

Quality of Parent-Child Relationships, Attachment, and Non-Suicidal Self-Injury: Two  
Investigations in Young Adult Samples

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To Mr. Marland, for all the times he asked, "*Is there nothing you can't do?*"  
and  
To Adam, for always encouraging me to stand up when I feel like falling down

## ABSTRACT

Non-suicidal self-injury (NSSI) is a destructive behaviour engaged in by a large proportion of youth and young adults in current society. Despite previous work, the recent revision of the DSM does not include NSSI as a distinct syndrome; instead it remains in a category for disorders requiring additional research. Thus, in order to better understand the many etiological components underlying NSSI behaviour, still more investigation is required. To this end the current investigations aimed to further elaborate upon known links between NSSI behaviour and parent-child relationships from two perspectives: first, with regard to the overall quality of relationships with parents, and second, with specific focus on the impact of attachment representations of early relationships with parents. Though both perspectives have been investigated in the past, the current studies were developed to alleviate methodological limitations of the existing literature. Study 1 adopted a person-centered approach to examine patterns of perceived relationship quality reported by self-injuring youth based on the combination of multiple relational characteristics; these patterns were then compared with several indices related to different manifestations of NSSI behaviour. Results show heterogeneity in the perceptions of parent-child relationship quality in self-injurers, such that both negative and positive family backgrounds were implicated in the behaviour. Further analyses demonstrate that the level of risk presented by a self-injuring individual can be differentiated based on perceived quality of parent-child relationship. Study 2 investigated how individuals' internalized states of mind regarding early attachment experiences are related to NSSI, with particular attention dedicated to the relative influences of child maltreatment and attachment representation. Attachment representations reflecting deficits in emotion regulation (preoccupied, unresolved/cannot classify) were most common in self-injurers. Moreover, self-reported childhood maltreatment and attachment states of mind independently contributed to the

prediction of NSSI. Lastly, findings suggest that distinct relational influences characteristic of relationships with mothers and fathers are associated with NSSI. The two studies presented here significantly contribute to existing knowledge concerning parental influences in the etiology of NSSI. These investigations add to existing knowledge of NSSI, and may ultimately aid in preventing and treating this damaging behaviour.

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CHAPTER 1:  
General Introduction

## General Introduction

### **Definition and Prevalence of NSSI**

Non-suicidal self-injury (NSSI) is defined as any purposeful, self-inflicted destruction of body tissue. NSSI is performed without conscious, observable suicidal intent, and uses methods that are not considered socially acceptable (Favazza, 1989; Nixon & Heath, 2009; Nock & Favazza, 2009). Although self-cutting is the most frequently documented method of NSSI (Favazza, 1996; Klonsky, 2009; Nock & Prinstein, 2004; Whitlock, Muehlenkamp, & Eckenrode, 2008), additional injurious methods such as self-burning, inserting objects beneath the skin, self-hitting, biting, minor overdosing, hair pulling, and interfering with wound healing are also commonly reported in research (Gratz, Conrad, & Roemer, 2002; Klonsky & Olino, 2008; Madge et al., 2011; Nixon, Cloutier, & Jansson, 2008; Nock, 2010; Ross & Heath, 2002; Whitlock, Eckenrode, & Silverman, 2006). Body modifications (i.e., tattooing, body piercing) are not examples of NSSI behaviour as these actions are socially accepted to at least some extent. NSSI is especially common in females aged 15 to 24 (Hawton et al., 2003), and is most often used as a means of coping with or reducing negative emotion and psychological distress (Klonsky, 2009; Muehlenkamp et al., 2009; Nock, Prinstein, & Sterba, 2009). Additional reasons for engaging in NSSI have also been reported at lesser frequencies, including as a way to avoid thoughts of suicide, to exert influence over others, or to punish oneself (see Klonsky, 2007).

Although NSSI was traditionally conceptualized as an issue underlying psychological diagnosis such as borderline personality and depressive or anxious disorders within clinical samples of adolescents and young adults (see Lofthouse, Muehlenkamp, & Adler, 2009; Nock & Cha, 2009 for reviews), theoretical and empirical study throughout the past two decades suggest that this behaviour is also quite common in community populations of youth. Conterio and Lader

(1998) first suggested that many self-injurers may demonstrate no symptoms of other debilitating psychological disorder, and are thus unlikely to seek help from mental health practitioners for their NSSI behaviour. In a recent epidemiological study surveying 3744 youth in the United Kingdom (Sayal, Yates, Spears, & Stallard, 2014) researchers found that less than 5% of the 337 youth in their sample who endorsed self-injury had seen mental health professionals in the six months prior to the study. These evidences provide a possible explanation for why many self-injurers in the general population remain hidden from medical and mental health professionals, and indication of where the misconception that NSSI is merely a symptom of psychiatric diagnosis originated. Additional empirical work by Selby and his colleagues (Selby, Bender, Gordon, Nock, & Joiner, 2012) provides further support to this early hypothesis, such that these researchers found that NSSI behaviour is commonly diagnosed both with and without additional comorbid psychopathology. Thus, it appears that a great many individuals engaging in self-injuring behaviour are never treated for these behaviours or their underlying causes, likely resulting in the previous misconception of NSSI as being relevant only in psychiatric populations.

Heath and colleagues (Heath, Schaub, Holly, & Nixon, 2009) reviewed the existing literature regarding prevalence rates in both clinical (i.e., individuals recruited from inpatient or outpatient psychiatric treatment facilities) and community (i.e., participants recruited from high schools, colleges or universities) samples of youth. Results of this review demonstrated that individuals in both populations endorsed NSSI, though the behaviour was reported to a higher degree in clinical populations. Specifically, between 38 and 67% of youth in the clinical samples reviewed by Heath et al. had engaged in NSSI, compared to between 4 and 38% of community-based adolescents and young adults. Thus, despite initial debate as to the occurrence of NSSI

external to mental health diagnosis and psychiatric populations, it is now accepted that individuals in community-based samples also engage in this damaging behaviour.

There remains, however, some debate as to the great range of prevalence of NSSI within community samples. Some experts attribute the higher end of the spectrum (i.e., prevalence rates close to the upper range reported by Heath et al.) to methodological issues within the studies themselves. Studies assessing NSSI behaviours using multi-item self-reports (as opposed to interviews or single item measures), those with broader definitions of NSSI (e.g., including nail-biting or wound picking as a type of self-injury), studies in which only one act of NSSI was required to determine status as a self-injurer, and investigations that were advertised as studies of self-injury to recruit participants have all been found to yield prevalence rates towards this upper range (Muehlenkamp, Claes, Havertape, & Plener, 2012; Nock, 2010). Still other researchers suspect that higher prevalence rates are indeed plausible within certain samples of community youth, but that due to a dearth of large-scale population based epidemiological studies regarding NSSI, rates can only be estimated across multiple studies using cross-sectional samples (Muehlenkamp et al., 2012; Plener & Muehlenkamp, 2007). According to these particular researchers, the rates presented above at best provide a rough estimate of the true prevalence of NSSI within community-based samples of adolescents and young adults. Thus, although researchers generally accept that rates between 13 and 17% are most common and are representative of the prevalence of NSSI in adolescent and young adult community samples (e.g., Favazza, DeRosear, & Conterio, 1989; Nixon et al., 2008; Ross & Heath, 2002; Swannell, Martin, Page, Hasking, & St. John, 2014; Whitlock et al., 2006), it remains possible that NSSI occurs at even greater frequencies in community populations than research has documented.

NSSI is a serious health risk for youth, particularly considering that a number of self-injuring youth will never seek medical attention or mental health treatment (Conterio & Lader, 1998; Sayal et al., 2014), and are thus at increased risk for infection or accidental death as a result of their harmful behaviours (Adrian, Zeman, Erdley, Lisa, & Sim, 2011; Muehlenkamp, 2006; Whitlock, Lader, & Conterio, 2007). Moreover, recent research has indicated that reports of NSSI have increased over the past two decades (Hawton et al., 2003; Muehlenkamp, Williams, Gutierrez, & Claes, 2009; O'Loughlin & Sherwood, 2005). In fact NSSI was proposed for inclusion as a separate diagnosis or syndrome in the recently revised *Diagnostic and Statistical Manual of Mental Disorders* (5<sup>th</sup> edition; DSM-V; American Psychiatric Association, 2013) based on repeated reference to NSSI's occurrence in community samples throughout the literature (see Muehlenkamp, 2005). However, despite evidence stressing the unique nature of NSSI in community-based as opposed to clinical populations of individuals with mental health diagnoses (Bracken-Minor & McDevitt-Murphy, 2013; In-Albon, Ruf, & Schmid, 2013; Lengel & Mullins-Sweatt, 2013; Selby et al., 2012; Ward et al., 2013) authors of the DSM-V refuted the move for inclusion, and indicated that additional research is required before this proposed change can be accepted. Thus, researchers must continue to conduct empirical investigations to help target those individuals who are ultimately at risk for engaging in NSSI in hopes of establishing prevention and intervention strategies, and to promote a more detailed understanding of the nature of NSSI and of the individuals who engage in this behaviour. Several theories have focused in particular on the role of experiences within the parent-child or family context in association with NSSI. Most notable of these include Linehan's (1993) theory regarding the role of invalidating family environments in NSSI's development, and the developmental psychopathology approach to NSSI (Yates, 2009).

**Invalidating Family Environments and NSSI**

Marsha Linehan (1993) proposed that invalidating relationships with caregivers increase the likelihood of engaging in NSSI in adolescence and young adulthood. Invalidating relationships are those in which the child's emotional distresses or needs are negated and rejected, such that the child learns that his or her emotional experience (particularly with negative emotions) in a given context is wrong, and in which inappropriate emotional responses (e.g., physical violence, verbal abuse) are modeled by parents. Such relationships are likely to promote deficits in emotion regulation skills, particularly in understanding the causes of particular emotions (e.g., Perlman, Kalish, & Pollak, 2008), and in developing adequate coping skills to use when dealing with emotional distress (e.g., Meesters & Muris, 2004). Indeed, researchers have provided empirical support for the importance of responsive parental care in the development of appropriate emotion regulation (see Calkins & Hill, 2007 for a review), such that sensitive, accepting, and soothing parental responses as well as parental monitoring and coaching of the child's emotional distresses are related not only to the use of more adaptive coping strategies, but also to the child's increased comfort with emotional experiences and additional flexibility for dealing with his or her own emotional needs (Brown, Fitzgerald, Shipman, & Schneider, 2005; Gottman, Katz, & Hooven, 1996; Sroufe, 1996). Conversely, children and adolescents who report being invalidated or emotionally rejected by parents report using more maladaptive emotion regulating strategies than their counterparts who feel emotionally supported by their parents (Yap, Allen, & Ladouceur, 2008). Thus, theory and evidence alike suggest that family environments in which feelings are invalidated or rejected leave the child with few opportunities to learn about or experience emotions appropriately, or to understand why certain emotions are experienced in response to various events. Moreover, such family environments fail to provide

the child with supportive responsiveness in the face of painful emotional experiences.

Combined, these limitations of invalidating family environments leave the child ill-equipped to cope with their own distressing emotions throughout development, and may increase the individual's likelihood of engaging in maladaptive coping strategies, including NSSI.

A great deal of empirical support for parental influences on engaging in NSSI comes from research linking childhood physical or sexual abuse and neglect to engagement in NSSI (see Klonsky & Moyer, 2008 for a review; see also Molnar, Berkman, & Buka, 2001; Paivio & McCulloch, 2004; van der Kolk, Herman, & Perry, 1991; Whitlock et al., 2006). However, as Tantam and Whitaker (1992) noted, and as Linehan (1993) proposed, it is possible that the overall negative family context in which maltreatment occurs, akin to an invalidating family environment, is also highly implicated in the development of NSSI rather than solely the experience of maltreatment itself. This proposition opens the potential for invalidating family environments in childhood to influence NSSI engagement even in the absence of more extreme forms of childhood maltreatment, which may be especially relevant in lower risk samples where maltreatment may occur at a lesser frequency, and may thus hold less influence in the development of NSSI (see Klonsky & Moyer, 2008). Indeed, subsequent findings suggest that childhood relationships with parents that are characterized by more general negative interactions also contribute to the occurrence of NSSI during adolescence and young adulthood. Many constructs representing negative interactions have been examined including miscommunication, conflict, parental rejection, alienation, lack of care, overprotection and control, poor social support, and negative emotionality (Andrews, Martin, Hasking, & Page, 2013; Bjärehead & Lundh, 2009; Bureau, Martin, Freynet et al., 2010; Gratz, 2006; Gratz et al., 2002; Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008; Lundh, Wångby-Lundh, & Ulander, 2008; Tantam &

Whitaker, 1992; Wedig & Nock, 2007; Yip, 2005). However, as described in more detail within Study 1, researchers in this area have not reached a consensus regarding which aspects of the parent-child relationship are most influential, resulting in a multitude of relational variables placed under investigation, and limited replication of the specific results obtained. Moreover, it is unclear how the many different characteristics of invalidating family environments and parent-child relationships identified in the existing literature may combine in association with NSSI behaviours or with specific cognitive and behavioural features of NSSI.

To date, researchers in this area have primarily employed a *variable-centered approach*. In analyses of this kind, the focus of the investigation is to identify individual relational characteristics associated with NSSI overall. In contrast, a *person-centered approach* uses the individual participant as the unit of interest, rather than particular variables (see Bergman & Trost, 2006). As such, person-centered approaches acknowledge patterns of responding on a designated set of features or characteristics in order to differentiate individuals from one another on the basis of these pre-defined constructs. The use of person-centered approaches in this particular field would allow an assessment of the individual's perceptions of multiple parent-child relational characteristics simultaneously, as well as examination of how specific combinations of relational characteristics or different family backgrounds are associated with NSSI, beyond those found independently for each characteristic. Finally such research approaches would also permit investigation of how various groupings of relational characteristics may be differentially correlated to particular manifestations or features of NSSI behaviour. Thus, Study 1 targets this gap in the existing literature, and uses a person-centered approach to studying familial influences on NSSI and its related features.

### **Developmental Psychopathology, Attachment and NSSI**

Aside from the aforementioned need for research from a person-centered approach, there is also a need for additional investigation of the proposed *mechanisms* by which poor quality of family experiences may be linked with NSSI. Thus, a developmental psychopathology or, more generally, an attachment-based framework for understanding NSSI has been proposed (see Yates, 2009). Additional research from such a perspective would further clarify the respective influences on NSSI of both *experiencing* poor quality interactions with parents, and of the *internalization* of these experiences into subsequent, insecure mental representations of attachment. In other words, such investigation would permit analysis of the influences of both having experienced maltreatment by parents as well as the individual's *concurrent* internalized representation of the quality of these early experiences. These internalized mental representations are believed to reflect the individual's capacity and strategies for coping with emotionally laden experiences in past and present (Allen, 2008), and have important consequences for the individuals' overall emotion regulating skills and psychological adjustment.

**Developmental psychopathology.** The developmental psychopathology paradigm offers one framework for understanding the possible processes or mechanisms through which early maltreatment, inadequate early care, or negative parent-child interaction ultimately lead to engaging in NSSI. As summarized by Yates (2009), this theory suggests that the risk of psychopathology (in this case NSSI behaviour) increases through maladaptation of the child's cognitive, emotional, or behavioural development, which result from inadequate early care experiences (including maltreatment in extreme cases, or invalidating environments in less severe instances). Such maladaptation prevents the child from developing appropriate self-regulatory skills for coping with emotional distresses during childhood and beyond, which likely increase the chance of ultimately engaging in NSSI (see Linehan, 1993). Insecure attachment to parents is

especially highlighted as one maladaptation possible through this perspective, as inadequate or invalidating parent-child interactions early in life commonly lead to the adoption of insecure internal working models. Moreover, as an extension of developmental psychopathology's framework, one can presume that the persistence of insecure attachment representations throughout development and into adolescence or early adulthood would further increase the likelihood of continued psychological maladaptation, and heightened risk for engaging in NSSI. Additional information regarding attachment theory, the development of adolescent and adult attachment mental representations, and related pathways to NSSI suggested by the developmental psychopathology framework are described in detail below.

**Attachment theory.** John Bowlby (1969/1982) proposed that children are biologically predisposed to behave in ways which are aimed at maintaining proximity to parents (caregivers) in order to feel safe, secure, and protected. Proximity-seeking behaviours are especially activated during times of distress or danger, or, more generally, when the infant or child feels apprehensive about events within his or her immediate environment. Parental responsiveness to these proximity-seeking behaviours contributes not only to the physical safety of the child, but also to the child's own internalized sense of attachment security. Attachment theorists and researchers have also proposed that, over time and through repeated interaction between infant and caregiver, the infant develops an internal working model of the self and of the attachment figure (Bretherton & Munholland, 2008). Internal working models endure throughout development and are ultimately incorporated into an adult mental representation of early experiences and attachment relationships (Main, Kaplan, & Cassidy, 1985), and, subsequently, the individual's capacity for the self-regulation of emotions in future times of distress (Allen, 2008).

The attachment system is sensitive to context, such that infants learn different patterns of behaviour to maintain proximity to caregivers, based on the degree to which caregivers are anticipated as being available (Ainsworth, Blehar, Waters, & Wall, 1978; Main, 1990; Main & Solomon, 1990). Four distinct behavioural patterns of attachment have been identified, each also corresponding with a specific pattern of parental behaviour. Infants and children who become securely attached tend to have caregivers who are consistently responsive to the child's distress. Through repeated interactions these children learn caregivers will be available when needed, and are comfortable to explore the environment when no threat is imminent. In contrast, insecurely attached infants and children tend to have parents who are either unresponsive or inconsistently available, thus these children learn behavioural strategies to employ during times of distress in order to maximize the likelihood of caregiver proximity and responsiveness. Insecure-avoidant children often have parents who reject the child's emotional responses to distress, and thus these children learn to minimize the expression of negative emotion in times of need in order to keep the caregiver nearby. In contrast, children classified as insecure-ambivalent have parents who are inconsistent in their availability, thus the child learns to overreact to distress, displaying urgent, insistent demands for attention from the caregiver to increase the likelihood of a response. Finally, some infants and children exhibit no organized or coherent pattern of behaviour in distressing interactions with parents, and are said to demonstrate disorganized/disoriented attachment strategies. It has been proposed (see Main & Hesse, 1990) that caregivers of disorganized children are either frightening (e.g., an abusive parent) or frightened (e.g., a depressed, withdrawn parent) in interactions with the child, or demonstrate an extreme lack of sensitivity or disrupted communication (Goldberg, Benoit, Blokland, & Madigan, 2003; Madigan, Moran, & Pederson, 2006; Lyons-Ruth, Yellin, Melnick, & Atwood, 2005). In

summary, children's attachment strategies are highly dependent upon the type of environment in which they interact with their parents.

In contrast to childhood, where attachment patterns are assessed through a child's interactions with the caregiver, by adolescence and adulthood a move to the *level of representation* (Main et al., 1985) occurs. By this developmental stage, adolescents and adults are able to reflect upon past relationships with parents, and are believed to have achieved internalized mental representations of these attachment relationships. As suggested previously, it is presumed that these mental representations also embody the adolescent's or adult's internalized strategy for the self-regulation of distress, which develops in part as a result of the quality of early experiences with caregivers (see Allen, 2008). These mental representations have been termed *attachment states of mind* and are best assessed using the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985/1996). Coding of AAI transcripts results in autonomous, dismissing, preoccupied or unresolved attachment state of mind classifications (Main, Goldwyn, & Hesse, 2002), which correspond with secure, avoidant, ambivalent, and disorganized attachment patterns from childhood, respectively. Just as the child's proximity-seeking behaviour is learned based on repeated interaction with caregivers, it is believed that an adolescent's or adult's attachment state of mind on the AAI reflects the manner in which they have internalized prior early experiences (Hesse, 2008). Each state of mind category represents a distinct manner through which the individual currently reflects on attachment relationships with parents (full coding procedures are described in Study 2), and his or her current strategy for regulating potentially disruptive emotions regarding attachment experiences. Research has repeatedly shown that insecure attachment in both childhood and adulthood are linked with psychopathology (DeKlyen & Greenberg, 2008; Dozier, Stovall-McClough, & Albus, 2008;

Hesse, 2008; Lyons-Ruth & Jacobvitz, 2008). In particular, insecure (i.e., dismissing, preoccupied) and unresolved states of mind have been linked with borderline personality disorder (BPD; see Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004 for a review; Barone, Fossati, & Guiducci, 2011; Levy et al., 2006) eating disorders (Barone & Guiducci, 2010; Dias, Soares, Klein, Cunha, & Roisman, 2011; Fonagy et al., 1996; Ramacciotti et al., 2001), and mood disorders (Ammaniti et al., 2006; Murray, Halligan, Adams, Patterson, & Goodyer, 2006; Patrick, Hobson, Castle, Howard, & Maughan, 1994; Pianta, Egeland, & Adam, 1996).

**Links with NSSI.** Both conceptual and empirical works support the association between insecure attachment representations and NSSI. The developmental psychopathology approach to NSSI suggests that inadequate early care (in its extreme form, child maltreatment) and insecure attachment to caregivers (and by extension, insecure attachment states of mind in adolescence or adulthood) can be conceptually linked with NSSI in three ways (see Yates, 2009). First, the inadequate early care underlying insecure attachment may affect the individual in terms of developing a view of self as hostile, unlikeable or undeserving of care (Fischer & Ayoub, 1994; Toth, Cicchetti, Macfie, & Emde, 1997). In these instances the individual may also perceive others as critical, harsh or unsupportive, and be left to learn how to cope with emotional distress on their own. This path has been termed by Yates (2009) as the *representational path*, as NSSI is thought to result from representations of the self as defective and of others as unsupportive or unhelpful, thus NSSI is used either to punish the self or to self-soothe. Similarly, NSSI may develop as a means of self-regulating emotion in those individuals for whom insecure attachment relationships with caregivers have left them otherwise unable to understand and deal with challenging emotional experiences. Such inabilities may result from early care in which emotional experience appeared overwhelming to the parent (and thus to the self), or in which

discussions regarding emotion did not occur, leaving the individual with a limited understanding of emotional contexts and few appropriate resources for dealing with severe emotional distress. Yates called this the *regulatory path*, in which the individual uses NSSI to self-soothe when faced with extreme negative emotion. Finally, Yates proposed that NSSI may develop through a *reactive path* from early inadequate care, such that the individuals' early negative experiences with caregivers result in dysfunction of the hypothalamic-pituitary-adrenal axis (HPA axis) due to repeated exposure to stress. Indeed inadequate early care and insecure attachment have each been linked with dysfunction of the stress response system (see Bureau, Martin, & Lyons-Ruth, 2010; Schuder & Lyons-Ruth, 2005). Advocates of attachment theory and of the AAI specifically would likely further predict that insecurity of attachment representations (i.e., dismissing, preoccupied, unresolved) may be equally likely to be the concurrent attachment representation for any one of these paths to NSSI. Given the overlap in the effects of insecure attachment and poor early care, these three pathways to NSSI are not mutually exclusive, and a self-injuring individual may be affected by more than one at a given time. Thus, the developmental psychopathology framework, even when modified slightly to account for concurrent as opposed to prospective influences of attachment, offers three explanations for the process of association between poor parent-child relationships, insecure attachment and NSSI.

***Gaps in the existing literature.*** Despite developmental psychopathology's traditional focus on childhood relationships in association with NSSI, the persistence of insecure attachment representations into adolescence and adulthood may be further cause for concern regarding individuals' psychological well-being and adaptation, given the prolonged adherence to insecure relational patterns and the resulting continued developmental maladaptation. Indeed, empirical research has emphasized the role of concurrent attachment representations in association with

NSSI (Critchfield, Levy, Clarkin, & Kernberg, 2008; Gormley & McNiel, 2010; Gratz et al., 2002; Hallab & Covic, 2010; Heath, Toste, Nedecheva, & Charlebois, 2008; Kimball & Diddams, 2007; Levesque, Lafontaine, Bureau, Cloutier, & Dandurand, 2010; Tatnell, Kelada, Hasking, & Martin, 2013), though this research has shown inconsistent results (see Study 2 for more detail). These contradictory findings likely result from methodological limitations inherent in assessing attachment via self-report questionnaires. Attachment questionnaires may only account for individuals' *consciously reportable* perceptions of the quality of attachment relationships, while much of attachment's fundamental premises are based on the fact that these processes are unconscious and occur external to the individual's awareness (see Bowlby, 1988). The existing literature base would be greatly benefited by further examination of these associations using a more complex assessment of attachment, such as the AAI. Additional justification for studying NSSI from an attachment perspective, particularly using the AAI, comes from research linking attachment with BPD (see Agrawal et al., 2004 for a review) and suicidal ideation/attempts (e.g., Adam, Sheldon-Keller, & West, 1996), both of which have been linked with NSSI (see Lofthouse et al., 2009). Finally, researchers have not thoroughly investigated the potential for developmental psychopathology explanations for NSSI. As such, the relative associations between NSSI and each of maltreatment and concurrent internalized attachment representations remain largely uninvestigated. Study 2 aimed to respond to these oversights.

### **The Current Studies**

The theories and research reviewed here identify two gaps in existing literature concerning the role of parent-child relationships and NSSI. First, despite repeated links between characteristics of invalidating parent-child relationships and NSSI, the majority of this research lacks replication and coherency. Nearly all studies in this area use different constructs or

assessments of parent-child relationship quality, thus it is unclear if the established associations between NSSI and specific quality of parent-child relationship variables would be replicated in additional investigations. Moreover, researchers have not determined how particular characteristics of invalidating family environments may combine or interact in association with NSSI and its related features (e.g., accessibility of additional coping strategies, reasons for engaging in NSSI, severity of NSSI). To remedy these limitations, Study 1 used a latent profile analysis to establish family background profiles of self-injurers based on a small subset of invalidating parent-child relational characteristics that have been related to NSSI in multiple past investigations, and are especially relevant in terms of Linehan's theory of invalidating family environments. The established profiles were then contrasted based on the degree to which participants within each profile reported using different strategies of general coping, their reported reasons for engaging in NSSI, and the severity of their NSSI behaviours.

The second overall research gap identified herein concerns a developmental psychopathology or attachment-related framework to understanding NSSI. Although attachment is strongly linked theoretically with NSSI, the existing research in this area is sparse and methodologically limited. Moreover, the relative importance of maltreatment in childhood and insecure attachment representations as predictors of NSSI engagement remain unknown. To alleviate these shortcomings of past research Study 2 utilized the AAI, the "gold standard" measurement of attachment in adolescence and young adulthood, to determine which states of mind regarding attachment are associated with NSSI specifically. Further analyses examined how attachment states of mind account for the prediction of engaging in NSSI beyond the occurrence of childhood maltreatment, and how features underlying AAI state of mind classification in self-injurers may differ when rated for relationships with mother versus fathers.

STUDY 1:

Identifying Profiles of University-Aged Self-Injurers based on Parent-Child Relationship

Quality: Comparing Coping Strategies, Functions, and Symptom Severity

Author Note

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### Abstract

Invalidating family environments have been linked with engagement in non-suicidal self-injury (NSSI). However, the potential for various combinations of family background characteristics to form profiles of self-injurers, and the potential for these profiles to differ based on cognitive and behavioural manifestations of NSSI remain uninvestigated. The current study established family background profiles based on multiple parent-child relationship characteristics, and compared general coping capacities, functions of NSSI, and severity of NSSI across these profiles. Latent profile analysis in a sample of 265 self-injuring university students (205 females;  $m = 19.37$  years) revealed four distinct profiles, two characterized by negative family backgrounds and two by positive backgrounds. Individuals reporting positive family backgrounds appeared at a lower risk based on general coping strategies, emotion regulation deficits, and severity of NSSI. In contrast, individuals reporting negative, disturbed family backgrounds demonstrated heightened risk for problems with coping, engaged in NSSI to regulate aggressive emotions, and reported more severe NSSI. As such, quality of family background should be considered when evaluating the continued risk faced by self-injuring youth, and in planning appropriate treatment approaches.

*Keywords:* non-suicidal self-injury; young adults; adolescents, latent profile analysis, parent-child relationships, family environments

Identifying Profiles of University-Aged Self-Injurers based on Parent-Child Relationship  
Quality: Comparing Coping Strategies, Functions, and Symptom Severity

Non-suicidal self-injury (NSSI) involves deliberate, self-inflicted damage to body tissue; these acts are performed without the intent to commit suicide, and using methods that are socially unsanctioned, commonly including the cutting or burning of skin (Nixon & Heath, 2009; Nock & Favazza, 2009). Researchers and clinicians alike suggest that NSSI is more prevalent than originally believed within community-based populations (e.g., Muehlenkamp, 2005), with between 4 and 38 % of high-school and university-aged youth reporting having engaged in at least one act of NSSI (see Heath, Schaub, Holly, & Nixon, 2009 for a review). More conservative estimates controlling for methodological differences across studies have placed NSSI's prevalence at between 13 and 17% of nonclinical samples of adolescents and young adults (Swannell, Martin, Page, Hasking, & St. John, 2014). Given the prevalence of NSSI, a great deal of recent research has focused on identifying particular risk factors for engaging in this behaviour, with emphasis on the role of the family context, particularly in non-clinical samples (Adrian, Zeman, Erdley, Lisa, & Sim, 2011; Bjärehead & Lundh, 2008; Claes, Vandereycken, & Vertommen, 2004; Crowell et al., 2008; Di Pierro, Sarno, Perego, Gallucci, & Madeddu, 2012; Wedig & Nock, 2007). However, the existing research has typically applied *variable-centered* as opposed to *person-centered* approaches to studying relational characteristics associated with NSSI, and as such do not account for any additional diversity of family backgrounds that may be reported within groups of self-injurers (see Bergman & Trost, 2006; von Eye & Bergman, 2003). Overlooking this possible diversity further limits existing knowledge regarding NSSI, as the potential for differential impacts of family backgrounds on the cognitive (e.g., coping strategies, functions of NSSI) and behavioural manifestations of NSSI (e.g., frequency, number of methods) across individuals remain uninvestigated, despite some evidence that varying risk factors may

have distinct influences on NSSI related outcomes (Hamza & Willoughby, 2013; Klonsky & Olino, 2008; Lundh, Wängby-Lundh, & Ulander, 2009; Whitlock, Muehlenkamp, & Eckenrode, 2008). The current study aimed to alleviate these limitations through its use of a person-centered approach to establish profiles of self-injurers based on different self-reported family backgrounds, and by comparing these profiles across cognitive and behavioural characteristics of NSSI behaviour.

