Non-Suicidal Self-Injury Among University Students:

Examining Emotion Regulation, Self-Control, and Social Learning

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Contributions of Authors

Although the study reported in this dissertation is co-authored by Dr. Nancy Heath, I am the primary author of the work presented. As primary author, I was responsible for the conceptualization of the overall study, including the development of research questions as well as the project coordination. These responsibilities included the selection of instruments, participant recruitment, data collection and analysis, as well as the writing of the current dissertation in its entirety. As my doctoral supervisor, Dr. Heath has served in an advisory capacity during the conceptualization of the study, formulation of the research questions, project management, and writing of the dissertation. The data used in the current dissertation were collected under the scope of Dr. Heath's research program at McGill University. In addition, the study reported in the current dissertation was supported by a research grant awarded by the Social Science and Humanities Research Council of Canada.

Abstract

Due to reports of high rates of non-suicidal self-injury (NSSI) among adolescents and young adults in the community, researchers have begun to examine the role of risk factor and social influence of NSSI on the initiation and maintenance of these behaviours among youth. Despite numerous reports of the social factors that surround youth who engage in NSSI, the need for a more comprehensive understanding about the learning mechanisms involved in NSSI engagement has arisen. The present study sought to examine differences between groups of self-injurers and non-self-injurers on the dimensions of emotion regulation and self-control, as well as the presence of social learning related to NSSI. Additionally, the present study directly examined the predictive power of each variable with regard to the likelihood of initial engagement in NSSI, as well as high frequency NSSI. A series of psychosocial measures were completed by first-year university students, and results were compared across groups of self-injurers and non-self-injurers. Results indicated that self-injurers differed from non-self-injurers in all three areas examined, reporting more difficulties in emotion regulation and lower levels of self-control in most areas. In addition, self-injurers reported a higher level of social learning in two of the three areas of social learning examined. For initial NSSI engagement, social learning was found to be the strongest predictor, with emotion regulation also predicting NSSI to a lesser extent. In contrast, emotion regulation was the only variable that significantly predicted a self-injurer's likelihood of engaging in high frequency NSSI. Neither social learning nor self-control played a role in the occurrence of frequent NSSI among self-injurers. It is possible that for some, the first episode of NSSI may be related to either social learning factors, emotion regulations difficulties, or both, whereas the same behaviour may continue at a high

frequency for reasons more closely tied to its emotion regulatory benefits. This shift in functional reinforcement is explored in relation to recent publications in the field, and implications for researchers and service providers are discussed.

Resume

L'automutilation non-suicidaire (AMNS) est un phénomène qui prend de plus en plus d'ampleur chez nos jeunes. Certains chercheurs ont donc entamé des études, afin d'identifier les facteurs de risques et les influences sociales qui initient et encouragent l'AMNS dans cette portion de la population. Malgré les nombreux facteurs sociaux qui peuvent influencer un jeune à s'initier à l'AMNS, plusieurs scientifiques ont débuté des recherches plus approfondies sur les mécanismes d'apprentissages liés à l'AMNS. Ces dernières ont tenté d'établir des différences entre les groupes de personnes auto-blessantes et ceux qui ne s'auto-blessent pas. En particulier, dans le domaine de la maitrise de soi-même et de la capacité à régulariser leurs émotions ainsi que tous les facteurs sociaux qui pourraient inciter une personne à entamer l'AMNS. De plus, cette étude s'est penchée sur l'influence de chacun de ces facteurs dans sa contribution à l'initiation à l'AMNS et sa contribution aux fréquences élevées de l'utilisation de l'AMNS. Une série de mesures psychosociales a été complétée auprès d'étudiants dans leur première année universitaire dont la moitié s'identifiait comme personne qui pratique l'AMNS ou qui l'avait déjà pratiqué. Les résultats démontrent que les personnes auto-blessantes différaient des personnes qui ne s'auto-blessaient pas dans les trois domaines examinés, témoignant des difficultés à régulariser leurs émotions et à avoir moins de maitrise sur soi-même dans la plupart des domaines examinés. De plus, les personnes auto-blessantes subissent plus intensément l'influence sociale dans deux des trois domaines étudiés. Pour prédire l'engendrement de l'AMNS, la capacité de régulariser ses émotions et l'apprentissage sociale sont les facteurs prépondérants. Par contre, la maitrise de soi-même ne semble pas contribuer de façon significative à ce qu'une personne se joigne au groupe d'AMNS. Finalement, la régularisation de ses émotions est le seul facteur ayant un lien

probant avec la fréquence élevée d'AMNS. Ni la maitrise de soi-même ni l'apprentissage sociale n'influencent la fréquence de l'AMNS chez une personne auto-blessante. Il est possible que la première tentative d'AMNS soit reliée à la régularisation des émotions et aux facteurs d'apprentissage social, mais une personne qui continue cette pratique le fait plus particulièrement pour des raisons de renforcement automatique. Cette modification du système de renforcement fonctionnel est étudiée par rapport à des publications récentes sur le sujet, et les implications pour les chercheurs et les intervenants en milieu social seront discutées en conséquence.

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Chapter I: Introduction

Statement of Problem

Rates of non-suicidal self-injury (NSSI), or the intentional destruction of one's body tissue, have reportedly ranged from 11% to as much as 40% among university students (Gratz, 2006; Gratz, Conrad, & Roemer, 2002; Hasking, Momeni, Swannell, & Chia, 2008; Heath, Ross, Toste, Charlebois, & Nedecheva, 2008; Whitlock, Eckenrode, & Silverman, 2006). Not only do university students engage in NSSI at alarmingly high rates, but they also do so frequently. Particularly, studies have found that over their lifetime, as many as 75% of university students who self-injure report doing so more than one time (Gratz, 2006; Heath, Schaub, Holly, & Nixon, 2009). Moreover, numerous studies have reported increasing rates of self-injury among community populations of adolescents and young adults (Classen, Trivedi, Shimizu, Steward, Larkin, & Litovitz, 2006; Derouin & Bravender, 2004; Fortune & Hawton, 2005; Klonsky, Oltmanns, & Turkheimer, 2003; Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007; Maughan, Iervolino, & Collinshaw, 2005; White Kress, 2003; Yates, Carlson, & Egeland, 2008). A major reason for this increase is the suspected contagion of NSSI among adolescents and young adults. According to Walsh and Rosen (1985), contagion refers to a sequence of events whereby one person engages in NSSI and one or more individuals in the immediate environment imitate the behaviour. Interestingly, the majority of youth report first thinking of self-injuring as a result of knowing someone else who also engaged in NSSI, or from learning about it in books, movies, television, music, or the internet (Claes, Houben, Vandereyken, Bjittebier, & Muehlenkamp, 2009; Deliberto & Nock, 2008; Hodsgon, 2004; Holly, 2007; Morey, Corcoran, Arensman, & Perry, 2008; Nixon, Cloutier, & Jansson, 2008; Yates et al., 2008).

