climate. *Journal of Research on Adolescence*, 19(1), 75-91. Retrieved from <http://www3.interscience.wiley.com>
- Sinclair, J., Hawton, K., & Gray, A. (2010). Six year follow-up of a clinical sample of self-harm patients. *Journal of Affective Disorders*, 121, 247-252. doi: 10.1016/j.jad.2009.05.027
- Sloan, P.A., Berman, M.E., Zeigler-Hill, V., Greer, T.F., & Mae, L. (2006). Group norms and self-aggressive behavior. *Journal of Social and Clinical Psychology*, 25(10), 1107-1121.

doi: 10.1521/jscp.2006.25.10.1107

Smithson, J., Sharkey, S., Hewis, E., Jones, R.B., Emmens, T., Ford, T., & Owens C. (2011).

Membership and boundary maintenance on an online self-harm forum. *Qualitative Health Research*, 21(11), 1567-1575. doi: 10.1177/1049732311413784

Snorrason, I., Smári, J., & Ólafsson, R.P. (2010). Emotion regulation in pathological skin-picking: Findings from a non-treatment seeking sample. *Journal of Behavior Therapy and Experimental Psychiatry*, 41, 238-245. doi: 10.1016/j.jbtep.2010.01.009

Stack, S. (2003). Media coverage as a risk factor in suicide. *J Epidemiol Community Health*, 57, 238-240. doi: 10.1136/jech.57.4.238

Stanley, B., Winchel, R., Molcho, A., Simeon, D., & Stanley, M. (1992). Suicide and the self-harm continuum: Phenomenological and biochemical evidence. *International Review of Psychiatry*, 4, 149-155. Retrieved from <http://informahealthcare.com>

Stanley, B., Sher, L., Wilson, S., Ekman, R., Huang, Y., & Mann, J. (2010). Non-suicidal self-injurious behavior, endogenous opioids and monoamine neurotransmitters. *Journal of Affective Disorders*, 124, 134-140. doi: 10.1016/j.jad.2009.10.028

Stanley, B., & Siever, L.J. (2010). The interpersonal dimension of borderline personality disorder: Toward a neuropeptide model. *American Journal of Psychiatry*, 167, 24-39. doi: 10.1176/appi.ajp.2009.09050744

Sternudd, H.T. (2012). Photographs of self-injury: Production and reception in a group of self-injurers. *Journal of Youth Studies*, 15(4), 421-436. doi: 10.1080/13676261.2012.663894

St. Germain, S.A., & Hooley, J.M. (2012). Direct and indirect forms of non-suicidal self-injury: Evidence for a distinction. *Psychiatry Research*, 197, 78-84. doi: 10.1016/j.psychres.2011.12.050

- Strasburger, V.C. (2009). Why do adolescent health researchers ignore the impact of the media? *Journal of Adolescent Health, 44*, 203-205. doi: 10.1016/j.jadohealth.2008.12.019
- Sussman, S., Dent, C.W., & McCullar, W.J. (2001). Group self-identification as a prospective predictor of drug use and violence in high-risk youth. *Psychology of Addictive Behaviors, 14*(2), 192-196. doi: 10.1037//0893-164X.14.2.192
- Suyemoto, K. (1998). The functions of self-mutilation. *Clinical Psychology Review, 18*(5), 531-554. doi:10.1016/S0272-7358(97)00105-0
- Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson/Allyn & Bacon.
- Taiminen, T.J., Kallio-Soukainen, K., Nokso-Koivisto, H., Kaljonen, A., & Helenius, H. (1998). Contagion of deliberate self-harm among adolescent inpatients. *J Am Acad Child Adolesc Psychiatry, 37*(2). Retrieved from <http://ovidsp.tx.ovid.com>
- Trewavas, C., Hasking, P., & McAllister, M. (2010). Representations of non-suicidal self-injury in motion pictures. *Archives of Suicide Research, 14*, 89-103. doi: 10.1080/13811110903479110
- University of California, Los Angeles, Center for Mental Health in Schools. (2009). *About emo youth subculture*. Retrieved from <http://smhp.psych.ucla.edu/pdfdocs/youth/emo.pdf>
- University of Saskatchewan (2011, July). Student headcount and demographics. Retrieved from <http://www.usask.ca/isa/statistics/students/headcount-demographics.php>
- Van Orden, K.A., Merrill, K.A., & Joiner, T.E. (2005). Interpersonal-psychology precursors to suicidal behavior: A theory of attempted and completed suicide. *Current Psychiatry Review, 1*, 187-196. doi: 10.2174/1573400054065541
- Victor, S.E., Glenn, C.R., & Klonsky, E.D. (2012). In non-suicidal self-injury an "addiction"? A

- comparison of cravings in substance use and non-suicidal self-injury. *Psychiatry Research*, 197(1-2), 73-77. doi: 10.1016/j.psychres.2011.12.011
- Walsh, B.W. (2006). *Treating self-injury: A practical guide*. New York, NY: The Guilford Press.
- Weierich, M.R., & Nock, M.K. (2008). Posttraumatic stress symptoms mediate the relation between childhood sexual abuse and nonsuicidal self-injury. *Journal of Consulting and Clinical Psychology*, 76(1), 39-44. doi: 10.1037/0022-006X.76.1.39
- Weinberg, A., & Klonsky, E.D. (2009). Measurement of emotion dysregulation in adolescents. *Psychological Assessment*, 21(4), 616-621. doi: 10.1037/a0016669
- Weinberg, A., & Klonsky, E.D. (2012). The effects of self-injury on acute negative arousal: A laboratory simulation. *Motivation and Emotion*, 36, 242-254. doi: 10.1007/s11031-011-9233-x
- Weismoore, J.T., & Esposito-Smythers, C. (2010). The role of cognitive distortion in the relationship between abuse, assault, and non-suicidal self-injury. *Journal of Youth and Adolescence*, 39, 281-290. doi: 10.1007/s10964-009-9452-6
- Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics*, 117, 1939-1940. doi: 10.1542/peds.2005-2543
- Whitlock, J.L., Powers, J.L., & Eckenrode, J. (2006). The virtual cutting edge: The internet and adolescent self-injury. *Developmental Psychology*, 42(3), 407-417. doi: 10.1037/0012-1649.42.3.407
- Whitlock, J., Lader, W., & Conterio, K. (2007). The internet and self-injury: What psychotherapists should know. *Journal of Clinical Psychology: In session*, 63(11), 1135-1143. doi: 10.1002/jclp.20420
- Wiedermann, W.T., & Alexandrowicz, R.W. (2007). The plea for more general tests than those

for location only: Further considerations on Rasch & Guiard's 'The robustness of parametric statistical methods'. *Psychology Science*, 49(1), 2-12. Retrieved from core.kmi.open.ac.uk