### **The Importance of a Person-centered Approach to Studying NSSI**

In variable-centered approaches, focus is placed on individual variables as the units of interest. Using the field of NSSI as an example, this approach has traditionally involved identifying individual relational characteristics associated with the overall occurrence of NSSI. In contrast, the person-centered approach assumes the individual as the unit of interest, and uses organizational patterns of responses on key variables to create profiles of individuals similar to one another on the variables of interest, but different from people assigned to the other identified profiles (Bergman & Trost, 2006). This approach is often suggested for use in developmental psychopathology research (see von Eye & Bergman, 2003) in order to account for diversity within groups of individuals sharing similar diagnosis or clinical behaviour, and to compare these groups based on the degree of risk they demonstrate within their particular psychological diagnosis. As developmental psychopathology is a framework commonly used to understand the etiology of NSSI (Yates, 2009), person-centered approaches may be of particular utility in this area. The current study applied a person-centered approach to assess multiple parent-child relational characteristics simultaneously, thus examining whether specific combinations of these characteristics formed diverse profiles of family backgrounds within the group of self-injuring youth. Comparisons were then made *across* the profiles of self-injurers based on features associated with the degree of risk inherent in NSSI behaviour. Of particular concern in this

study were the individuals' varied capacities for coping with distress, reported reasons for engaging in NSSI, and different severities of the behaviour (e.g. earlier age of onset of NSSI, higher frequency, greater number of methods used and body parts injured, more medical treatment needed for NSSI, and more hospitalization because of NSSI). Despite a recent trend of using person-centered approaches in NSSI research (Hamza & Willoughby, 2013; Klonsky & Olino, 2008; Lundh et al., 2009; Whitlock et al., 2008; You, Leung, Fu, & Lai, 2011), the current study is the first of its kind to apply this approach to characteristics of parent-child relationship quality specifically, and to address their relative associations to manifestations of NSSI.

### **NSSI and Indicators of Parent-child Relationship Quality**

Following the ground-breaking theory outlined by Marsha Linehan (1993), a substantial amount of research has shown that the quality of parent-child relationships are linked with NSSI, such that individuals who engage in self-injury tend to report relationships with parents that are characterized by negative interactions. To name a few, family chaos, separation from parents, lack of family cohesiveness, parental emotional rejection, lack of parental care, high parental control, limited parental emotional expressivity, negative emotional tone between parent and child, and poor communication with parents have all been linked with NSSI (e.g., Adrian et al., 2011; Bjärehead & Lundh, 2008; Bureau, Martin, Freynet et al., 2010; Claes et al., 2004; Crowell et al., 2008; Gratz, 2006; Tulloch, Blizzard, & Pinkus, 1997; van der Kolk, Perry, & Herman, 1991; Wedig & Nock, 2007). Despite this wealth of knowledge, there is a lack of consistency in the specific relational characteristics assessed across studies, as well as a lack of replication of the obtained results. There is, however, a subset of literature that has replicated findings using the same underlying dimensions of parent-child relationship quality in samples of community adolescents and young adults (e.g., high school or university students recruited from sources other than hospital or outpatient facility). A series of studies using the Parental Bonding

Index (PBI; Parker, Tupling, & Brown, 1979) have shown that maternal and paternal control and lack of care from mothers and fathers were associated with NSSI in several community samples. For instance, lack of parental care in general (averaged across both mothers and fathers) has been associated with NSSI in both male ( $n = 97$ ) and female ( $n = 249$ ) undergraduate students (Gratz, 2006; Gratz & Chapman, 2007); female self-injurers from this research also reported greater parental control. When maternal and paternal lack of care and control were measured separately in a sample of 1238 university students, Bureau, Martin, Freynet et al. (2010) demonstrated that lack of care and high control from both mothers and fathers were associated with having engaged in NSSI.

Research has also shown that individuals who engage in NSSI perceive their relationships with parents as characterized by lack of trust, poor communication and feelings of alienation, as measured by the Inventory of Parent and Peer Attachment (IPPA; Arnsden & Greenberg, 1987). In one such study, Hilt and colleagues (Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008) showed that participants who had engaged in NSSI reported poorer overall quality of relationships with parents (indicated by composite IPPA scores) compared to participants who did not engage in NSSI in their sample of 508 sixth, seventh, and eighth graders. Bureau, Martin, Freynet et al. (2010) expanded on these findings using the individual subscales of the IPPA rather than a composite score in their sample of university-aged students. These authors showed that individuals reporting NSSI behaviour similarly perceived relationships with parents as being characterized by less trust, poor communication and high degrees of alienation. Also within Bureau and colleagues' investigation, alienation was the strongest predictor of NSSI of the three IPPA subscales. Similarly, alienation in particular has been shown to partially mediate the association between parental criticism and engaging in NSSI in female ( $n = 514$ ), and to fully mediate the same association in male ( $n = 465$ ) high school students (Yates, Tracy, & Luthar,

2008), suggesting that it may be through feeling alienated from parents that some other negative relational characteristics are especially linked with NSSI's occurrence.

While the literature presented above clearly depicts that maternal and paternal lack of care and control, as well as limited trust, poor communication and feelings of alienation stemming from relationships with parents in general are consistently linked with NSSI across multiple community populations, there may be still other, more extreme characteristics of parent-child relationships which are associated with engaging in NSSI behaviour. The aforementioned investigations, save for those pertaining specifically to feeling alienated from parents, have focused on aspects of the parent-child relationship that reflect a general lack of intimacy, rather than on dimensions which may be associated with more extreme hidden relational traumas. Relational traumas are thought to originate in infancy and early childhood, and to result primarily from highly insensitive or inadequate caregiving and, in extreme cases, from child maltreatment (Bureau, Martin, & Lyons-Ruth, 2010; Schuder & Lyons-Ruth, 2004). The Adolescent Unresolved Attachment Questionnaire (AUAQ; West, Rose, Spreng, & Adam, 2000) was created to measure the degree to which individuals perceive their childhood relationships with parents to be characterised by a sense of *failed protection*, *anger*, or *fear of abandonment*. Specifically, these dimensions together can be interpreted as reflecting the degree to which individuals perceive *relational trauma* within early relationships with parents. In the first published study using the AUAQ, West and colleagues (2000) found that a group of 133 adolescents demonstrating recent suicidal behaviour reported more relational trauma within relationships with parents than a comparison group of 691 non-suicidal adolescents from the community. Given the strong links between suicidality and NSSI (see Lofthouse & Yager-Schweller, 2009 for a review) and between early maltreatment or inadequate care and NSSI (see Yates, 2009 for a review), it is likely that similar results would be found in association with

NSSI behaviour. Indeed Bureau, Martin, Freynet et al. (2010) showed that university students who had engaged in recent NSSI retrospectively reported greater relational trauma indicated by the AUAQ than participants who did not engage in NSSI. Although limited in number, these findings indicate that relational dimensions associated with maladaptive or damaging parent-child relationships are associated with NSSI in young adults as suggested by earlier theoretical models (Linehan, 1993; Tantam & Whitaker, 1992).

In summary, a number of different researchers have identified associations between NSSI and specific dimensions underlying parent-child relationships within community samples of adolescents and young adults. Despite this evidence, the majority of past research in this area has come from a variable-centered approach, thus researchers have not examined how specific dimensions may combine to form different relational profiles of young adult self-injurers.

### **Existing Evidence from Person-centered Approaches**

In several recent studies researchers have determined subgroups of individuals engaging in NSSI based on indicators of the severity of NSSI behaviour (Hamza & Willoughy, 2013; Klonsky & Olino, 2008; Lundh et al., 2009; Whitlock et al., 2008; You et al., 2011). However, only one existing study has based their approach on patterns of interpersonal relationship quality (Lundh et al., 2009). Lundh and colleagues used a hierarchical cluster analysis to create profiles based on self-reported quality of emotional tone in both parent and peer relationships within a sample of 482 female seventh and eighth graders. Five clusters were extracted from the data, two of which were characterized by poor emotional tone with parents but differed from one another in regards to reported quality of peer relationships. Further comparisons demonstrated that individuals in the two groups with poor parent-child emotional tone reported a higher frequency of NSSI than the other groups demonstrating positive emotional tone in these relationships, regardless of the quality of peer relationships. These findings suggest that,

compared to peer relationships, the quality of emotional tone in parent-child relationships is especially influential in the frequency of NSSI.

Lundh et al. (2009) provided a first step in terms of identifying subgroups of self-injurers based on quality of interpersonal relationships. However, their study is limited by the inclusion of both self-injurers and non-self-injurers within analyses, so their findings may overlook additional diversity in the reported quality of parent-child relational characteristics evident for self-injurers alone. Further, the inclusion of both peer and parent relationship qualities in the clustering method makes it impossible to discern the precise influences of parent-child relationship quality in creating these subgroups, while the use of a single assessment of relationship quality (emotional tone) limits the detail that can be obtained regarding how different aspects of parent-child relationships may form varying typologies of self-injuring youth. Relationships are multifaceted, and can be characterized by many different features. Thus, truly accurate parent-child relationship profiles should be created based on multiple relational characteristics believed to underlie overall relationship quality.

As presented above, lack of parental care, parental control, lack of trust, poor communication, alienation, and relational trauma have been consistently over-reported by self-injurers across multiple studies. Combined with the fact that it is unlikely for all self-injurers to report each of these relational dimensions to the same degree, it can be presumed that these characteristics will combine in heterogeneous patterns to form different relational profiles of young adults who engage in NSSI. Individuals may also present with differing manifestations of their NSSI behaviours, which may also be linked with the heterogeneity of reported family characteristics. For example, individuals who report having overly controlling parents versus those with more severely maltreating parents, may report further differences in general capacities to cope with distress, reasons for engaging in NSSI, or the severity of NSSI behaviour. The

identification of unique self-injurer profiles such as these provides an opportunity to move empirically beyond the general understanding that negative or invalidating family environments predict the use of NSSI in later years, and permit further analysis of the influences of various family backgrounds on the manifestation of NSSI in young adults within the general community.

### **Coping Strategies, Parent-child Relationships, and NSSI**

Given the assumption that the present study will establish subgroups of self-injurers who report diverse family backgrounds, it is likely that individuals in these groups will have also developed different ways to cope with distress in general, external to their use of NSSI. Coping encompasses the cognitive and behavioural strategies that people use to deal with both the emotional and instrumental dimensions of stress (Aldwin, 1994; Costa & McCrae, 1990; Fields & Prinz, 1997; Lazarus & Folkman, 1984; Patterson & McCubbin, 1987). Existing research has shown that individuals who engage in NSSI use more avoidance-based strategies and fewer problem-focused or positive coping strategies to deal with stress than people who have never self-injured (see Guerreiro et al., 2013 for a review). Moreover, the capacity to use positive coping strategies may protect against ultimately engaging in NSSI in individuals who experience psychological distress (Williams & Hasking, 2009). Thus, it can be concluded that self-injurers in general tend to use more negative coping strategies and fewer positive coping strategies compared to individuals who do not engage in NSSI.

Poor relationships with parents have been similarly linked with the use of negative coping strategies, and there is a great deal of literature suggesting that positive, supportive relationships with parents promote the capacity to implement active, adaptive coping strategies in the face of stress. For instance, adolescents who perceive their parents as warm and supportive tend to use more active problem-solving and support-seeking coping strategies than adolescents who view their parents as neglectful or harsh discipliners (Dusek & Danko, 1994;

Meesters & Muris, 2004; Ruchkin, Eisemann, & Hägglöf, 1999; Wagner, Cohen, & Brook, 1996). Conversely, adolescents who describe their parents as unsupportive or rejecting engage in fewer active or positive coping strategies and in more avoidant strategies (Lafferty & Dorrell, 2006; Meesters & Muris, 2004; Ruchkin et al., 1999). Thus, it is intuitive to expect that individuals from family background profiles characterized by especially negative or damaging parent-child interactions (e.g., abusive), will likely report using more negative, and fewer positive coping strategies than individuals belonging to profiles defined by negative relationships of a lesser degree (e.g., overprotective or controlling parents).

### **Reasons for Engaging in NSSI and Parent-child Relationships**

As previously suggested, it is also likely that individuals across the family background profiles established in the current study may report different functions of engaging in NSSI. Functions of NSSI can be conceived of as one's underlying motivations or reasons for engaging in self-injurious behaviours. Klonsky (2007) compiled a comprehensive review of the reported reasons for engaging in NSSI, and extracted seven super-ordinate functions from the past literature. The first of these, and the most empirically supported function, is to regulate negative emotion, which posits that individuals engage in NSSI in order to relieve extreme negative or otherwise aversive emotions. Klonsky also indicated anti-dissociation functions from past research, in which NSSI is used as a means of generating feelings when the individual feels otherwise numb or empty. Anti-suicide functions have also been reported, where NSSI is used to manage suicidal urges. Additional functions include using NSSI as a means of establishing oneself within a social environment. For instance, social influence functions serve as an attempt to influence people with whom the individual interacts. Here self-injury is used as "a cry for help, a means of avoiding abandonment, or an attempt to be taken more seriously or otherwise affect people's behaviour" (Klonsky, 2007, p. 229). The last two functions reviewed by Klonsky

entail influence specifically on the self. Self-punishment models indicate that self-injury is an expression of negative feelings toward the self. Finally, sensation seeking functions depict NSSI as a risk behaviour that provides excitement or euphoria.

It is possible that individuals may report different functions of NSSI based at least in part on their perceptions of the quality of relationships with parents. Unfortunately it is difficult to make especially concrete hypotheses regarding the role of parental behaviours on individuals' reasons for engaging in NSSI due to an extreme lack of information to this regard in past research. In fact to date only one investigation has directly assessed the influence of parent-child relationship characteristics on functions of NSSI. Kaess et al. (2013) showed that characteristics of negative relationships with mother or father were associated with increases in the degree to which NSSI was used for emotion regulating functions, but with either only slight decreases or no change in reports of using NSSI for reasons of social or interpersonal influence in their sample of 125 clinically diagnosed adolescents and young adults. Despite the limited information available, tentative predictions were made in the present study based on results from Kaess et al., and on the available knowledge of the impact of parental practices on youth socioemotional development more generally. For instance, given the findings presented by Kaess et al., combined with the fact that emotion regulating abilities are limited by being raised in an invalidating, negative family environment (e.g., Linehan, 1993; Schuder & Lyons-Ruth, 2004; Yates, 2004), it is likely that individuals reporting particularly negative or damaging relationships with parents may be more likely to engage in NSSI for emotion regulating purposes. Additional evidence has indicated that negative childhood relationships with parents are related to poorer social interactions with peers (Howes & Hong, 2008; Leary, Kelley, Morrow, & Mikulka, 2008; Scharf & Mayselless, 2008). Thus, individuals reporting poorer quality of childhood relationships with their parents may also fail to develop appropriate social

skills to implement during interpersonal conflicts, instead turning to less adaptive methods of dealing with interpersonal difficulties, and perhaps using NSSI as a means of influencing others within social contexts. Finally, quality of parent-child interactions have been linked with risk taking in adolescence (Ivan & Bereczkei, 2006; Lac, Alvro, Crano, & Siegel, 2009; Yu et al., 2006), which may be likened to using NSSI as a means of sensation seeking, and thus individuals with especially damaging or negative family backgrounds may report sensation seeking as a common function of their NSSI behaviour. Thus, it was proposed that profiles characterized by especially negative or damaging parent-child interactions (e.g., abusive), may report functions associated with emotion regulation, social influences, or sensation seeking to a greater degree than individuals belonging to profiles defined by negative relationships of a lesser degree (e.g., overprotective or controlling parents). Given the findings of Kaess et al. (2013), variations in emotion regulating functions were especially anticipated.

### **Severity of NSSI and Parent-Child Relationships**

It is also possible that individuals experiencing varying degrees of negative interactions with parents will also report engaging in NSSI at different levels of severity. Common indicators of NSSI severity include behavioural characteristics such as on age of onset, number of methods used, frequency of NSSI, need for treatment of NSSI, and body parts injured (e.g., Lundh et al., 2009; Whitlock et al., 2008). Research has shown that self-injurers who engage in severe NSSI tend to report more experiences of physical, sexual, and emotional abuses than those engaging NSSI of lesser severity (Whitlock et al., 2008). Moreover, negative family environments or interactions have been shown to predict both severity and frequency of NSSI in some investigations (Di Pierro et al., 2012; Lundh et al., 2009) but not in others (Kaess et al., 2013), indicating a need for additional research. Together, these findings suggest that individuals in the current study who report especially negative or traumatizing family backgrounds may be more

likely to engage in higher severity NSSI than participants who describe less traumatically negative backgrounds (e.g., overprotecting or controlling), or those reporting positive relationships with parents.

### **Objectives and Hypotheses**

#### **Objective 1: Can Profiles of Self-injurers be Established based on Family Background**

##### **Characteristics?**

The primary objective of the current study was to establish profiles of self-injurers based on perceptions of multiple characteristics underlying parent-child relationships or family backgrounds. It was first expected that multiple profiles would be obtained, with all profiles differing on some combination of family background characteristics, based on the argument that it is unlikely for all individuals to report the same types of experiences and relationships with parents. It was further hypothesized that some profiles would report especially damaging or negative characteristics of their relationships with parents (e.g., abusive, traumatic), while other profiles would describe features deemed to be less damaging or traumatic in nature (e.g., overprotective, controlling).

#### **Objective 2: Do the Established Profiles Differ in their Use of Coping Strategies?**

The second objective of this research was to ascertain whether the coping strategies reported by participants varied across the obtained family background profiles. Three negative coping strategies (risk behaviour, avoidance, escape coping) and one positive coping strategy (active coping) were assessed in the current study. Based on the information presented regarding established associations between parent-child relationship quality and coping strategies, it was hypothesized that individuals within profiles characterized by extremely negative, damaging family backgrounds (e.g., abusive, traumatic) would be more likely to endorse negative coping strategies, and less likely to report using positive coping when distressed.

**Objective 3: Do the Established Profiles Differ in Reasons for Engaging in NSSI?**

The third objective of the current investigation was to determine if individuals in the obtained profiles reported different functions of NSSI. Specifically, the functions of internal emotion regulation (internal ER; e.g., regulating feelings such as depression, suicidal ideation), social influence, external emotion regulation (external ER; e.g., regulating emotions like aggression, anger), and sensation seeking were assessed as potential reasons for engaging in NSSI (see Martin, Cloutier et al., 2013 for detailed descriptions of each function). Individuals within profiles characterized by particularly poor or damaging family backgrounds were expected to more highly endorse any of these functions. It was further expected that internal ER and external ER functions, reflecting the greatest psychological deficits, would be especially over-reported by individuals in these negatively characterised profiles.

**Objective 4: Do the Established Profiles Differ based on Severity of NSSI?**

The final objective aimed to distinguish the established profiles based on the severity of NSSI. Severity was assessed by age of onset of NSSI, recent frequency of NSSI, number of self-injuring methods used, number of body parts injured, needing hospitalization for NSSI treatment (e.g., inpatient), and needing medical treatment for NSSI (e.g., stitches), which have been used as indicators of severity by researchers in the past (Klonsky & Olino, 2008; Laukkanen, Rissanen, Tolmunen, Kilmä, & Hintikka, 2013; Whitlock et al., 2008; You et al., 2011). It was hypothesized that profiles characterized by especially negative and damaging relationships with parents would report earlier age of onset of NSSI, engage in NSSI more frequently, report a greater number of methods used and body parts injured, and be more likely both to have been hospitalized for mental health treatment related to NSSI, and to have received medical treatment for self-inflicted wounds.

**Method**

## Participants

Participants were recruited through the Integrated System for Participation in Research (ISPR) at the University of Ottawa. Individuals were selected from a sample of 3990 undergraduate students between the ages of 17 and 25 (3076 females;  $M_{\text{age}} = 19.39$  years,  $SD = 1.50$ ) who had participated in an ongoing study regarding the relational influences on coping strategies in young adulthood. From the larger sample, 265 (205 females;  $M_{\text{age}} = 19.37$  years,  $SD = 1.53$ ) were selected for analyses based on reports of having engaged in at least one NSSI act in the six months prior to the study. These findings reflect a 6.6% prevalence rate of NSSI within the overall sample, which is at the low end of the rates identified in past research (see Heath et al., 2009 for a review). This rate is not unexpected, however, as only recent NSSI was assessed in the current research, representing a more conservative approach than studies using a measure of lifetime prevalence, and the sample was comprised of older adolescents and young adults.

The majority of the 265 individuals selected for analyses were Caucasian (76.3%), with some representation of Black (6.5%), Asian (5.7%) and Middle Eastern (4.2%) ethnicities. Seventy-eight percent of the sample were English speaking compared to French. A majority of the sample (57.8%) lived in accommodations other than with their parents. On average, participants reported initiating NSSI at 14.97 years of age ( $SD = 2.61$ ). Most individuals had engaged in NSSI one to five times in the past six months (76.1%), though some did endorse monthly (12.1%), weekly (8.3%), and daily (3.4%) NSSI. Cutting (55.5%), burning (31.3%), and hitting (34.5%) were the most commonly reported methods used to self-injure.

## Procedure

All participants were registered in introductory psychology courses and selected the current research from a list of available investigations in which they could participate for additional course credit. Participants were provided with a secure Web link in order to complete

questionnaires hosted on Survey Monkey. An information sheet informed participants that consent was implied through completion of the questionnaires (see Supplemental Materials). Each participant was assigned an anonymous 5-digit identification code by the computerized system, which was used to label the data, and no other identifying information was collected. Participating students were awarded one or two credits toward their final course grade in exchange for completing the requirements of the study, depending on the timeframe in which they completed the questionnaires (between Fall 2008 and Summer 2010 two credits were awarded, between Fall 2010 and Winter 2011 one credit was awarded). Participants were treated in accordance with the national and institutional ethical standards for human experimentation.

### **Measures**

**Non-suicidal self-injury.** The Ottawa Self-Injury Inventory (OSI; Cloutier & Nixon, 2003; Martin, Cloutier et al., 2013) assessed the occurrence of NSSI behaviour, reported functions of NSSI, and NSSI severity. Frequency and occurrence of NSSI were determined by answers to “how often in the past six months have you actually injured yourself without the intention to kill yourself?” Responses were rated on a 5- point scale (*not at all, 1–5 times, monthly, weekly, daily*). To identify the subsample of self-injurers used in the current study these responses were further collapsed to create a dichotomous variable, with *not at all* ratings reflecting a *no NSSI* category, and all other responses indicating an endorsement of NSSI. Only individuals who reported engaging in NSSI in the past six months were retained for analyses. Past research has demonstrated success in the OSI’s assessment of NSSI in university student samples

Functions of NSSI were determined by the degree to which participants rated each of twenty-four listed reasons as explanations for their NSSI. Each reason was rated on a 5-point scale ranging from *never a reason* to *always a reason*. Researchers (Martin, Cloutier et al.,

2013) have shown these items collapse into four function subscales: internal ER (8 items), social influence (9 items), external ER (3 items), and sensation seeking (4 items). Internal consistencies for the subscales ranged between fair and excellent in the current research (internal ER,  $\alpha = .86$ ; social influence,  $\alpha = .74$ ; external ER:  $\alpha = .81$ ; sensation seeking:  $\alpha = .64$ ).

Several items on the OSI were used to indicate the severity of NSSI. Age of onset was assessed by “how old were you when you started to self-injure?” which was responded to in numerical format. The items “how do you injure yourself (without the intention of killing yourself)” and “what areas of your body do you injure?” were used to measure the number of NSSI methods used and number of body parts injured, respectively. For these items, participants were presented a checklist of seventeen methods and twenty-two body parts and were asked to select all that apply to their NSSI behaviour. Seven methods were omitted as they did not meet the definitional criteria for tissue damage (i.e., hair pulling, piercing of body parts, severe nail biting and/or nail injuries, excessive use of street drugs, excessive use of alcohol, taking too little medication, eating or drinking things that are not food). The remaining list of methods (cutting, scratching, interfering with wound healing, burning, biting, hitting, piercing skin with sharp pointy objects, trying to break bones, head banging, taking too much medication) and of body parts (scalp, eye, ear, face, nose, lips, inside mouth, neck/throat, chest, breast(s), back, shoulder(s), abdomen, hips/buttocks, genitals, rectum, upper arm/elbow, lower arm/wrist, hand/finger, lower leg/ankle, thigh/knee, foot/toe) were each summed to create two separate count variables, one for methods and one for body parts. Finally, two dichotomous items (each with response options of *yes* and *no*), “have you been treated by a doctor after injuring yourself on purpose? (e.g., stitches, wound dressings, etc.)” and “have you stayed in hospital because of hurting yourself on purpose?” were used to determine if participants have received medical

treatment for their self-injury, or if they have been hospitalized for treatment of their NSSI respectively.

**Parent-child relational dimensions.**

***Care and overprotection/control.*** The PBI (Parker et al., 1979) assessed the degree to which participants perceived their mother and their father as caring or controlling. The PBI was presented as two 25-item scales asking about mother and father separately. The items assessing the care subscales (12 items, scores ranging from 12 to 48) measure parental care ranging from warmly expressing emotion and providing emotional support to emotional neglect and rejection, while the control items (13 items, scores ranging from 13 to 52) measure from parental allowance of physical and psychological autonomy to extreme overprotection and psychological control. Response options range from *very like* to *very unlike* on a 4-point scale. Adequate validity and reliability for the PBI have been demonstrated by several studies (e.g., Gotlib, Mount, Cordy, & Whiffen, 1988; Wilhelm, Niven, Parker, & Hadzi-Pavlovic, 2005). Internal consistencies of the four scales were strong in the current sample, with Cronbach's  $\alpha$  ranging between .85 and .93.

***Trust, communication, alienation.*** The IPPA (Armsden & Greenberg, 1987) measures the quality of participants' relationships with parents and peers; for the current investigation, only the items pertaining to parents were used. The IPPA-parent is a 28-item self-report measure using a 5-point Likert scale from *almost never or never true* to *almost always or always true*; scores range from 10 to 50 for the trust and communication subscales (10 items each), and from 8 to 45 for the alienation subscale (8 items), with higher scores indicating higher levels of each subscale. The instrument has shown strong test-retest reliability, and convergent validity with measures of anxiety and depression (Armsden & Greenberg, 1987; Lopez & Gover, 1993).

Cronbach's alpha coefficients were strong for both trust ( $\alpha = .84$ ) and alienation subscales ( $\alpha = .87$ ), but poor for the communication dimension ( $\alpha = .60$ ). Given the weak internal consistency for the communication dimension, it was ultimately removed from present analyses.

**Relational trauma.** The AUAQ (West et al., 2000) is a 10-item self-report scale measuring one's current perceptions regarding the childhood attachment relationship with parents. Particular focus is placed on the degree to which early relationships were characterized by relational trauma resulting in continued feelings of failed protection, anger towards parents, and fear of abandonment. In the current study, relational trauma was indicated by composite scores of all 10 items across the three dimensions. Ratings are given on a 5-point Likert scale, with higher scores indicating more relational trauma. A total score representing relational trauma was used rather than individual subscales given the following: First, the AUAQ is based solely on 10 items, thus limiting the nuance particular to each individual subscale; second, the subscales were highly correlated ( $r$ s between .52 and .66,  $p$ s < .001); and third, the total score yielded better internal consistency ( $\alpha = .89$ ) than each of the separate subscales (failed protection:  $\alpha = .86$ ; anger:  $\alpha = .80$ ; fear of abandonment:  $\alpha = .75$ ), suggesting that the total score was a more reliable, comprehensive indicator of relational trauma than each subscale in isolation. The AUAQ has good test-retest reliability, internal consistency, and discriminant and convergent validities from past research (Bureau, Martin, Freynet et al., 2010; West et al., 2000).

**Coping strategies.** The Youth Stress and Coping Scale (YSCQ; Cloutier, Kennedy, & Glennie, 2008; Martin, Ginsburg et al., 2013) assesses the degree to which participants used various coping strategies to deal with stressful experiences. The YSCQ is a 21-item questionnaire assessing four approaches to coping with distress: active coping (e.g., trying to solve the problem; 9 items), avoidance coping (e.g., making fun of the situation; 5 items), risk

behaviour coping (e.g., do drugs; 5 items), and escape coping (e.g., play online video games; 2 items). Participants rate how frequently they typically engage in specific activities as a means of dealing with stress on a 4-point scale ranging from *never* to *frequently*. Internal consistency coefficients ranged from .64 to .79 in past research (Martin, Ginsburg et al., 2013), and between .70 and .81 in the current sample.

**Demographic variables.** Participants also completed a standard sociodemographic questionnaire. Several items from this questionnaire were explored as potential covariates, based on previously demonstrated associations with NSSI in past research (e.g., Bureau, Martin, Freynet et al., 2010; Melendez & Melendez, 2010; Nixon, Cloutier, & Jansson, 2008; Nock, 2010; Tulloch et al., 1997). Specific variables for this study include sex, participant age, primary language (English vs. French), and current living arrangements (e.g., “do you currently live with your parents?”).