Despite evidence that some type of social contagion exists, the challenges posed in studying this phenomenon have led to a notable lack of research. First, it is a challenge to identify self-injurers from the larger community without obtaining a self-selected or biased sample. The results of many community surveys of NSSI face limitations associated with self-selected participants. Second, it is impossible to trace the pathways through which NSSI spreads among adolescents and young adults in this type of setting, as there are rarely predictable and systematic links between individuals in a community. On the other hand, school and hospital settings have had the advantage of a closed system in which to examine the behaviour trends and cluster effects (Fennig, Carlson, & Fennig, 2005; Walsh & Rosen, 1985).

The present study tackled both of these obstacles by first utilizing a screening measure to identify self-injurers from the university community in an anonymous manner, and second, by conducting in-depth retrospective questionnaires with self-identified self-injurers. This provided valuable information about some of the factors influencing individuals during the time when they first engaged in NSSI, as well as the role of social learning in the participant's NSSI by investigating relevant aspects of their lives that may have supported the first episode or ongoing NSSI. The results from this study shed light on participants' individual experiences related to the first episode of NSSI, as well as the factors that supported its continuation.

Definition of Terms

Over the past decade, the number of researchers studying non-suicidal self-injury has increased significantly. As a response to the growing need for an overall consensus for common definition and terminology, the *International Society for the Study of Self-Injury* (ISSS) was established in 2006. The group defined NSSI as "the deliberate, self-inflicted destruction of body tissue resulting in immediate damage, without suicidal intent and for purposes not socially

sanctioned. As such, this behaviour is distinguished from: suicidal behaviours involving an intent to die, drug overdoses, and other forms of self-injurious behaviours, including culturally-sanctioned behaviours performed for display or aesthetic purposes; repetitive, stereotypical forms found among individuals with developmental disorders and cognitive disabilities, and severe forms (e.g., self-immolation and auto-castration) found among individuals with psychosis" (Nixon & Heath, 2009).

As previously noted, there have been numerous researchers examining NSSI over the past few decades. As a result of this burgeoning interest, many different terms have been used to describe this behaviour. Prior to the current term, non-suicidal self-injury, put forth by ISSS in 2006, the most common terms used to describe self-injury related behaviours include self-injury, self-injurious behaviours, and self-harm. Originally, Favazza's (1989) definition of self-injury (SI) stated that SI was a low lethality behaviour which was characterized by the deliberate destruction of one's body tissue. However, over the years several problems with this definition emerged.

For instance, under Favazza's definition of SI, certain more socially acceptable behaviours such as tattoos or body piercings were subsumed. Researchers have since argued that socially acceptable forms of body modification (e.g., tattoos or piercings) are different than non-socially acceptable forms of self-injury (e.g., cutting skin with a razor blade), and therefore moved to a less vague definition of the phenomenon (Suyemoto, 1998).

According to the ISSS definition, NSSI includes all behaviours that result in immediate and intentional tissue damage, including the ingestion of substances consistent with this intention. This definition omitted the descriptor of low-lethality from Favazza's definition, and clearly delineated self-injury from suicidal behaviours by adopting the term "non-suicidal self-injury"

(Nixon & Heath, 2009). The definition of NSSI excluded stereotypical self-injurious behaviours; a term that is commonly used to describe the behaviours associated with individuals with developmental delays. Additionally, acts of *major self-injury*, such as limb amputation, were also excluded from the definition as these acts are more appropriately associated with individuals with psychosis or other major mental health problems (Harvey, Dean, Morgan, Walsh, Demjaha, & Dazzan, 2008).

Additionally, the term NSSI is distinguished from deliberate self-harm (DSH) which is a term used by the Child and Adolescent Self-Harm in Europe (CASE) group. DSH describes a broad array of self-harming behaviours, including suicidal behaviours. It is defined as "an act with a non-fatal outcome in which an individual deliberately did one or more of the following: initiated behaviour (for example, self cutting, jumping from a height), which they intended to cause self-harm; ingested a substance in excess of the prescribed or generally recognized therapeutic dose; ingested a recreational or illicit drug that was an act that the person regarded as self-harm; or ingested a non-ingestible substance or object" (Hawton, Rodham, Evans, & Weatherall, 2002). Despite the inclusion of suicide attempts in the CASE group definition of self-harm, ISSS and various researchers have called for the distinction between self-injury and a failed suicide attempt; arguing that the two are fundamentally different (Gratz, 2001; Pattison & Kahan, 1983). Please see the *NSSI vs. Suicide* section for a detailed examination of the distinction between the two phenomena.

Research Questions

Although non-suicidal self-injury is a growing problem among youth in the community, little empirical work has been done to develop a theoretical understanding about the process by which NSSI is adopted by youth. Despite the evidence of social factors playing a role in the

initial episode of NSSI for a large majority of adolescents (Deliberto & Nock, 2008; Hodsgon, 2004; Holly, 2007; Morey et al., 2008; Nixon, Cloutier, & Jansson, 2008; Yates et al., 2008), there have been no attempts at investigating the learning processes involved in the development of this behaviour in youth. Additionally, although an abundance of risk factor research has been conducted to pinpoint the factors that might predispose youth toward NSSI (e.g., emotional regulation, Gratz & Roemer, 2004; childhood trauma, Gratz, 2006); results from related fields such as criminology and sociology suggest that the personality trait of self-control, characterized by impulsivity, risk taking, short-sightedness (Gottfredson & Hirschi, 1990), might also play a role in the proliferation of NSSI among adolescents.

The present study had four primary research questions. The first research question addressed the prevalence rate of non-suicidal self-injury among a sample of first year undergraduate students. This was assessed using an anonymous screening measure investigating the NSSI episodes that have occurred throughout the participant's lifetime. The second research question examined differences between self-injurers and non-self-injurers on variables such as emotion regulation, self-control, and social learning. The risk factors that were examined included one that has been previously supported in the literature, emotion regulation, as well as a new possible risk factor, self-control, which was proposed based on findings from related bodies of literature in sociology and criminology. In addition to these risk factors, elements of social learning (e.g., differential associations, differential reinforcements, and definitions) were also examined. The third research question investigated which factor, emotion regulation, self-control, or social learning, or combination of factors, were most associated with NSSI. The variables of emotion regulation, self-control, and social learning were all examined with respect to their ability to predict the likelihood of an individual being in the NSSI group. This provided

information about which factors play a role in youth gravitating towards NSSI. The fourth research question was to examine the same three constructs (i.e., emotion regulation, self-control, and social learning) with regard to their effect on the frequency of NSSI behaviour. The goal of this research question was to provide more information on the factors that are most predictive of higher frequency NSSI.

The results from this investigation sought to inform prevention and treatment efforts of NSSI among youth by targeting the specific factors that predicted a young adult's likelihood of being a self-injurer, as well as the factors that supported its use among these individuals. In addition, by systematically examining select risk factors with regard to the likelihood of engagement in NSSI behaviours, the present study provided valuable information about the clinical profiles of individuals who are at a greater risk of turning to NSSI. Finally, by establishing predictors of NSSI, the present study sought to provide guidance for future research in NSSI, as well as inform practitioners and school professionals in the identification, assessment and treatment of adolescents most at risk for self-injuring.