Wilcox, H.C., Arria, A.M., Caleira, K.M., Vincent, K.B., Pinchevsky, G.M., & O'Grady, K.E. (2012). Longitudinal predictors of past-year non-suicidal self-injury and motives among college students. *Psychological Medicine*, 42, 717-726. doi: 10.1017/S0033291711001814

Wilkinson, P., & Goodyer, I. (2011). Non-suicidal self-injury. *European Child and Adolescent Psychiatry*, 20, 103-108. doi: 10.1007/s00787-010-0156-y

Williams, F., & Hasking, P. (2010). Emotion regulation, coping and alcohol use as moderators in the relationship between non-suicidal self-injury and psychological distress. *Prev Sci*, 11, 33-41. doi: 10.1007/s11121-009-0147-8

Young, R., Sweeting, H., & West, P. (2006). Prevalence of deliberate self harm and attempted suicide within contemporary Goth youth subculture: Longitudinal cohort study. *BMJ*, 332, 1058-1061. doi: 10.1136/bmj.38790.495544.7c

Zahl, D.L., & Hawton, K. (2004). Media influences on suicidal behaviour: An interview study of young people. *Behavioural and Cognitive Psychotherapy*, 32, 189-198. doi: 10.1017/S1352465804001195

Zeidner, M., Matthews, G., Roberts, R.D., & MacCann, C. (2003). Development of emotional intelligence: Towards a multi-level investment model. *Human Development*, 46, 69-96. doi: 10.1159/000068580

Appendix A

Consent and Debriefing Forms

CONSENT FROM

You are invited to participate in a research project entitled “The associations among parental and peer relationships, emotional functioning, and coping strategies.” Please read this letter carefully, and feel free to ask any questions that you might have.

Researchers:

Maegan Sharp, B.A. (Hons.), *maegan.sharp@usask.ca*

Dr. Lisa Kalynchuk, *lisa.kalynchuk@usask.ca*

Department of Psychology, University of Saskatchewan

Purpose and Procedure: Non-suicidal self-injury (NSSI) is becoming increasingly common among adolescents and young adults and there is a need for increased research investigating the risk factors for these behaviours. The purpose of this research is to examine the influence of different personal and social factors that may contribute to NSSI. In particular, this study is exploring how emotional, family, and peer-related factors may be risk factors or protective factors for self-injury.

Your participation in this study will involve filling out a confidential and anonymous online survey that will take approximately 30 minutes to complete. Please note that the survey needs to be completed during a single session; you will not be able to save your responses and complete the remaining items at a later time. If you agree to participate you will be asked to provide information such as your age, gender, and ethnicity. You will also be asked questions about whether you have had previous or current experiences with NSSI or other mental health difficulties, and questions about your family and peer group. The information you provide will only be shared with the research team involved with this study and you will not be asked to provide your name. The results of this study will be used towards the completion of a doctoral degree in clinical and psychology and will be presented in aggregate form at conferences and published in peer-reviewed journals.

Potential Benefits: Although you may not experience any direct benefits from the completion of the survey, you may benefit from being exposed to research being done in the NSSI field. You may also benefit from being provided with community, online, and self-help resources for coping with NSSI and depression (included below). Your participation also has the potential to benefit the scientific community by working to develop a better understanding of the factors that contribute to NSSI.

Potential Risks: This study involves asking some personal and sensitive questions that you may find upsetting. In the event you are feeling distressed following completion of the survey, all participants will be provided with a list of resources for help coping with NSSI and depression. You are also free to contact the researchers if you would like assistance gaining a referral for psychological assessment or care. If you are currently experiencing difficulty not harming

yourself in some way (e.g., if you experience frequent, uncontrollable urges to self-injure), or if you find the topic of NSSI distressing, it is advised that you do not participate in this study.

Storage of Data: If you would like to receive a summary of the results of the study, you will be asked to provide your email address. To ensure that your answers will remain anonymous, your email will be stored separately from the information collected in the survey, in an encrypted electronic file. Once you have been mailed the research summary, the record of your email address will be destroyed. Other study data (i.e., survey responses) will be stored for five years following completion of the study, at which point they will be destroyed beyond recovery.

Confidentiality: The results from this research study will be published and presented at conferences; however, your identity will be kept both confidential and anonymous and the data will be presented in aggregate form, so it will not be possible to identify individuals. Again, your email address will be stored separately from your answers, so it will not be possible to associate a name with any given set of responses. Please do not put your name or other identifying information on any of the other survey measures.

Right to Withdraw: Your participation is voluntary, and you can answer only those questions that you are comfortable with. There is no guarantee that you will personally benefit from your involvement. The information that is shared will be held in strict confidence and discussed only with the research team. You may withdraw from the research project by discontinuing your completion of the survey questions, for any reason, at any time, without penalty of any sort, and this will not affect obtaining research credit for your participation. If you choose to discontinue the survey, your completed responses up to that point will be destroyed. Due to the anonymous nature of the research, surveys are not connected with the individual who completed them; therefore after submission of the completed survey you would be unable to withdraw your responses at a later date.

If you have any questions concerning the research project, please feel free to ask at any point; you are also free to contact the researchers at the email addresses provided if you have other questions. This research project has been approved on ethical grounds by the University of Saskatchewan Behavioural Research Ethics Board on (date). Any questions regarding your rights as a participant may be addressed to that committee through the Ethics Office (966-2084). Out of town participants may call collect.