## Results

### **Objective 1: Can Profiles of Self-injurers be Established based on Family Background Characteristics?**

The first hypothesis of this study proposed that multiple profiles of different patterns family backgrounds would be identified within this sample of self-injurers. This hypothesis was tested using a latent profile analysis (LPA) in LatentGOLD version 4.5 (Vermunt & Magidson, 2005a). LPA uses expectation maximization (EM) algorithms of parameter estimation to identify profiles comprised of participants who resemble one another, but who can be differentiated from individuals in other profiles on the basis of a set of defined indicator variables. Thus, profiles in LPA are created based on the probability or likelihood of each case belonging to a particular profile, given that case’s scores on indicator variables and their “likeness” to others within that particular profile. In other words, people who are more similar

on a given set of characteristics will most likely be assigned to the same profile, while individuals who report different characteristics will likely be classified into different profiles. This technique is similar to traditional non-hierarchical methods of clustering, such as *k*-means cluster analyses, but has an added benefit such that the use of EM algorithms in LPA provides probabilistic information regarding the obtained profiles and their models (see Vermunt & Magidson, 2002). Whereas traditional clustering algorithms rely solely on calculating distances between individuals' scores and cluster means in determining cluster membership, LPA determines the probability of a particular case belonging to a specific profile, and also provides model fit information, which allows the researcher to determine statistically which identified model (with which number of profiles) best fits the data.

Additional benefits compared to traditional clustering techniques include the limited number of assumptions required of the data. For instance, LPA is able to accommodate missing data and data with non-normal distributions, as well as modest inter-correlations between indicator variables (Muthén, 2004). In the current study, the degree to which each of the following parent-child relationship dimensions were reported by participants were included as indicator variables for the latent family background profiles: maternal care, maternal overprotection/control, paternal care, paternal overprotection/control (each measured by the PBI), trust in relationships with parents, feeling alienated from parents (each measured by the IPPA), and perceptions of relational trauma stemming from childhood relationships with parents (measured by the AUAQ).

**Screening of LPA indicator variables.** Prior to conducting the LPA, indicator variables were screened for missing data, univariate outliers, and multivariate normality. Items for the father version of the PBI were missing between 5.3% and 7.2% of data, though missing data analyses showed this data was missing at random (Little's MCAR test:  $\chi^2(1018) = 1061.28, p <$

.17). All other parent-child relationship variables were missing less than 5% of data per item. Given that LPA estimates missing data on its own through maximum likelihood estimations (Vermunt & Magidson, 2005b), missing data for indicator variables were not replaced prior to analyses. Univariate outliers were identified and replaced by scores within 3 standard deviations from the mean (Tabachnick & Fidell, 2007a; 2007b) for the following variables: mother care (1 outlier), mother control (1 outlier), father control (1 outlier), trust (1 outlier), and relational trauma (2 outliers). Multivariate normality was assumed as all parent-child relationship dimensions demonstrated univariate and bivariate normality, as well as linearity and homoscedasticity (see Tabachnick & Fidell, 2007b).

**Identification of profiles.** Descriptive statistics and correlations for each of the indicator variables for the LPA are shown in Table 1.1, indicating moderate correlations between family background indicators. Multiple fit indices were examined to determine the best fitting classification model, including the Akaike Information Criterion (AIC), the Consistent Akaike Information Criterion (CAIC), and the Bayesian Information Criterion (BIC). Lower values of BIC, AIC, and CAIC for a particular solution compared to other models tested in the same analyses indicate a better fit to the data (Vermunt & Magidson, 2005a; 2005b). Entropy values, which represent the percent of cases correctly classified in the model, were also considered, with values closer to 1 demonstrating better model fit (Ramaswamy, Desarbo, Reibstein, & Robinson, 1993), as were the Wald statistics for each model, which indicate the significance of the indicators as a set (Vermunt & Magidson, 2005b). A 4-profile model was ultimately selected based on these criteria (see Table 1.2). BIC, AIC and CAIC values reached a low point at the 4-profile solution, before again increasing at the 5-profile model. Entropy and Wald statistics were maximized in the 4-profile model compared to models with fewer or more profiles, further supporting the appropriateness of the 4-profile solution.

**Description of profiles.** A MANOVA was used for descriptive purposes to further understand the features of the obtained family background profiles and in order to assign labels (see Table 1.3 for details, Figure 1.1 for graphical depiction of comparisons). Multivariate statistics (Wilks'  $\lambda = .09$ ,  $F(21, 615.04) = 39.12$ ,  $p < .001$ ) and Bonferroni corrected univariate tests ( $.05/7 = .007$  to determine significance) indicated significant differences between the obtained profiles for each of the indicators. Two of the profiles (profiles 2 and 3) were characterized by positive perceptions of family backgrounds overall (at least in comparison to the other identified profiles), while the remaining two subgroups (profiles 1 and 4) demonstrated reports of negative relational patterns.

The largest proportion of participants ( $n = 112$ ) was classified in profile 1, which was labeled the *Negative-invalidating* group. Compared to other profiles, particularly the two reflecting positive family backgrounds, individuals in this group reported having overall negative relationships with their parents, though not as negative as those reported in profile 4. Characteristics of this first profile resembled what Linehan (1993) described as invalidating family environments (e.g., limited in parental care, some parental control, reports of relational trauma, moderate to high alienation and limited trust in parents). The second profile, deemed the *Positive-moderate* group, was comprised of 96 individuals. Although parent-child relationships in this group were rated positively overall, especially compared to the two negative family background profiles, they were not exaggeratedly so. In contrast, 35 participants were classified in the third profile, which was characterized by *Positive-idealistic* perceptions of family backgrounds. Across all relational dimensions, individuals within this third profile reported the highest scores on positive relational dimensions, and the lowest scores on negative relationship indicators. The fourth and final profile group was entitled *Negative-disturbed* ( $n = 22$ ).

Participants within this final profile reported significantly less trust and care from mothers, and significantly more relational trauma and alienation than individuals in all other groups; the remaining indicators were also negative, but not markedly more so compared to the *Negative-invalidating* profile. Nonetheless, these individuals were assumed to have the most damaging perceptions of their relationships with parents of all the identified profiles.

### **Screening of Variables for Remaining Objectives**

All remaining analyses were conducted using SPSS Version 20. For objectives 2, 3, and 4 additional data cleaning was required for the dependent variables (e.g., coping scales, NSSI function scales, indicators of NSSI severity) and potential covariates. OSI items regarding functions of NSSI and indicators of NSSI severity were missing between 37.10% and 62.90% of data. However, a missing value analysis showed that data were missing at random across profiles (Little's MCAR tests: Profile 1:  $\chi^2(58) = 71.66, p = .11$ ; Profile 2:  $\chi^2(38) = 44.68, p = .21$ ; Profile 3:  $\chi^2(11) = 19.68, p = .06$ ; Profile 4:  $\chi^2(4) = 2.46, p = .65$ ). While such a high proportion of missing data is at first alarming, it is not necessarily unexpected as research has shown that many self-injuring individuals are willing to admit to having engaged in the behavior, but are often less likely to divulge additional information regarding the details of their experiences with NSSI (see Klineberg, Kelly, Stansfeld, & Bhui, 2013). Thus, the variables were retained for analytic purposes, but restricted sample sizes representing only those individuals who reported full information for functions of NSSI and NSSI severity were used for the relevant objectives. No other variables were missing more than 5% of data. Both medical treatment of NSSI and having been hospitalized for NSSI demonstrated highly discrepant cell sizes for *yes* and *no* responses (more than 10 times the number of *no* responses compared to *yes* responses), and were thus eliminated from analyses. Frequency of recent NSSI also

demonstrated discrepant cell sizes in its original 4-category (1 to 5 times, monthly, weekly, daily) format across the obtained profiles. Categories were thus collapsed into a dichotomous variable (1 to 5 times, more than 5 times) to alleviate this issue in analyses, but the original 4 categories were retained for descriptive purposes (see Participants section).

Escape coping, the social influence function, number of NSSI methods, and number of body parts injured each demonstrated positively skewed distributions. The social influence function was normalized using a square root transformation, while both number of NSSI methods and number of body parts injured required logarithmic transformations to reach the normal distributions required for analyses. Escape coping remained skewed following both square root and logarithmic transformations, and was thus eliminated from analyses. The remaining screening steps were carried out using transformed versions of these variables. Univariate outliers were found for the following: active coping (2), risk coping (3), social influence (1), external ER (1), sensation seeking (1), number of body parts injured (1). All outliers were brought to within 3 standard deviations of the mean for each variable in order to retain the data (see Tabachnick & Fidell, 2007a; 2007b). No variables violated assumptions of linearity, homoscedasticity, bivariate normality, bivariate outliers, or homogeneity of variances. Two multivariate outliers were found (1 among reasons for engaging in NSSI, 1 among indicators of NSSI severity) and were removed from relevant analyses.

### **Potential Covariates**

Age, sex, language and current living arrangements were considered as potential covariates. Only significant associations between covariates and dependent variables are detailed below, no other relevant associations were found. Pearson's product moment correlations between each continuous dependent variable and age showed that age was significantly associated with number of NSSI methods used ( $r = .24, p < .01$ ), number of body

parts injured ( $r = .19, p < .05$ ), and NSSI age of onset ( $r = -.17, p < .05$ ). Living arrangements was associated with social influence functions ( $t(139) = -2.06, p < .05$ ), such that individuals currently living with their parents ( $m = .70$ ) reported engaging in NSSI for reasons of social influence to a greater degree than those who did not currently live with parents ( $m = .53$ ). As such, age was included as a covariate in analyses regarding NSSI severity (Objective 4) and living arrangements were controlled for in analyses using NSSI function variables (Objective 3).

### **Family-wise Error Corrections**

A Bonferroni family-wise error correction was used to protect against increased Type I error due to the number of tests conducted in the present study. As a result, any analysis in which an omnibus test was used as a preliminary step (e.g., the  $F$ -test in MANOVAs, MANCOVAs) an alpha of  $(.15/5)*3 = .09$  was used to determine significance, while all subsequent planned comparisons and post-hoc tests within these analyses were then compared to alpha of .05 unless otherwise specified (see Tabachnick & Fidell, 2007b). For all other analyses within which the omnibus test was itself of interest for the research question (e.g., chi-square) obtained statistics were compared against a critical alpha of  $.05/5 = .01$ .

### **Objective 2: Do the Established Profiles Differ in their Use of Coping Strategies?**

Mean differences between profiles for active coping, risk behaviour coping, and avoidance coping were tested using a MANOVA. The use of a MANOVA was justified by modest correlations between the majority of coping scales ( $r$ s ranging from .03 to .28,  $p$ s between .001 and .61; see Field, 2013) and theory. Box's test confirmed the additional assumption of homogeneity of variance-covariance matrices (Box's  $M = 14.39, F(18, 28058.69) = .77, p = .73$ ). Multivariate statistics indicated main effects of profile membership across coping strategies (Wilks'  $\lambda = .86, F(9, 618.32) = 4.47, p < .001$ ). Univariate analyses indicated

that main effects held for both active and risk behaviour coping, but not for avoidance coping (see Table 1.4). As planned contrasts can be conducted in lieu of significant omnibus findings (see Tabachnick & Fidell, 2007a; 2007b), these comparisons were calculated for all three coping strategies, while post-hoc pairwise comparisons were only conducted to follow up on *additional* differences for significant univariate tests (i.e., active and risk behaviour coping).

Planned comparisons were conducted such that the *Negative-disturbed* profile was compared to each of the other obtained profiles for each type of coping strategy. Results show that individuals in the *Negative-disturbed* profile engaged in less active coping than both the *Positive-moderate* ( $t(115) = 2.32, p < .05$ ) and *Positive-idealistic* ( $t(55) = 3.59, p < .001$ ) profiles, and in more risk behaviour coping than both of these positive profiles ( $t(115) = -2.30, p < .05$  and  $t(55) = -2.92, p < .01$ , respectively). No significant profile differences were found for avoidance coping ( $ts$  between  $-0.88$  and  $-1.89$ ,  $ps$  between  $.06$  and  $.38$ ), or between the two negative profiles for either active ( $t(128) = 1.42, p = .16$ ) or risk behaviour coping ( $t(128) = -0.87, p = .39$ ).

Post-hoc Tukey's lowest significant difference (LSD) tests were used to examine all other possible pairwise comparisons (see Table 1.4). Only pairwise differences found in addition to those identified in planned comparisons are described in detail. For active coping, individuals in the *Positive-idealistic* profile reported significantly greater active coping compared to all other profiles. For risk behaviour coping, individuals in the *Negative-invalidating* profile also reported more risk behaviour coping than members of the *Positive-moderate* and *Positive-idealistic* profiles. Thus, hypotheses were partially supported such that the profiles defined by more negative family backgrounds demonstrated less active coping and more risk behaviour coping than the profiles characterized by more positive parent-child relationships. Further, the *degree* to which parent-child relationships were perceived as positive seemed to affect how much the

individual reported engaging in active coping (e.g., more positive = more active coping). In contrast parent-child relationships characterized by negative experiences, regardless of the degree of these negative experiences, appeared to increase the use of risky behaviour to cope with distress.

### **Objective 3: Do the Established Profiles Differ in Reasons for Engaging in NSSI?**

A MANCOVA was used to compare family background profiles based on their reported functions of engaging in NSSI (internal ER, social influence, external ER, sensation seeking) while controlling for current living arrangements. Correlations between NSSI functions were acceptable for use of a multivariate approach ( $r$ s between .24 and .49,  $p$ s < .01), and the assumption of homogeneity of variance-covariance matrices was supported, Box's  $M = 31.11$ ,  $F(30, 10224.83) = .96$ ,  $p = .54$ . Multivariate statistics indicated significant differences across NSSI functions (Wilks'  $\lambda = .87$ ,  $F(12, 338.95) = 1.65$ ,  $p < .09$ ), while Bonferroni corrected ( $\alpha = .05/4 = .01$ ) univariate tests provided partial support for the hypothesis that functions would differ across the family background profiles (see Table 1.5). Univariate mean differences were found only for external ER functions. Because planned contrasts were the focus of this hypothesis, these comparisons were conducted for all four functions of NSSI regardless of non-significant univariate tests (see Tabachnick & Fidell, 2007a; 2007b); post-hoc tests were analyzed only for the external ER function.

The same structure of planned comparisons was conducted as described in Objective 2, this time comparing the degree of NSSI functions reported by individuals in the *Negative-disturbed* profile with the other three profiles. For internal ER functions, the *Negative-disturbed* profile scored higher than the *Positive-idealistic* profile ( $t(32) = -2.73$ ,  $p < .01$ ), but no differently than either the *Positive-moderate* ( $t(66) = -1.86$ ,  $p = .06$ ) or *Negative-invalidating*

profiles ( $t(70) = -1.14, p = .24$ ). In contrast, the *Negative-disturbed* profile demonstrated greater endorsement of external ER functions compared to each of the *Positive-moderate* ( $t(66) = -2.68, p < .01$ ), *Positive-idealistic* ( $t(32) = -3.41, p < .01$ ) and *Negative-invalidating* ( $t(70) = -1.97, p < .05$ ) groups. Finally, sensation seeking functions were endorsed at a higher rate in the *Negative-disturbing* profile than in the *Positive-idealistic* group ( $t(32) = -2.00, p < .05$ ), but were no different from the other two profiles (*Positive-moderate*:  $t(66) = -1.63, p = .10$ ; *Negative-invalidating*:  $t(70) = -.33, p < .73$ ). Social influence functions did not differ between the *Negative-disturbing* profile and any of the remaining three family background profiles ( $t$ 's between  $-1.31$  and  $.13, p$ 's between  $.19$  and  $.90$ ).

Follow up post-hoc Tukey's LSD tests were conducted to determine additional pairwise differences on the external ER function (see Table 1.5). Similar to the findings for the *Negative-disturbing* profile described above, participants in the *Negative-invalidating* profile also endorsed external ER functions to a higher degree than those in the *Positive-idealistic* profile. Thus, partial support was gathered for the hypotheses of Objective 3. Although experiencing more negative family environments in general was associated with increased use of NSSI to regulate externalizing emotions such as aggression and frustration, at least compared to individuals with extremely positive childhood relationships with parents, this was especially true when negative family backgrounds were markedly disrupted or disturbed.

#### **Objective 4: Do the Established Profiles Differ based on Severity of NSSI?**

Objective 4 was analyzed using two separate methods. First, family background profiles were compared based on age of NSSI onset, number of NSSI methods used, and number of body parts injured using a MANCOVA with current age included as a covariate. Next, the frequency of NSSI during the past 6 months was compared across profiles using a chi-square analysis. Inter-correlations of all NSSI severity indicators are detailed in Table 1.6.

**Age of onset, number of methods, and number of body parts injured.** Continuous indicators of NSSI severity were modestly inter-correlated (see Table 1.6), justifying the use of a multivariate approach. Box's test of homogeneity of variance-covariance matrices was also supported (Box's  $M = 15.81$ ,  $F(18, 6724.78) = .82$ ,  $p = .69$ ). Multivariate tests were non-significant (Wilks'  $\lambda = .92$ ,  $F(9, 275.16) = 1.04$ ,  $p = .41$ ), as were univariate tests (see Table 1.7). However, given that the specific contrasts for this analysis were planned, they were performed in lieu of these omnibus assessments (see Tabachnick & Fidell, 2007a; 2007b). Planned contrasts are detailed below, but no post-hoc tests were conducted for this analysis.

The planned comparisons were completed in similar fashion to Objectives 2 and 3, comparing NSSI severity reported within the most negative profile (*Negative-disturbed*) with reports from all other obtained groups for each severity indicator. Individuals in the *Negative-disturbed* group reported using significantly more NSSI methods than those in the *Positive-idealistic* group ( $t(28) = -2.75$ ,  $p < .05$ ), but the number of reported methods did not differ from individuals in the *Positive-moderate* ( $t(56) = -1.18$ ,  $p = .08$ ) and *Negative-invalidating* ( $t(69) = -1.50$ ,  $p = .12$ ) groups. Moreover, age of onset was significantly lower in the *Negative-disturbed* group than in the *Positive-moderate* profile ( $t(56) = 2.31$ ,  $p < .05$ ), but no different from the *Positive-idealistic* ( $t(28) = 1.75$ ,  $p = .08$ ) or *Negative-invalidating* ( $t(69) = 1.34$ ,  $p = .18$ ) profiles. No differences were found regarding the number of body parts injured across profiles ( $t$ 's between  $-.88$  and  $-1.56$ ,  $p$ s between  $.12$  and  $.38$ ). Thus, partial support was found for hypotheses, such that individuals from the most disturbed family backgrounds tended to commence engaging in NSSI earlier, and tended to use more methods than some of the individuals who endorsed positive parent-child relationships.

**Frequency of recent NSSI.** A chi-square analysis showed that frequency of self-injury within the past six months differed between family background profiles,  $\chi^2(3, n = 265) = 11.99$ ,  $p < .01$ . Examination of adjusted standardized residuals (see Table 1.8) within each cell determined that individuals in the *Positive-moderate* profile were less likely than expected to have engaged in NSSI more than 5 times in the past six months. Conversely, participants in the *Negative-disturbed* profile were more likely to have engaged in NSSI more than 5 times during the prior six month period.

### Discussion

Although negative characteristics of parent-child relationships have been traditionally associated with NSSI in adolescents and young adults using variable-centered approaches, there was previously no information regarding how different combinations of relational characteristics may form varying family background profiles of self-injuring individuals. The current study used a person-centered approach to demonstrate that self-injurers can be differentiated based on their self-reported perceptions of the quality of relationships with parents in late adolescence and young adulthood. Further, this research showed that individuals who had engaged in NSSI but reported different types of family backgrounds could be further discriminated with regard to strategies used to cope with stress, self-reported reasons for engaging in NSSI, and the severity of NSSI behaviour.

#### Objective 1: Family Background Profiles

As expected from the existing literature, combinations of negative relational features characterized two of the identified profiles. Individuals within the largest of these profiles (*Negative-invalidating*) reported relationships with parents which resembled general invalidating family environments (low parental care and trust, high parental control, alienation and trauma).

This profile was perhaps the most anticipated based on past theory (Linehan, 1993) and research (e.g., Bureau, Martin, Freynet et al., 2010; Gratz, 2006) demonstrating that individuals who engage in NSSI often report characteristics of invalidating family relationships. The *Negative-disturbed* profile presented the most adverse family backgrounds, with individuals reporting markedly low care from mothers and limited trust in their parents, as well as feeling highly alienated from parents, and reporting high levels of relational trauma. Identifying a profile such as this confirms that, at least for some, NSSI may develop as a consequence of extremely damaging family environments, as suggested by theoretical models (see Yates, 2004; 2009), even outside of clinical populations. Future research aimed at further examining these issues should implement longitudinal methodologies, and observational or task-oriented measurement of parent-child relationship quality, as opposed relying solely on self-reported information.

Somewhat surprisingly, the remaining two profiles consisted of individuals reporting positive family backgrounds. A large subgroup called the *Positive-moderate* profile was found in which parent-child relationships were generally perceived as positive, though levels of positive relational dimensions were not markedly high. That said it is possible that some characteristics of invalidating family environments (e.g., parental control) may still exist within relationships that are generally perceived as positive. Indeed the individuals within this profile did report more parental control than participants who were classified in the more highly positive profile described below. Although researchers have typically assumed that reports of parental control in previous investigations reflected an overall negative family environment (e.g., Bureau, Martin, Freynet et al., 2010; Gratz, 2006), it is nonetheless possible that family relationships were somewhat positive aside from the parental control problems in this past research, thus resembling the reports characterizing the *Positive-moderate* profile. Alternatively, it is possible that individuals in this profile ultimately began engaging in NSSI for reasons external to their

family background. For instance, past research has shown that underlying depression or anxiety (see Lofthouse, Muehlenkamp, & Adler, 2009 for a review), peer influences (Hasking, Andrews, & Martin, 2013; Prinstein et al., 2010; Wu, Chang, Huang, Liu, & Stewart, 2013), extra-familial sexual or physical violence (Levesque, Lafontaine, Bureau, Cloutier, & Dandurand, 2010), or other distressing life events (De Leo & Heller, 2004; Hasking et al., 2013) each increase the likelihood of engaging in NSSI. Future research should thus be aimed at determining if individuals reporting positive parent-child relationships have also experienced one or more of these additional risk factors.

A second positive relationship profile, deemed the *Positive-idealistic* profile, was comprised of individuals reporting exceptionally positive relationships with parents. Although it may seem conceptually counterintuitive that individuals engaging in NSSI would have experienced such highly positive childhood family relationships, these findings are in line with the one existing study that has similarly shown that some individuals who endorse NSSI do report positive interactions with parents (Lundh et al., 2009). As mentioned briefly above with regard to participants within the *Positive-moderate* profile, it is possible that engagement in NSSI by individuals in the *Positive-idealistic* group was triggered following experiences or risk factors occurring external to the family context, though additional research is needed for a more substantial argument to this effect. Alternatively, we may turn to the adult attachment literature for another possible explanation.

In responses to the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985/1996), some adults demonstrate *dismissing states of mind* by describing their parents in a positive light, but failing to support these descriptions with specific episodic memories (Main, Kaplan, & Cassidy, 1985). Dismissing states of mind are believed to result from the unconscious disconnection from attachment related memories, a defence mechanism discussed by Bowlby

(1969/1982), perhaps in order to repudiate having felt rejected by parents during childhood. Thus, individuals in the *Positive-idealistic* profile may actually have been suppressing negative feelings regarding rejection or maltreatment by parents in childhood, and may engage in NSSI due to an inability to express these feelings in more appropriate ways. While no previous research has been conducted linking AAI states of mind with NSSI, dismissing states of mind have been identified in eating disordered women (Barone & Giuducci, 2009; Cole-Detke & Kobak, 1996; Ward et al., 2001), which frequently co-occurs with NSSI (Claes et al., 2013; Fujimori et al., 2011). Unfortunately, the methodology of the current study did not permit verification of this hypothesis so additional research remains necessary regarding this proposed explanation.

### **Objective 2: Profile Differences in the Capacity to Cope with Distress**

The second objective aimed at comparing self-reported general coping strategies across the obtained family background profiles. The majority of hypotheses were supported. First, active coping (talking to someone, trying to solve the problem) was more strongly endorsed by individuals in the two positively characterised profiles, most strikingly so by the *Positive-idealistic* group, compared to the two negative family background profiles. Thus, it appears that not only did perceiving family backgrounds as positive relate to an increase in the use of positive coping strategies, but the *degree* of positivity that one perceived in his or her family background further influenced the capacity for using active strategies to cope with distress. Such findings were expected based on past research indicating that individuals who perceive their relationships with parents positively tend to use more active, positive coping strategies (Dusek & Danko, 1994; Meesters & Muris, 2004; Ruchkin et al., 1999; Wagner et al., 1996). However, it is perhaps counterintuitive that a group of individuals who had engaged in recent NSSI would report a heightened capacity for using positive, active coping strategies. This may reflect a

tendency for youth who engage in NSSI and who experienced positive family interactions to be better able to use more appropriate means of coping, at least in some contexts. For instance, perhaps NSSI behaviour of individuals within this particular profile was specific to only certain types of distress, rather than being more globally applied to all stressful, challenging experiences. Findings may also indicate a limited severity or duration of NSSI within these individuals, perhaps similar to findings from Williams and Hasking (2009), where the authors suggest that the ability to engage in positive coping may to some extent protect against severe NSSI in distressed individuals. Indeed the results of the current study do suggest that individuals in the *Positive-idealistic* profile also present with less severe NSSI (fewer methods, later age of onset; see discussion of Objective 3 below), which is also consistent with this explanation. Regardless, future research should further focus on addressing what is ultimately enticing these individuals to use NSSI.

Second, individuals in both the *Negative-invalidating* and *Negative-disturbed* profiles reported engaging in more risk behaviour coping (e.g., alcohol and drug use) than participants in the two positively characterized profiles; levels of risk behaviour coping did not differ between the two negative groups, nor between the two positive profiles. In contrast to the findings for active coping, it seems that simply perceiving one's parent-child relationship as having been negative or positive, regardless of the degree of negativity or positivity, was associated with the amount of risk behaviour engaged in to cope with stress. These findings are in line with past research regarding the links between engaging in NSSI and using alcohol to cope with stress (Evans, Hawton, & Rodham, 2005), as well as associations of poor quality of parent-child relationships with both negative coping in general (Gaylord-Harden, Campbell, & Kesselring, 2010; Lafferty & Dorrell, 2006; Meesters & Muris, 2004; Walsh et al., 2009) and alcohol and drug use specifically (Branstetter, Low, & Furman, 2011; Kopak, Chen, Haas, & Gillmore, 2012;

Ledoux, Miller, Choquet, & Plant, 2002). As such it appears that individuals engaging in NSSI, who also perceive their relationships with parents as negative, are more likely to also use other risk behaviours to deal with distress, like alcohol, drugs and cigarettes in addition to NSSI. This may be additional indication of the increased risk or severity facing self-injurers from negative family backgrounds compared to those who perceive family relationships more positively.

Contrary to expectations, there were no differences in avoidance coping (convincing oneself that the stress is not there) across profiles. However, given that avoidance coping strategies have been repeatedly linked with engaging in self-injury (see Guerreiro et al., 2013 for a review), this finding suggests that engaging in avoidant coping is relevant to self-injurers in general, regardless of the quality of family backgrounds. In fact, these findings may suggest that NSSI itself is an avoidant coping behaviour, as it channels the stress toward the self and away from the source of distress. Thus, it is possible that NSSI provides an additional manner through which self-injuring individuals can avoid actively dealing with distress, regardless of the specific characteristics of their family backgrounds.

### **Objective 3: Profile Differences in Functions of NSSI**

As hypothesized, individuals in the negative family background profiles reported using NSSI for emotion regulating purposes to a high degree. Specifically, individuals in the *Negative-disturbed* group endorsed internal ER functions to a higher degree than the *Positive-idealizing* profile, and more external ER functions than all of the other profiles. Further, the *Negative-invalidating* profile demonstrated more external ER deficits compared to both positive profiles. These findings are congruent with existing theory and research (Adrian et al., 2011; Crowell, Beauchaine, & Linehan, 2009; Linehan, 1993) indicating that negative or damaging parent-child relationships are associated with deficits in emotion regulating skills in self-injuring youth. Moreover, given that adequate emotion regulating skills are believed to develop within parent-

child interactions (see Thompson, 1994), it makes sense that individuals reporting disrupted or invalidating relationships with parents would also demonstrate emotion regulation deficits, evidenced in this instance through their use of NSSI to regulate aversive emotion. It is also intuitive that individuals reporting extremely positive relationships with parents would have no such obvious deficit.

Interestingly, profile differences were particularly notable for external ER, and may suggest that the use of NSSI for external ER purposes reflects the greatest psychological deficit when compared even to internal ER, especially at the item level. Internal ER was represented by items requiring the individual to identify a specific emotion, or lack thereof, experienced before engaging in NSSI (e.g., “to relieve feelings of sadness”). The ability to correctly label these emotional experiences when responding to this item can be considered indicative of rudimentary emotion regulation (see Thompson, 1994). In contrast, items reflecting the external ER function reflected the use of NSSI to alleviate negative arousal *in general* (e.g., “to release frustration (or) unbearable tension”), rather than a particular labelled emotion. It could be argued that higher endorsements of the external ER items thus required a lesser degree of emotion regulating skills as opposed to the precise labelling of emotional experiences required of the internal ER function scale. Thus it is possible that these two affect regulating functions themselves demonstrate varying degrees of deficits to self-regulation of emotions, with the external ER function indicating the greatest detriment. Given the current findings, such differentiation is consistent with empirical support that individuals who experience maltreatment by parents demonstrate limited emotion regulating capacities (Moretti & Craig, 2013; Shipman et al., 2007; Shipman & Zeman, 2001; Sullivan, Bennett, Carpenter, & Lewis, 2008). Given the characteristics reported by individuals in the *Negative-disturbed* profile, these participants were most likely to have experienced some form of parental maltreatment, thus similarly decreasing their capacities to

efficiently regulate emotional arousal, or even to identify and label particular emotional experiences. Future research should focus on the specific differences between these two types of emotion regulating functions of NSSI, particularly where family based influences are concerned.