Chapter II: Literature Review

Introduction to Non-Suicidal Self-Injury

Non-suicidal self-injury (NSSI) among adolescents and young adults has become a serious concern for researchers, practitioners, and school professionals. The purpose of the present study was to examine the effect of emotion regulation, self-control, and social learning on the first episode of NSSI retrospectively, as well as ongoing NSSI, among young adults. As such, this review will begin by first presenting a definition of NSSI and critical examination of NSSI with regard to the characteristics of the behaviour, followed by a discussion of prevalence rates, and finally, its distinction from suicide behaviours. Following that, the focus will shift towards understanding the most commonly cited risk factors in the development of NSSI, with particular emphasis placed on emotion regulation and self-control. This will provide the reader with a better understanding of factors that make youth more vulnerable to NSSI. Next, this review will examine some of the social factors that play a role in the spread and reinforcement of NSSI, with respect to contagion issues and the social learning processes of the behaviour among youth. Finally, the unique relationship between self-control and social learning will be discussed with regard to the development of NSSI among youth.

Characteristics of NSSI: What, when, how, and why.

NSSI Definition. Consistent with the *International Society for the Study of Self-Injury (ISSS)*, NSSI is defined as "the deliberate, self-inflicted destruction of body tissue resulting in immediate damage, without suicidal intent and for purposes not socially sanctioned. As such, this behaviour is distinguished from: suicidal behaviours involving an intent to die, drug overdoses, and other forms of self-injurious behaviours, including culturally-sanctioned behaviours performed for display or aesthetic purposes; repetitive, stereotypical forms found

among individuals with developmental disorders and cognitive disabilities, and severe forms (e.g., self-immolation and auto-castration) found among individuals with psychosis" (Nixon & Heath, 2009).

Age of Onset. Most researchers and practitioners have focused on adolescence as the key developmental period in which NSSI begins to emerge, as most of the literature cites the age of onset around this time (Lloyd Richardson, Perrine, Dierker, & Kelley, 2007; Nixon, Cloutier, & Jansson, 2008). Although adolescence is a period typically characterized by experimentation in risky behaviours, non-suicidal self-injury may present as an unusually dangerous activity that can become an effective, though unhealthy, coping method for youth. The reason for this speaks to NSSI's reported effectiveness as an emotion regulatory strategy for both adolescents and adults (Lloyd-Richardson, Nock, & Prinstein, 2009). Though adolescence is often believed to be the most common age of onset for most self-injurers, researchers are beginning to report that NSSI may begin later for some youth. A recent survey of college students found that almost 40% of self-injurers reported their age of onset to be during late adolescence or early adulthood (Whitlock et al., 2006). In fact, a comprehensive review by Rodham and Hawton (2009), young adulthood was deemed the period of highest risk for NSSI engagement, making this group a unique population in the field of NSSI.

Methods of NSSI. Clearly, the level of severity of NSSI actions can range from less severe behaviours to progressively more dangerous actions. Recently, a study examining methods of NSSI found that the most common methods of self-injury cited by university students were cutting and scratching (Holly, 2007; Laye-Gindhu & Schonert-Reichl, 2005; Nixon, Cloutier, & Aggarwal, 2002). A recent study by Claes and colleages (2009) found that 72% of self-injurers in their high school sample were using at least one or two different methods of NSSI, while 28%

were using between three and five different methods. There were gender differences noted in the type of method used by the self-injurers; with males opting for methods of outwards aggression, such as banging their heads or hitting themselves, whereas females tended to prefer methods of inwards aggression, such as cutting or scratching themselves.

Functions of NSSI. Recent investigations about the functions of NSSI found preliminary support for a typology of self-injurers, suggesting that the function NSSI serves may be different for different types of self-injurers (Holly, 2007; Lloyd-Richardson, 2010). More specifically, results from an exploratory factor analysis found that items tended to load on factors that were interpreted by the author as representing the following subtypes: 1) repetitive NSSI with possible psychopathology or suicidal ideation; 2) NSSI employed to manage emotion regulation difficulties; 3) NSSI as a form of sensation-seeking; and 4) socially-influenced NSSI. This function model supports subtypes that are also consistent with Klonsky's (2007) review of functions of NSSI. Other models have also been presented describing the functional reinforcement of NSSI as both automatic and social (Nock & Prinstein, 2004). Consistent across all research examining function of NSSI is the overwhelming reports of self-injurers describing NSSI as effective at achieving a desirable state (Klonsky, 2007, Nock & Prinstein, 2004, Gratz & Roemer, 2004). In fact, in addition to serving a function of affect regulation, Nock, Prinstein, and Sterba (2009) showed that NSSI may also serve a cognitive regulation function; by distracting the self-injurer from ruminating thoughts of NSSI or other unwanted negative thoughts. An important note addressed by Prinstein, Guerry, Browne, and Rancourt (2009), is the lack of research assessing whether or not acts of NSSI are indeed followed by specific contingencies or reinforcement. In other words, any functional reinforcements that have been

reported, and otherwise accepted, in the field are based solely on self-injurers perceived functions of NSSI. Typically, these perceived functions are also reported retrospectively.

Another argument that has become more prominent in the literature is the view of NSSI as an overdetermined behaviour (Lloyd-Richardson, 2010). In other words, researchers are beginning to suggest that NSSI may serve multiple functions for the individual. Additionally, the function may change in relation to the adolescent's own development. Although a pre-adolescent might begin to NSSI for one reason, the reason might change as the developmental context or stage changes (Lloyd-Richardson, 2010).

Much like other risky activities, such as excessive drinking or drug use, these types of unhealthy behaviours can be difficult to change in individuals that perceive them as being effective (Zuckerman, 2007). Though unhealthy, NSSI serves a clear purpose for many adolescents and young adults who use it. Unlike other self-destructive behaviours, such as suicide, self-injurers are, for the most part, trying to find ways to improve their situation.

NSSI versus Suicide. As noted above, numerous researchers have noted the important distinction between NSSI and suicidal behaviours. In fact, most researchers and clinicians in the field agree that non-suicidal self-injury is fundamentally different than those behaviours that are performed with suicidal intent (Best, 2005; Favazza, 1998; Muehlenkamp & Kerr, 2010; Walsh, 2006). A recent review on the distinction between NSSI and suicide outlined differences in behavioural frequency, type and lethality of methods used, severity, and aftermath of behaviour (see Muehlenkamp & Kerr (2010) for a more detailed review).

These differences are apparent in the underlying motivations; while suicide is often viewed as an attempt to end or destroy life, self-injury is generally seen as a way of improving life (Bennum, 1994; Muehlenkamp & Kerr, 2010; Walsh, 2006). Studies have found that non-

suicidal self-injurers report lower levels of suicidal ideation than individuals who have attempted suicide in the past (Jacobson, Muelhenkamp, & Miller, 2006), suggesting that those who engage in NSSI show more positive views about life. In fact, further evidence of this point can be obtained from research conducted with self-injuring high school students by Muehlenkamp and Gutierrez (2004), who endorsed more optimistic attitudes towards life than did suicidal adolescents.