Consent to Participate:

Please hit print screen to obtain a copy for your records. Alternatively you may contact the researcher at the contact information provided above and one will be sent to you.

Completion of the survey implies your consent to participate.

DEBRIEFING INFORMATION

Project Title: The associations among parental and peer relationships, emotional functioning, and coping strategies

Investigators: Maegan Sharp, B.A., & Lisa Kalynchuk, Ph.D.

Non-suicidal self-injury (NSSI) is an important clinical health problem and can include behaviours such as cutting or burning the skin, hitting oneself, or intentionally breaking bones. Estimates of the prevalence of NSSI range from 12 to 38% among college and university students (Brown & Williams, 2007), and international studies have reported estimated lifetime prevalence rates of 13.5% for females and 4.3% for males (Madge et al., 2008). NSSI typically begins during adolescence, can continue for many years without coming to the attention of mental health professionals, and appears to be increasing in prevalence. Certainly, increased research attention towards the risk factors, functions, and protective factors of NSSI is certainly needed.

Theories and research investigating the functions that NSSI serves for individuals indicate that these behaviours may serve an emotion regulation function or, in other words, are used as a short-term coping mechanism for emotions that seem overwhelming or unbearable (Klonsky, 2007). Research also suggests that negative family environments, such as early experiences of abuse or neglect, negative emotion socialization, or negative relationships with parents may also contribute to NSSI, especially for individuals who have difficulty regulating emotions or experience emotions very intensely (e.g., Gratz, 2003). Finally, recent research suggests that individuals in certain subcultural peer groups may also experience higher rates of NSSI (Young, Sweeting, & West, 2006). Therefore the overall purpose of this study was to investigate each of these factors within an integrated framework of self-injury. This research will contribute to developing a more comprehensive understanding of NSSI and encourage future research towards developing effective intervention programs for individuals struggling with self-injury.

Thank you for your participation in this research. If requested, the research results will be made available to you upon completion of the study.

If you have any further questions regarding this study, or NSSI, please contact:

Maegan Sharp: maegan.sharp@usask.ca or Dr. Lisa Kalynchuk: lisa.kalynchuk@usask.ca

Please hit print screen to obtain a copy for your records. Alternatively you may contact the researcher at the contact information provided above and one will be sent to you.

Appendix B

Questionnaire Packet

1. Age: _____

2. Gender: (check one)

_____ 1) Male

_____ 2) Female

3. What is your ethnic group?:

_____ 1) Caucasian

_____ 2) African Canadian

_____ 3) Asian

_____ 4) Aboriginal

_____ 5) Hispanic

_____ 6) Biracial/Multiracial

_____ 7) Other: _____

4. Where do you live?

_____ (City/Town) _____ (Province)

5. What is your marital status?

_____ 1) Single (never married)

_____ 2) Married

_____ 3) Living with someone as if married

_____ 4) Separated

_____ 5) Divorced

6. Do you drink alcohol? _____ 1) Yes _____ 2) No

7. If yes, how often, on average, do you drink alcoholic beverages?

_____ 1) less than once a month _____ 3) once a week

_____ 2) once or twice a month _____ 4) 2-3 times a week

_____ 5) 4-6 times a week _____ 6) Every day

8. How many drinks will you typically have in a day when you drink? (One drink equals 12oz of beer, 5oz of wine, or 1.5oz of liquor): _____

9. Do you use street drugs (e.g., marijuana or cocaine)?

_____ 1) Yes _____ 2) No

10. If yes, how often do you typically use street drugs:

_____ 1) less than once a month _____ 3) once a week

_____ 2) once or twice a month _____ 4) 2-3 times a week

_____ 5) 4-6 times a week _____ 6) Every day

11. Your biological/adoptive parents were (check one):

_____ 1) Never married

_____ 2) Still married to one another

_____ 3) Divorced/Separated

_____ 4) Widowed

12. Who do you consider to be your primary maternal/mother figure?

_____ 1) Biological mother _____ 2) Stepmother

_____ 3) Grandmother _____ 4) Other (describe): _____

13. How many years did you live with your primary maternal/mother figure, from birth to the present? _____

14. During your childhood and adolescence, did your primary maternal/mother figure experience any type of mental health concerns (whether or not she received any treatment)?

_____ 1) Yes _____ 2) No

_____ 3) Don't know

15. If yes, check all the mental health concerns she experienced:

- | | |
|---|---|
| <input type="checkbox"/> 1) Depression | <input type="checkbox"/> 5) Alcohol Abuse |
| <input type="checkbox"/> 2) Bipolar Disorder (Manic-Depression) | <input type="checkbox"/> 6) Other substance abuse |
| <input type="checkbox"/> 3) Excessive worry or anxiety | <input type="checkbox"/> 7) Thoughts about suicide |
| <input type="checkbox"/> 4) Panic attacks | <input type="checkbox"/> 8) Other (describe): _____ |

16. Who do you consider to be your primary paternal/father figure?

- | | |
|---|---|
| <input type="checkbox"/> 1) Biological father | <input type="checkbox"/> 2) Stepfather |
| <input type="checkbox"/> 3) Grandfather | <input type="checkbox"/> 4) Other (describe): _____ |

17. How many years did you live with your primary paternal/father figure, from birth to the present? _____

18. During your childhood and adolescence, did your primary paternal/father figure experience any type of mental health concerns (whether or not he received any treatment)?