Participants within the *Negative-disturbed* profiles also reported using NSSI as a means of sensation seeking to a greater extent than individuals in the most positive profile. This can be explained using two potential explanations. First, suppose that engaging in NSSI for purposes of sensation seeking is similar to engaging in other risk behaviours, like substance use or promiscuous sex, such that engaging in the behaviour provides a sense of excitement or exhilaration to the individual. Assuming this to be true, these findings are in line with past research linking poor parent-child relations to risk behaviours in general (Ivan & Bereczkei, 2006; Lac et al., 2009; see Yu et al., 2006 for a review). Alternatively, an induction of these feelings of exhilaration may be some other manifestation of emotion regulation, one that involves the creation of feeling from the absence of feeling. As described by Klonsky (2007), some individuals use NSSI as a means of generating feelings, albeit negative, within themselves when they otherwise feel numb or unreal. It is possible that endorsement of sensation seeking functions may reflect the need to create an exhilarated feeling to eliminate numbness or lack of reality. Thus, perhaps the findings for sensation seeking functions within the present study provide further support for previous results regarding emotion regulation. Regardless, additional research on sensation seeking functions is needed, as these functions have been greatly overlooked in the existing literature.

Finally, while all other functions measured in this study demonstrated variation based on the perceived quality of family backgrounds, the social influence function was endorsed at similar rates across all four profiles. This suggests that socially inclined functions are equally common across self-injurers from all types of family backgrounds. Despite being frequently

identified in the literature (Andover, Pepper, & Gibb, 2007; Baetens, Claes, Muehlenkamp, Grietens, & Ongena, 2011; Heath, Toste, Nedecheva, & Charlebois, 2008; Whitlock, Eckenrode, & Silverman, 2006), there is limited research examining the correlates of social functions of NSSI specifically, and thus additional explanation for this lack of finding in the current study is difficult at this time.

#### **Objective 4: Profile Differences in the Severity of NSSI Behaviour**

The final objective of the current study examined how severity of NSSI behaviour varied across the obtained family background profiles. Results provided partial support for hypotheses. First, as expected, individuals in the *Negative-disturbed* profile reported having initiated NSSI at an earlier age than participants in *Positive-idealistic* profile. This result corresponds with the limited past research that has shown that lack of parental care is related to an earlier onset of NSSI (Saldias, Power, Gillanders, Campbell, & Blake, 2013). This previous study further demonstrated that the association between parental care and onset of NSSI was fully mediated by the self-injurer's maladaptive schemas regarding parents, including continued feelings of anger regarding partial or complete abandonment by a parent, having been punished by parents, and having feelings of deserving that punishment. These past findings may provide a possible explanation as to why only individuals in the *Negative-disturbed* profile, and not those in both negative profiles, reported significantly earlier ages of onset. For instance, the characteristics of the *Negative-disturbed* profile, perceiving family backgrounds as characterized by relational trauma and alienation, strongly resembles the characteristics of maladaptive schemas that Saldias et al. describe. As such, it is possible that the individuals in the less relationally disrupted *Negative-invalidating* profile simply did not possess such maladaptive schemas, and thus would not necessarily be expected to have engaged in NSSI at an earlier age. This finding may also be further indication that individuals in the *Positive-idealistic* profile may engage in NSSI for

reasons other than negative parental influences. Because these individuals were delayed in their initiation of NSSI, there was perhaps more time during which additional experiences were encountered which triggered NSSI, including problems with peers (Adrian et al., 2011; Wu et al., 2013), exposure to peers' own NSSI behaviours (Deliberto & Nock, 2008; Hasking et al., 2013), or perhaps even general exposure to the stresses and new experiences associated with the beginning of high school, which would correspond with the age of onset reported by participants in the *Positive-idealistic* profile. Although the current findings are quite interesting, there is very little existing research regarding influences on the age of onset of NSSI, and thus additional investigation is required before these results can be fully understood.

Individuals in the *Negative-disturbed* profile reported using a greater number of self-injuring methods compared to those in the *Positive-idealistic* profile, and were more likely than expected to engage in frequent NSSI (more than 5 times in the last six months). In line with previous results (Williams & Hasking, 2009), these overall findings suggest that individuals reporting positive interactions with parents tend to engage in NSSI of lesser severity. Findings further correspond with past research suggesting that individuals with especially damaging family relationships may engage in more severe NSSI in general (Di Pierro et al., 2012; Hamza & Willoughby, 2013), and may use NSSI more frequently in specific (Lundh et al., 2009). As with the results of prior objectives, and combined with the age of onset results within this current objective, findings support the overall notion that compared to other self-injurers, individuals reporting disturbed family backgrounds demonstrate the greatest pathology with regard to their NSSI. For instance, the use of a greater number of self-harming methods may indicate greater deficits in emotion regulation, and thus a heightened need within the individual to adopt additional ways to self-injure in order to achieve the same relief as was previously experienced using a single or less diverse set of methods. More simply, a greater number of methods might

also reflect having engaged in NSSI for a longer duration, as would also be suggested by the earlier age of onset reported in the *Negative-disturbed* profile. Similarly, more frequent engagement in NSSI may also signal a need for increasingly intense self-harming behaviour in order to satisfy self-injurious urges, and may perhaps lead to a behavioural addiction over time as some researchers have suggested (Martin, Cloutier et al., 2013; Nixon, Cloutier, & Aggarwal, 2002; Schaub & Heath, 2013). Unfortunately these ideas remain conjecture at this point, as there is no research to date regarding the particular risk factors and correlates for method choice or frequency of engaging in NSSI. This is an avenue in which future research is greatly needed.

Contrary to prediction the number of body parts injured did not differ based on perceived parent-child relationship quality. While injuring a greater number of areas is considered indicative of more severe NSSI (Laukkanen et al., 2013; Whitlock et al., 2008), it appears that these particular increases in severity may be independent from the quality of family environments during childhood, and are instead associated with other risk factors not identified by the current study.

### **Limitations**

Despite the important findings of the current research, there are nonetheless a few limitations worth noting. Primarily, the findings pertaining to characteristics or manifestations of NSSI (functions, severity) should be interpreted cautiously as they represent a restricted portion of the overall sample of due to the large amount of missing data for these items specifically. As previously discussed, this amount of missing data may reflect individuals' willingness to disclose that they had engaged in NSSI, but to remain hesitant to discuss such experiences in detail, even through questionnaire format (see Klineberg et al., 2013). Failure to provide additional detail is perhaps to be expected given that these youths may still be developing an understanding the nature of their behaviour. Second, the generalizability of results to community populations of

late adolescents and young adults may be limited as these data come from a university student sample, comprised of a high proportion of female students. As such, the aforementioned results should be replicated in samples drawn from the community at large, accounting for equal number of males and females in future research. That said, the gender distribution within the current sample was similar to that reported in epidemiological research regarding self-harming behaviour (Hawton & Harriss, 2008), particularly within the age range of late adolescence. This suggests that the current findings are generalizable to the general population of self-injurers, at least with regard to the gender distribution. Third, the use of retrospective self-report measures of parent-child relationship dimensions and family backgrounds may yield modified and subjective perceptions of actual past events and experiences. Nonetheless, it is the individual's current perception of these past experiences that is ultimately relevant, though it would behoove researchers to examine similar research questions using longitudinal data and observational assessments of both past and concurrent parent-child relationship quality.

### **Clinical Implications & Conclusions**

The development of prevention and intervention strategies for NSSI is a crucial task requiring a better understanding of various risk factors and their interplay in the development and maintenance of this behaviour. The present study furthers our knowledge of parent-child relationship and family background influences in the etiology of NSSI. In particular these findings suggest that clinicians, teachers, frontline workers and counselors alike should not assume that only adolescents and young adults with histories of child abuse or neglect are at risk for engaging in NSSI, and that some self-injuring youth may even claim to have a history of highly positive interaction with parents. That said, although individuals engaging in self-injury report both positive and negative family backgrounds, the present study suggests that those with especially disrupted family histories may have greater deficits in general coping and emotion

regulating skills, and may thus be at increased risk for engaging in especially severe NSSI. Thus the combination of NSSI engagement and negative family backgrounds should be considered when assessing the immediate risk facing self-injuring adolescents and young adults presenting for treatment.

In conclusion, clinicians, school personnel, and parents witnessing NSSI behaviour in young adults should be sensitive to the impact of relational influences in the development of such problems; therapy focusing on improving the quality of family relationships, or on changing the individual's perceptions of relationship quality, may also be particularly useful in the treatment and prevention of NSSI for many individuals. Assuming that retrospective self-reports of relationship quality are indeed rooted in the childhood relationship with parents, and are not biased by current relational issues, results of the present study add to the long list of empirical evidence underlying the importance of preventive programs aimed at supporting parents, and at helping them to develop adequate parenting skills and establishing secure, positive relationships with their children.

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Table 1.1

*Correlations between Indicators of Perceived Parent-child Relationship Quality included in Latent Profile Analysis (LPA)*

	PBI				IPPA		AUAQ
	1. Maternal Care	2. Paternal Care	3. Maternal Control	4. Paternal Control	5. Trust	6. Alienation	7. Relational Trauma
1.	--	.32***	-.33***	-.15*	.68***	-.54***	-.62***
2.		--	-.23***	-.28***	.43***	-.44***	-.32***
3.			--	.47***	-.51***	.38***	.35***
4.				--	-.38***	.25***	.28***
5.					--	-.69***	-.66***
6.						--	.59***
7.							--
Mean (SD)	37.91 (7.87)	34.29 (9.06)	30.73 (8.06)	28.01 (7.58)	35.42 (8.55)	22.78 (7.05)	23.41 (8.38)

*Note.*  $n = 238$  to  $265$  depending on paired variables. All correlations were calculated using Pearson's  $r$  with pairwise deletion of missing data. PBI = Parental Bonding Index; IPPA = Inventory of Parent and Peer Attachment; AUAQ = Adolescent Unresolved Attachment Questionnaire. Pearson's Product-moment correlations with pairwise deletion of missing data are presented.

\*\*\* $p < .001$ .

Table 1.2

*Model Fit Statistics for Latent Profile Analysis (LPA) Models*

	BIC	AIC	CAIC	Entropy	Wald
1 Cluster	12389.91	12339.79	12403.91	--	--
2 Cluster	11913.52	11809.71	11942.52	.85	11.98***
3 Cluster	11781.18	11623.67	11825.18	.85	34.51***
4 Cluster	<b>11740.80</b>	<b>11529.59</b>	<b>11799.80</b>	<b>.86</b>	<b>62.17***</b>
5 Cluster	11747.60	11482.70	11821.60	.82	36.27***

*Note.*  $n = 265$ . BIC = Bayesian Information Criterion; AIC = Akaike Information Criterion; CAIC = Consistent Akaike Information Criterion. Bolded entries indicate the tested model that demonstrated optimal fit to the data.

\*\*\*  $p < .001$ .

Table 1.3

*Between-Subjects Effects, Post-hoc Pairwise Comparisons for Profile Differences in Indicators of Parent-child Relationship Quality*

Indicator variables	Profile 1 <i>n</i> = 112 Adj. Mean (SE)	Profile 2 <i>n</i> = 96 Adj. Mean (SE)	Profile 3 <i>n</i> = 35 Adj. Mean (SE)	Profile 4 <i>n</i> = 22 Adj. Mean (SE)	Between-subjects effects ( <i>F</i> )	Pairwise Comparisons <sup>a</sup>
Maternal care <sup>b</sup>	34.73 (.57)	40.96 (.60)	47.18 (.96)	26.90 (1.24)	76.46***	4 < 1 < 2 < 3***
Paternal care <sup>b</sup>	30.01 (.77)	35.55 (.82)	45.67 (1.31)	29.05 (1.70)	39.46***	1, 4 < 2 < 3***
Maternal control <sup>b</sup>	34.58 (.71)	28.57 (.76)	23.50 (1.21)	36.37 (1.57)	28.49***	3 < 2 < 1, 4***
Paternal control <sup>b</sup>	31.14 (.71)	27.03 (.76)	21.30 (1.20)	30.41 (1.56)	18.14***	3 < 1, 2, 4*** 2 < 1**
Trust <sup>c</sup>	30.99 (.41)	40.10 (.44)	46.91 (.70)	19.19 (.90)	276.27***	4 < 1 < 2 < 3***
Alienation <sup>c</sup>	26.50 (.45)	19.75 (.48)	13.67 (.76)	34.05 (.99)	127.52***	3 < 2 < 1 < 4***
Relational trauma <sup>d</sup>	27.74 (.59)	18.65 (.63)	15.02 (1.00)	34.73 (1.30)	85.80***	3 < 2 < 1 < 4***

*Note.* Profile 1 = Negative-invalidating; Profile 2 = Positive-moderate; Profile 3 = Positive-idealistic; Profile 4 = Negative-disturbed.

<sup>a</sup>As indicated by post-hoc Tukey's LSD tests. <sup>b</sup>Measured by the *Parental Bonding Index* (Parker, Tupling, & Brown, 1979). <sup>c</sup>Measured by the *Inventory of Parent and Peer Attachment* (Armsden & Greenberg, 1987). <sup>d</sup>Measured by the *Adolescent Unresolved Attachment Questionnaire* (West et al., 2000).

\*\**p* < .01. \*\*\**p* < .001

Table 1.4

*Between-Subjects Effects, Post-hoc Pairwise Comparisons for Active, Risk Behaviour, and Avoidance Coping across Family Background Profiles*

Coping strategies <sup>a</sup>	Profile 1 <i>n</i> = 107 Adj. Mean (SE)	Profile 2 <i>n</i> = 95 Adj. Mean (SE)	Profile 3 <i>n</i> = 35 Adj. Mean (SE)	Profile 4 <i>n</i> = 22 Adj. Mean (SE)	Between- subjects effects <sup>b</sup> ( <i>F</i> )	Pairwise Comparisons <sup>c</sup>
Active coping	15.14 (.53)	16.38 (.56)	18.83 (.94)	13.13 (1.19)	5.68**	1, 4 < 3** 2 < 3*
Risk behavior coping	5.37 (.35)	3.96 (.37)	2.85 (.62)	6.28 (.78)	6.42***	2, 3 < 1, 4**
Avoidance coping	6.72 (.34)	5.81 (.36)	6.15 (.61)	7.47 (.77)	1.79	--

*Note.* Profile 1 = Negative-invalidating; Profile 2 = Positive-moderate; Profile 3 = Positive-idealistic; Profile 4 = Negative-disturbed.

<sup>a</sup> Measured by the *Youth Stress and Coping Questionnaire* (YSCQ; Cloutier et al., 2008; Martin, Ginsburg et al., 2013).

<sup>b</sup> Univariate significance was compared to a Bonferroni corrected alpha of  $.05/3 = .02$ . <sup>c</sup>As indicated by post-hoc Tukey's LSD tests.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Table 1.5

*Between-Subjects Effects, Post-hoc Pairwise Comparisons for NSSI Functions across Family Background Profiles*

NSSI Functions <sup>a</sup>	Profile 1 <i>n</i> = 53 Adj. Mean (SE)	Profile 2 <i>n</i> = 49 Adj. Mean (SE)	Profile 3 <i>n</i> = 15 Adj. Mean (SE)	Profile 4 <i>n</i> = 19 Adj. Mean (SE)	Between- subjects effects <sup>b</sup> ( <i>F</i> )	Pairwise Comparisons <sup>c</sup>
Internal ER	1.77 (.14)	1.55 (.15)	1.08 (.27)	2.09 (.24)	2.85	--
Social influence	.62 (.06)	.57 (.07)	.39 (.12)	.60 (.11)	.97	--
External ER	2.55 (.15)	2.31 (.16)	1.81 (.29)	3.14 (.26)	4.26**	4 > 1*, 2**, 3*** 1 > 3**
Sensation seeking	.70 (.09)	.46 (.10)	.29 (.18)	.77 (.16)	2.32	--

*Note.* Profile 1 = Negative-invalidating; Profile 2 = Positive-moderate; Profile 3 = Positive-idealistic; Profile 4 = Negative-disturbed.

<sup>a</sup>Measured by the *Ottawa Self-injury Inventory* (OSI; Cloutier & Nixon, 2003; Martin, Cloutier et al., 2013). <sup>b</sup>Univariate significance was compared to a Bonferroni corrected alpha of  $.05/4 = .01$ . <sup>c</sup>As indicated by post-hoc Tukey's LSD tests.

\*\* $p < .01$ . \*\*\* $p < .001$

Table 1.6

*Inter-correlations between Indicators of NSSI Severity*

	1. Age of onset	2. Number of methods	3. Number of body parts	4. Frequency
1.	--	-.36***	-.39***	.14
2.		--	.55***	.15
3.			--	.14
4.				---

*Note.* Indicators of NSSI severity were measured by the *Ottawa Self-injury Inventory* (Cloutier & Nixon, 2003; Martin, Cloutier et al., 2013). Pearson's Product-moment correlations with pairwise deletion of missing data are presented.

\*\*\*  $p < .001$ .

Table 1.7

*Between-subjects Effects for Age of Onset, Number of Methods, and Number of Body Parts Injured across Family Background Profiles*

Indicators of NSSI Severity <sup>a</sup>	Profile 1 <i>n</i> = 53 Adj. Mean (SE)	Profile 2 <i>n</i> = 39 Adj. Mean (SE)	Profile 3 <i>n</i> = 11 Adj. Mean (SE)	Profile 4 <i>n</i> = 19 Adj. Mean (SE)	Between-subjects effects <sup>b</sup> ( <i>F</i> )
Age of onset	14.72 (.34)	15.50 (.41)	15.86 (.87)	13.95 (.61)	1.26
Number of methods	.44 (.04)	.42 (.05)	.31 (.10)	.57 (.07)	1.06
Number of body parts injured	.47 (.04)	.40 (.05)	.36 (.11)	.56 (.07)	.89

*Note.* Profile 1 = Negative-invalidating; Profile 2 = Positive-moderate; Profile 3 = Positive-idealistic; Profile 4 = Negative-disturbed.

<sup>a</sup>Measured by the *Ottawa Self-injury Inventory* (OSI; Cloutier & Nixon, 2003; Martin, Cloutier et al. 2013). <sup>b</sup> Univariate significance was compared to a Bonferroni corrected alpha of  $.05/3 = .02$ .

Table 1.8

*Comparisons of Frequency of Recent NSSI across Family Background Profiles*

NSSI Frequency <sup>a</sup>		Family Background Profiles				Totals
		Profile 1	Profile 2	Profile 3	Profile 4	
1 to 5 times	Observed	79	82	28	12	201
	Expected	84.5	73.1	26.6	16.8	
	Adj. Std. Residual	-1.6	2.7	.6	-2.5	
More than 5 times	Observed	32	14	8	10	64
	Expected	26.5	22.9	8.4	5.3	
	Adj. Std. Residual	1.6	-2.7	-.6	2.5	
Totals		111	96	35	22	265

*Note.* Profile 1 = Negative-invalidating; Profile 2 = Positive-moderate; Profile 3 = Positive-idealistic; Profile 4 = Negative-disturbed. Adjusted standardized residuals are compared to critical cutoffs of  $z$  distribution.

<sup>a</sup>Measured by the *Ottawa Self-injury Inventory* (Cloutier & Nixon, 2003; Martin, Cloutier et al., 2013).

$\chi^2(3) = 11.99, p < .01.$

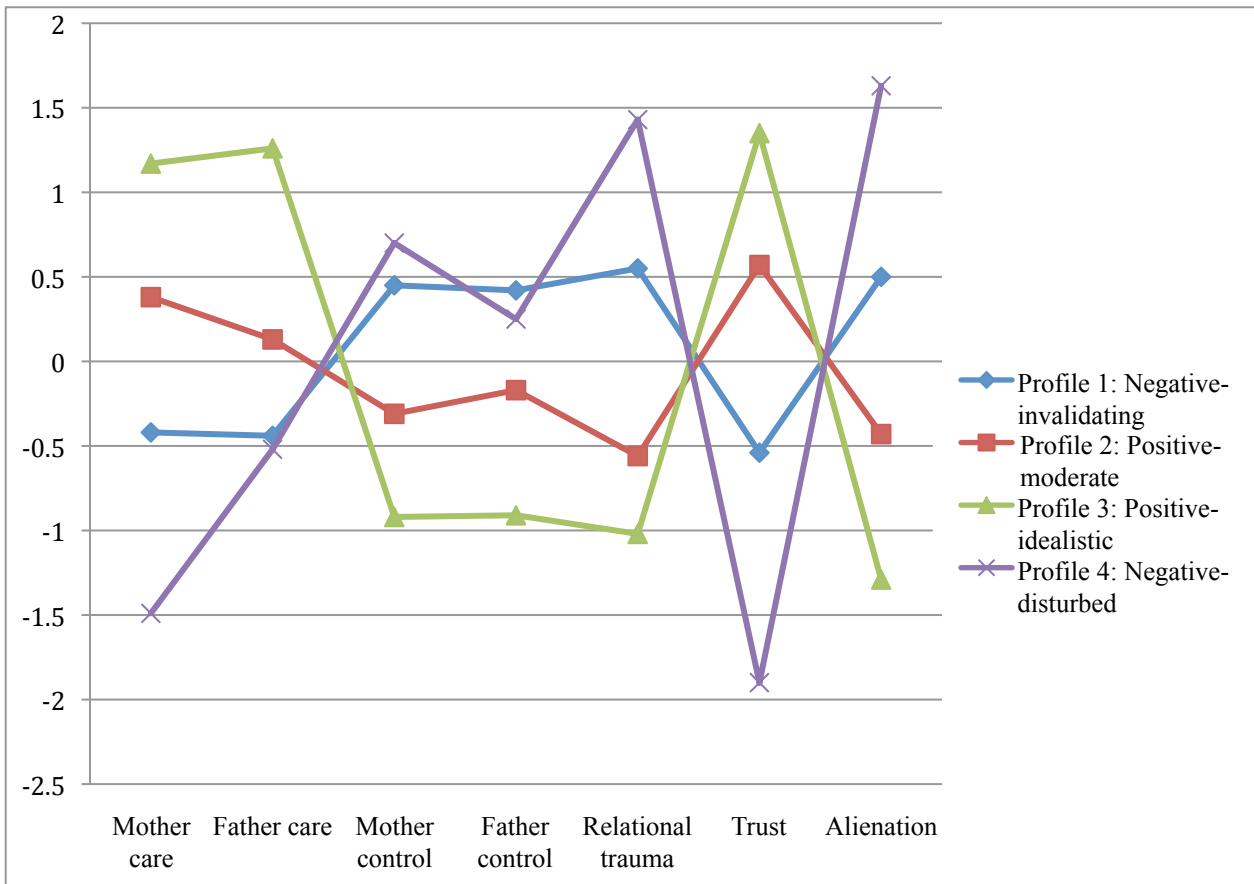


Figure 1.1 Standardized means of indicator variables reflecting quality of parent-child relationships used in latent profile analysis (LPA). Four family background profiles were obtained from the LPA, each demonstrating a different pattern of family background.

STUDY 2:

Retrospective States of Mind Regarding Attachment in Young Adults Engaging in Non-suicidal  
Self-injury: A Comparative Study

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## Abstract

The developmental psychopathology approach suggests that non-suicidal self-injury (NSSI) develops through experiences of childhood maltreatment and disrupted attachment to parents. However research to this end is sparse, limited by the use of questionnaire assessments of attachment, and overlooks the potential relative influences of relationships with mothers versus fathers. The present study administered the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985/1996), to 60 young adults (53 females;  $m_{\text{age}} = 20.38$  years) from the general population who had engaged in NSSI, and 60 control participants matched by age and gender. Results show that attachment representations reflecting emotion regulation deficits (preoccupied, unresolved/cannot classify) were over-represented in the NSSI group. Paternal maltreatment and both preoccupied and unresolved/cannot classify states of mind independently contributed to the prediction of NSSI. Lastly, relationships with mothers and fathers that violate stereotypical relational norms (e.g., rejecting mothers, role-reversing fathers) were implicated in NSSI, as were passive discourse patterns. Findings support the developmental psychopathology framework for NSSI, and suggest that distinct relational influences characteristic of mother and father relationships are associated with NSSI. The importance of attachment preoccupation in association to NSSI is discussed. Additional consideration is given to methodological implications regarding attachment theory and future research.

*Keywords:* non-suicidal self-injury; attachment; Adult Attachment Interview; child maltreatment; mother and father relationships

Retrospective States of Mind Regarding Attachment in Young Adults Engaging in  
Non-suicidal Self-injury: A Comparative Study

Non-suicidal self-injury (NSSI) is defined as the intentional self-inflicted destruction of body tissue, which is performed without suicidal intent and using methods that are not socially sanctioned (Nixon & Heath, 2009; Nock & Favazza, 2009). Although originally conceptualized as a consequence of severe psychological disorder, NSSI is also prevalent in community populations, with between 4 and 38% of high-school and university-aged youth reporting having engaged in at least one act of NSSI (see Heath, Schaub, Holly, & Nixon, 2009 for a review). Given the prevalence and associated health risks facing self-injurers in the general population (see Muehlenkamp, 2005), a great deal of research over the past two decades has been dedicated to identifying risk factors for engaging in NSSI, including the role of parental maltreatment (e.g., abuse, neglect) and the general quality of the family context and relationships with parents (see Linehan, 1993; Yates, 2009). However, the internalization of these prior experiences, in the form of individuals' later attachment representations or states of mind regarding early experiences, remains under-investigated in relation to NSSI. This oversight in the literature occurs despite theoretical implications regarding attachment's role in the development of NSSI (see Yates, 2009) and empirical evidence regarding attachment's influence in related psychopathology (Adam, Sheldon-Keller, & West, 1996; Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004; Farber, 2008; Fonagy, 1991; Lizardi et al., 2011; Sheftall, Mathias, Furr, & Dougherty, 2013; Stepp et al., 2008). Moreover, the few investigations that have examined the role of attachment with regard to NSSI specifically are methodologically limited by their use of self-reports to assess attachment representations. Thus additional research is needed using methodologically

sound assessments of attachment, conducted from a developmental psychopathology approach to alleviate the shortcomings of the extant research.

Further, despite evidence that experiences with mothers and fathers may have differential impacts on children's psychological well-being in general (Bronte-Tinkew, Moore, & Carrano, 2006; Gould, Shaffer, Fisher, & Garfinkel, 1998; Sheftall et al., 2013; Shek, 1998; Stein, Milburn, Zane, & Rotheram-Borus, 2009), and suggestions that such an effect also applies to NSSI specifically (Di Pierro, Sarno, Perego, Gallucci, & Madeddu, 2012; Gratz, Conrad, & Roemer, 2002; Hallab & Covic, 2010; Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008; Kaess et al., 2013), researchers have traditionally examined maltreatment and quality of attachment across both parents. Thus the relative influences of relationships with each individual parent are not well known. The current investigation is the first of its kind to use a gold-standard approach to measuring attachment representations in relation to NSSI, and to examine the relative influences of maternal and paternal maltreatment, as well as general characteristics of mother-child and father-child relationships.

### **Childhood Maltreatment, Developmental Psychopathology and NSSI**

A great deal of research has documented the role of childhood maltreatment in relation to NSSI, including the influences of sexual and physical abuses, emotional and physical neglect, and witnessing violence in the family (see Yates, 2009 for a review). While researchers have traditionally indicated that childhood experiences of sexual abuse are a strong risk factor for NSSI (Boudewyn & Liem, 1995; Gratz et al., 2002; van der Kolk, Perry, & Herman, 1991; Yates, Carlson, & Egeland, 2008; Zlotnick et al., 1996), results from a recent meta-analysis across 43 studies (Klonsky & Moyer, 2008) suggest only a moderate association, particularly in lower-risk community populations as opposed to clinically based (e.g., inpatient) samples. Childhood

physical abuse has also been linked to NSSI across several studies of non-clinical samples (Di Pierro et al., 2012; Gratz et al., 2002; Green, 1978; Yates et al., 2008). Findings regarding the influences of childhood neglect are less common and demonstrate inconsistent results. For instance, Dubo and colleagues (Dubo, Zanarini, Lewis, & Williams, 1997) linked childhood emotional neglect with NSSI in a sample of 42 inpatients, as did Lipschitz et al. (1999) in their clinical sample of 71 adolescents. In contrast, additional research has failed to identify links between NSSI and physical neglect in a community sample of 147 women (Wiederman, Sansone, & Sansone, 1999). Emerging evidence also suggests that childhood emotional and psychological abuse may be especially important predictors of later NSSI (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007; Wedig & Nock, 2007; Yates, Tracy, & Luthar, 2008), particularly in non-clinical populations. Some research also suggests that witnessing violence within the family context is associated with an increase likelihood of engaging in NSSI (Wiederman et al. 1999), though research regarding this particular form of maltreatment is limited.

Despite the bulk of evidence for the influences of childhood maltreatment on the occurrence of NSSI, the existing literature does not consistently account for the potential relative influences of maltreatment from different parental sources (mothers versus fathers), with few exceptions (see Gratz et al., 2002). Moreover, a large portion of the research linking maltreatment and NSSI has been conducted in high risk, clinical samples, and the links between maltreatment and NSSI within community populations are often contradictory or inconsistent. Thus, additional research is needed to elucidate the differential roles that mothers and fathers may play as perpetrators of maltreatment, particularly in community based samples of youth and young adults who engage in NSSI.

Given the links with early maltreatment, a developmental psychopathology (attachment-based) approach to understanding the development of NSSI has been proposed (see Yates, 2004; 2009). In short this framework proposes that negative early experiences, such as being maltreated by caregivers, diminish the child's capacity for appropriately coping with the demands of both social and emotional development. With lowered capacity for negotiating these demands, the probability of pathology or maladaptation (in this case, NSSI) in the child increases. Particularly implicated in developmental psychopathology is the quality of early attachment relationships with parents (Cicchetti & Toth, 2005; Yates, 2009), as the organization of attachment bonds is believed to guide the individual's self-organization and ability to self-regulate emotional distress (e.g., Sroufe, 1995) both in childhood and beyond. The internalization of early experiences with caregivers continues through development, culminating in adult mental representations of early attachment relationships (see Main, Kaplan, & Cassidy, 1985). These mental representations reflect not only the individual's current reflections on past attachment relationships, but also their current capacity and strategy for coping with emotionally laden experiences in past and present (e.g., J. P. Allen, 2008; Allen & Miga, 2010). In fact it has been argued that both the occurrence of childhood maltreatment as well as the individual's inability to coherently reflect on or come to terms with early negative experiences within attachment relationships, as evidenced in insecure or disorganized mental representations regarding attachment, are of similar importance in predicting psychopathology in early adulthood (e.g., Ainsworth & Eichberg, 2002; Farber, 2000; 2008; Fonagy, 1991). Indeed, insecure and disorganized attachment representations have been frequently linked with several psychiatric diagnoses (see van IJzendoorn & Bakermans-Kranenburg, 2008 for a review), including both borderline personality disorder (BPD) and suicidal behaviour, each of which are characteristically

related to NSSI (see Lofthouse, Muehlenkamp, & Adler, 2009). Although a few researchers have already examined attachment representations and NSSI, the existing findings are sparse and inconsistent despite the strong theoretical justification for such investigation. Moreover, the existing research has not examined the relative influences of both maltreatment and attachment on the occurrence of NSSI.