More specifically, NSSI has been described by self-injurers as an effective coping strategy to deal with unpleasant affect, tension, anger or anxiety. Whereas suicidal individuals are often plagued by feelings of helplessness and hopelessness, non-suicidal self injurers may actually feel more optimistic and hopeful about their situation as a result of their NSSI. Typically, individuals who report engaging in NSSI also report feeling more in control of their lives than do suicidal individuals. Moreover, a recent study by Nock et al. (2009) showed that thoughts of NSSI were rarely accompanied by suicidal thoughts, suggesting that the two are not necessarily associated with each other.

The difference in motivations underlying suicide and NSSI does not preclude the existence of both behaviours within the same individual simultaneously. Studies that employ a broader definition of deliberate self-harm (which typically includes suicidal behaviours), have consistently shown that youth engaging in DSH also may have histories of suicide attempt or ideation (Favazza, 1996; Pattison & Kahan, 1983; Stanley, Winchel, Molcho, Simeon, & Stanley, 1992). Furthermore, reports indicate that among youth suicides, anywhere from 30% to 47% have a history of past DSH behaviours (Evans, Platts, & Liebenau, 1996). The previously mentioned studies all use definitions of deliberate self-harm that include past suicide attempts, an inclusion that may artificially inflate the co-existence of suicidal behaviours and NSSI.

However, research using definitions of self-injury that are consistent with ISSS' exclusionary criteria has also shown that some youth engage in NSSI while also experiencing periods of suicidal ideation (Briere & Gil, 1998). In particular, Nock, Joiner, Gordon, Lloyd-Richardson, and Prinstein (2006) reported that upwards of 70% of a sample of adolescents admitted to an adolescent inpatient unit who engaged in NSSI also reported past suicide attempts throughout their lives.

In one of the largest studies of high school students examining NSSI, over 60% of the students that engaged in NSSI reported that they never did so with the intent to die (Heath, Toste, Baxter, & McLouth, 2010). Although the remaining 40% did indicate suicidal intent while engaging in NSSI, the majority did so infrequently. Approximately 6% of the entire sample of self-injurers indicated suicidal intent for every episode of self-injury.

Therefore, it is clear that while most youth who engage in NSSI are not motivated by suicidal intentions; suicidal ideation may nevertheless co-exist within these youth. In addition to conducting a proper on-going risk assessment in practice, future research is needed to investigate the potential evolution of NSSI in individuals.

Prevalence of NSSI in the Community

The prevalence of NSSI in the general community has traditionally been underestimated, as most researchers assumed the behaviour to be more common in clinical or psychiatric populations, such as individuals with borderline personality disorder (Walsh & Rosen, 1985) or eating disorders (Claes, Vandereychen, & Vertommen, 2005; Solano, Fernandez-Aranda, Aitken, Lopez, & Vallejo, 2005; Stein, Lilenfeld, Wildman, & Marcus, 2004). In fact, for a time it seemed as though the only acknowledgment that NSSI was a common occurrence among adolescents was by adolescents themselves. As the focus shifted from inpatient units to high

schools and universities, community surveys have clearly shown that NSSI is present among today's youth. Prior to examining these rates directly, special consideration must be paid to the time frame in which NSSI is assessed by each study. For instance, studies may ask participants to indicate if they have engaged in NSSI throughout their lifetime, during the last year, or even during the past 6 months. Using such different time periods in assessing past and current engagement in NSSI can provide widely varying results even for the same individual; therefore, the following prevalence rates are grouped by population and assessment periods.

In terms of lifetime prevalence rates, past reports of adolescents and young adults engaging in NSSI in the general community have ranged from 4% to as high as 18.4% (Klonsky et al., 2003; Martin, Berger, Richardson, Roeger, & Allison, 2004; Nixon et al., 2008; Yates et al., 2008). Yates and colleagues surveyed young adults about lifetime engagement in NSSI and found that close to 17% reported self-injuring at least once. They further explored rates of NSSI by frequency and found that approximately 9% had engaged in NSSI intermittently (i.e., one or two times) and the same percentage reported engaging in NSSI on a recurrent basis (i.e., more than three times).

One particular study examined adolescent well-being with mothers and daughters in the community that was not included in the overview above found that 56% of girls indicated engaging in NSSI over their lifetime (Hilt, Cha, & Nolen-Hoeksema, 2008). When limited to the past 12 months, the rate decreased, but still remained quite high at 36%. This study was omitted from the summary above in order to avoid confusion, as the reason for such a high prevalence rate among this sample of girls may reflect a number of sampling limitations. First, the sample was drawn from an ethnically diverse population which may have resulted in a more complex array of risk factors (i.e., the sample was characterized by low SES and varied educational

backgrounds). Second, the adolescents were recruited through two local public schools and through community advertisement. As such, it is possible that the mother-daughter respondents to community advertisements for the study are not representative of the general population. Finally, consent was sought over the telephone and close to 15% declined to continue at this time. It is possible that the remaining sample had specific motivations in their desire to participate in a study about non-suicidal self-injury, reflecting a self-selection bias.

Not surprisingly, other reports of prevalence in the community from the past 12 months have shown lower rates (e.g., 5.1%; Patton et al., 1997) while those assessing NSSI over the past six months have shown a wider variation, ranging from 2.2% to 13% (Briere & Gil, 1998; Haavisto et al., 2005; Sourander et al., 2006). The difficulty judging the time frame within which NSSI occurred (e.g., six months versus six to twelve months) might explain some of the discrepancy between the rates at both time points. Additionally, Briere and Gil's sample was primarily adult participants, whereas the other studies were primarily made up of adolescents and young adults.

Several studies have assessed the prevalence of NSSI among adolescents within the schools, from the high school level to the university level. Whereas the studies discussed above also target primarily youth samples, these differ in that they are pulling from a more normative sample of adolescents and involve less bias in the sample recruitment. Students are not singled out to participate, nor do they have to make an extra effort (e.g., contacting researchers) to participate. In high school, studies have found lifetime prevalence rates of NSSI ranging from 13.9% to as high as 40% (Claes et al., 2009; Bjarehed & Lundh, 2008; Laye-Gindhu & Schonert-Reichl, 2005; Matsumoto & Imamura, 2008; Muehlenkamp & Gutierrez, 2004; Ross & Heath, 2002; Zoroglu et al., 2003), and 12 month prevalence rates ranging from 6.3% to 46% (De Leo & Heller, 2004; Lloyd-Richardson et al., 2007; Hawton, Rodham, Evans, & Weatherall, 2002).

Of note, Bjarehed and Lundh (2008) collected data about the students' self-injury at two separate time intervals using the Deliberate Self-Harm Inventory (Gratz, 2001), and established stability in their rates from Time 1 to Time 2. This is an important finding as it indicates that self-reports of current and past engagement in non-suicidal self-injury are reliable, despite the wide range found among various research studies.