- 1) Yes 2) No
 3) Don't know

19. If yes, check all the mental health concerns he experienced:

- | | |
|---|---|
| <input type="checkbox"/> 1) Depression | <input type="checkbox"/> 5) Alcohol Abuse |
| <input type="checkbox"/> 2) Bipolar Disorder (Manic-Depression) | <input type="checkbox"/> 6) Other substance abuse |
| <input type="checkbox"/> 3) Excessive worry or anxiety | <input type="checkbox"/> 7) Thoughts about suicide |
| <input type="checkbox"/> 4) Panic attacks | <input type="checkbox"/> 8) Other (describe): _____ |

20. Have you ever experienced any difficulties with mental health concerns (whether or not you received any treatment)?

- 1) Yes 2) No

21. If yes, check all the mental health concerns you have experienced:

- | | |
|---|---|
| <input type="checkbox"/> 1) Depression | <input type="checkbox"/> 5) Alcohol Abuse |
| <input type="checkbox"/> 2) Bipolar Disorder (Manic-Depression) | <input type="checkbox"/> 6) Other substance abuse |
| <input type="checkbox"/> 3) Excessive worry or anxiety | <input type="checkbox"/> 7) Thoughts about suicide |
| <input type="checkbox"/> 4) Panic attacks | <input type="checkbox"/> 8) Other (describe): _____ |

22. Have you ever received treatment for mental health concerns?

- 1) Yes 2) No

23. If yes, specify:

- 1) Medications
- 2) Counseling/Psychologist
- 3) Group counseling/therapy
- 4) Hospitalization (i.e., inpatient program)
- 5) Other: _____

Difficulties in Emotion Regulation Scale

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item:

1-----2-----3-----4-----5
almost never sometimes about half the time most of the time almost always
(0-10%) (11-35%) (36-65%) (66-90%) (91-100%)

- _____ 1) I am clear about my feelings.
- _____ 2) I pay attention to how I feel.
- _____ 3) I experience my emotions as overwhelming and out of control.
- _____ 4) I have no idea how I am feeling.
- _____ 5) I have difficulty making sense out of my feelings.
- _____ 6) I am attentive to my feelings.
- _____ 7) I know exactly how I'm feeling.
- _____ 8) I care about what I am feeling.
- _____ 9) I am confused about how I feel.
- _____ 10) When I'm upset, I acknowledge my emotions.
- _____ 11) When I'm upset, I become angry with myself for feeling that way.
- _____ 12) When I'm upset, I become embarrassed for feeling that way.
- _____ 13) When I'm upset, I have difficulty getting work done.
- _____ 14) When I'm upset, I become out of control.
- _____ 15) When I'm upset, I believe that I will remain that way for a long time.
- _____ 16) When I'm upset, I believe that I'll end up feeling very depressed.
- _____ 17) When I'm upset, I believe that my feelings are valid and important.
- _____ 18) When I'm upset, I have difficulty focusing on other things.

- _____ 19) When I'm upset, I feel out of control.
- _____ 20) When I'm upset, I can still get things done.
- _____ 21) When I'm upset, I feel ashamed with myself for feeling that way.
- _____ 22) When I'm upset, I know that I can find a way to eventually feel better.
- _____ 23) When I'm upset, I feel like I am weak.
- _____ 24) When I'm upset, I feel like I can remain in control of my behaviours.
- _____ 25) When I'm upset, I feel guilty for feeling that way.
- _____ 26) When I'm upset, I have difficulty concentrating.
- _____ 27) When I'm upset, I have difficulty controlling my behaviours.
- _____ 28) When I'm upset, I believe that there is nothing I can do to make myself feel better.
- _____ 29) When I'm upset, I become irritated with myself for feeling that way.
- _____ 30) When I'm upset, I start to feel very bad about myself.
- _____ 31) When I'm upset, I believe that wallowing in it is all I can do.
- _____ 32) When I'm upset, I lose control over my behaviours.
- _____ 33) When I'm upset, I have difficulty thinking about anything else.
- _____ 34) When I'm upset, I take time to figure out what I'm really feeling.
- _____ 35) When I'm upset, it takes me a long time to feel better.
- _____ 36) When I'm upset, my emotions feel overwhelming.

Emotion Reactivity Scale

This questionnaire asks different questions about how you experience emotions **on a regular basis (for example, each day)**. When you are asked about being “emotional,” this may refer to being angry, sad, excited, or some other emotion. Please rate the following statements.

0	1	2	3	4
Not at all like me	A little like me	Somewhat like me	A lot like me	Completely like me

1	When something happens that upsets me, it’s all I can think about it for a long time.	0	1	2	3	4
2	My feelings get hurt easily.	0	1	2	3	4
3	When I experience emotions, I feel them very strongly/intensely.	0	1	2	3	4
4	When I’m emotionally upset, my whole body gets physically upset as well.	0	1	2	3	4
5	I tend to get very emotional very easily.	0	1	2	3	4
6	I experience emotions very strongly.	0	1	2	3	4
7	I often feel extremely anxious.	0	1	2	3	4
8	When I feel emotional, it's hard for me to imagine feeling any other way.	0	1	2	3	4
9	Even the littlest things make me emotional.	0	1	2	3	4
10	If I have a disagreement with someone, it takes a long time for me to get over it.	0	1	2	3	4
11	When I am angry/upset, it takes me much longer than most people to calm down.	0	1	2	3	4
12	I get angry at people very easily.	0	1	2	3	4
13	I am often bothered by things that other people don’t react to.	0	1	2	3	4
14	I am easily agitated.	0	1	2	3	4
15	My emotions go from neutral to extreme in an instant.	0	1	2	3	4
16	When something bad happens, my mood changes very quickly. People tell me I have a very short fuse.	0	1	2	3	4
17	People tell me that my emotions are often too intense for the situation.	0	1	2	3	4
18	I am a very sensitive person.	0	1	2	3	4
19	My moods are very strong and powerful.	0	1	2	3	4
20	I often get so upset it’s hard for me to think straight.	0	1	2	3	4
21	Other people tell me I'm overreacting.	0	1	2	3	4

Inventory of Parent and Peer Attachment

This questionnaire asks about your relationships with important people in your life – your mother, your father, and your close friends. Please read the directions to each part carefully.

Part I

Each of the following statements asks about your feeling about your mother, or the woman who has acted as your mother. If you have more than one person acting as your mother (e.g., a natural mother and a stepmother) answer the questions for the one you feel has most influenced you. Please read each statement and circle the ONE number that tells how true the statement is for you now.