### **Existing Research Regarding Attachment and NSSI**

Attachment theory (Bowlby, 1969/1982) provides a comprehensive framework regarding pathways to emotion regulation deficits. Such deficits in the individual's capacity to cope with aversive emotional experiences increase the likelihood of adopting negative or damaging behaviours to dealing with distress, such as NSSI (see Linehan, 1993; Yates, 2009). However, only eight studies to date have directly investigated the role of adult attachment styles or representations in association with self-injuring behaviour, each of which have utilized self-report questionnaires to assess attachment. The use of questionnaires in this respect presumes that all aspects of attachment representations are consciously reportable, which may not be the case (Bowlby, 1988). Moreover, the dimensions of attachment typically assessed by questionnaires often reflect *relationship quality* rather than internalized attachment representations per se, or assume that a lack of negative relationship behaviour indicates secure attachment, which, again, may not necessarily be true (see Jacobvitz, Curran, & Moller, 2002).

Four of these past studies defined attachment from the social psychology perspective (see Mikulincer & Shaver, 2008), such that attachment style was assessed for either adult relationships in general (as opposed to a specific type of relationship), or within romantic relationships specifically. In these investigations attachment style was rated on the dimensions of attachment anxiety and attachment avoidance. Attachment anxiety represents relational styles

characterized by fear of abandonment, and an exaggeration of attachment related needs. Conversely, attachment avoidance features a rejection of attachment related needs, often associated with feeling discomfort with intense feelings or emotional closeness. From this perspective, when attachment anxiety and avoidance are both low, the individual is deemed to approach relationships with representations of secure attachment, while either high anxiety or high avoidance scores suggest the individual adopts an insecure attachment style in relationships with important others.

Results from this set of studies provide somewhat contradictory results, though attachment anxiety appears to be most implicated in association with NSSI. For instance, in their sample of 109 adults from a psychiatric inpatient unit, Gormley and McNiel (2010) found that attachment anxiety (rated by Bartholomew and Horowitz's (1991) adult attachment paragraphs) differentiated individuals who had engaged in NSSI from individuals with no history of self-injury. Levesque, Lafontaine, Bureau, Cloutier, and Dandurand (2010) also found that having an anxious attachment style in romantic relationships (measured by the *Experiences in Close Relationships Scale*; ECR; Brennan, Clark, & Shaver, 1998) predicted NSSI in a group of 429 female university students. Critchfield and colleagues (Critchfield, Levy, Clarkin, & Kernberg, 2008) administered the ECR to 92 adult patients diagnosed with BPD, but found contrasting results such that attachment avoidance was primarily associated with having engaged in NSSI. Finally, using the *Attachment Style Questionnaire* (Feeney, Noller, & Hanrahan, 1994), Kimball and Diddams (2007) showed that insecure attachment overall (a single latent dimension represented by both avoidant and anxious attachment) indirectly predicted frequency of NSSI through corresponding associations with emotion dysregulation in a sample of 216 university students. Thus, results from research measuring attachment from the social psychology

perspective typically suggest that anxious attachment styles are best linked with NSSI, though these findings are not consistent across samples (clinical versus community) and assessments.

Four additional research teams have retrospectively examined attachment to parents in association with NSSI behaviour, using high school and university student samples. Results from these studies are again inconsistent, and are similarly limited by the use of self-report questionnaires to assess attachment to parents. For instance, Gratz and colleagues (2002) found that insecure attachment to fathers (indicated by poor affective relationship quality, limited fostering of autonomy, and lack of emotional support measured by questionnaire designed specifically by the authors for that particular study) significantly predicted greater frequency of NSSI in 133 undergraduate students, while insecure attachment in relationships with mothers did not. Hallab and Covic (2010) showed that self-injurers reported poorer quality attachment relationships with both mothers and fathers (measured by total scores on the *Inventory of Parent Attachment*; Armsden & Greenberg, 1987) than participants who did not engage in NSSI in a sample of 114 female university students. Additional findings by Hallab and Covic showed that attachment was only indirectly predictive of NSSI, such that poor attachment relationships with fathers only predicted self-injury through mediation by concurrent stress; no direct or indirect paths were significant for quality of attachment to mothers. Heath and colleagues (Heath, Toste, Nedecheva, & Charlebois, 2008) found no association between the frequency of NSSI and quality of attachment to parents ( $N = 46$ ; characterized by availability and responsiveness of the caregiver, feared loss of the caregiver, proximity seeking, separation protest, and use of attachment figure as indicated on the *Reciprocal Attachment Questionnaire*; West & Sheldon-Keller, 1992; 1994). Most recently, Tatnell, Kelada, Hasking, and Martin (2013) assessed attachment using the *Adolescent Attachment Questionnaire* (AAQ, West, Rose, Spreng, Sheldon-

Keller, & Adam, 1998) and found that poor attachment (analogous to greater attachment anxiety) to parents was related to NSSI in a sample of 1973 high school students.

In sum, findings from the existing studies regarding parent-child attachment are also somewhat non-conclusive, though less inconsistent than the results regarding attachment from the social perspective. Rather than attributing the inconsistencies from both social and developmental perspectives to a true lack of association between NSSI and attachment relationships, it is likely that the lack of consensus in results stems from methodological limitations inherent in the studies' designs. As previously mentioned, the use of self-report questionnaires to assess attachment presumes that all aspects of attachment representations are consciously reportable; at best the multiple self-report instruments used in the studies reviewed above are indicators of relationship quality, rather than of mental representations of attachment relationships (see Bernier & Matte-Gagné, 2011; Jacobvitz et al., 2002; Mayseless & Sharf, 2007; Shaver, Belsky & Brennan, 2000 for more information regarding the distinction between self-reported and other-rated attachment measures). Attachment is a multifaceted construct, which is difficult to precisely capture via questionnaire format. For instance, in the study by Hallab and Covic (2010) secure attachment relationships were characterized by high trust and communication, and low alienation in relationships with parents. Insecure attachment is more complex than simply a "negative" attachment relationship. Similarly, secure attachment is, by definition, more than just an absence of relational difficulties (see Ainsworth, Blehar, Waters, & Wall, 1978; Main, 1990). The nuances of these distinctions within insecure adult attachment representations are largely overlooked by self-report questionnaires. Thus, based on the theoretical support linking NSSI and attachment representations, additional examination of these

associations in community samples of young adults is warranted, especially if these investigations utilize methodologies that alleviate limitations of existing research.

### **The “Gold Standard” Assessment of Attachment Representations in Adulthood**

The Adult Attachment Interview (AAI; George et al., 1985/1996) is a semi-structured interview designed to assess how the individual currently reflects upon or thinks about his or her past experiences and the quality of childhood attachment relationships with parents. These reflections are believed to also represent the individual’s capacity for regulating emotion (see J. P. Allen, 2008; Allen & Miga, 2010; Sroufe & Waters, 1977). Verbatim transcripts of the interviews are coded for attachment state of mind classification, based on a narrative analysis of the interview. Precisely, it is the manner in which the individual organizes their discussion of attachment related topics throughout the interview which is coded to yield one of five final state of mind classifications (Hesse, 2008; Main, Hesse, & Goldwyn, 2008). Speakers who are clearly coherent in their discussion of both positive and negative memories are coded as having *autonomous* states of mind (conceptually similar to security of attachment in childhood). Interviews in which the speaker minimizes or denies the impact of negative experiences are classified as *dismissing* (analogous to childhood avoidant attachment), and individuals who overemphasize negative experiences with parents, or discuss such memories in anger or with passive, convoluted speech patterns are rated as *preoccupied* (comparable to resistant-ambivalent childhood attachment patterns). The final two states of mind are thought to reflect a lack of strategy for dealing with particularly emotionally distressing attachment related material. First, *unresolved* states of mind are assigned to speakers who cannot maintain an organized structure of discourse when discussing experiences of either loss (death of a loved one) or trauma (abuse). In contrast speakers deemed to possess *cannot classify* states of mind display no distinct organized

strategy throughout the entire interview, rather than in response to isolated types of experiences (Hesse, 1996). Due to low frequency, unresolved and cannot classify states of mind are often collapsed into single category in research, particularly in lower risk samples.

Using the AAI in research regarding NSSI offers several methodological benefits compared to the existing research. First, the AAI allows for multiple attachment state of mind classifications, rather than solely an anxious versus avoidant dichotomy, permitting analysis of the specific variations in attachment representations that may be linked to NSSI. Also, the design of the interview, which requires the individual to discuss specific childhood memories in detail, is likely to elicit a greater diversity of information regarding attachment relationships than predetermined responses on a questionnaire. For instance, some specific experiences may not be directly referenced by questionnaire items, and may thus be overlooked by these assessments. In contrast, the AAI permits free discourse regarding childhood experiences, thus ensuring a more inclusive discussion of various past experiences and current interpretations. Moreover, the interview analyzes *how* the interviewee discusses certain experiences, rather than simply reporting a frequency of the occurrence of certain experiences. This provides information not only regarding whether or not such experiences occurred, but also about how these experiences have been incorporated into the individuals' current mental representation regarding attachment, which may be more important in predicting psychological outcomes than is the occurrence of negative interaction or traumatic experience (Ainsworth & Eichberg, 2002; Fonagy, 1991). This may alleviate the limitation of attachment questionnaire, which fail to capture certain characteristics of attachment strategies occurring external to the individual's conscious awareness. In summary, the AAI is a useful tool with which to conduct additional research in association with NSSI behaviour in order to clarify the findings of past research. However, it

must be emphasized that, although the AAI offers methodological strength in several aspects over questionnaire methods, its assessment of attachment states of mind are still retrospective, and cannot be used to make longitudinal, prospective predictions.

### **Attachment States of Mind and NSSI**

The AAI has not yet been empirically linked with NSSI, despite theoretical justification for such an investigation. In fact, the only reference in the literature that directly connects the AAI with NSSI comes from a case study by Levy, Yeomans, and Diamond (2007), in which the progress of a patient undergoing treatment for her NSSI is described. In this case study, the patient completed the AAI prior to treatment, and was classified as unresolved with a secondary preoccupied state of mind. After a year of treatment for her self-injury, the patient completed another AAI, and was this time classified as autonomous though her state of mind remained characterized by mild features of preoccupied attachment state of mind (e.g., slight passivity of speech patterns, moderate involving anger). The frequency of the patient's self-injurious behaviours were also greatly reduced post-intervention, with only one incident requiring hospitalization during the twelve month treatment period compared to five in the year prior to enrolling in therapy. Details from this case study suggest that unresolved or preoccupied states of mind may be associated with NSSI, and that a move toward a more autonomous mental representation of attachment might protect against continued engagement in self-injurious behaviour. Although limited by the restrictions of generalizability inherent in case studies, these findings combined with those discussed below regarding the AAI's associations with other psychopathologies similar to NSSI, provide additional justification for the use of the AAI in empirical studies regarding NSSI.

### **Attachment States of Mind in Association with Psychopathology**

Particular justification for studying NSSI in association with AAI states of mind comes from research regarding both BPD, for which NSSI is an associated symptom (*Diagnostic and Statistical Manual of Mental Disorders* (5<sup>th</sup> ed.; DSM-V); American Psychiatric Association, 2013; Linehan, 1993; Lofthouse et al., 2009), and suicidal behaviour, with which NSSI frequently co-occurs (Cloutier, Martin, Kennedy, Nixon, & Muehlenkamp, 2010; Hamza & Willoughby, 2013; Jacobson, Muehlenkamp, Miller, & Turner, 2008; Muehlenkamp & Gutierrez, 2004; 2007; Nixon, Cloutier, & Aggarwal, 2002). However, despite similarities with these pathologies, NSSI remains distinct from both. BPD is a psychiatric diagnosis in which the individual experiences serious disorder of personality, and disruption to daily functioning (American Psychiatric Association, 2013), whereas NSSI is a behavioural act, and many individuals who engage in NSSI do so without comorbid psychological diagnosis, and may never seek treatment (see Rodham & Hawton, 2009). Moreover individuals engaging in NSSI often fail to meet diagnostic criteria for BPD (Selby, Bender, Gordon, Nock & Joiner, 2012). Researchers have similarly differentiated suicide attempters from self-injurers, such that suicide attempters demonstrate more severe deficits in a number of areas including depressive symptoms, life attitudes, impulsivity and suicidal ideation (Cloutier et al., 2010; Jacobson et al., 2008; Muehlenkamp & Gutierrez, 2004). Thus while the existing research associating the AAI with both BPD and suicidality can be used to guide hypotheses of the present research, NSSI remains a distinct behavioural construct regarding which additional research is needed.

***BPD research.*** The AAI has been used extensively in research concerning BPD. Agrawal and colleagues (2004) reviewed seven studies that investigated the specific attachment states of mind associated with BPD. The literature reviewed showed that both unresolved and preoccupied states of mind regarding childhood attachment relationships with parents were

consistently over-represented in BPD patients (including: Barone, 2003; Fonagy et al., 1996; Patrick, Hobson, Castle, Howard, & Maughan, 1994; Rosenstein & Horowitz, 1996; Stalker & Davies, 1995). For example, Patrick and colleagues (1994) compared attachment states of mind between twelve female patients diagnosed with dysthymia and twelve female patients diagnosed with BPD. Frequency analyses showed that *all* BPD patients in Patrick et al.'s sample had either a primary or secondary preoccupied classification; nine of these women were given a primary classification of unresolved with respect to trauma with secondary preoccupied classification, while the remaining three adopted primary preoccupied strategies. Both preoccupied and unresolved classifications were significantly more likely in the BPD group compared to the dysthymic group, even after accounting for the occurrence of past trauma. While multiple other researchers have found similar results as described in Agrawal and colleagues' review (2004), two recent articles have shown slightly different findings. Levy and colleagues (Levy et al., 2006) used the AAI to assess pre-treatment state of mind classifications in a sample of 60 BPD patients, finding a distribution of 31.7% unresolved, 18.3% cannot classify, 30% dismissing, and 15% preoccupied. When only secondary classifications were used (i.e., when unresolved and cannot classify categories were ignored), the distribution of insecure classifications was nearly equal (50% preoccupied, 45% dismissing). Similarly, Barone, Fossati, and Giuducci (2011) found high rates of dismissing attachment in their sample of 140 BPD patients, with a distribution of 51% dismissing, 35% preoccupied, 28% unresolved, and 12% cannot classify. From these findings, there is still near overwhelming support for the link between BPD and both preoccupied and unresolved states of mind, though in at least some particular samples dismissing attachment representations have also been implicated.

***Suicidality research.*** As suggested previously, research regarding associations between attachment states of mind and suicidal behaviour also provide further justification for linking NSSI and attachment, such that suicidality may be a more specific, behavioural correlate to NSSI than BPD symptomatology in general. Although a myriad of researchers have linked questionnaire assessments of attachment styles (usually anxious) with suicide attempts and ideation (Lizardi et al., 2011; Maimon, Browning, & Brooks-Gunn, 2010; Santorelli, Woods, Carlin, Marsic, & Kaslow, 2012; Sheftall et al., 2013; Stepp et al., 2008), only one study has examined this association using the AAI. In this unique investigation, Adam et al. (1996) found primary classification as unresolved to be most common for adolescents with a history of suicidal behaviours ( $n = 69$ ) in their sample of 133 psychiatric patients, even though the frequency of attachment related trauma (abuse) was equal in both suicidal and non-suicidal groups in their research. Amongst individuals in the suicidal behaviour group who had adopted an unresolved strategy, the most common secondary classification was preoccupied. While the existing research provides a great deal of support for an association between preoccupied and unresolved states of mind and both BPD and suicidal behaviours, it is impossible to conclude that similar patterns of association would be found within community samples of self-injurers without further research, particularly regarding individuals who engage in NSSI in community populations. The current study offers a unique contribution to the existing literature in that it is the first to examine the states of mind regarding attachment that are specifically associated with NSSI in a non-psychiatric sample of adolescents and young adults.

### **Specific Factors Underlying Attachment States of Mind: AAI Subscales in Research**

Despite an overwhelming tendency for researchers to use the AAI's attachment state of mind classifications in empirical work, Main's coding system (Main, Goldwyn, & Hesse, 2002;

Main et al., 2008) provides a great deal of additional detail regarding individuals' childhood relationships with parents. Classification is determined based on ratings assigned to a series of continuous scales regarding Probable Experiences reported as having occurred in childhood interactions with each of mothers and fathers. These include coders' ratings as to how the maternal and paternal behaviour described by participants reflect love, rejection, neglect, role-reversal, and pressure to achieve. Coders also assign ratings to scales reflecting the individual's current perspective or state of mind regarding these early experiences. State of mind scales are separated into two sections, the first is specific to parents (mother and father ratings for idealization, involving anger, and derogation) and the second represents the speaker's overall state of mind, which includes insistence on lack of recall, passivity of speech, meta-cognitive monitoring, fear of loss (extremely rare and often unrated), unresolved with respect to loss or trauma, and coherence of transcript and of mind (see Appendix A for a detailed description of state of mind subscales). State of mind rating scales reflect the discourse strategy adopted by the interviewee while responding to AAI questions.

Although the AAI subscales provide rich detail about characteristics of relationships with both parents, these ratings are almost exclusively used to determine overall classification, excluding a great deal of specific information regarding the relative interpersonal influences from each parent. Past research suggests characteristics of relationships with mothers and fathers may differentially influence the development of psychological well-being in general (Bronte-Tinkew et al., 2006; Gould et al., 1998; Shek, 1998; Stein et al., 2009), and NSSI specifically (Gratz et al., 2002; Hallab & Covic, 2010; Hilt et al., 2008; Kaess et al., 2013), such that characteristics underlying father-child relationships have been especially highlighted while the same characteristics in mother-child relationships are not associated with NSSI. Thus further research

regarding the association between NSSI and AAI subscale ratings for maternal and paternal relationships offers a unique contribution to the literature, and adds to the field's current understanding of the familial influences contributing to NSSI's occurrence. As mentioned previously, use of the individual subscales from the AAI is rare, however, two existing studies (Fonagy et al., 1996; Barone, 2003) have examined AAI subscales in association with BPD.

Fonagy and colleagues (1996) first associated the relevant subscales with BPD symptomatology, although subscale scores were averaged across mother and father ratings where applicable in their study. Regardless, these researchers found that individuals diagnosed with BPD ( $n = 36$ ) had parents rated as less loving and more neglecting, and individuals were rated as having lower meta-cognitive monitoring compared to a group of psychiatric patients with non-BPD diagnoses ( $n = 23$ ). These findings suggest that there are specific factors underlying attachment states of mind that can be linked with borderline pathology, but failed to address the separate ratings assigned to mothers and fathers within the AAI coding system. In a subsequent study Barone (2003) compared separate mother and father ratings on AAI subscales between 40 BPD patients and a group 40 (non-clinical) undergraduate students. She found that the BPD patients had higher ratings for mother and father rejection, mother role-reversing, mother and father neglect, involving anger towards mother and father, and unresolved scores with respect to trauma. The BPD group also yielded lower mother and father loving scores, fewer instances of meta-cognitive monitoring, and lower coherence of both transcript and mind. The findings presented thus far from both investigations still did not identify AAI subscales unique to BPD, as comparisons were made without accounting for the potential excess of insecure attachment states of mind in the BPD groups. Thus, to determine which subscales were uniquely associated with BPD Barone further compared AAI subscale scores of only those participants rated as insecure

(preoccupied, dismissing, unresolved) between both BPD and non-BPD groups. These additional findings demonstrated a different pattern of results, indicating that highly neglecting and less loving mothers, more rejecting fathers, and higher unresolved trauma scores were unique to the BPD group. The authors interpreted these findings as demonstrating the joint effects of having an emotionally distant father and a neglecting, unloving mother, as well as an inability to find mental or emotional resolution regarding early traumatic experiences as significant risk factors underlying insecure attachment that were specific to BPD symptomatology.

These studies demonstrate the amount of detail that can be derived through use of the AAI, beyond attachment state of mind classification alone. Moreover, this research suggests that particular features of mother and father relationships are especially influential in the development of BPD, with different combinations of maternal and paternal factors implicated in this pathology. Despite the importance of these findings, and their relevance to the study of NSSI, additional research is still necessary, especially to determine the precise associations between NSSI and the AAI subscales, particularly in non-psychiatric young adult populations.

### **The Current Study**

The current study is the first of its kind to examine the distribution of attachment states of mind measured by the gold standard assessment in a sample of self-injuring young adults. This study is also original in its empirical application of a developmental psychopathology framework to NSSI, examining the relative influences of both past childhood maltreatment and current attachment representations. Finally, this study made use of the AAI subscales to perform in-depth examination of the characteristics underlying attachment states of mind which may serve as risk or protective factors distinctive of NSSI. Looking at the associations with subscales also permitted the analysis of potential differential influences of characteristics of relationships with

mothers and fathers in relation to the occurrence of NSSI, as past research has indicated that certain characteristics of relationships with fathers are especially implicated in NSSI (e.g., Gould et al., 1998; Hallab & Covic, 2010). This research was guided by three objectives.

**Objective 1: Are attachment states of mind associated with NSSI?** The first objective was to determine which attachment states of mind (autonomous, dismissing, preoccupied, unresolved/cannot classify) were associated with NSSI in young adults recruited from the general population. Based on the findings of past research regarding similar links with BPD and suicidal behaviour, it was predicted that individuals reporting NSSI would more frequently display preoccupied and unresolved states of mind compared to non-self-injuring controls.

**Objective 2: Do attachment states of mind predict NSSI beyond the influences of experiencing childhood maltreatment?** The second objective of the current study had two aims. First, the relative influences of self-reported frequency of childhood maltreatment perpetrated by mothers versus fathers were compared; although it was expected that more severe maltreatment histories would predict NSSI, no specific hypotheses were made with regard to mother and father as perpetrators based on the lack of past research. Second, the developmental psychopathology framework of NSSI was applied to examine how reports of childhood maltreatment and individuals' internalized attachment states of mind combined in their prediction of NSSI. It was expected that attachment states of mind would predict the occurrence of NSSI beyond the contribution of (i.e., in addition to) childhood maltreatment based on the existing theory (see Fonagy, 1991; Yates, 2009).

**Objective 3: Do specific factors underlying AAI states of mind relate to NSSI?** Lastly, this investigation aimed at determining which subscales of the AAI represent specific risk or protective factors of NSSI within a community sample of young adults. Based on past

research regarding associations between AAI subscales and BPD (Barone, 2003; Fonagy et al., 1996), the NSSI group was expected to yield lower ratings of positive AAI subscales (e.g., maternal and paternal love, coherence of transcript and mind, metacognitive monitoring), and higher ratings on negative AAI subscales, particularly those underlying preoccupied and unresolved states of mind (e.g., rejecting, neglecting, and role-reversing experiences with parents, involving anger towards parents, unresolved scores with respect to loss and trauma, passivity of discourse) compared to individuals who had not engaged in NSSI. Second, to differentiate which AAI subscale ratings were uniquely associated with NSSI rather than with insecure attachment states of mind in general, additional analyses comparing only those participants classified as insecure from both the NSSI and control groups were conducted. As identified in Barone's research (2003), it was expected that a distinct subset of scales would be uniquely associated with NSSI; no specific predictions were made for this examination. For the second set of analyses in particular, it was also expected that the patterns of subscales pertaining to mothers and fathers would differ in their association to NSSI, though no specific predictions were made regarding particular scales.

## **Method**

### **Participants**

One hundred and twenty young adults aged 17 to 25 (106 females;  $M = 20.38$  years,  $SD = 1.98$ ) were recruited from either a university student participant pool, or through external advertisements (see below). Exactly half ( $n = 60$ ) of participants were specifically targeted during recruitment because they had previously engaged in NSSI; the remaining 60 individuals had not engaged in NSSI, and were matched to their self-injuring counterparts based on age and gender. The majority (86.3%) of participants in the overall sample were students while others

identified as white-collar workers (6.0%) or as unemployed (3.4%); the remaining 4.4% were blue-collar workers, self-employed, or homemakers. Seventy-five percent of the sample was of Caucasian descent, while other ethnicities including Asian (5.9%), Black (5.9%), Latino (4.2%), and Middle Eastern (4.2%) were represented at lesser frequencies. Lastly, 85.7% of participants were English-speaking while the remaining were Francophone. Demographics did not differ between NSSI and control groups, except that self-injurers were less likely than expected to be students (see Table 2.1). Similarly most demographics did not vary based on recruitment method, except that individuals recruited from external advertising tended to be older than those recruited through the university student participant pool, and were less likely to be students (see Table 2.1).

Within the subgroup of self-injurers, average age of onset of NSSI was 13.88 years ( $sd = 3.39$ ). While 52.5% of the NSSI group had not self-injured in the past six months, 28.8% had engaged in NSSI one to five times in the past six months, 8.5% endorsed monthly and weekly self-injury, and 1.7% had self-injured daily. The most commonly reported methods for NSSI included cutting (70.2%), scratching (41.2%), burning (40.0%) and trying to break bones (40.0%).

**Recruitment through participant pool.** Fifty participants (20 self-injurers) were recruited through the *Integrated System for Participation in Research* (ISPR) from the School of Psychology at the University of Ottawa, following participation in a larger, related online study (see Study 1). When individuals participated in the online study, they were asked to leave contact information (email address, phone number) if they were interested in participating in a continuation of the research at a later date. All participants who indicated having engaged in

NSSI behaviour in online questionnaires were contacted first, followed by non-self-injuring participants who were possible matches (based on age and gender) for each NSSI participant.

**Recruitment through external advertising.** The remaining 70 participants (40 self-injurers) were recruited through advertisements posted online (Craigslist, Kijiji, Facebook) or across the university's campus (see Appendix B). Willing participants were invited to contact the researcher by phone or email for more information regarding the study's procedures. Upon initial contact participants were screened for age (between 17 and 25 years), gender, and NSSI status. All participants who had engaged in NSSI were immediately invited to participate; those who had not engaged in NSSI were invited to participate provided they matched a counterpart in the NSSI group based on age and gender. Contact information for individuals with no such match at the time of initial contact were retained by the researcher and were contacted subsequently if a suitable NSSI group match was eventually identified. The two recruitment methods were conducted in parallel, as was recruitment of participants for both NSSI and control groups.

### **Procedure**

Participants each completed a 2.5- to 3-hour testing session. Following consent, participants completed a series of questionnaires. The researcher then reviewed each participants' responses to the following questions to determine if additional risk assessment was required: 1) have you ever thought about taking your life; 2) have you made an attempt to take your life in the past six months; 3) have you ever been treated by a medical doctor after injuring yourself on purpose; 4) have you ever been kept in hospital because of hurting yourself on purpose (see Appendix C for full risk assessment procedures). Risk assessments were conducted if a *yes* response was provided for any question listed above to determine if the participant was in imminent danger of extreme self-injury, or purposeful or accidental suicide. If the researcher

believed a participant to be at risk, procedures were ceased; no individuals were excluded from the study due to imminent risk. Following questionnaires and, if applicable, risk assessment, the AAI was completed. Participants received \$20 compensation for their participation, and reviewed a mental health resource sheet with the researcher following completion of the study procedures (see Supplemental Materials).

### **Measures**

**NSSI.** Both lifetime occurrence and recent (within the past six months) frequency of NSSI were assessed in this study. Lifetime experiences with NSSI were measured by responses to “have you ever in your lifetime purposefully hurt yourself without the intention of killing yourself?” which was added to the original items of the *Ottawa Self-injury Inventory* (OSI; Cloutier & Nixon, 2003; Martin et al., 2013) for the purposes of this study; participants were offered forced choice response of *yes* or *no*. The frequency of recent NSSI was determined by answers to “how often in the past six months have you actually injured yourself without the intention to kill yourself?” Responses were rated on a 5- point scale (*not at all, 1–5 times, monthly, weekly, daily*). Past research has demonstrated success in the OSI’s assessment of NSSI in university student samples (see Martin et al., 2013).

**Attachment states of mind.** Current states of mind or mental representations regarding attachment were assessed using the AAI (George et al., 1985/1996). The AAI is a semi-structured interview consisting of twenty questions, most of which concern the participant’s relationship with their parents during childhood. Additional questions refer to past traumatic experiences, including sexual and physical abuses, possible explanations regarding motivations underlying parents’ past behaviour, prior experiences with the deaths of close friends and family members, as well as individuals’ perceptions of how their childhood experiences impacted their

current personalities. Verbatim transcripts of the interviews were coded using the system outlined by Main and colleagues (Hesse, 2008; Main et al., 2002; Main et al., 2008). Main's coding system consists of several subscales (see Introduction; Appendix A), each rated on a 9-point scale with low scores (1) representing an absence of the subscale characteristic and a high score (9) indicating extremely high incidence of the particular characteristic. Using the guidelines laid out by Main et al. (2002), the coder then uses the assigned ratings for the subscales (excluding unresolved ratings), as well as general descriptors of each state of mind classification to assign one of three organized classifications for the speaker. As discussed previously, the three organized classifications include autonomous, insecure-dismissing, and insecure-preoccupied. Interviews coded as autonomous are characterized by a relative ease of accessing childhood memories, and an ability to discuss relationships clearly and coherently. Dismissing transcripts are marked by a turning-away from attachment material either through a striking inability to recall details or memories from childhood, idealization of one or both parents, or endorsement of negative experiences having been beneficial. Conversely, preoccupied state of mind is assigned if the interviewee discusses parent-child relationships at length using either angry or passive (vague) speech patterns, or, more rarely, if the speaker becomes extensively preoccupied with traumatic experiences during the interview. Transcripts which fail to correspond with any one major classification, or which demonstrate a combination of organized strategies throughout the interview, are deemed cannot classify. All transcripts in which loss and/or abuse are reported are further rated based on the degree to which the speaker is able to coherently discuss these experiences. A classification as unresolved is given when a speaker experiences lapses in monitoring speech when discussing abusive or loss experiences; unresolved classification can also be assigned if the interviewee reports extreme behavioural responses to

such experiences. All unresolved and cannot classify transcripts are also assigned a secondary best fitting organized (autonomous, dismissing, preoccupied) classification. Past research has demonstrated high test-retest reliability of AAI classifications (Bakermans-Kranenburg & van IJzendoorn, 1993; Sagi et al., 1994). Researchers have also demonstrated the discriminant (Bakermans-Kranenburg & van IJzendoorn, 1993; Crowell et al., 1996; Sagi et al., 1994) and predictive (van IJzendoorn, 1995) validities of AAI classifications, and convergent validity for both the overall classifications (Crowell et al., 1996) and for the AAI subscales (Manassis, Owens, Adam, West, & Sheldon-Keller, 1999).