Among university students, rates of lifetime prevalence range from 11% to 40% of students (Gratz, 2006; Gratz, Conrad, & Roemer, 2002; Hasking et al., 2008; Heath, Schaub et al., 2009; Whitlock, Eckenrode et al., 2006). Although this may reflect a true increase in rates of NSSI among university students, it is also probable that these higher numbers are reflective of the longer period of time within which the NSSI is being assessed. In other words, university students are much older than high school students, thus allowing more time for the NSSI to occur and be assessed. Additionally, although Hasking et al. (2008) found an alarming 40% prevalence rate of NSSI engagement among university students surveyed, their participant recruitment might have led to over-inflation for a community sample. Although much of the sample was recruited from university classes, part of the recruitment was done through counselling centers and private clinical practices in the nearby area. Therefore, the 40% prevalence rate obtained in this study may be inflated given the sample was partially recruited from a clinical population.

Researchers have found that university students engage in NSSI at high rates, and also report that they engage in NSSI frequently. For instance, studies with university students have found that 72% to 75% of students reported engaging in NSSI more than once over their lifetime (Gratz, 2006; Schaub, 2007), whereas closer to 40% of high school students engage in frequent self-injury (Brown, Houck, Grossman, Lescano, & Frenckel, 2008). Again, the inflated rates in

university samples may simply reflect longer time period assessed for an older population. In addition, a possible avenue for future directions in research might include investigating the role of social desirability in reporting NSSI.

In terms of ethnic distribution of NSSI, most researchers have reported rates of NSSI to be higher in Caucasian populations, as compared to populations of Hispanic, Asian American or African American background (Deliberto & Nock, 2008; Jacobson & Gould 2007). However, as Jacobson and Gould reported in their empirical review, there are many inconsistencies in the literature, with some studies finding no differences in rates of self-injury among different ethnicities. An important note is that many researchers use samples that consist of university students, or other groups, that already have a higher Caucasian percentage. More research is necessary in this area to clarify the prevalence rates of NSSI among different ethnic backgrounds.

An emerging area in NSSI research has begun to provide valuable information about prevalence of NSSI actions as well as NSSI thoughts. Recently, Nock and colleagues (2009) conducted an innovative study examining the incidents and duration of both thoughts and behaviours of NSSI among adolescents and young adults using real-time ecological momentary assessments. The youth reported, via handheld computers, an approximate rate of one thought of NSSI per day, typically of moderate intensity and short duration. On average, the youth reported two episodes of NSSI per week. Further research using real-time assessments will be crucial in developing our understanding of how thoughts translate into action among self-injuring youth.

Trends in NSSI. Numerous studies have reported increasing rates of both DSH and NSSI, as defined by the CASE and ISSS groups, among community populations of adolescents and young adults (Classen et al., 2006; Derouin & Bravender, 2004; Fortune & Hawton, 2005;

Klonsky et al., 2003; Lloyd-Richardson et al., 2007; Maughan et al., 2005; White Kress, 2003; Yates et al., 2008). In fact, several studies in particular point to overall increases in the number of adolescents and young adults that are reporting engagement in NSSI, particularly that of Lloyd-Richardson and colleagues (2007). In this study, the researchers surveyed high school students about their engagement in NSSI behaviour, and found that 46% of students reported engaging in an act of NSSI over the past year. While this rate is significantly higher than most 12 month prevalence rates in high schools (e.g., 6.3% to 9%, De Leo & Heller, 2004; Hawton et al., 2002), the authors suggest several reasons for this high rate. First, when the results were re-analyzed using data that only encompassed more moderate-severe forms of NSSI such as biting, cutting, carving, hitting and burning skin (rather than milder form of NSSI such as picking at wounds), the rate dropped to 28% of the overall sample, which is more comparable to other studies (Gratz et al., 2002). Secondly, the authors suggest that use of a measurement tool such as the Functional Assessment of Self-Mutilation (FASM; Lloyd, 1998) may encourage a higher response rate as the extensive list of response options may serve as a cue for respondents.

Yates and colleagues (2008) found that the mean age of onset of first episode of NSSI to be 14 years of age. However, close to 27% percent of the sample indicated engaging in NSSI for the first time prior to age 13. Although these rates are consistent with past reports showing age of onset at between 13 and 15 years of age (Muelenkamp & Gutierrez, 2007; Ross & Heath, 2002; Sourander et al., 2006), they may suggest a trend toward an earlier age of onset among adolescents.

Although the reason for this increase is unclear, some researchers point to growing awareness and acceptance of NSSI as a possible explanation. A recent study examining NSSI in the media compiled movies, songs, and news stories that referenced self-injury from the mid-

1960's to mid-2000's and found an alarmingly high upward trend for all media forms (Whitlock, Purington, & Gershkovich, 2009). While early media barely averaged one reference per year, the authors found that between 2000 and 2005, there were more than 50 songs, 20 movies, and 1750 news stories referencing self-injury. While part of this representation is likely due to an increase in overall media, the presence of NSSI is still noteworthy.

The reason for this suspected rise in NSSI among adolescents and young adults may also be reflective of the increased ability of practitioners and service providers to properly identify, assess, and treat self-injurers. In addition to this greater awareness and understanding about NSSI, help-seeking behaviours among youth have also increased overall (Purington & Whitlock, 2004). This is evidenced by the growing number of students requesting services through college and university counselling centers (Whitlock, Eels, Cummings, & Purington, 2006). Despite this trend among young adults, a recent study among high school students indicated that 83% would not seek help if their school were to provide a program for youth who engage in NSSI (Heath et al., 2010). This may be indicative of the ineffectiveness of current school-based intervention programs, or perhaps the adolescents' reluctance to self-identify as a self-injurer. One study by Deliberto and Nock (2008) found that the majority of self-injurers (78%) reported at least one reason for wanting to stop self-injuring, although only half were receiving treatment at the time of the study. A more comprehensive understanding of the reinforcing factors supporting this behaviour may assist schools and community centers in implementing programs that will be utilized by youth, as these results clearly show that the desire to stop is present in many self-injurers.

Youth at Risk for NSSI

Risk Factors

Examining the development of NSSI among adolescents and young adults necessitates a discussion of the risk factors that play a role in predisposing certain youth to attempting NSSI. Despite some inconsistencies in terms of the role of childhood trauma in later NSSI (Klonsky & Moyer, 2008; Gratz, 2003; Zweig-Frank, Paris, & Guzder, 1994), there is some evidence to support a link between the two (Evren & Evren, 2005; Gratz, 2006; Prinstein et al., 2009; Whitlock, Eckenrode et al., 2006; Zoroglu et al., 2003). In addition, there are several environmental and mental health factors that have been linked to NSSI. These factors include family composition or serious illness or disabilities in the family (Laye-Gindhu & Schonert-Reichl, 2005), socio-economic deprivation (Ayton, Rasool, & Cottrell, 2003), the absence of a family confidant in the home (Tulloch, Blizzard, & Pinkus, 1997), as well as the presence of eating disorders (Claes et al., 2005; Solano et al., 2005; Stein et al., 2004), Borderline Personality Disorder (Andover, Pepper, Ryabchenko, Orrico, & Gibb, 2005), substance abuse (Evren et al., 2006), and anxious and depressive symptomatology (Haavisto, et al., 2005; Ross & Heath, 2002). Finally, a recent study conducted by Serras, Saules, Cranford, and Eisenberg (2010) found that college students who engaged in NSSI were more likely to also engage in another risky behaviour, such as smoking, gambling, and drug use. These results suggest that for some, engagement in other risky behaviours might be an important risk factor in the youth's vulnerability to later NSSI engagement.