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
1. My mother respects my feelings.	1	2	3	4	5
2. I feel my mother does a good job as my mother.	1	2	3	4	5
3. I wish I had different mother.	1	2	3	4	5
4. My mother accepts me as I am.	1	2	3	4	5
5. I like to get my mother's point of view on things I'm concerned about.	1	2	3	4	5
6. I feel it's no use letting my feelings show around my mother.	1	2	3	4	5
7. My mother can tell when I'm upset about something.	1	2	3	4	5
8. Talking over my problems with my mother makes me feel ashamed or foolish.	1	2	3	4	5

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
9. My mother expects too much from me.	1	2	3	4	5
10. I get upset easily around my mother.	1	2	3	4	5
11. I get upset a lot more than my mother knows about.	1	2	3	4	5
12. When we discuss things, my mother cares about my point of view.	1	2	3	4	5
13. My mother trusts my judgment.	1	2	3	4	5
14. My mother has her own problems, so I don't bother her with mine.	1	2	3	4	5
15. My mother helps me to understand myself better.	1	2	3	4	5
16. I tell my mother about my problems and troubles.	1	2	3	4	5
17. I feel angry with my mother.	1	2	3	4	5
18. I don't get much attention from my mother.	1	2	3	4	5
19. My mother helps me to talk about my difficulties.	1	2	3	4	5
20. My mother understands me.	1	2	3	4	5

21. When I am angry about something, my mother tries to be understanding.	1	2	3	4	5
22. I trust my mother.	1	2	3	4	5
23. My mother doesn't understand what I'm going through these days.	1	2	3	4	5
24. I can count on my mother when I need to get something off my chest.	1	2	3	4	5
25. If my mother knows something is bothering me, she asks me about it.	1	2	3	4	5

Part II

This part asks about your feeling about your father, or the man who has acted as your father. If you have more than one person acting as your father, (e.g., natural and stepfathers) answer the questions for the one you feel has most influenced you.

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
1. My father respects my feelings.	1	2	3	4	5
2. I feel my father does a good job as my father.	1	2	3	4	5
3. I wish I had a different father.	1	2	3	4	5
4. My father accepts me as I am.	1	2	3	4	5

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
5. I like to get my father's point of view on things I'm concerned about.	1	2	3	4	5
6. I feel it's no use letting my feelings show around my father.	1	2	3	4	5
7. My father can tell when I'm upset about something.	1	2	3	4	5
8. Talking over my problems with my father makes me feel ashamed or foolish.	1	2	3	4	5
9. My father expects too much from me.	1	2	3	4	5
10. I get upset easily around my father.	1	2	3	4	5
11. I get upset a lot more than my father knows about.	1	2	3	4	5
12. When we discuss things, my father cares about my point of view.	1	2	3	4	5
13. My father trusts my judgment.	1	2	3	4	5
14. My father has his own problems, so I don't bother him with mine.	1	2	3	4	5
15. My father helps me to understand myself better.	1	2	3	4	5
16. I tell my father about My problems and troubles.	1	2	3	4	5

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
17. I feel angry with my father.	1	2	3	4	5
18. I don't get much attention from my father.	1	2	3	4	5
19. My father helps me to talk about my difficulties.	1	2	3	4	5
20. My father understands me.	1	2	3	4	5
21. When I am angry about something, my father tries to be understanding.	1	2	3	4	5
22. I trust my father.	1	2	3	4	5
23. My father doesn't understand what I'm going through these days.	1	2	3	4	5
24. I can count on my father when I need to get something off my chest.	1	2	3	4	5
25. If my father knows something is bothering me, he asks me about it.	1	2	3	4	5

Part III

This part asks about your feelings about your relationships with your close friends. Please read each statement and circle the ONE number that tells how true the statement is for you now.

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
1. I like to get my friends' points of view on things I'm concerned about.	1	2	3	4	5
2. My friends can tell when I'm upset about something.	1	2	3	4	5
3. When we discuss things, my friends care about my point of view.	1	2	3	4	5
4. Talking over my problems with my friends makes me feel ashamed or foolish.	1	2	3	4	5
5. I wish I had different friends.	1	2	3	4	5
6. My friends understand me.	1	2	3	4	5
7. My friends help me to talk about my difficulties.	1	2	3	4	5
8. My friends accept me as I am.	1	2	3	4	5
9. I feel the need to be in touch with my friends more often.	1	2	3	4	5

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
10. My friends don't understand what I'm going through these days.	1	2	3	4	5
11. I feel alone or apart when I'm with my friends.	1	2	3	4	5
12. My friends listen to what I have to say.	1	2	3	4	5
13. I feel my friends are good friends.	1	2	3	4	5
14. My friends are fairly easy to talk to.	1	2	3	4	5
15. When I am angry about something, my friends try to be understanding.	1	2	3	4	5
16. My friends help me to understand myself better.	1	2	3	4	5
17. My friends care about how I am.	1	2	3	4	5
18. I feel angry with my friends.	1	2	3	4	5
19. I can count on my friends when I need to get something off my chest.	1	2	3	4	5
20. I trust my friends.	1	2	3	4	5
21. My friends respect my feelings.	1	2	3	4	5

	Almost never true	Not very often true	Some- times true	Often true	Almost always or always true
22. I get upset a lot more than my friends know about	1	2	3	4	5
23. It seems as if my friends are irritated with me for no reason.	1	2	3	4	5
24. I can tell my friends about my problems and troubles.	1	2	3	4	5
25. If my friends know something is bothering me, they ask me about it.	1	2	3	4	5

Peer Group Identification

People often hang out in different social groups. For example, a lot of schools and communities have a group of “jocks.” Below is a list of social groups that you might identify with. Please indicate how much you identify with **each group** on the scale. Marking at 100 means you identify with this group very much/strongly and marking the bar to 0 means you do not identify with this group at all. Please answer according to how much you currently identify with these groups and how much you identified with these groups during your teenage years.

0 (not at all) ————— 100 (very much)

Artists/Artsy
Athletes/Jocks
Emo
Academic
Musicians
Popular/cool
Preppy
Goth
Indie
Techie
Nerds
Theater/Drama
Straightedge
Misfits/Outsider
Gamer
Skater
Nonconformist
Religious
Goody-goodie
Hippie
Rebel
Partier
Hipster
Average/Regular

Deliberate Self-Harm Inventory

This questionnaire asks about a number of different things that people sometimes do to hurt themselves. Please be sure to read each question carefully and respond honestly. Often, people who do these kinds of things to themselves keep it a secret, for a variety of reasons. However, honest responses to these questions will provide us with greater understanding and knowledge about these behaviors and the best way to help people. Please answer yes to a question only if you did the behavior intentionally, or on purpose, to hurt yourself. Do not answer yes if you intended to kill yourself. Do not respond yes if you did something accidentally (e.g., you tripped and banged your head on accident). Also, please be assured that your responses are completely confidential.