A trained and reliable coder, who was blind to NSSI status, coded interview transcripts in the current study. Thirty transcripts (25%) were double coded for reliability purposes. Excellent agreement was found between coders on 5- ( $\kappa = .86$ ; 90% agreement), 4- ( $\kappa = .81$ ; 87% agreement) and 3- ( $\kappa = .80$ ; 87% agreement) category classifications. Final classifications that did not match between coders were discussed until consensus was reached. Intra-class correlation coefficients (ICC) were calculated between coders' rating scores on the AAI subscales, with coefficients ranging between .49 (maternal pressure to achieve) and .98 (father involving anger; see Table 2.2). Based on the ICCs for AAI subscales identified in past research (e.g., Bernier, Larose, Boivin, & Soucy, 2004; Larose & Bernier, 2001) and recommended cut-offs (see Kottner et al., 2011) subscales with an ICC lower than .60 (maternal pressure to achieve, ICC = .49; father neglect, ICC = .59) were excluded from analyses. Remaining subscales for which rating scores did not match were averaged between coders; none of these changes in scores resulted in modification to final classifications.

**Maternal and paternal maltreatment.** The *Comprehensive Childhood Maltreatment Scale* (CCMS; Higgins & McCabe, 2001) was used to assess different types of childhood

maltreatment perpetrated by either mothers or fathers. The CCMS is a 22-item questionnaire requiring participants to respond based on the frequency (*never or almost never to very frequently*) of behaviour indicative of psychological abuse (3 items; scores range from 3 to 15), physical abuse (3 items; scores range from 3 to 15), witnessing violence in the family (2 items; scores range from 2 to 10), neglect (3 items; scores range from 3 to 15), and sexual abuse (11 items; scores range from 0 to 44); each item is rated separately for mothers and fathers. Higher scores reflect a greater frequency of the abuse for all maltreatment subtypes. Due to low response rates for sexual abuse scales (only 4% of the sample indicated experiencing childhood sexual abuse), this scale was omitted from the present research. Composite scores representing overall frequency of maternal and paternal maltreatments were calculated for the current study by summing scores for the relevant maltreatment subtypes, as prior research has linked overall maltreatment summary scores with NSSI (Arens, Gaher, & Simons, 2012; McReynolds & Wasserman, 2011). Researchers have previously demonstrated the validity and reliability of the CCMS in young adult samples (B. Allen, 2008; Higgins & McCabe, 2000; Higgins & McCabe, 2001; Vranceanu, Hobfoll, & Johnson, 2007). Internal consistency was acceptable for the current sample with Cronbach's alphas of .75 for witnessing family violence, .78 for maternal maltreatment, and .85 for paternal maltreatment.

**Demographic variables.** All participants completed a standard sociodemographic questionnaire, including items regarding language, primary occupation, living arrangements, and ethnicity, which were used either as potential covariates (e.g., language, living arrangements) or for descriptive purposes (e.g., primary occupation, ethnicity).

## Results

### Preliminary Analyses & Assumptions

All statistical analyses were conducted using SPSS Version 20. Prior to testing hypotheses the data were screened as outlined by Tabachnick and Fidell (2007). Less than 5% of data was missing for variables of interest. All AAI subscales demonstrated positively skewed distributions except for mother and father loving, unresolved-trauma, and coherence of both mind and transcript, which were normally distributed. As this was expected given the nature of these scales, no transformations were applied to the data; instead non-parametric analyses were used for the relevant objective (see Objective 3). The assumptions of outliers and heterogeneity of variance were not investigated for the AAI subscales as the use of non-parametric tests also protects against the influences of these violations (Field, 2013). Discrepant cell sizes were found for the 5-way AAI state of mind variable (autonomous, dismissing, preoccupied, unresolved, cannot classify) as there were only two transcripts identified as cannot classify. These two cases were collapsed into an unresolved/cannot classify category as is the common practice in research using the AAI, alleviating the discrepancy. Based on past literature (e.g., Adam et al., 1996) both 4-way (autonomous, dismissing, preoccupied, unresolved/cannot classify) and 3-way (autonomous, dismissing, preoccupied) state of mind variables were used in analyses. Occupation also demonstrated discrepant cell sizes, even after the original seven-category variable was transformed into a dichotomous variable representing students ( $n = 101$ ) versus non-students ( $n = 16$ ); thus the variable was dropped from analyses as a potential covariate and was instead used solely for descriptive purposes. Regarding CCMS maltreatment variables, two outliers beyond 3 standard deviations from the mean were found for paternal maltreatment, and were changed to be within 3 standard deviations from the mean in order to retain as much data as possible. All three CCMS maltreatment variables demonstrated positive skew, with most individuals reporting very low levels of maltreatment. As this is not unexpected in a sample

recruited from a non-clinical, relatively low risk population, and because normality of the distribution of scores for continuous predictors is not an assumption underlying logistic regression (the analysis in question for these variables, see Objective 2; Tabachnick & Fidell, 2007) no transformations were required. All CCMS variables met the assumptions for homogeneity of variances.

**Potential covariates.** The possible confounding influences of age and gender were already accounted for by the matching procedures used to create the control and NSSI groups, thus only language (English vs. French), current living arrangements (e.g., “Do you currently live with your parents?”), and ethnicity were explored as potential covariates based on previously established links with NSSI (e.g., Melendez & Melendez, 2010; Tulloch, Blizzard, & Pinkus, 1997). No significant associations were found between these variables and NSSI status (see Table 2.1), thus no covariates were included in analyses.

### **Objective 1: Are Specific Attachment States of Mind Related to NSSI?**

**Distribution of attachment states of mind in NSSI versus control groups.** The first objective examined if specific attachment states of mind were associated with NSSI, with the hypothesis that preoccupied and unresolved/cannot classify states of mind would be over-represented. Chi-square contingency tests compared the distribution of attachment states of mind across NSSI and control groups using both the 4-way (see Table 2.3) and 3-way (see Table 2.4) classification systems. Within the control group, 4-way states of mind were distributed as follows: 70% autonomous, 20% dismissing, 1.7% preoccupied, and 8.3% unresolved/cannot classify (1 unresolved trauma, 4 unresolved loss). Distribution of attachment states of mind were quite different for the NSSI group, with 45% autonomous, 15% dismissing, 11.7% preoccupied, and 28.3% unresolved/cannot classify (5 unresolved trauma, 10 unresolved loss, 2 cannot

classify). Indeed statistical results supported the hypothesis such that attachment states of mind differed significantly based on NSSI status ( $\chi^2(3) = 14.74, p < .01$ , Cramer's  $V = .35$ ).

Examination of adjusted standardized residuals (Table 2.3) showed that autonomous states of mind were underrepresented in the NSSI group, while both preoccupied and unresolved/cannot classify states of mind occurred more frequently than expected in this group. It should be noted that two cells (25%) had expected frequencies less than 5, violating an assumption of chi-square analyses. However, as the expected frequencies in question were both counts of 4, and because the violation was not far from the allowable 20% of expected frequencies lower than 5 (see Field, 2013), analyses were conducted as planned. Moreover, using Fisher's exact test, which can be used when this assumption is violated (Field, 2013), also yielded significant differences ( $p < .01$ ).

Results for the 3-way system (Table 2.4) similarly demonstrated significant differences in the distribution of AAI states of mind ( $\chi^2(2) = 9.80, p < .01$ , Cramer's  $V = .29$ ). In this analysis, 73.3% of the control group was autonomous, 20.0% were dismissing, and 6.7% demonstrated preoccupied states of mind compared to 55.0% autonomous, 16.7% dismissing, and 28.3% preoccupied in the NSSI group. As predicted, adjusted standardized residuals showed that self-injurers were less likely than expected to demonstrate autonomous attachment representations and more likely than expected to have preoccupied states of mind regarding attachment.

Given the potential for overlap between unresolved and preoccupied classifications suggested in the literature (Fonagy et al., 1996; Patrick et al., 1994; Rosenstein & Horowitz, 1996; Stalker & Davies, 1995), the distribution of secondary classifications for individuals demonstrating unresolved states of mind were also compared. Thirteen participants with primary unresolved/cannot classify states of mind had secondary preoccupied classification. Of these, 10 (76.9%) had engaged in NSSI, suggesting a high degree of overlap between these two states of

mind, particularly in the NSSI group. These findings suggest that having a state of mind regarding attachment which is characterized by an exaggeration of attachment related experiences *overall* (preoccupied) rather than a lack of organized discourse regarding solely loss and/or trauma experiences (unresolved) may be especially implicated in NSSI behaviour.

**Objective 2: Do Attachment States of Mind Predict NSSI beyond the Influence of Childhood Maltreatment?**

A hierarchical logistic regression examined the relative influences of maternal versus paternal maltreatment, and of having witnessed violence in childhood, and tested the hypothesis that AAI states of mind, specifically preoccupied and unresolved/cannot classify, would continue to predict NSSI beyond the contribution of maltreatment variables. Prior to analyses, additional assumptions for linearity of the logit (linear relationship between continuous predictors and logit of the outcome variable; Field, 2013; Tabachnick & Fidell, 2007) and the absence of multicollinearity were examined. Linearity of the logit was tested by examining the predictive capacity of interaction terms created for the continuous three CCMS maltreatment variables and each respective variables' natural logarithm. As none of these interaction terms significantly predicted NSSI group membership, it was concluded that the assumption was met. Collinearity diagnostics for the proposed regression model showed tolerance values greater than .10 for all predictors (range between .37 and .85; Menard, 1995), and variance inflation factor (VIF) values well below 10 (between 1.18 and 2.49; Myers, 1990), indicating no multicollinearity violations.

Correlations and descriptive statistics for CCMS maltreatment variables and AAI states of mind are listed in Table 2.5. Hierarchical logistic regression analyses were conducted in two steps (see Table 2.6). In the first step, maternal maltreatment, paternal maltreatment, and witnessing violence were entered simultaneously as predictors, with NSSI as the binary outcome

variable. The model demonstrated good fit to the data (Omnibus  $\chi^2(3) = 9.00, p < .05$ ; Hosmer & Lemeshow's  $\chi^2(8) = 14.15, p = .08$ ) with the set of maltreatment predictors (maternal maltreatment, paternal maltreatment, witnessing violence) accounting for an estimated 11% of variance (Nagelkerke's  $R^2 = .108$ ) in the likelihood of engaging in NSSI. Odds ratios (OR; see Table 2.6) indicated that for each unit of increase in the frequency of paternal maltreatment the odds of having engaged in NSSI increased by 13%. Neither maternal maltreatment nor witnessing violence within the family was associated with NSSI. In the second step, three dummy coded variables representing attachment states of mind were added to the model. The second step made significant improvement to model fit as demonstrated by Omnibus chi-square ( $\chi^2(3) = 10.87, p < .01$ ) and Hosmer and Lemeshow's ( $\chi^2(7) = 9.56, p = .22$ ) tests, and accounted for an additional 12% of variance in the likelihood of engaging in NSSI (a total of 23% of variance accounted for by all predictors at Step 2; Nagelkerke's  $R^2 = .226$ ). Examination of odds ratios in the second step showed that while paternal maltreatment remained a significant predictor of NSSI (accounting for a 12% increase in the odds of NSSI for each unit increase in frequency of paternal maltreatment), both preoccupied and unresolved/cannot classify states of mind were each also associated with increased odds of NSSI. Specifically, having a preoccupied state of mind (compared to autonomous) increased the odds of having engaged in NSSI nearly ten-fold, while individuals with unresolved/cannot classify states of mind had three times the odds of having engaged in NSSI compared to participants with autonomous states of mind. Thus, even after controlling for the effects of maternal and paternal maltreatment and witnessing violence within the family context, preoccupied and unresolved/cannot classify states of mind remained significantly associated with NSSI behaviour, and accounted for far greater increases in the odds of engaging in NSSI than having experienced maltreatment by fathers. Moreover,

results showed that the odds of engaging in NSSI were three times higher for individuals with preoccupied states of mind than those who were rated as having unresolved/cannot classify attachment representations.

### **Objective 3: Do Specific Factors Underlying AAI States of Mind Relate to NSSI?**

For the final objective it was predicted that ratings on positive AAI subscales would be lower and ratings on negative AAI subscales, particularly those associated with preoccupied and unresolved/cannot classify states of mind, would be higher for participants in the NSSI group compared to the non-NSSI group. Intercorrelations, and relevant descriptive statistics for the AAI subscales (excluding mother pressure to achieve and father neglect scores due to poor inter-rater reliability) are detailed in Table 2.7. In order to minimize the number of required analyses, several redundant variables were altered or excluded. First, coherence of transcript and coherence of mind scores were averaged to reflect overall coherency due to a near perfect correlation between the two variables ( $r = .98$ ). Scores for unresolved loss and unresolved trauma were redundant with overall unresolved scores ( $r_s = .95$  and  $.60$  respectively) so only the overall unresolved scores were included in analyses. Similarly, only the overall derogation score was retained due to its correlation with both mother and father derogation ratings ( $r_s = .90$  and  $.46$  respectively). Thus a total of 18 subscales were compared between NSSI and control groups.

Given the exploratory nature of this research, no correction for multiple comparisons was made. Instead significance was determined based on an alpha cutoff of .05. This decision was made based on the following reasoning: First, even statisticians cannot decide upon when family-wise error corrections should be conducted, how such corrections should be made, or if they result in an excessive increase of Type II error while attempting to control Type I error (see Perneger, 1998). Second, statistical researchers suggest that the provision of standardized effect

sizes and their confidence intervals (Beaulieu-Prévost, 2006; Loftus, 1996; Nakagawa, 2004; Wilkinson and the Task Force on Statistical Inference, 1999) may be as important for aiding in the interpretation of statistical findings as is determining the significance of an effect. Thus, effect sizes and corresponding confidence intervals are reported for all analyses within this objective to aid in fully describing the effects therein.

A series of non-parametric Mann-Whitney U tests were used to compare AAI subscales across NSSI and control groups (see Table 2.8). Hypotheses were partially supported such that individuals who had engaged in NSSI yielded higher ratings of maternal rejection, neglect, and anger, more passivity, and lower scores on maternal love and overall coherence compared to individuals who had never engaged in NSSI. Effect sizes (obtained by squaring the  $r$  values presented in Table 2.8) for these findings were small, with between 4.0% and 6.25% of variance in subscale ratings accounted for by group membership. No differences were found between groups for any of the subscale ratings for relationships with fathers, nor for any other state of mind subscale.

To determine which AAI subscales were uniquely associated with having engaged in NSSI, as opposed to reflecting subscales associated with insecure states of mind, which were over-represented in the NSSI group, parallel analyses were completed for only those individuals in each of the NSSI and control groups with dismissing, preoccupied, or unresolved/cannot classify states of mind (see Table 2.9). Indeed the pattern of results was different for this second set of analyses. Specifically, while scores reflecting maternal rejection remained higher for people with insecure states of mind in the NSSI group, this group was also rated as describing early experiences characterized by more maternal and paternal role-reversal, more passivity, and less mother and father idealization in their interviews compared to control participants.

Moreover, the magnitudes of these effects (calculated by squaring the  $r$  values presented in Table 2.9) were larger than those identified for the overall sample, with between 8% and 16% of variance in AAI subscale ratings accounted for by NSSI status. These findings again highlight not only the implication of preoccupied passivity of discourse in association with NSSI, but also that there are specific aspects of childhood relationships with parents which are reported by self-injurers in the context of the AAI. Findings also suggest that the types of early experiences with mothers and fathers that are associated with NSSI engagement are qualitatively different (e.g., rejecting mothers vs. role-reversing fathers).

### **Discussion**

The present study aimed at elaborating upon the inconsistencies of existing research regarding associations between attachment representations and NSSI, at testing a concurrent model of the developmental psychopathology framework for understanding associations between early maltreatment, current attachment representations and NSSI engagement, and at examining the relative influences of maternal and paternal relationships on NSSI. Results support the primary hypotheses of this research. Findings suggest that self-injuring individuals are unique in terms of both their states of mind regarding attachment and their particular early experiences within relationships with mothers and fathers. Moreover, concurrent attachment states of mind were associated with increases in the likelihood of having engaged in NSSI beyond the influence of early maltreatment. These findings have empirical and clinical implications for NSSI, as well as conceptual implications regarding attachment theory as a framework for studying NSSI.

#### **Preoccupied and Unresolved Attachment in Association with NSSI**

Findings of this research supported hypotheses such that individuals who had engaged in NSSI were more likely than expected to have preoccupied or unresolved/cannot classify states of

mind regarding attachment relationships with parents, and were less likely than expected to demonstrate autonomous states of mind. The over-representation of preoccupied and unresolved/cannot classify states of mind in particular are highly correspondent with past research regarding BPD (see Agrawal et al., 2004 for a review), adolescent suicidality (Adam et al., 1996) and overall psychopathology in community populations (Ward, Lee, & Polan, 2006). Moreover, current findings are in line with past research that has identified anxious attachment styles as measured by self-report questionnaires to be linked with greater incidence of NSSI in community populations (Levesque et al., 2010; Tatnell et al., 2013), as these self-reported styles of attachment share some features with preoccupied states of mind in particular (Bartholomew & Shaver, 1998).

A strong link between NSSI and attachment preoccupation is especially logical when considering attachment states of mind as reflective of affect regulation strategies (Allen & Miga, 2010; Kobak, 1986; Sroufe & Waters, 1977). From an emotion regulation perspective of attachment, it is believed that preoccupied individuals adopt hyperactivating strategies to manage their emotions, such that the emotional needs and distresses of these individuals are excessive (see Kobak, Cole, Ferenz-Gillies, & Fleming, 1993). Hyperactivating strategies are assumed to develop as a means of ensuring responsiveness from parents who are inconsistently sensitive to the child's needs (e.g., sometimes rejecting, sometimes attentive), and that these patterns then endure throughout development. On the AAI, hyperactivating strategies are evident through the disproportionate attention that preoccupied speakers dedicate to early experiences, either through lengthy, drawn out discussions or exaggerated complaints regarding parental behaviours. Indeed research has repeatedly shown that individuals who demonstrate preoccupation with early attachment experiences self-report high levels of distress in a number of areas including (but not

limited to) adolescent psychological symptoms (Cole-Detke & Kobak, 1996; Dozier, Stevenson, Lee, & Velligan, 1991; Kobak & Ferenz-Gillies, 1995; West, Adam, Spreng, & Rose, 2001), college adjustment (Bernier et al., 2004; Larose & Bernier, 2001; Larose, Bernier, & Soucy, 2005), and interpersonal relationships (Tarabulsky et al., 2012). While this research may reflect a tendency for individuals with preoccupied states of mind to simply over-report their own distressed feelings, additional researchers suggest that higher emotional arousal is actually experienced. Such argument is supported by observations of greater intensity of emotional expressivity (both positive and negative; Haydon, Roisman, & Burt, 2012), and heightened physiological reactivity (indicating increased affective arousal; Roisman, 2007) in preoccupied individuals during emotional discussion tasks. Combined with the knowledge that NSSI is most often used as a means of regulating intense emotional arousal (see Klonsky, 2007), it is quite intuitive that preoccupied states of mind were over-represented in self-injurers in the present investigation, as we would expect that these individuals would be likely to engage in more extreme behaviour like NSSI to cope with their negative emotions.

The link between NSSI and unresolved/cannot classify states of mind can be similarly interpreted, as unresolved and cannot classify representations are considered to reflect disorganized attachment as manifested in adulthood (see Hesse, 2008) and are thought to reflect the greatest deficits in emotion regulating capacities. Transcripts coded as unresolved feature the speaker's apparent inability to monitor discourse pertaining to experiences of either loss or trauma, thus reflecting a failure to develop adequate capacities to regulate the emotions experienced when reflecting upon these difficult experiences. Individuals with cannot classify attachment states of mind are believed to have failed to develop coherent organized strategies with which to cope with potentially harmful emotions provoked by reflecting upon difficult early

experiences, and generally demonstrate conflicting strategies (e.g., dismissing *and* preoccupied) throughout the interview (see Hesse, 1996). This divide in strategies is believed to continue from childhood, resulting from internal working models based on attachment figures who were potentially maltreating (see Main & Solomon, 1990), or from highly insensitive or disrupted child-caregiver interaction (e.g., Goldberg, Benoit, Blokland, & Madigan, 2003; Madigan, Moran, & Pederson, 2006). Thus, the abundance of individuals with unresolved/cannot classify states of mind identified in the current study are in line with past research showing that disrupted attachment relationships through parental separation or loss (Conterio & Lader, 1998; Suyemoto, 1998; Walsh, 2006), or childhood experiences of maltreatment (Carroll, Schaffer, Spensley, & Abamowitz, 1980; Gratz et al., 2002; van der Kolk et al., 1991) are associated with NSSI behaviour. Individuals who possess these states of mind are likely to report more of these negative experiences than those with organized attachment representations, thus justifying such over-representation.

However, the links between NSSI and unresolved/cannot classify attachment states of mind are perhaps more difficult to attribute solely to unresolved/cannot classify representations, given their degree of overlap with attachment preoccupation in this study. It remains possible that the influence of preoccupied attachment may at least in part account for associations with unresolved/cannot classify states of mind within this sample. Indeed existing research has also identified strong overlap between these two states of mind (e.g., Adam et al., 1996; see Agrawal et al., 2004 for a review) which, as suggested by West and colleagues (West et al., 2001) likely reflects the similarity of cognitive processes underlying each of preoccupied and unresolved/cannot classify representations. Alternatively, this overlap might demonstrate a conceptual, methodological shortcoming of the original AAI classification system, such that

preoccupied and unresolved states of mind are intrinsically linked and may not necessarily represent distinct categories. This is likely a controversial notion for most advocates of attachment theory. However, emerging evidence (Haltigan, Roisman, & Haydon, in press; Roisman, Fraley, & Belsky, 2007) from large, representative samples supports a three-dimensional structure underlying the AAI state of mind scales. The first of these dimensions reflects dismissing versus secure states of mind, while the remaining two each represent combinations of preoccupied and unresolved manifestations, the first of these being anger and trauma oriented, the second passive and loss driven. Thus, as neither preoccupied nor unresolved state of mind scores form independent dimensions across these two large-scale investigations, a potential intrinsic overlap between these state of mind classifications is supported. Additional research regarding this possibility, and linking the three-dimensional structure of attachment states of mind to psychological outcomes are required before firm conclusions can be drawn.

### **Maternal and Paternal Maltreatment are Differentially Linked with NSSI**

Interestingly, results showed that only paternal maltreatment (indicated by the frequency of physical abuse, psychological abuse, and neglect perpetrated by fathers) was linked with NSSI, while similar experiences with maternal maltreatment and having witnessed violence within the family were unrelated to the odds of engaging in NSSI. While results are comparable to past research linking childhood maltreatment with NSSI (e.g., Arens et al., 2012; Di Pierro et al., 2012; Glassman et al., 2007; see Lang & Sharma-Patel, 2011 for a review; McReynolds & Wasserman, 2011), findings from the current study further refine the existing literature given the inclusion of both maternal and paternal sources of maltreatment. This distinction is especially important, as there is evidence that certain indicators of relationships with fathers are more implicated in NSSI than are the same features of mother-child relationships (Gould et al., 1998;

Gratz et al., 2002; Hallab & Covic, 2010). Although one may argue that the current findings are simply evidence of fathers being the most frequent perpetrators of direct child maltreatment (see Brewster et al., 1998; Guterman & Lee, 2005), it is also possible that these findings indicate true differential influences of relationships with mothers versus fathers. Indeed, mean rates of maternal and paternal maltreatment were similar in the current sample (see Table 2.5). Thus, the lack of association between NSSI and maternal maltreatment likely reflects distinct etiological implications for NSSI from abusive or neglectful relationships with mothers versus fathers.

Given the findings discussed in more detail below regarding specific characteristics of mother and father relationships associated with NSSI, it is possible that relational trauma spawning from early mother-child interactions (e.g., unresponsive or rejecting maternal behaviour) as opposed to outright maltreatment or abuse from mothers are especially implicated in NSSI. In contrast, as fathers may be somewhat less emotionally responsive to or responsible for childhood needs in general compared to mothers, then only more direct, outright maltreatment from fathers are important in predicting occurrence of NSSI in early adulthood. It should be noted that these findings may also suggest unique implications for NSSI in community based populations, where maltreatment can be assumed to occur at a lesser frequency and severity than in more at-risk populations. Indeed much of the past research indicating the significant impacts of childhood experiences of abuse and neglect in relation to NSSI have involved clinical samples of adolescents (Brodsky, Cloitre, & Dulit, 1995; Carroll et al., 1980; Dubo et al., 1997; Matsumoto et al., 2004; Paivio & McCulloch, 2004), and findings regarding the role of maltreatment in normative populations are less consistent (e.g., Weierich & Nock, 2008; Weismoore & Esposito-Smythers, 2009). Additional research concerning the role of

maltreatment as perpetrated by mothers and fathers separately within both types of samples is needed before final conclusions are made.

### **Attachment States of Mind Predict NSSI beyond Paternal Maltreatment**

Importantly, this study was the first of its kind to examine the influences of internalized attachment representations on predicting NSSI beyond the contribution of parental maltreatment. Preoccupied and unresolved/cannot classify states of mind as well as childhood maltreatment by fathers were unique, additive predictors to the likelihood of having engaged in NSSI in this sample. In other words, not only was maltreatment by fathers implicated in NSSI, but the way in which individuals internalized or reflected upon early experiences (e.g., their current state of mind or mental representation of attachment) were also influential, and accounted for even greater increases in the odds of having engaged in NSSI than did paternal maltreatment. This suggests that, at least in community samples of self-injurers, *how* early experiences are internalized into mental representations may be more salient risk/protective factors of NSSI than is the occurrence of maltreatment by fathers. These findings are in line with past research concerning the general developmental psychopathological consequences of childhood maltreatment (Cicchetti & Toth, 2005; Yates, 2009). Taken again from an emotion regulation perspective of attachment, it seems that the individual's inability to adequately regulate emotions during discussions of early experiences is a strong risk factor for NSSI in addition to the known risk factor of experiencing maltreatment by fathers in particular. These findings correspond with past theoretical and empirical work suggesting that individuals may be at increased risk for psychopathology particularly if they have experienced severe maltreatment *and* fail to resolve or come to terms with these past experiences (Adam et al., 1996; Fonagy, 1991; Fonagy et al., 1996; Patrick et al., 1994; Stalker & Davies, 1995).

### **AAI Subscales and NSSI**

**Characteristics of relationships with mothers and fathers differ in association with NSSI.** As predicted, results showed that characteristics of parent-child relationships and overall states of mind rated for AAI discourse were uniquely associated with NSSI even after accounting for the over-representation of insecure attachment found within this group. Self-injurers were rated as having more rejecting mothers, and more role-reversal in relationships with both mothers and fathers than individuals who had never engaged in NSSI. Conceptually, high rejection scores for mothers would be assigned when maternal interaction described in the context of the AAI is characterized by an active turning away from the child's affection and needs, where independence is inappropriately encouraged, and "the effect is usually to shift the child's attention away from the parent and from attachment" (Main et al., 2002, p. 21). Given this definition findings are coherent with past research showing links between NSSI, maternal lack of care, emotional neglect, and antipathy (Bureau et al., 2010; Dubo et al., 1997; Gratz et al., 2002; Kaess et al., 2013; Lipschitz et al., 1999; van der Kolk et al., 1991).

In contrast, role reversal on the AAI ranges from parental overprotection or excessive worry about the child, to parental incompetence with the child expressing an implicit sense of guilt or responsibility for the parent, to full role reversal or spousification. Again, the findings of the present study complement existing literature, particularly with regard to parental overprotection, which has been linked with increased incidence or frequency of NSSI in past research (e.g., Gratz et al., 2002; Bureau et al., 2010). Moreover, Gratz and colleagues (2002) previously suggested that relationships with fathers characterized by emotional over-involvement, which is conceptually akin to role reversal, might be damaging to the child's development due to the

father's inappropriate reliance on the child for comfort and affection. Relationships with fathers characterized by these features may thus increase the likelihood of engaging in NSSI.

The current findings certainly suggest that there are distinct characteristics of relationships with mothers and with fathers that can be linked with the occurrence of NSSI, which is in line with past work regarding the AAI subscales and BPD pathology (Barone, 2003; Barone et al., 2011). Indeed, findings from the present investigation suggest that parental relationships which defy the stereotypical norms of mothers as caring, emotionally supportive and stable (evidenced through either rejection or role-reversal), and fathers as strong, competent parental figures (evidenced through role-reversing relationships) may be especially implicated. Further, it may be the combination of having both a rejecting mother and an emotionally over-involved, role-reversing father which places individuals at the highest risk, though additional research regarding this possibility is needed. In general, future research should further examine the particular roles of mothers and fathers in relation to NSSI, particularly in community-based samples of individuals.