The common thread underlying the above list of risk factors is the nature of the population surveyed; while many youth may find themselves self-injuring as a result of unstable family environments or clinical symptoms, there exists a subgroup that do so despite the lack of these risk factors. In fact, the associations noted above between these risk factors and NSSI are far less clearly developed when examining a more normative population, such as high school or

college students. Within these non-clinical populations overall, there is one risk factor in particular that has been shown to strongly relate to NSSI; that of emotion regulation (Klonsky, 2007).

Emotion Regulation. Emotional regulation involves the awareness and understanding of emotions, the acceptance of emotions, the ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, as well as the access to emotion regulation strategies perceived as effective (Gratz & Roemer, 2004). Gratz and Roemer's model of emotion regulation with respect to NSSI is currently the most empirically supported risk factor in the development of NSSI behaviour among adolescents and young adults. In 2006, Chapman, Gratz and Brown presented the experiential avoidance model of NSSI, which proposed that individuals used self-injury as a means of avoiding unwanted emotional experiences. Numerous studies have lent support to this theory of emotion dysregulation, and both researchers and practitioners have come to view NSSI as an unhealthy coping mechanism used to manage overwhelming emotions by youth with emotion regulation difficulties. Haines and Williams (2003) provided evidence that NSSI effectively serves to reduce heightened levels of physiological arousal. Similarly, research examining the functions of NSSI has consistently found that self-injurers cite reasons such as tension release, or relief from unwanted emotional states (i.e., anger, fear, loneliness) as the primary motivation behind their NSSI (Briere & Gil, 1998; Favazza & Conterio, 1989). In a comprehensive review, Klonsky (2007) found evidence that negative emotions or distress are present prior to an episode of NSSI, and that following an episode of NSSI, there is a decrease in negative emotions and an increase in positive feelings (i.e., relief, calm). In addition, an abundance of literature has shown that prior to episodes of NSSI, most youth will report feelings of anxiety, tension, anger, and

depression (Briere & Gil, 1998; Favazza & Conterio, 1989; Ross & Heath, 2002; Suyemoto, 1998). Following this episode of self-injury, the same youth report a feeling of calm, relief and a sense of control (Briere & Gil, 1998; Suyemoto, 1998). The majority of self-injurers report that the motivating factor behind their NSSI is the desire to alleviate negative emotional states (Klonsky, 2007). It is clear that for these individuals, NSSI serves as an effective method of coping with increasingly negative emotional states and distress.

A study by Gratz (2006) with female college students found that participants who engaged in NSSI differed from those who did not based on their level of emotional inexpressivity, or an inability to express emotions. This study lends additional support to the notion that difficulties with emotion regulation (which include the ability to express emotions) are underlying much of the NSSI observed in youth. A more recent study by Claes et al. (2009) using self-reported data from high school students further supported the claim that difficulties in emotion regulation existed among self-injurers. Those who engaged in NSSI rated themselves lower on emotional stability, along with other traits such as global self-esteem, academic intelligences, and physical attractiveness.

Although it is evident that NSSI is an effective method for dealing with overwhelming or powerful emotions for many, there remain questions about why youth might try NSSI in the first place. In other words, considering that most youth do not know of the effectiveness of NSSI until they have tried it, what are the factors that determine whether an adolescent will engage in NSSI for the first time? Given that the ability to control emotional states is a distinguishing factor in the presence of emotion regulation problems, it is possible that a key factor in the decision to engage in NSSI may be related to an individual's level of self-control.

Self-Control. The role of self-control in the development of NSSI has never been directly tested. However, given that self-control theory includes an element of impulsivity (Gottfredson & Hirschi, 1990), the need to examine this construct with regard to NSSI development is justified. Indeed, recent work by Claes, Bijttebier, Mitchell, de Zwaan, and Mueller (2011) has demonstrated that differences in levels of behavioural activation (or impulsivity) are linked to behavioural outcomes, such as compulsive buying, among university students. Prior to investigating the relevance of self-control as a risk factor of NSSI, the discussion will begin with a review of studies examining links between impulsivity and NSSI.

Numerous researchers have found links between an individual's tendency toward impulsivity and various forms of self-injurious behaviours and deliberate self-harm (Casillas & Clark, 2002; Evans et al., 1996; Hargus, Hawton, & Rodham, 2009; Herpetz et al., 1997; Matthews et al., 2008; Milligan & Waller, 2001). In terms of suicide literature, several studies have found that suicidal youth are higher on measures of aggression and impulsivity than are non suicidal youth (Renaud, Berlim, McGirr, Tousignant, & Tuecki, 2007). More specifically, one study found interesting differences in impulsivity between three groups of youth; those who had a plan to attempt suicide but never attempted, those who had no plan but did attempt suicide, and those who had a plan and did attempt suicide (Witte et al., 2008). The least impulsive group were those with a plan but no attempt, whereas the most impulsive group was the group who had both a plan and an attempt. The authors suggest that the more impulsive youth might be more likely to expose themselves to painful or provocative stimuli on a more recurrent basis, thus making them less likely to engage in these acts in a "spur of the moment" fashion, as previously believed. These results may also suggest that when it comes to suicide behaviours, impulsivity,

as assessed through self-report measures, may tell us more about a person's actions than thoughts.

In terms of self-injury, a study conducted with incarcerated adult males found that those who scored higher on a self-report measure of impulsivity, also had a higher likelihood of self-injury than groups of individuals with suicide ideation and those who've attempted suicide in the past (Carli et al., 2010). In fact, both groups of suicidal individuals scored similarly lower on impulsivity than the self-injury group, suggesting that self-injury and suicide may show differences in levels of impulsivity. In addition to higher rates of self-injuring, these adult inmates also tended to be younger, single, extraverted, aggressive, hostile, and presented with more prominent psychoticism and diagnoses of substance abuse.

Another study by Evans and colleagues in 1996 found clear support for the association between self-harm and impulsivity with individuals referred for psychiatric assessment for deliberate self-harm. The researchers compared the role of impulsivity in first time versus repetitive self-harmers and found that while both groups scored high on a measure of impulsivity compared to the general population, those with a history of DSH had significantly higher scores than those presenting for first time DSH. These results indicate that although the levels of impulsivity are higher among self-injurers as compared to non self-injuring populations, differences also exist between those who only self-injure one time versus those who continue to do so repetitively. The authors suggest that the reason for this may be reflective of the underlying motivation for engaging in DSH; with first timers doing so as a result of a transient crisis, whereas repeaters may be self-harmers as a result of more enduring factors (e.g., childhood factors, substance abuse, psychiatric conditions, or socio-economic status). Given the clear

associations between NSSI and emotion regulation noted earlier, another possible explanation for this difference may be related to how effective the NSSI is for the individual.