1. Have you ever intentionally (i.e., on purpose) cut your wrist, arms, or other area(s) of your body (without intending to kill yourself)? (circle one):

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

2. Have you ever intentionally (i.e., on purpose) burned yourself with a cigarette?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

3. Have you ever intentionally (i.e., on purpose) burned yourself with a lighter or a match?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

4. Have you ever intentionally (i.e., on purpose) carved words into your skin?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

5. Have you ever intentionally (i.e., on purpose) carved pictures, designs, or other marks into your skin?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

6. Have you ever intentionally (i.e., on purpose) severely scratched yourself, to the extent that scarring or bleeding occurred?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

7. Have you ever intentionally (i.e., on purpose) bit yourself, to the extent that you broke the skin?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

8. Have you ever intentionally (i.e., on purpose) rubbed sandpaper on your body?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

9. Have you ever intentionally (i.e., on purpose) dripped acid onto your skin?

- 1. Yes
- 2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

10. Have you ever intentionally (i.e., on purpose) used bleach, comet, or oven cleaner to scrub your skin?

- 1. Yes
- 2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

11. Have you ever intentionally (i.e., on purpose) stuck sharp objects such as needles, pins, staples, etc. into your skin, not including tattoos, ear piercing, needles used for drug use, or body piercing?

- 1. Yes
- 2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

12. Have you ever intentionally (i.e., on purpose) rubbed glass into your skin?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

13. Have you ever intentionally (i.e., on purpose) broken your own bones?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

14. Have you ever intentionally (i.e., on purpose) banged your head against something, to the extent that you caused a bruise to appear?

1. Yes
2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

15. Have you ever intentionally (i.e., on purpose) punched yourself, to the extent that you caused a bruise to appear?

- 1. Yes
- 2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

16. Have you ever intentionally (i.e., on purpose) prevented wounds from healing?

- 1. Yes
- 2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

17. Have you ever intentionally (i.e., on purpose) done anything else to hurt yourself that was not asked about in this questionnaire? If yes, what did you do to hurt yourself?

- 1. Yes
- 2. No

If yes,

How old were you when you first did this? _____

How many times have you done this? _____

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

Appendix C

Adolescent Subcultural Identification - University Sample

	1	2	3	4	5	6	7	8
1. NSSI Freq	-							
2. Artist	.089	-						
3. Athlete	.004	.336**	-					
4. Emo	.251**	.563**	.551**	-				
5. Academic	-.010	.488**	.654**	.534**	-			
6. Musician	.089	.585**	.430**	.545**	.602**	-		
7. Popular	-.033	.381**	.754**	.516**	.675**	.502**	-	
8. Preppy	-.044	.279**	.440**	.299**	.482**	.293**	.553**	-
9. Goth	.349**	.483**	.602**	.733**	.510**	.513**	.510**	.530**
10. Indie	.173*	.721**	.473**	.555**	.604**	.629**	.536**	.361**
11. Techie	.033	.544**	.524**	.645**	.560**	.523**	.535**	.412**
12. Nerd	.092	.527**	.450**	.461**	.700**	.552**	.402**	.331**
13. Theatre	.094	.661**	.420**	.535**	.538**	.650**	.446**	.288**
14. Straight-edge	-.022	.604**	.512**	.585**	.595**	.595**	.527**	.391**
15. Misfit	.243**	.561**	.341**	.674**	.516**	.500**	.333**	.187**
16. Gamer	.011	.506**	.589**	.629**	.589**	.532**	.581**	.359**
17. Skater	.065	.499**	.620**	.497**	.533**	.557**	.621**	.354**
18. Non-conformist	.244**	.495**	.470**	.675**	.462**	.473**	.495**	.304**
19. Religious	-.032	.566**	.427**	.565**	.562**	.567**	.459**	.312**
20. Goody-good	.038	.563**	.526**	.583**	.699**	.621**	.517**	.407**
21. Hippie	.183*	.634**	.457**	.595**	.580**	.645**	.557**	.334**
22. Rebel	.183**	.440**	.511**	.603**	.479**	.510**	.586**	.353**
23. Partier	-.008	.410**	.697**	.473**	.588**	.459**	.806**	.487**
24. Hipster	.067	.551**	.578**	.513**	.667**	.556**	.663**	.446**
25. Average	-.071	.489**	.609**	.448**	.684**	.534**	.646**	.480**

* $p < 0.5$; ** $p < 0.1$

	9	10	11	12	13	14	15	16	17	18	19
.562**	-	-	-	-	-	-	-	-	-	-	-
.702**	.644**	-	-	-	-	-	-	-	-	-	-
.551**	.554**	.623**	-	-	-	-	-	-	-	-	-
.522**	.583**	.524**	.549**	-	-	-	-	-	-	-	-
.547**	.636**	.653**	.606**	.578**	-	-	-	-	-	-	-
.755**	.534**	.518**	.671**	.497**	.560**	-	-	-	-	-	-
.635**	.516**	.762**	.634**	.513**	.610**	.509**	-	-	-	-	-
.576**	.635**	.645**	.411**	.578**	.535**	.577**	-	-	-	-	-
.690**	.592**	.496**	.441**	.459**	.605**	.641**	.566**	.685**	-	-	-
.615**	.574**	.514**	.542**	.527**	.585**	.453**	.614**	.496**	.492**	-	-
.627**	.494**	.505**	.683**	.566**	.717**	.536**	.514**	.568**	.475**	.630**	-
.531**	.729**	.594**	.566**	.691**	.603**	.582**	.501**	.657**	.597**	.558**	-
.735**	.562**	.435**	.431**	.495**	.452**	.600**	.583**	.615**	.715**	.398**	-
.578**	.494**	.535**	.423**	.453**	.454**	.406**	.633**	.609**	.489**	.427**	-
.561**	.801**	.576**	.520**	.529**	.597**	.536**	.543**	.704**	.631**	.582**	-
.500**	.602**	.540**	.547**	.541**	.623**	.369**	.584**	.510**	.424**	.544**	-