#### **Manifestations of insecure states of mind between NSSI and control groups.**

Findings from the current study also suggest key differences in how insecure attachment representations manifested between the NSSI and control groups. Mother and father idealization scores were rated as lower for self-injurers compared to non-self-injurers. According to Main and colleagues (2002), high scores for idealization are assigned when individuals fail to support general positive descriptions of parents either through outright contradictions (e.g., interviewee describes relationship positively but provide memories of experiences that the coder deems to have been negative or even abusive), or simply by failing to provide any support for the positive description (e.g., refusing to elaborate on a particular descriptor). Both strategies are believed to

reflect the individual's avoidance of attachment related materials that may be emotionally distressing. Thus this finding suggests that being able to avoid or dismiss negative aspects of early experiences may be a protective factor against engaging in NSSI. This is an idea that has been discussed more generally in relation to both adult and child attachment literatures (see Belsky, Steinberg, & Draper, 1991; Del Giudice, 2009) as avoidant, deactivating attachment strategies may increase individuals' resiliency to negative environmental factors by providing an adaptation to the lack of relational resources available.

Conversely, but as predicted, passivity scores were higher in the NSSI group than in the control group. High passivity scores are assigned when speakers discuss childhood experiences in vague, indecisive terms (see Main et al., 2002; 2008). Passive speech reflects the individual's inability to fully discuss past relationships, due to excessive absorption in the material as opposed to an avoidance of it. Rather than turning away from negative early experiences and blocking potentially upsetting attachment related information, attachment preoccupation features a turning toward, or over-analysis of these experiences. Such preoccupation keeps potentially damaging memories and experiences present in the mind, rather than allowing the individual to move on. These findings suggest that attachment preoccupation may be especially implicated in the etiology of NSSI in community populations, especially given additional existing findings for the links between NSSI and rumination (Selby, Franklin, Carson-Wong, & Rizvi, 2013; Zaki, Coifman, Rafaeli, Berenson, & Downey, 2013), which shares some common features with passivity of discourse in the AAI. The link between preoccupation and NSSI in the current study was further evidenced by the lack of differences in unresolved scores between NSSI and control groups, suggesting, as proposed previously, that associations between unresolved/cannot classify states of mind and NSSI identified in this research may result from the overlap between

preoccupied and unresolved states of mind. However, additional research to this effect is still needed to replicate the present results.

### **BPD, Suicidal Behaviour and NSSI as a Continuum of Attachment Related Distress**

Despite the correspondence between current results and past research regarding BPD and suicidal behaviour, the present findings provide sufficient unique nuance to suggest a potential continuum of attachment related distress for NSSI and related behaviour. First, the overall distribution of attachment states of mind in the NSSI group appear to differ (though statistical analysis to this effect was not conducted) from distributions identified in meta-analytic summaries of the AAI in BPD and suicidal samples (van IJzendoorn & Bakermans-Kranenburg, 2008). Most strikingly, fewer transcripts were classified as unresolved/cannot classify (15 to 20% fewer), and more were classified as autonomous (30% more) within the NSSI group in the current study than in meta-analyses of BPD and suicidal samples, while dismissing and preoccupied rates remained comparable. These differences likely reflect the distinction between individuals who engage in NSSI within the general community as opposed to individuals with various psychiatric diagnoses, who were recruited for research from inpatient or outpatient treatment centers. Such distinction suggests that, while individuals who engage in NSSI are still at a heightened risk for insecure attachment states of mind compared to those who do not, self-injurers do not demonstrate the same degree of attachment related deficit as individuals with full psychiatric diagnosis.

This argument is further supported by results showing preoccupied states of mind accounted for nearly three times the increase in odds of engaging in NSSI than unresolved/cannot classify states of mind, as well as findings that showed passive discourse scores were higher for self-injuring as opposed to control individuals, but that unresolved scores did not differ between

the two groups. Thus, NSSI may be more likely to result from individuals' representations of past relational trauma, or inconsistent and unresponsive parenting, each believed to underlie preoccupied states of mind (Hesse, 2008; Main et al., 2008), as opposed to a lack of resolution regarding more directly traumatic experiences of abuse or loss reported by individuals with more extreme symptoms of distress such as BPD or suicidality. Following this line of thought, a stronger link with attachment preoccupation, an organized albeit insecure attachment representation, is perhaps not surprising given that self-injuring individuals in the present research were drawn from the general community thus comprising a lower risk sample than used in past investigations concerning BPD and suicidal behaviour, each of which featured psychiatric patient samples. Together these findings provide support for the call to consider NSSI as diagnostically external to other forms of psychopathology, particularly in the general population where psychiatric diagnosis may be less common. However, additional research to this end is required to replicate these distributions given that the sample sizes in the current study prohibited use of statistical comparisons to existing meta-analytic distributions of attachment states of mind.

### **Limitations**

Despite the important, unique findings presented herein, this investigation is not without a few methodological limitations. First, data were collected from a cross-sectional sample of young adults precluding longitudinal, developmental conclusions. That said, the direction of the tested predictive models are rooted in past research and theory, and are thus justified. Second, a proportion of participants were recruited through advertisements directly recruiting individuals who had engaged in NSSI and may represent a biased sample of self-injurers. Thus, it is possible that this group is not truly representative of all individuals in the general population who have engaged in NSSI. Related, the lack of assessment of psychological disorder in this study may

limit the generalizability of results specifically to non-clinical populations of self-injurers, as there was no way to ensure that NSSI occurred entirely external to psychiatric diagnosis.

However, as participants were all recruited from the community, it is likely that this sample at least represented a lower degree of risk compared to clinical populations recruited from within treatment facilities. Finally, this study's reliance on self-reported experiences of childhood maltreatment and retrospective narrative reports of early experiences prohibited verification of the reported experiences. The use of gold-standard, well-validated measures of these constructs is nonetheless believed to exert some control over the rigorousness of the information collected.

### **Clinical Implications and Future Research**

Findings from the current study have important clinical implications. First, findings suggest it would benefit clinicians to consider the quality of attachment representations in assessment and treatment of NSSI, especially if family experiences are implicated for a particular case. As suggested by Levy et al. (2006) and Zaki et al. (2013), assisting individuals to achieve more autonomous states of mind, and thus more appropriate differentiation of particular emotional experiences when regulating negative affect, may aid in decreasing NSSI engagement. Moreover, the current study suggests that the types of relationships with mothers and fathers that influence NSSI may be quite different, which should be considered at patient intake. Therapies aimed at improving familial relationships may also be helpful in treating self-injuring behaviour.

Future research should aim to replicate current findings by continuing to use the AAI in research involving community samples of self-injurers. Additional investigations should also focus on the relative influences of mothers and father in relation to NSSI, both in regard to childhood maltreatment and more general relational characteristics. While current and past findings (e.g., Gratz et al., 2002; Hallab & Covic, 2010) do suggest differential influences from

each parent, the extant literature has used a diverse number of methods thus replication is needed to better substantiate these findings. Finally, attachment researchers should continue to examine the potential overlap between preoccupied and unresolved states of mind, as this is an issue that has been repeatedly identified in the literature. Research to this effect should focus on whether such overlap represents a similarity of mental processes or a methodological overlap inherent within the traditional coding system.

### **Conclusions**

The current study was the first to include a gold-standard assessment of adult attachment representations, the AAI, in association with NSSI behaviour in a community-based sample of young adults. This research provides clarification and extension to the existing research regarding attachment's associations with NSSI, and also adds to existing knowledge regarding the relative etiological influences specific to relationships with mothers and fathers, both in terms of maltreatment experiences and general relationship quality. States of mind reflecting the greatest degree of emotional dysregulation were associated with NSSI, even after accounting for the effects of childhood maltreatment. Importantly, preoccupied states of mind rather than unresolved appeared to make the greatest contribution, suggesting that self-injurers within the general population are perhaps more likely to be impacted by early experiences characterized by relational trauma (e.g., inconsistent, insensitive care; see Bureau, Martin, & Lyons-Ruth, 2010) as opposed to having been subjected to abuse or more severe disruptions to attachment relationships. Moreover, findings indicate that having relationships with mothers and fathers that violate stereotypical relational norms may put adolescents and young adults at a higher risk for engaging in NSSI to cope with emotional distress. In general the developmental psychopathology framework for understanding the etiology of NSSI was supported.

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Table 2.1

*Demographic Differences between NSSI and Control Groups, and between Participant Pool and External Recruitment Methods*

	NSSI Obs. (Exp.)	Control Obs. (Exp.)	Group Differences
Age <sup>a</sup>	20.45 (1.97)	20.30 (2.00)	$t(118) = -.41, p = .68$
Gender			$\chi^2(1, n=119) = .001, p = .97$
Males	7 (6.9)	7 (7.1)	
Females	52 (52.1)	53 (52.9)	
Occupation			$\chi^2(1, n=117) = 4.79, p < .05$
Student	46 (50.1)	55 (50.9)	
Other <sup>b</sup>	12 (7.9)	4 (8.1)	
Ethnicity			$\chi^2(1, n=119) = .35, p = .56$
Caucasian	46 (44.6)	44 (45.4)	
Other <sup>c</sup>	13 (14.4)	16 (14.6)	
Language			$\chi^2(1, n=119) = .05, p = .82$
English	51 (50.6)	51 (51.4)	
French	8 (8.4)	9 (8.6)	
	Participant Pool Obs. (Exp.)	External Recruitment Obs. (Exp.)	
Age <sup>a</sup>	19.31 (1.10)	21.15 (2.11)	$t(107.46) = 6.20, p < .001$
Gender			$\chi^2(1, n=120) = 1.49, p = .22$
Males	8 (5.9)	6 (8.1)	
Females	42 (44.1)	64 (60.9)	
Occupation			$\chi^2(1, n=117) = 6.92, p < .01$
Student	48 (43.2)	53 (57.8)	
Other <sup>b</sup>	2 (6.8)	14 (9.2)	
Ethnicity			$\chi^2(1, n=119) = 2.72, p = .10$
Caucasian	34 (37.8)	56 (52.2)	
Other <sup>c</sup>	16 (12.2)	13 (16.8)	
Language			$\chi^2(1, n=119) = .97, p = .32$
English	41 (42.9)	61 (59.1)	
French	9 (7.1)	8 (9.9)	

*Note.* <sup>a</sup>Means and standard deviations are presented for age. <sup>b</sup>Based on discrepant cell sizes additional categories used for descriptive purposes were collapsed into "Other." <sup>c</sup>Based on discrepant cell sizes additional categories used for descriptive purposes were collapsed into "other."

Table 2.2  
*Intra-class Correlation Coefficients of Adult Attachment Interview Subscales for Inter-coder Reliability*

	Intra-Class Correlation Coefficient
Mother rejection	.93
Father rejection	.95
Mother role-reversal	.77
Father role-reversal	.86
Mother pressure to achieve	.49
Father pressure to achieve	.95
Mother neglect	.94
Father neglect	.59
Mother love	.91
Father love	.93
Mother idealizing	.92
Father idealizing	.90
Mother anger	.89
Father anger	.98
Mother derogation	.61
Father derogation	.65
Overall derogation	.76
Lack of memory	.90
Meta-cognition	.63
Passivity	.75
Unresolved – loss	.91
Unresolved – trauma	.97
Unresolved – overall	.92
Unresolved – other trauma	.97
Coherence of transcript	.93
Coherence of mind	.93

Table 2.3

*Distribution of 4-way Attachment States of Mind across NSSI and Control Groups*

	Frequencies	F	Ds	E	U/CC	Totals
Control						
Observed		<b>42</b>	12	<b>1</b>	<b>5</b>	60
Expected		34.5	10.5	4	11	
<i>z</i>		<b>2.8</b>	.7	<b>-2.2</b>	<b>-2.8</b>	
NSSI						
Observed		<b>27</b>	9	<b>7</b>	<b>17</b>	60
Expected		34.5	10.5	4	11	
<i>z</i>		<b>-2.8</b>	-.7	<b>2.2</b>	<b>2.8</b>	
Totals						
		69	21	8	22	120

*Note.* F = autonomous; Ds = dismissing; E = preoccupied; U/CC = unresolved/cannot classify. *z* = adjusted standardized residual. Bolded values indicate significant deviations from expected frequencies. Attachment States of Mind measured by the Adult Attachment Interview (Main, Goldwyn, & Hesse, 2002).

$\chi^2(3) = 14.74, p < .01.$

Table 2.4

*Distribution of 3-way Attachment States of Mind across NSSI and Control Groups*

Frequencies		F	Ds	E	Totals
Control					
Observed		<b>44</b>	12	<b>4</b>	60
Expected		38.5	11	10.5	
<i>z</i>		<b>2.1</b>	.5	<b>-3.1</b>	
NSSI					
Observed		<b>33</b>	10	<b>17</b>	60
Expected		38.5	11	10.5	
<i>z</i>		<b>-2.1</b>	-.5	<b>3.1</b>	
Totals		77	22	21	120

*Note.* F = autonomous; Ds = dismissing; E = preoccupied. *z* = adjusted standardized residual. Bolded values indicate significant deviations from expected frequencies. Attachment States of Mind measured by the Adult Attachment Interview (Main, Goldwyn, & Hesse, 2002).  $\chi^2(2) = 9.80, p < .01$ .

Table 2.5

*Descriptive Statistics and Inter-correlations for Self-reported Maternal and Paternal Maltreatment and AAI States of Mind*

	1.	2.	3.	4.	
1. Attachment state of mind <sup>a</sup>	--	.26**	.29**	.22*	
2. Maternal maltreatment <sup>b</sup>		--	.39***	.46***	
3. Paternal maltreatment <sup>b</sup>			--	.53***	
4. Witness violence <sup>b</sup>				--	
	<i>Mean</i>	--	14.51	13.51	4.23
	<i>SD</i>	--	5.23	4.59	2.16
	<i>n</i>	120	118	114	111

*Note.* Pearson's product-moment correlations were calculated between all variables.

<sup>a</sup>Attachment state of mind measured by the Adult Attachment Interview (George, Kaplan, & Main, 1985/1996). <sup>b</sup>Maternal and paternal maltreatment and witness violence measured by the *Comprehensive Childhood Maltreatment Scale* (Higgins & McCabe, 2001).

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2.6

*Maternal and Paternal Maltreatment and Attachment States of Mind Predicting NSSI*

Predictors	B	S.E.	Wald $\chi^2$	Odds Ratio	95% CI	
					Lower	Upper
Step 1						
Maternal maltreatment	.05	.05	.95	1.05	.96	1.15
Paternal maltreatment	.12	.05	4.89*	1.13	1.01	1.25
Witness violence	-.06	.12	.29	.94	.75	1.18
Step 2						
Maternal maltreatment	.04	.05	.54	1.04	.94	1.14
Paternal maltreatment	.11	.06	3.75*	1.12	1.00	1.26
Witness violence	-.08	.13	.45	.92	.72	1.18
Attachment states of mind			8.91*			
Dismissing	-.40	.62	.43	.67	.20	2.24
Preoccupied	2.28	1.13	4.09*	9.81	1.07	89.74
Unresolved/cannot classify	1.19	.61	3.81*	3.30	1.00	10.92

*Note.* Attachment state of mind measured by the *Adult Attachment Interview* (George, Kaplan, & Main, 1985/1996). Maternal and paternal maltreatment measured by the *Comprehensive Childhood Maltreatment Scale* (Higgins & McCabe, 2001).

\*  $p < .05$ .

Table 2.7  
*Inter-correlations and Descriptive Statistics for AAI Subscales for Overall Sample*

AAI Subscales	1	2	3	4	5	6	7	8	9	10	11
1. M Rejection	--	.43***	.19*	.07	.16	.62***	-.72***	-.33***	.03	.11	
2. F Rejection		--	.18	-.02	.40***	.18	-.28**	-.68***	.06	-.03	.31**
3. M Role-reversal			--	.26**	-.09	.22*	-.23*	-.11	-.24**	-.14	.37***
4. F Role-reversal				--	-.14	.05	-.08	.06	-.05	-.09	.14
5. F Pressure to Achieve					--	.11	-.06	-.32***	.14	.06	.09
6. M neglect						--	-.54***	-.22*	-.11	-.01	.57***
7. M love							--	.44***	-.23*	-.24**	-.45***
8. F love								--	-.21*	-.12	-.17
9. M Idealizing									--	.73***	-.21*
10. F Idealizing										--	-.08
11. M Anger											--
12. F Anger	.44***	.55***	.16	.04	.29**	.25**	-.31**	-.41**	-.08	-.07	.47***
13. M Derogation	.38***	.21*	.15	-.09	-.11	.36***	-.35***	-.17	-.03	.09	.25**
14. F Derogation	.12	.14	-.10	-.09	-.10	-.02	-.11	-.14	.22*	.05	-.09
15. Derogation	.37***	.14	.12	-.08	-.14	.33***	-.38***	-.21*	.13	.16	.22*
16. Lack of memory	.16	.08	-.18	-.11	.09	.07	-.34***	-.20*	.44***	.45***	-.09
17. Metacognition	-.19*	-.12	.10	-.09	-.14	-.07	.12	.09	-.25**	-.23*	-.08
18. Passivity	.30**	.34***	.37***	.37***	-.11	.25**	-.28**	-.25**	-.16	-.21*	.39**
19. Unresolved - Loss	.22*	.17	.26*	.25*	-.06	.18	-.13	-.09	-.18	-.21*	.20
20. Unresolved - Trauma	.32	.10	-.21	.51*	.10	.01	-.02	.06	-.13	-.07	.09
21. Unresolved - Overall	.31**	.28**	.20*	.29**	.02	.20*	-.15	-.16	-.19	-.24*	-.26**
22. Coh. - Transcript	-.55***	-.41***	-.15	-.06	-.21*	-.35***	.65***	.48***	-.38***	-.39***	-.44***
23. Coh. - Mind	-.55***	-.45***	-.17	-.10	-.19*	-.34***	.64***	.50***	-.37***	-.36***	-.41***
<i>N</i>	117	116	119	118	118	119	119	119	119	118	119
<i>Mean</i>	2.90	2.84	1.84	1.31	1.73	1.90	4.32	3.66	2.37	1.94	1.68
<i>Median</i>	2.00	1.50	1.00	1.00	1.00	1.00	4.00	3.50	2.00	1.00	1.00
<i>Range</i>	8.00	8.00	6.00	3.50	8.00	6.00	8.00	7.50	6.00	5.50	7.00

	12	13	14	15	16	17	18	19	20	21	22
12. F anger	--	-.01	.06	.01	-.10	-.09	.38***	.18	.10	.26***	-.38***
13. M Derogation		--	.33***	.90***	.22*	-.11	-.03	.03	.03	.04	-.29***
14. F Derogation			--	.47***	.23*	-.07	.05	-.01	.36	.05	-.20
15. Derogation				--	.27**	-.14	.02	.001	.02	.01	-.38***
16. Lack of memory					--	-.18	-.06	-.20*	.34	-.17	-.43***
17. Metacognition						--	-.14	.03	-.24	-.02	.43***
18. Passivity							--	.42***	.14	.45***	-.42***
19. Unresolved - Loss								--	-.16	.95***	-.14
20. Unresolved - Trauma									--	.60*	-.09
21. Unresolved – Overall										--	-.18
22. Coh. - Transcript											--
23. Coh. – Mind	-.38***	-.28**	-.22*	-.37***	-.41***	.41***	-.47***	-.28**	-.13	-.33**	.98***
<i>N</i>	118	119	118	120	120	120	120	98	16	120	120
<i>Mean</i>	1.54	1.30	1.11	1.45	1.93	1.60	2.45	2.69	3.72	5.48	5.25
<i>Median</i>	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.50	3.25	6.00	6.00
<i>Range</i>	7.50	5.00	2.00	5.00	6.00	4.00	5.00	7.00	6.00	8.00	7.50

*Note.* M = mother rating; F = father rating; Coh. = Coherence.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2.8

*Mann-Whitney U Results for AAI Subscale differences between NSSI and Control Groups (Overall Sample)*

	Control	NSSI	<i>U</i> ( <i>z</i> )	<i>r</i>	95% CI	
	( <i>n</i> = 60 ) <i>m</i> Rank	( <i>n</i> = 60) <i>m</i> Rank			Lower	Upper
M Rejection	48.91	69.27	<b>2306.50***</b> (3.40)	<b>.22</b>	.15	.29
F Rejection	57.70	59.35	1728 (.28)	.03	-.04	.10
M Role-reversal	58.01	61.96	1887.50 (.73)	.07	.004	.14
F Role-reversal	56.29	62.82	1932.50 (1.66)	.15	.08	.22
F Pressure to achieve	60.02	58.97	1709 (-.22)	.02	-.05	.09
M Neglect	54.37	65.53	<b>2102*</b> (2.23)	<b>.21</b>	.14	.28
M Love	66.81	53.31	<b>1368.50*</b> (-2.14)	<b>.20</b>	.13	.27
F Love	60.68	59.31	1729 (-.22)	.02	-.05	.09
M Idealizing	60.34	59.67	1750 (-.11)	.01	-.06	.08
F Idealizing	57.89	61.16	1836.50 (.58)	.05	-.02	.12
M Anger	54.44	65.47	<b>2098*</b> (2.32)	<b>.21</b>	.14	.28
F Anger	57.03	62.05	1888 (1.22)	.11	.04	.18
Derogation	56.56	64.44	2036.50 (1.78)	.16	.09	.23
Lack of memory	55.81	65.19	2081.50 (1.65)	.15	.08	.22
Metacognition	63.83	57.17	1600 (-1.19)	.11	.04	.18
Passivity	52.12	68.88	<b>2302.50**</b> (2.71)	<b>.25</b>	.18	.32
Unresolved	50.83	52.95	1365 (.37)	.04	-.03	.11
Coherence	68.93	52.07	<b>1294**</b> (-2.66)	<b>.24</b>	.17	.31

*Note.* Pearson's *r* used to reflect magnitude of effect for each comparison. Standardized effect sizes were calculated by squaring the presented *r* values. 95% CI = 95% confidence interval for relevant effect size. Bolded *U*, *r* values indicate significant differences between control and NSSI groups.

\**p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

Table 2.9  
*Mann-Whitney U Results for AAI Subscale differences between NSSI and Control Groups (Insecure States of Mind)*

	Control ( <i>n</i> = 18)	NSSI ( <i>n</i> = 33)	<i>U</i> ( <i>z</i> )	<i>r</i>	95% CI	
	<i>m</i> Rank	<i>m</i> Rank			Lower	Upper
M Rejection	18.75	28.63	<b>391.50*</b> (2.35)	<b>.34</b>	.01	.21
F Rejection	22.00	26.00	315.00 (.97)	.14	.03	.25
M Role-reversal	21.06	28.70	<b>386*</b> (2.02)	<b>.28</b>	.03	.38
F Role-reversal	20.50	28.31	<b>378**</b> (2.61)	<b>.37</b>	.27	.47
F Pressure to achieve	27.28	24.50	256 (-.80)	.11	.01	.21
M Neglect	22.08	28.14	367.50 (1.58)	.22	.11	.33
M Love	27.31	25.29	273.50 (-.47)	.07	-.04	.17
F Love	26.11	25.16	277 (-.23)	.03	-.08	.14
M Idealizing	33.19	22.08	<b>167.50**</b> (-2.62)	<b>.37</b>	.26	.48
F Idealizing	30.81	22.52	<b>192.50*</b> (-2.04)	<b>.29</b>	.18	.40
M Anger	21.72	28.33	374 (1.81)	.25	.14	.36
F Anger	22.83	27.00	336 (1.26)	.18	.07	.29
Derogation	25.33	26.36	309 (.27)	.04	-.07	.15
Lack of memory	29.58	24.05	232.50 (-1.33)	.19	.08	.30
Metacognition	24.97	26.56	315.50 (.51)	.07	-.04	.18
Passivity	17.94	30.39	<b>442**</b> (2.89)	<b>.40</b>	.29	.51
Unresolved	23.09	25.20	278.50 (.50)	.07	-.05	.19
Coherence	25.78	26.12	301 (.08)	.01	-.10	.12

*Note.* Pearson's *r* used to reflect magnitude of effect for each comparison. Standardized effect sizes were calculated by squaring the presented *r* values. 95% CI = 95% confidence interval for relevant effect size. Bolded *U*, *r* values indicate significant differences between control and NSSI groups.

\**p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

Appendix A:  
Adult Attachment Interview Subscale Descriptions

State of Mind Subscales	Description and Related Classifications
<i>Rated for each Parent</i>	
Idealization	Assesses any apparent contradiction between speaker's description of the quality of relationship with parents and the coder's own judgement regarding the quality of interactions described. Underlies <i>dismissing</i> classification.
Derogation	Rated based on speaker's cold, negative comments regarding the need for attachment or close relationships. Typically indicates that the speaker has no time for closeness or views the attachment behaviours of others as useless or weak. Underlies <i>dismissing</i> classification.
Involving anger	This scale assesses the degree to which the speaker remains angrily preoccupied with past or present relationships with parents. Evidenced through entangled speech, exaggerative language, lengthy passages in which parental faults are listed or responded to, etc. Underlies <i>preoccupied</i> classification.
<i>Rated Overall</i>	
Lack of recall	Coders rate how insistent the speaker is regarding inability to recall details from the past. Especially strong ratings are assigned if very little detail is provided and lack of memory serves as a means of blocking further inquiry. Underlies <i>dismissing</i> classification.
Passivity	Ratings indicate the degree to which the individual lapses into vague, incoherent or wandering discourse when asked to be specific about past relationships with parents. Underlies <i>preoccupied</i> classification.
Meta-cognitive monitoring	The individual's ability to reflect upon their own thought processes while discussing past attachment experiences is rated. Higher scores are assigned when the speaker is able to point out potential contradictions in their speech, or awareness that others may have different interpretations of past experiences. Underlies <i>autonomous</i> classification.
Coherence of transcript	Indicates the degree to which the speaker is able to coherently, concisely, and freely evaluate past experiences and their effects

	on current development. Underlies <i>autonomous</i> classification.
Coherence of mind	Similar to coherence of transcript, but directly assesses the quality of individual's state of mind. Specific attention is given to speakers' beliefs, and lower scores are assigned for speakers with odd associations, magical beliefs, as well as contradictions throughout the transcript. Underlies <i>autonomous</i> classification.
Unresolved loss/trauma	Assesses the degree to which the individual has come to terms with (resolved) losses of important figures (parents, grandparents, friends; anyone to whom the individual felt close personal connection) and traumatic experiences of child abuse at the hands of an attachment figure. A number of indices underlie these scores, each of which, when present, indicates some failure to monitor discourse during discussions of the relevant difficult experiences. Underlies <i>unresolved</i> classification.

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*Note.* Descriptions were adapted from: Hesse, 2008; Main, Golwyn, & Hesse, 2002; Main, Hesse, & Goldwyn, 2008.

Additional subscales ratings are assigned to the following: overall derogation (highest score for mother or father derogation, or if derogating comment is made regarding another attachment figure); fear of loss not connected to the source (within the current sample no transcripts portrayed this characteristic thus no scores were assigned to this particular subscale across the sample).

Appendix B:  
Recruitment Posters

**Recruitment Poster Targeting NSSI Group Participants**

Would you like to help us understand how to help people who  
self-injure?

Self-injury involves hurting yourself without the intention of killing yourself (e.g., cutting or burning yourself and banging your head). The Attachment Research Team from the University of Ottawa is conducting a study to better understand the influences of parental and intimate relationships in predicting self-injury in young adults, and we want your help!

What you can do?

Participation involves a 2 hour testing session at the University of Ottawa Main Campus.

Who can participate?

People between 17 and 25 years of age who currently self-injure or have self-injured in the past.

Are there any benefits for you?

You will receive \$20 for your participation.

**Recruitment Poster Targeting Control Group Participants**

Would you like to help us understand how relationships  
influence your well-being?

The Attachment Research Team at the University of Ottawa is conducting a study to better understand the influences of parent-child and romantic relationships in predicting well-being in young adults, and we want your help!

What you can do?

Participation involves a 1.5 hour testing session at the University of Ottawa Main Campus either alone or with your romantic partner. Tasks include: questionnaires (45 minute – 1 hour), interaction with partner (if applicable; 20 min)

Who can participate?

People between 17 and 25 years of age, and their romantic partners (if applicable)

Are there any benefits for you?

You (and your partner if applicable) will each receive \$20 compensation.

Appendix C:  
Suicide Risk Protocol

## **Suicide Risk Assessment Evaluation Protocol**

**OSI 5. Have you ever thought about taking your life?**

If participant endorses “yes” response to this question then risk assessment protocol should be completed.

**OSI 6/7. Have you ever made an attempt to take your life?**

If participant endorses a suicide attempt in the “past 1 month” or “past 6 months” then risk assessment protocol should be completed.

**OSI 8. Have you been treated by a doctor after injuring yourself on purpose?**

If participant endorses “yes” response to this question then risk assessment protocol should be completed.

**OSI 10. Have you been kept in hospital because of hurting yourself on purpose?**

If participant endorses “yes” response to this question then risk assessment protocol should be completed.

.....

RA should check for this response on participant’s OSI immediately following completion of the questionnaires. If evaluation protocol requirement (any one of the above) is met, risk assessment evaluation must be followed.

Risk assessment evaluation is conducted privately and confidentially. If the participant is completing the lab study with his or her partner, only participant should be taken to the observation room, with the partner remaining in the questionnaire/conflict task room. When asking the participant to accompany you to the other room, inform both participant and partner that you “*have to verify some questions on (your) questionnaires*”.