Another study conducted by Hawton, Kingsbury, Steinhardt, James, and Fagg (1999) found no association between DSH and scores of impulsivity, as assessed using the Plutchik Impulsivity scale (Plutchik & Van Praag, 1986, as cited in Hawton et al., 1999). Although this finding differs from some of the previously mentioned studies, the authors suggest that aside from small sample size, this inconsistency may also reflect the relationship between impulsivity and the likelihood of first episode of NSSI engagement.

While there is some evidence of a link between impulsivity and NSSI, there still seem to be significant gaps in the way impulsivity is understood with respect to an individual's likelihood of engaging in NSSI. A more comprehensive understanding of this association might be achieved by encompassing the smaller trait of impulsivity into a more comprehensive construct, such as self-control. Poor self-control, a broader construct, may actually better represent the risk factor that is at play. Examining self-control as a potential risk factor might help to further elucidate the relationship between NSSI and impulsivity, through the lens of self-control theory. This new way of looking at the relationship may shed light on some of the inconsistencies in the literature, as well as provide additional information about other characteristics associated with self-control.

The most commonly used theory of self-control is put forth by Gottfredson and Hirschi in 1990, which suggests that an individual's self-control is a relatively stable personality construct first developed in early childhood (Higgins, Fell, & Wilson, 2006). Although levels of self-control are considered to be stable throughout one's lifetime (Arneklev, Cochran, & Gainey, 1998), the degree to which an individual shows a certain level of self-control will largely be determined by the situational and motivational factors involved. The theory, backed by

substantial empirical support (Gibbs, Giever, & Higgins, 2003), characterizes individuals with low self-control as impulsive, risk taking, insensitive, short-sighted, non-verbal, and more likely to engage in physical acts. These individuals are unlikely to consider potential negative consequences of their actions, regardless of how painful they may be (Gottfredson & Hirschi, 1990). They are likely to be drawn to acts that result in immediate gratification, are easy to accomplish, and possess a certain level of excitement; features that are all consistent with criminal or deviant behaviour (Higgins, Fell, & Wilson, 2006).

In fact, numerous studies have established the link between low self-control and types of unhealthy or non-normative behaviour, such as smoking (Feng, 2005), substance abuse (Gibson, Schreck, & Miller, 2004), digital piracy (Higgins et al., 2006), and even with the likelihood of criminal victimization (Schreck, Stewart, & Fisher, 2006). In addition, a moderate relationship between low self-control and academic misconduct, or cheating, was found among college students (Vowell & Chen, 2004). Despite the plethora of evidence that low self-control can lead to engagement in risky or deviant behaviours, several researchers have challenged the validity of applying such a theoretically oriented construct to specific behavioural outcomes, such as binge drinking or digital piracy. A recent study conducted by Schmeichel and Zell (2007) addressed this issue by testing participants' ability to refrain from blinking and tolerate painful stimuli based on their self-report of self-control. Results from this study found that participants' ability to refrain from blinking or tolerate pain for longer periods of time positively correlated to their earlier self-report of high levels of self-control.

It is clear then that self-reports of low self-control are associated with the individual's likelihood of engaging in risky behaviours, however, no studies to date have examined this personality construct with regard to NSSI. Although researchers have begun to show links

between non-suicidal self-injury and the trait of impulsivity, there remain some inconsistencies regarding this relationship. Much like the traits that characterize individuals with low self-control, NSSI can be considered an impulsive act that involves an element of risk taking and excitement. In addition, engagement in NSSI involves a physical act and appeals to the desire for immediate gratification and short-sightedness common to individuals with low self-control (Gottfredson & Hirschi, 1990). Given all the evidence of an association between low self-control and an individual's likelihood of participating in risky or deviant behaviours, along with the clear links between impulsivity (a subsidiary trait of self-control) and NSSI, it is possible that low self-control is also a precipitating factor in the initiation of NSSI. Further evidence is needed, however, to establish this link.

Social Learning of NSSI

Aside from the numerous risk factors that may play a role in youth NSSI, researchers are also speculating about the role of social factors in the adolescent's environment as a powerful influence in their decision to engage in NSSI. In fact, many researchers have suggested that NSSI in community samples may be, in part, a socially influenced and reinforced behaviour (Deliberto & Nock, 2008; Derouin & Bravender, 2004; Hodsgon, 2004; Holly, 2007; Nock, 2008; Yates et al., 2008). Unfortunately, while the phenomenon of contagion is well documented in NSSI, few researchers have attempted to explain the mechanisms underlying this spread. As a result, there remain many questions about why certain youth are particularly susceptible when exposed to NSSI, or how an adolescent will come to adopt the behaviour.

Learning Processes

A deeper understanding of this phenomenon may be achieved by examining similar behaviours in related fields. For example in criminology, youth engagement in risky behaviours

is often explained using elements of social learning theory (Bandura, 1986; 1992). Social learning theory has also been suggested by Whitlock and Knox (2009) as a potential theoretical framework to explain, in part, the effect of the media and internet on self-injury among youth. Nock (2010) argued that the social learning hypothesis was vital area for future research in the field of NSSI, particularly in light of the numerous research findings that cite social influences surrounding NSSI.

Akers (1998), adapted Bandura's social learning theory by breaking the larger theory down into smaller, measurable, components. According to Akers, social learning theory is best thought of as a collection of elements, rather than as one unitary construct. The processes that result in social learning include differential association (i.e., direct association with individuals who engage in certain forms of conduct and exposure to different norms and consequences), differential reinforcement (i.e., balance of anticipated and actual rewards and punishments following a certain behaviour), and definitions (i.e., the attitudes and meaning that individuals attach to a behaviour). This measurable version of social learning theory has been utilized by various social science researchers for the last two decades, and has garnered substantial empirical support in the process. More specifically, elements of social learning theory have quickly become a popular explanatory framework for many non-normative behaviours, and are backed by empirical support by studies examining various risky behaviours and forms of deviancy (e.g., substance abuse, Durkin, Wolfe, & Clark, 2005; digital piracy, Higgins et al., 2006; recidivism, Benda, Toombs, & Peacock, 2003).

One particular area of investigation in criminology that has looked at examining elements of social learning theory is that of substance use. One such study examined the relationship between alcohol expectancies and actual intoxication outcomes of adult men and women in a

naturalistic bar setting (Wall, Thrussell, & Lalonde, 2003). The researchers succeeded in finding a predictive relationship with the bar patrons' alcohol outcome expectancies and their later experiences with actual intoxication outcomes, as predicted by social learning theory. Another similar study also examined alcohol consumption, however with a focus on college students and their experiences with binge drinking (Durkin et al., 2005). Much like the previous study, researchers found that a large percentage of the variance could be accounted for by factors associated with social learning theory; with differential peer associations acting as the most predictive factor for whether college students engaged in binge drinking. Two related studies examining smoking among adolescents (Akers & Lee, 1996) and Asian American men (Spigner, Shigaki, & Tu, 2005) also support the elements of social learning theory: differential associations, differential reinforcement and favourable definitions.