20 21 22 23 24 25

.585***
-
.412*** .677**
-
.493*** .509** .673***
-
.579*** .716** .663** .650**
-
.621** .499** .457** .659** .648**
-

Current Subcultural Identification - University Sample

	1	2	3	4	5	6	7	8
1. NSSI Freq	-							
2. Artist	.060	-						
3. Athlete	-.049	.206**	-					
4. Emo	.157*	.531**	.427**	-				
5. Academic	-.059	.485**	.546**	.481**	-			
6. Musician	.085	.685**	.310**	.427**	.538**	-		
7. Popular	-.072	.361**	.676**	.463**	.663**	.475**	-	
8. Preppy	-.084	.344**	.551**	.359**	.612**	.353**	.726**	-
9. Goth	.218*	.473**	.523**	.754**	.533**	.451**	.457**	.485**
10. Indie	.141*	.710**	.354**	.583**	.530**	.615**	.441**	.402**
11. Techie	.066	.466**	.379**	.519**	.496**	.423**	.418**	.378**
12. Nerd	.076	.485**	.305**	.555**	.630**	.475**	.363**	.429**
13. Theatre	.047	.575**	.214**	.426**	.422**	.620**	.390**	.355**
14. Straight-edge	-.044	.471**	.393**	.584**	.639**	.481**	.465**	.467**
15. Misfit	.161**	.529**	.239**	.635**	.458**	.489**	.289**	.254**
16. Gamer	-.033	.400**	.468**	.524**	.501**	.404**	.470**	.419**
17. Skater	-.018	.492**	.549**	.595**	.498**	.578**	.582**	.581**
18. Non-conformist	.237**	.518**	.338**	.575**	.566**	.549**	.409**	.356**
19. Religious	-.062	.496**	.336**	.405**	.542**	.467**	.422**	.397**
20. Goody-good	-.031	.438**	.309**	.510**	.586**	.451**	.392**	.458**
21. Hippie	.233**	.541**	.364**	.474**	.535**	.555**	.464**	.392**
22. Rebel	-.146*	.431**	.443**	.557**	.485**	.546**	.565**	.460**
23. Partier	.000	.325**	.582**	.426**	.559**	.432**	.723**	.575**
24. Hipster	.036	.582**	.420**	.563**	.551**	.577**	.573**	.519**
25. Average	-.074	.458**	.515**	.521**	.711**	.541**	.622**	.578**

* $p < 0.5$; ** $p < 0.1$

	9	10	11	12	13	14	15	16	17	18	19
.555**	-										
.585**	.552**										
.517**	.449**	.600**									
.434**	.487**	.497**	.476**								
.560**	.520**	.558**	.576**	.443**							
.558**	.480**	.358**	.526**	.385**	.486**						
.522**	.475**	.690**	.550**	.355**	.524**	.441**					
.507**	.545**	.442**	.436**	.482**	.559**	.472**	.652**				
.577**	.576**	.503**	.438**	.413**	.586**	.587**	.421**	.580**			
.527**	.370**	.446**	.446**	.500**	.534**	.449**	.519**	.456**	.497**		
.493**	.364**	.406**	.515**	.491**	.640**	.405**	.364**	.505**	.496**		
.524**	.607**	.567**	.466**	.485**	.516**	.518**	.486**	.521**	.664**	.359**	
.465**	.524**	.438**	.387**	.384**	.410**	.578**	.510**	.634**	.608**	.406**	
.433**	.415**	.406**	.343**	.335**	.428**	.278**	.465**	.612**	.440**	.317**	
.484**	.721**	.459**	.426**	.425**	.489**	.386**	.461**	.654**	.523**	.378**	
.535**	.539**	.423**	.537**	.510**	.581**	.429**	.451**	.524**	.470**	.481**	

Appendix D

Adolescent Subcultural Identification - Online Sample

	1	2	3	4	5	6	7	8
NSSI Freq	-							
NSSI Forms	.46**	-						
Artist	.01	.13	-					
Athlete	.14	.18	.54**	-				
Emo	.07	.17	.54**	.31**	-			
Academic	.07	.01	.54**	.46**	.49**	-		
Musician	-.11	-.02	.58**	.38**	.53**	.55**	-	
Popular	-.004	.09	.33**	.62**	.21	.48**	.29**	-
Preppy	-.009	-.09	.39**	.45**	.31**	.55**	.35**	.69**
Goth	.17	.18	.57**	.16	.72**	.48**	.47**	.21
Indie	.04	.14	.48**	.42**	.61**	.51**	.55**	.43**
Techie	-.03	.15	.59**	.46**	.56**	.61**	.65**	.42**
Nerd	.03	.09	.59**	.41**	.62**	.72**	.55**	.29**
Theatre	.004	.18	.66**	.35**	.53**	.51**	.64**	.35**
Straight-edge	.04	-.06	.46**	.46**	.38**	.75**	.51**	.49**
Misfit	.06	.17*	.57**	.37**	.70**	.52**	.51**	.25*
Gamer	.02	.06	.57**	.40**	.39**	.57**	.40**	.39**
Skater	-.10	.13	.52**	.36**	.68**	.59**	.56**	.28*
Non-conformist	.04	.25**	.68**	.28**	.68**	.53**	.52**	.34**
Religious	.08	.11	.13	.26*	-.008	.31**	.11	.31*
Goody-good	.001	-.11	.39**	.33**	.52**	.70**	.46**	.39**
Hippie	.008	.29**	.58**	.47**	.60**	.49**	.43**	.57**
Rebel	.06	.25**	.54**	.32**	.62**	.43**	.54**	.27**
Partier	.000	.16	.41**	.55**	.52**	.44**	.42**	.56**
Hipster	-.07	.32**	.55**	.60**	.52**	.37**	.43**	.75**
Average	-.03	-.05	.33**	.53**	.32**	.55**	.34**	.62**