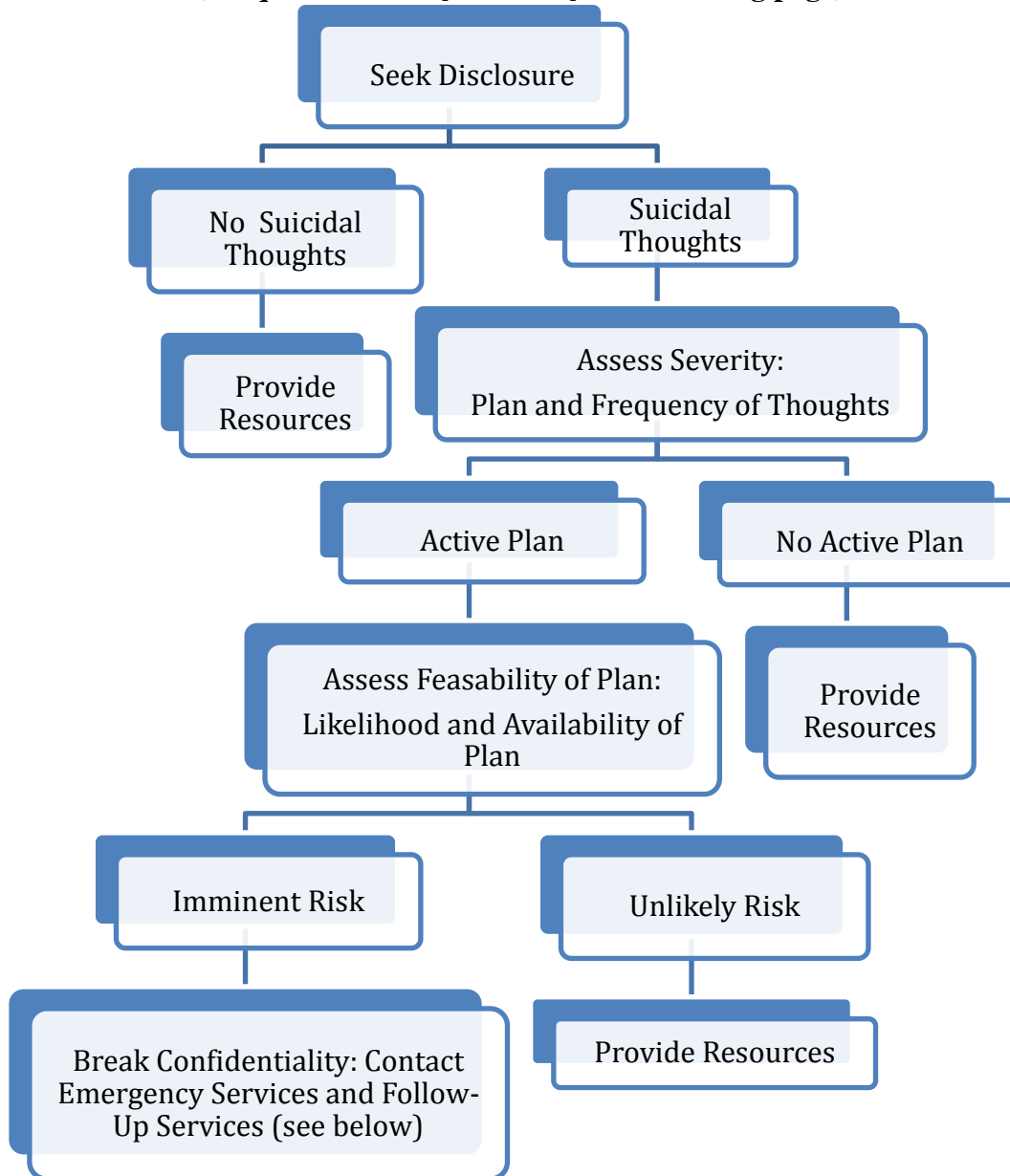
After risk assessment, all participants who undergo the evaluation should be provided with the *Mental Health Resource List*, and informed that they will receive a follow-up phone call one week later from the RA who completed the risk assessment (record contact information, and set date for follow up call). Follow-up is to reiterate the usefulness of the resources provided, and to

ensure that participant does not require further assistance. If, at the time of follow-up, the participant appears to be experiencing increased distress, additional follow-up with a principle investigator (either Dr. Lafontaine or Dr. Bureau) will be scheduled.

See risk assessment flow chart and specified questions below:

## **Risk Assessment Evaluation Protocol**

(see questions for specific steps on following page)



<b>University of Ottawa Centre for Psychological Services</b>	(613)562-5289
<b>University of Ottawa Mental Health Services</b>	(613)562-3950 ext 225
<b>Ottawa Distress Centre</b>	(613)238-3311
<b>Centre d'Aide 24/7 (Francophone)</b>	(819)595-9999
<b>Emergency Services</b>	911

**Seek Disclosure:**

1. “You indicated on your questionnaires that you have previously *thought about suicide/attempted suicide/been treated by doctor for self-injury/been kept in hospital for hurting yourself* (choose whichever phrase applies based on applicable responses on OSI). Could you tell me a bit about that?”

- Here you’re looking for details about the incident, to get them talking about it, how they did it, how it was dealt with afterwards etc. Use prompts to get these answers if needed.
- Other questions that could be helpful: “Had you planned to hurt yourself, or was it spontaneous?”, “If something like that happened again, how do you think you would handle it now?”

**Assess Severity: plan and thoughts:**

2. “Are you thinking about suicide currently?”

3. “Do you have a suicide plan?”

- If yes to thoughts and yes to plan, proceed to next question
- If yes to thoughts only OR yes to plan only (unlikely) OR yes to thoughts and no to plan: “How often do you think about suicide?” and “How would you rate the risk of killing yourself: low, medium, or high risk?”
  - o If medium or high risk, proceed to next question
  - o If low risk, provide resource list, review list with participant, and obtain contact info in order to schedule one week follow up phone call with RA (should be same RA as completed the risk assessment)

**Assess Feasibility of Plan:**

4. “Have you thought about how and when and where you’re going to kill yourself?”

5. “Do you have access to (*method*)?”

- If yes, continue with question #6 below
- If no or vague response: “Do you have plans to kill yourself in the next 24 hours?”
  - If yes, proceed directly to Emergency Procedures to break confidentiality
  - If no, continue with questions below

6. “Have you taken any steps to prepare for suicide, such as write a note, get your financial affairs in order, or anything else?”

- If yes, proceed directly to Emergency Procedures to break confidentiality
- If no, provide resource list, review list with participant, and obtain contact info in order to schedule one week follow up phone call with RA (should be same RA as completed the risk assessment)

**Emergency Procedures**

- Inform the participant that according to the law we have to break confidentiality when there is a risk of imminent harm to the self or other.

- RA should call 911 and notify the operator that she/he has a research participant who is at risk of suicide. The operator should ask you to confirm address and location, etc. The address is 136 Jean-Jacques Lussier Private. Try to meet them at the main entrance (this is where assistance from security may be helpful).
- Should also notify the other RA (if applicable) and the university's security emergency number (613-562-5411) to provide additional support, should it be needed
- Await emergency professionals, and accompany the participant to hospital to ensure the risk is acknowledged

CHAPTER 4:  
General Discussion

## General Discussion

### **Summary and Recap of Thesis Objectives**

Reports of NSSI by adolescents and young adults within the general population have increased in recent years (Hawton et al., 2003; Muehlenkamp et al., 2009; O’Loughlin & Sherwood, 2005). Combined with anecdotal and empirical evidence that shows many individuals engaging in NSSI within the community do not seek help or treatment (e.g., Conterio & Lader, 1998; Sayal et al., 2014), it is clear that NSSI is an increasingly serious issue facing a substantial proportion of today’s youth. Moreover, despite previous work by researchers and clinicians with NSSI expertise, the recent revision of the DSM-V did not include NSSI as a syndrome distinct from overarching psychological diagnosis such as depression or BPD. Instead NSSI remains in a category for disorders requiring additional research. Thus, despite increasing research interest and calls for clinical awareness throughout the past two decades regarding the need for better understanding of the many etiological components underlying NSSI behaviour, still more investigation is required.

To this end the current investigations aimed to further elaborate upon known links between NSSI behaviour and parent-child relationships from two perspectives: first, with regard to the overall quality of relationships with parents and family environments, and second, with specific focus on the impact of internalized attachment representations of early relationships with parents. Though both perspectives have been investigated in the past, the current studies were developed in response to limitations of the current literature, and gaps in the existing research. As discussed previously, a great deal of theoretical and empirical work has identified links between negative or invalidating early relationships with parents and the occurrence of NSSI in adolescence and young adulthood (e.g., Linehan, 1993). However the extant literature is limited

by a focus on individual characteristics of parent-child relationships in association with NSSI rather than potential combinations of these relational features. Thus, the aim of the first study was to examine various patterns of perceived relationship quality reported by self-injuring youth based on the combination of multiple characteristics; these patterns were then compared with several indices related to different manifestations of NSSI behaviour. Existing research concerning the relevance of concurrent attachment representations in association with NSSI is similarly limited. Moreover, the few investigations to this end have relied upon self-report questionnaires to measure attachment styles and representations; at best questionnaire assessments of attachment simply provide another assessment of relationship quality rather than tapping into an internalized representation of past relationships. To alleviate this limitation of past work, the second study analyzed how individuals' internalized states of mind regarding early attachment experiences were related to NSSI, with particular attention paid to the relative influences of child maltreatment and attachment representations, as well as to components underlying separate relationships with mothers and fathers. Key findings from these studies, as well as the shared clinical implications and directions for future research evident from these works are discussed in detail below.

### **Key Findings**

From Study 1, we learned that self-injuring youth report a variety of family backgrounds, represented by different combinations of retrospectively reported characteristics of relationships with parents. Somewhat surprisingly, not all of the identified profiles represented negative perceptions of family relationships, as the findings of existing research, which has repeatedly linked negative characteristics to the occurrence of NSSI through variable-centered approaches (see Study 1), would have us believe. Indeed two of the four profiles identified in the current

investigation were characterized by positive parent-child relationships, one of which (labeled as the *Positive-idealistic* profile) reported positive characteristics to an exceptional degree in comparison to all other profiles. As discussed in more detail in Study 1, I propose two potential explanations for these results. First, it is possible that individuals within these two profiles did indeed have positive relationships and experiences with their parents, and ultimately engaged in NSSI for other reasons (e.g., peer influences, trauma external to the family environment, etc.). Alternatively, it is possible these individuals were untruthful in their reports regarding the quality of their relationships with parents, perhaps in an effort to protect themselves from the emotional trauma and distress of admitting to or reflecting upon negative early experiences. Additional results from Study 1 indicate that individuals who perceived their relationships with parents as especially disturbed also demonstrated the greatest deficits in terms of the types of coping strategies they used, the degree to which they reported using NSSI to regulate negative affect, and the severity of their NSSI. Conversely, individuals reporting more positive perceptions of family backgrounds reported the least detriment in these areas. Thus, although existing research, and even many of the present findings, indicate that negative or invalidating relationships with parents are associated with engaging in NSSI, the overall results show that perceiving one's family background as positive is not necessarily a complete protective factor against NSSI's occurrence. That said, there is at least some protective aspect that stems from perceiving one's family context in a positive light, such that these individuals reported the least deficit across coping behaviour, reasons for engaging in NSSI, and NSSI severity. In sum, Study 1 represents a significant contribution to the literature, especially given its use of a person-centered approach to studying the role of parent-child relationship quality in association with NSSI, and the unique findings therein regarding the role of positive perceptions of family backgrounds. Additional

contributions of Study 1 come from the investigation of risk factors related to specific characteristics or manifestations of NSSI as opposed to with solely NSSI engagement versus non-engagement upon which many researchers have in the past.

Through use of the AAI, a gold-standard measure of attachment in adolescence and young adulthood, Study 2 was designed to overcome the limitations of past research linking attachment with NSSI. The key findings from Study 2 can be summarized in three points. First, findings show that the frequency of childhood maltreatment by fathers as well as both preoccupied and unresolved/cannot classify states of mind were independent, additive predictors of NSSI in this community based sample. These findings suggest that the experience of paternal maltreatment *and* the way early experiences are internalized into mental representations of these relationships (whether or not these relationships were abusive) are each important factors influencing the occurrence of NSSI. Second, when the magnitude of influence of specific predictors were considered, having a preoccupied state of mind regarding attachment was associated with nine times the increase in the odds of having engaged in NSSI compared to the odds associated with paternal maltreatment, and three times the increase compared to having an unresolved/cannot classify state of mind. This suggests that preoccupation with early experiences may have special implication in association with NSSI in community samples, a notion further supported by the strong links identified between underlying passivity scores and NSSI that were also found in this research. Lastly, Study 2 also showed that the specific relational characteristics associated with NSSI were fundamentally different for relationships with mothers versus relationships with fathers. The strongest links with NSSI were found for mothers rated as primarily rejecting, while fathers of self-injuring individuals were rated as having been over-involving or role reversing. Findings from this study not only contribute to the

field of NSSI with the methodological benefit inherent in using the AAI instead of questionnaire-based assessments of attachment, but also provide empirical testing of an extension to the developmental psychopathology framework to understanding NSSI, as described in detail within Study 2 itself.

### **Collective Implications across Studies**

Although the two investigations herein are conceptually and methodologically distinct, their findings are nonetheless complementary, with Study 2 providing additional follow up to some remaining questions from Study 1. Most simply, both studies provide parallel support for the links between deficits in emotion regulation and NSSI. For instance, within Study 1 the two groups associated with negative family backgrounds reported using NSSI to regulate aggressive, externalizing emotions to a great extent, while in Study 2 the attachment states of mind reflecting the greatest inefficiencies in regulating emotions during discussions of challenging early experiences with parents (preoccupied and unresolved/cannot classify) were strongly associated with an increased likelihood of having engaged in NSSI. Not only are these findings highly correspondent with one another, but also with the abundance of existing research concerning NSSI and deficits in emotion regulation (see Klonsky, 2007 for a review; Klonsky, 2009).

Perhaps more interestingly, Study 2 provides further insight regarding the unexpected discovery of the *Positive-idealistic* profile of self-injurers in Study 1. I previously proposed that this group of self-injuring youth, who reported highly positive perceptions of parent-child relationships (at least in comparison to the other self-injurers within the sample), could potentially be explained from an attachment theory perspective. I suggested that these individuals may have adopted dismissing states of mind regarding earlier relationships with parents, and thus overemphasized the positive nature of these early experiences in order to avoid

acknowledgement of having been treated poorly by caregivers. To illustrate, individuals with dismissing states of mind tend to describe early relationships with parents in a highly positive light, but are either unable to provide real, episodic memories to support these positive descriptions, or describe interactions with parents which blatantly contradict the overall positive image the individual attempts to create (e.g., mother described as “very loving” but memories depict maternal rejection during times of hurt or distress). It is believed that adopting a dismissing state of mind is an unconscious effort to protect oneself from these damaging and difficult past experiences rather than having to address the nature of parents’ behaviour, or the effects that such experiences may have had on the self (Bowlby, 1969/1982; Hesse, 2008; Main, Hesse, & Goldwyn, 2008). Thus, when completing a self-report questionnaire regarding the quality of early relationships with parents, one would expect a dismissing individual to similarly portray a positive image of parents through these responses, much like the reports by individuals in the *Positive-idealistic* profile in Study 1.

When I first introduced this argument, I also highlighted a need for researchers to use the AAI in investigations regarding NSSI, in part to further elucidate the nature of the *Positive-idealistic* profile in particular. Unfortunately, despite the partial overlap in recruitment methods between Study 1 and Study 2, only six participants within the current investigations were included in analyses from both studies, which did not permit further statistical examination of this explanation. Moreover, the analyses using the AAI subscales in Study 2 offer potentially contradictory results such that high ratings for both maternal and paternal idealization (a subscale which is highly correspondent with dismissing states of mind) were actually lower in the NSSI group compared to control participants. However, as this particular finding simply demonstrated that idealization scores tended to be higher in the control group than in the NSSI group, rather

than that increases in idealization predicted corresponding *decreases* in the likelihood of NSSI occurring, I would argue that the original explanation regarding dismissing states of mind within the *Positive-idealistic* profile remains plausible. For instance, while dismissing states of mind were not over-represented in the NSSI group in Study 2, and although idealization scores for mothers and fathers were more strongly related to having not engaged in NSSI, there were still several ( $n = 9$ ) dismissing classifications within the NSSI group (compared to 12 within the control group). Thus findings from Study 2 do demonstrate that dismissing states of mind still occur in self-injurers, and may still have influenced the patterns of responses by these individuals on self-report questionnaires regarding relationships with parents, and regarding their relevant NSSI characteristics in Study 1. Unfortunately an examination of this precise possibility remained beyond the scope of Study 2, and must be left to future endeavors. This argument further suggests that the low risk in terms of coping strategies, functions of NSSI, and NSSI severity reported by individuals in the *Positive-idealistic* profile may have also resulted from the protective features of dismissing states of mind. Instead of the limited risk reported by these individuals reflecting a defensive denial of symptomatic distress (see Larose & Bernier, 2001; Tarabulsy et al., 2013), perhaps having a dismissing state of mind (or more generally, perceiving early experiences with parents as being highly positive) protected against engaging in NSSI at higher degrees of severity. Clearly, there is a need for continued research in this area in order to address these remaining questions.

An additional explanation for the *Positive-idealistic* profile can also be considered in light of the findings in Study 2 regarding the especially strong predictive association between preoccupied attachment states of mind and NSSI. Study 2 plainly demonstrates the role of attachment preoccupation in association with the occurrence of NSSI, both in terms of state of

mind classification and through the tendency for self-injurers to yield higher ratings for preoccupied passivity of discourse compared to controls. This finding corresponds with the past research described in Study 2, as well as with findings in Study 1 regarding the quality of relationships with parents reported by participants. Preoccupied states of mind are believed to develop as a result of early experiences characterized by inconsistencies in the degree to which parents are rejecting, role reversing, or neglectful, and sensitively responsive. Indeed much of the extant research supports these types of family backgrounds, and it is likely that many of the individuals within the *Negative-invalidating*, *Positive-moderate*, and *Negative-disturbed* profiles may well have demonstrated preoccupied states of mind had the AAI been administered in that study. However, I would argue that the *Positive-idealistic* profile may also have roots in attachment preoccupation.

Preoccupied states of mind on the AAI manifest most commonly in the following two ways (see Hesse, 2008; Main et al., 2008). In *Angry preoccupation* the individual is overly critical and exaggerating of parents' past negative behaviours. For individuals possessing this subtype of preoccupied state of mind, one would expect excessively negative responses on self-reports of parent-child relationships as well, given continued angry preoccupation within these relationships. In contrast, individuals classified as *Passively preoccupied* appear too caught up in the continued influence of early negative experiences with parents to be able to concisely reflect upon or discuss these experiences in clear, coherent detail. For instance, passively preoccupied individuals tend to describe early experiences in glowingly positive terms, yet also refer abstractly or vaguely to potentially negative experiences, the nature of which the coder may find difficult to clearly establish based on the speaker's rapid oscillations between positive and negative analysis of events. When reading a transcript coded as passively preoccupied, the coder

may indeed feel the speaker is struggling to even abstractly refer to early experiences as negative, despite being justified in doing so. The general consensus among attachment theorists and AAI coders is that passively preoccupied individuals have internal representations of attachment in which both positive and negative aspects of early experiences are recognized (see Main et al., 2002). In discussing these instances, however, the individual either feels too threatened by the negative experiences, or finds his or her own sense of self too closely tied to those of his or her parents' to openly discuss the negative relational aspects of early childhood without becoming lost in irrelevancies. Thus, passively preoccupied individuals succumb to vague speech patterns as a defensive mechanism to protect against the emotionally harmful consequences of discussing negative early experiences with caregivers.

With this in mind, I propose that the *Positive-idealistic* profile of self-injurers identified in Study 1 may in part represent the great number of preoccupied states of mind and the high instances of passivity within self-injurers in the general community that are indicated in Study 2. Given my previous description of passively preoccupied tendencies, it is possible that these individuals may also perceive past experiences with parents as positive, whether or not they were in actuality. For example, a passively preoccupied individual may describe his or her mother as loving or nurturing on the AAI, but provides only vague and at times ominous or contradictory descriptions of particular maternal behaviours to support the reasoning underlying this perception (e.g., mother described as loving/nurturing, episodic support given of mother sheltering the child from the outside world which speaker then interprets as being *over-nurturing* and possibly a bad characteristic of mother. Speaker next indicates that over-nurturing was a good thing because it made them happy, well not always happy because sometimes there were bad things, but yes happy, they were quite happy. This description may also be excessively long,

there may be instances of childlike speech and confusions between the self and the mother throughout discourse). An AAI coder would read a transcript such as this, plagued by oscillations of whether past experiences with mother were positive or negative, and would recognize mental representations or cognitive mechanisms underlying such a description that would clearly indicate passive tendencies, *regardless of what the speaker's own beliefs and statements as to the meaning or intentions of mother's behaviour may suggest*. This highlights the methodological superiority of the AAI such that internal processes occurring outside of the speaker's awareness can be coded with regard to early experiences and their continued effects. In contrast, how would one expect this same individual to respond to questionnaires regarding the quality of her childhood relationship with her mother? While there may still be some inconsistencies in the individual's reports across multiple items and, perhaps even more so, across multiple questionnaires, ultimately these methods will only account for what is *consciously reportable* on the participant's behalf regarding the relationship with his or her mother. Thus, just as the mother was described as loving and nurturing on the AAI, regardless of the quality of the narrative provided regarding this description, the participant nonetheless perceived the early relationship as positive, which would also be reflected through responses to self-report questionnaires regarding past relationship quality. From this perspective then, it is possible that the individuals within the *Positive-idealistic* profile might have had preoccupied states of mind, which would nonetheless be reflected by self-report questionnaire responses indicating parent-child relationships as positive. Unfortunately it was not possible to confirm or disconfirm either conjecture regarding the *Positive-idealistic* profile (as having dismissing or preoccupied attachment representations) within the current investigations. Additional research

including a combination of the methods used in both Study 1 and Study 2 would shed empirical clarity upon these potential explanations.

### **Implications for the Treatment of NSSI**

Despite the varying conceptual and methodological approaches of the two present investigations, important clinical implications can be drawn from the two studies combined. Each study relied on cross-sectional data, with participants providing concurrent information regarding quality of past relationships, occurrence of childhood maltreatment and attachment states of mind, thus I could not verify whether reported experiences actually occurred. Instead the collected data indicates information regarding the individuals' *perceptions* of past relationships, rather than documenting experiences that occurred in reality. While this may indeed be a limitation of both investigations, and although prospective research in this field is greatly needed, I believe this approach nonetheless provides clinically important information regarding the *cognitions* that develop regarding early experiences, and the importance of these cognitions in association to NSSI behaviour. Such information could be especially helpful in designing interventions for self-injuring youth, as it is possible that therapies designed to restructure an individual's cognitions or perceptions about relationships with parents (and potentially other important relationship partners) may also help to reduce engagement in NSSI. Cognitive restructuring such as this may help the individual to understand the origins of parents' past misdeeds, resulting in either a reduction in the amount of distress experienced (particularly if family relationships are a specific trigger), a change in the way the individual perceives his or her own role in negative relationships, or a modification in the attributions the individual makes regarding others' behaviour (see also Mikulincer, Shaver, & Berant, 2013). We can turn again to the developmental psychopathology approach to NSSI to further illustrate this possibility.

I previously described (see General Introduction) three pathways proposed by Yates (2009) through which NSSI may develop from early experiences, which include the following: first, the *representational path* through which the individual learns from negative early experiences that he or she is defective and that parents are vicious, dangerous, and NSSI is ultimately used as a means to continue this learned self-punishment. Second, the *regulatory path*, through which the individual develops an inability to accurately reflect upon others' intentions and feelings, and where NSSI is used as a means of expressing and regulating aversive emotion. And third, the *reactive path*, where changes in the physiological processes underlying stress reactivity influence the need to engage in NSSI to reduce arousal. Thus, it is likely that by adjusting individuals' perceptions of others' past behaviour, there may be corresponding changes in how the individual reflects upon the self or others (i.e., parents), and a reduced need for engaging in NSSI. For instance, these cognitive adjustments could focus on aiding the client to recognize that parents' maltreatment or invalidating behaviour during childhood were not deserved or, in some cases, maliciously inclined (representational path). Such restructuring may also assist self-injurers in understanding their parents' past intentions and their own emotions in response to past parental misdeeds (regulatory path). By reducing the urge to self-harm through either representational or regulatory paths, there would be a reduction in the need for continued self-punishment through NSSI. Changes in the individuals' own emphasis upon first two paths to NSSI would likely culminate in decreases in the reactive path over time, such that dysregulated physiological processes will become more normalized, thus further reducing the need to engage in NSSI to manage physiological arousal.

Indeed, existing clinical research has shown that using transference-focused psychotherapy (TFP), which teaches individuals to reframe their ways of thinking about

experiences in important relationships, reduces suicidality (Clarkin et al., 2001) and symptoms of narcissistic personality disorder (Diamond et al., 2013) in BPD patients. This research group has also shown through an additional randomized control trial that BPD patients do in fact demonstrate increased coherence on the AAI, evidenced through a move to more autonomous states of mind following TFP (Levy et al., 2006). Levy, Yeomans, and Diamond (2007) replicated the increase in AAI coherence following TFP, and found an accompanying reduction in of the frequency and severity of self-injury after treatment. Considering the current findings it is likely that approaches such as TFP, which challenge individuals' perceptions of past relationships, would be useful therapeutic approaches to decreasing NSSI behaviour within individuals in the general population as well, though no research to this effect has been conducted thus far.

That said, one must remember that a large proportion of self-injuring youth in the community do not seek treatment for their NSSI (e.g., Conterio & Lader, 1998; Sayal et al., 2014), thus waiting to restructure cognitions regarding past relationships once the individuals present for treatment may not help a bulk of those concerned. As such, it would be important to also design preventive strategies for children who appear to be at particular risk. Such strategies should target children from at-risk backgrounds (e.g., low-socioeconomic status in which parental stress is high, households where maltreatment has been reported, etc.), aiming to help these children understand their own and their parents' circumstances. Increased understanding of others' perspectives and behaviour may likely maximize the chance that at risk children will ultimately develop more autonomous states of mind regarding early experiences with hardship, and will thus be able to adopt appropriate emotion regulating strategies *before* engaging in NSSI. This could be accomplished by helping children to understand the intergenerational transmission

of parenting behaviour and to understand parents' intentions and own states of mind behind particular behaviours, to recognize that as children they deserve to be valued within relationships with caregivers (and perhaps be encouraged to seek alternative sources of care external to parents in more extreme cases), and by simultaneously educating parents regarding the impact of parenting behaviour on their children. Although such preventive techniques may be costly and time-consuming, these may ultimately be the best approach to target and treat NSSI, particularly within community populations.

### **Limitations and Directions for Future Research**

Although the present investigations provide significant contributions to existing literature regarding both the general quality of parent-child interactions and the role of concurrent attachment representations in relation to NSSI, additional research is still needed to fully understand these important associations, both from methodological and conceptual standpoints. First and foremost, future research in this area ought to apply prospective research designs. I was unable to verify the occurrence of self-reported early experiences regarding both general quality of parent-child relationships and severity of maltreatment experiences within the current investigations. Prospective longitudinal designs would permit analysis of actual occurrences of these events, as well as examination of the subsequent perceptions of these early experiences. Moreover the degree of match versus mismatch between actual experiences and later perceptions of these experiences could be addressed, which may provide additional clarity in predicting of adolescent and young adult self-injury from early relationship characteristics. Similarly, precise developmental pathways or mechanisms to the development of NSSI could be analyzed using longitudinal approaches, such that predictive directions could be clearly established. A second methodological need to add to existing knowledge concerns the use of multi-method approaches,

obtaining information from both self-reports as well as through third-party coded interview methods such as the AAI or through observations of interaction task techniques for assessing parent-child relationship quality. Whenever possible, particularly for longitudinal studies, data regarding both early experiences and the target individuals' NSSI behaviour should be obtained from multiple informants (e.g., self, parents, teachers, peers); this will permit a better analysis of whether individuals' own experiences influence their pattern of responding regarding the severity of NSSI behaviour, or the particular deficits reported.

Several additional areas for future research can be identified from a conceptual perspective. Findings from both studies, and from Study 2 in particular, point to the added importance of studying the separate influences of relationships with mothers and fathers, as different types of relationships with each parent may have varying influences on the incidence of NSSI. However, the existing research has not well examined these nuances within the field of NSSI specifically aside from a few exceptions (e.g., Gratz et al., 2002; Hallab & Covic, 2010; Hilt et al., 2008). Thus, additional investigations should further pursue the findings of Study 2, to both replicate and further examine how each parent may differentially influence engagement in NSSI. Further, much of the existing research regarding NSSI has focused on determining the behaviour's prevalence, functions, and underlying risk factors, but researchers have not yet fully examined risk factors and correlates associated to *specific* manifestations of NSSI, such as the particular influences for certain reasons for engaging in NSSI, for certain methods of NSSI, and for the varying personality or trait characteristics of individuals who engaged in NSSI. Study 1 aimed at doing just this, but additional work is still required. To this end, researchers should aim to elaborate on existing knowledge regarding the general influence of parent-child relationships and attachment representations (as well as other known correlates and risk factors) in association

with particular characteristics and manifestations of NSSI, rather than with the simple occurrence or frequency of the behaviour. Finally, more research regarding the effectiveness of various family based treatments for NSSI are needed. While much of the existing research has emphasized that family or parent-child focused therapies may help to reduce frequency of NSSI, there are few evaluations of the effectiveness of these techniques.

### **Conclusions**

In summary, the two studies presented here significantly contribute to existing knowledge concerning the role of parent-child relationship characteristics in association with engaging in NSSI. These findings will aid in the assessment and treatment of NSSI, which is an increasingly common mental health issue facing adolescents and young adults. More generally, the results of these investigations add to our understanding of the phenomenon of NSSI, and, in combination with additional research, may ultimately help prevent future engagement in this dangerous and damaging behaviour. Given NSSI's current status in the DSM-V as requiring additional research before being included as a separate syndrome or diagnosis, and the extreme risk posed to adolescents and young adults who continue to engage in NSSI within the community, there is a call for researchers to further pursue research in this area. Additional investigation will expand the existing knowledge of how NSSI develops and manifests, and will help to treat those individuals who already engage in NSSI, and, ultimately, to target individuals who are at risk for NSSI even before they have the opportunity or need to engage in this troubling behaviour.

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