* $p < 0.5$; ** $p < 0.1$

	9	10	11	12	13	14	15	16	17	18	19
.36**	-	-	-	-	-	-	-	-	-	-	-
.47**	.57**	.57**	.67**	.77**	.73**	.36**	.49**	.53**	.69**	.62**	.39**
.41**	.52**	.67**	.77**	.77**	.65**	.45**	.72**	.53**	.61**	.59**	.45**
.36**	.53**	.59**	.77**	.77**	.73**	.36**	.59**	.64**	.59**	.73**	.62**
.24	.44**	.55**	.64**	.51**	.51**	.49**	.49**	.53**	.69**	.69**	.37**
.56**	.28**	.60**	.59**	.73**	.73**	.36**	.49**	.53**	.72**	.59**	.37**
.29**	.72**	.54**	.54**	.65**	.65**	.45**	.49**	.53**	.72**	.59**	.37**
.36**	.44**	.47**	.68**	.73**	.73**	.36**	.72**	.53**	.69**	.69**	.37**
.22	.57**	.58**	.61**	.73**	.73**	.45**	.59**	.64**	.59**	.69**	.37**
.35**	.69**	.61**	.62**	.62**	.62**	.54**	.50**	.73**	.59**	.62**	.37**
.37**	.12	.08	.22	.19	.19	.10	.14	.16	.10	.12	.14
.59**	.44**	.52**	.50**	.64**	.64**	.29**	.76**	.57**	.43**	.45**	.39**
.52**	.52**	.48**	.51**	.54**	.54**	.56**	.44**	.57**	.61**	.58**	.59**
.22	.57**	.58**	.57**	.59**	.59**	.42**	.45**	.65**	.51**	.67**	.73**
.58**	.38**	.49**	.42**	.44**	.44**	.35**	.35**	.53**	.32**	.63**	.56**
.49**	.39**	.60**	.61**	.47**	.47**	.39**	.39**	.52**	.62**	.34**	.53**
.61**	.15	.45**	.46**	.41**	.41**	.43**	.65**	.36**	.55**	.37**	.33**

Current Subcultural Identification - Online Sample

	1	2	3	4	5	6	7	8	9
NSSI Freq	-								
NSSI Forms	.46**	-							
Artist	.03	.11	-						
Athlete	.11	.09	.17	-					
Emo	-.03	.09	.43**	.17	-				
Academic	.07	.02	.41**	.47**	.43**	-			
Musician	-.06	-.02	.48**	.39**	.45**	.53**	-		
Popular	-.09	-.04	.39**	.40**	.20	.39**	.27**	-	
Preppy	-.16	-.13	.31**	.37**	.15	.49**	.34**	.84**	-
Goth	.13	.18	.51**	.13	.65**	.44**	.45**	.23*	.23
Indie	-.02	.05	.60**	.20	.47**	.45**	.46**	.53**	.46**
Techie	-.05	.05	.47**	.39**	.37**	.53**	.49**	.33**	.38**
Nerd	.06	.01	.44**	.28**	.50**	.62**	.50**	.29**	.29**
Theatre	-.005	.06	.54**	.36**	.36**	.37**	.46**	.45**	.43**
Straight-edge	-.07	-.06	.33**	.34**	.41**	.62**	.45**	.27**	.56**
Misfit	.17*	.15*	.43**	.38**	.54**	.49**	.49**	.20*	.25*
Gamer	.05	-.001	.47**	.26**	.42**	.52**	.46**	.30**	.32**
Skater	-.14	.09	.40**	.39**	.59**	.51**	.73**	.40**	.37**
Non-conformist	.09	.24**	.62**	.27**	.48**	.52**	.53**	.29**	.24**
Religious	-.05	-.09	.40**	.26*	.43**	.49**	.51**	.45**	.67**
Goody-good	.03	-.09	.24**	.34**	.43**	.59**	.35**	.37**	.47**
Hippie	-.003	.24*	.59**	.38**	.51**	.49**	.57**	.46**	.48**
Rebel	.11	.18*	.47**	.29**	.51**	.48**	.53**	.31**	.23*
Partier	-.03	.004	.35**	.51**	.37**	.42**	.43**	.64**	.51**
Hipster	-.10	.09	.58**	.52**	.44**	.51**	.48**	.79**	.73**
Average	-.03	.000	.34**	.47**	.35**	.47**	.32**	.53**	.51**

* $p < 0.5$; ** $p < 0.1$

	10	11	12	13	14	15	16	17	18	19	20
	.59**	-	-	-	-	-	-	-	-	-	-
	.48**	.47**	-	-	-	-	-	-	-	-	-
	.53**	.51**	.73**	-	-	-	-	-	-	-	-
	.46**	.61**	.48**	.49**	-	-	-	-	-	-	-
	.43**	.32**	.57**	.54**	.38**	-	-	-	-	-	-
	.58**	.37**	.56**	.63**	.38**	.52**	-	-	-	-	-
	.52**	.46**	.61**	.66**	.37**	.68**	.54**	-	-	-	-
	.58**	.51**	.56**	.61**	.44**	.43**	.54**	.61**	-	-	-
	.53**	.53**	.56**	.58**	.42**	.54**	.64**	.51**	.61**	-	-
	.57**	.39**	.44**	.48**	.38**	.42**	.46**	.49**	.72**	.55**	-
	.26**	.31**	.38**	.52**	.26*	.49**	.45**	.29**	.31*	.22**	.64**
	.49**	.58**	.57**	.55**	.49**	.43**	.57**	.57**	.51**	.66**	.47**
	.63**	.47**	.54**	.54**	.36**	.42**	.65**	.43**	.58**	.58**	.45**
	.36**	.38**	.43**	.40**	.34**	.37**	.42**	.42**	.64**	.34**	.41**
	.47**	.66**	.52**	.51**	.52**	.49**	.50**	.59**	.49**	.57**	.65**
	.24*	.45**	.36**	.32**	.48**	.48**	.42**	.33**	.39**	.42**	.41**