Social learning theory has also found support in numerous studies examining other forms of deviant behaviour within criminology and sociology over the years, including adolescent and adult risky sexual behaviour (DiBlasio & Benda, 1990; Hogben & Byrne, 1998, respectively), digital piracy (Higgins et al., 2006), recidivism in adult offenders (Benda et al., 2003), as well as adolescent firesetting (Singer & Hensley, 2004), partner violence among adults (Sellers, Cochran, & Branch, 2005), and even police misconduct (Chappell & Piquero, 2004).

Given the abundance of evidence reviewed above, it is clear that certain elements of social learning theory are empirically supported in a variety of populations and with a variety of behaviours. It is also clear that NSSI is a behaviour that is spread socially among adolescents and young adults, at least in part. Researchers have shown that NSSI is socially reinforced to some degree, whether it be through peer or family relationships (Adler & Adler, 2008; Hilt, Nock et al., 2008; Nock, 2008), or through social reinforcement (Nock, 2008). Until now, few

researchers have examined the spread of NSSI apart from surveying youth about where or from whom they learned about NSSI. While valuable, the information only tells part of the story. The next section will address this issue by applying social learning theory to the study of non-suicidal self-injury, and a new social learning model of NSSI development will be presented.

Social Learning Theory and NSSI

Social learning theory can shed light on how adolescents and young adults learn about NSSI by providing a theoretical framework for understanding how information about the behaviour is shared among peer groups, what reinforcers are at work, and which youth are most vulnerable to the effects of these reinforcers. Prinstein et al. (2010) examined selection and socialization effects of peer groups on later development of NSSI, and found evidence to support both learning mechanisms. In the sections that follow, a similar model of socialization of NSSI will be developed largely based on the social learning theory presented above.

Differential Associations. According to Akers' (1998) version of social learning theory, differential association is an individual's direct association with peers who engage in certain forms of conduct, which in turn, affect one's exposure to different norms and consequences. Recent studies conducted with adolescents and young adults found that the majority of self-injurers cited first getting the idea of NSSI through socially influenced means (Deliberto & Nock, 2008; Hodsgon, 2004; Holly, 2007; Nixon et al., 2008). Researchers have also shown a link between association with certain peers, and likelihood of engaging in NSSI. For instance, evidence of a social contagion of NSSI has been documented in an early study by Walsh and Rosen (1985) in which 25 adolescents admitted to a psychiatric inpatient unit were observed over a one-year period. The researchers documented episodes of contagion among the youth, which they defined as a sequence of events whereby one person engages in NSSI and one or more

individuals in the immediate environment imitate the behaviour. Walsh and Rosen found that incidents of contagion occurred as clusters throughout the year, and that the adolescents appeared to be imitating one another's behaviour. Several years later, the researchers replicated this finding and provided preliminary evidence that NSSI outbreaks are often initiated by a core of youth at the center of the contagion activity (Rosen & Walsh, 1989). These youth then promote the spread of NSSI throughout the rest of the group.

This type of peer association effect is not limited to psychiatric samples. Fennig and colleagues (1995) investigated the social contagion of NSSI in a high school setting using in-depth interviews. The researchers also reported a contagion effect, and similar to Rosen and Walsh's findings six years earlier, they were also able to pinpoint a small core of students at the center of the NSSI activity. Although the sample studied by Fennig and colleagues did not present with overt mental health problems, many of the students who reported engaging in NSSI also reported more internalizing traits (i.e., anxiety and depression) than their same age peers. In fact, these students also tended to be the ones in the core of youth initiating the NSSI contagion.

Also examining NSSI in the community, Prinstein, Guerry, and Rancourt's study (as cited in Prinstein et al., 2009) investigated prospective NSSI contagion by examining friends' self-report of their own engagement in NSSI over a two-year period. The authors found that best friends' reports of NSSI was associated with a greater likelihood of the target adolescent also reporting engagement in NSSI over the two-year period. Finally, a study by Hargus et al. (2009) examined associations of youth with DSH, and found that those who engaged in DSH without the intent to die were more likely to have a friend engage in DSH, whereas youth who engaged in DSH with the intent to die were associated with a family member who engaged in DSH.

Based on these findings, it is possible that social contagion of NSSI is present in both clinical and community populations. Further, compelling experimental evidence has also demonstrated that perceptions of peer behaviour can play a role in an adolescent's own self-harming behaviour. An experimental paradigm provided support for this relationship by showing that participants would increase the intensity of self-administered shocks to match that of their peers, based on bogus feedback (Sloan et al. 2006, as cited in Prinstein et al., 2010).

Along the same lines, another study examining acquaintances of self-injurers in high school found that approximately one half of the sample of both self-injuring and non self-injuring youth knew someone else who also self-injured. However, compared to their non self-injuring peers, those who self-injured were more likely to know other self-injurers; and the level of familiarity with the other self-injurers did not impact their own likelihood of engaging in NSSI (Claes et al., 2009). The authors suggested that self-injurers may seek out other self-injurers due to a similarity, for example, a common sentiment of low self-concept. In essence, both of these studies found that the mere association with certain peers led some youth to engage in a highly dangerous behaviour.

In addition to the contagion documented among inpatients and high school students, researchers have also begun looking to the internet as a new means of spreading the behaviour. Adler and Alder (2008) conducted in-depth interviews with over eighty users of self-injury internet website and message boards who had both past and current experience with NSSI. During this investigation, one particular participant noted that many online groups promoted NSSI, despite the group's mandate. As the twenty-year old college junior Amber described, "It's like you need to cut to stay in that group, you know? Because that's what chat rooms are for." (Adler & Alder, 2008, pp. 41.). This comment points to the dangers associated with online

groups about NSSI that lack any structured censoring. It is possible that some self-injurers, as in the case of Amber, may have begun engaging in acts of NSSI in order to establish a sense of group belongingness. Furthermore, she may continue to do so in order to maintain it.

For a minority of youth, the spread of NSSI goes far beyond the exchange of information. Not only do studies clearly show that youth who engage in NSSI know of others who do the same, but research has also pointed to the possibility that some self-injurers engage in acts of NSSI in front of others, in groups, or even allowed others to injure them (Favazza & Conterio, 1989; Holly, 2007). In these instances, youth may share tools or implements and take turns injuring their bodies (Walsh, 2006). Interestingly, the phenomenon of group NSSI is a finding that is particularly apparent in males; however it is not clear why this is the case (Lloyd-Richardson et al., 2007). Nock and colleagues (2009) corroborated these findings, in their study using real-time assessments of NSSI thoughts and actions. For their self-injuring youth, a small percentage (e.g., approximately 4%) reported that others sometimes encouraged the youth to engage in NSSI. Although this did not occur often, when it did, it nearly doubled the youth's likelihood of engaging in NSSI.

Differential Reinforcements. Akers (1998) defined differential reinforcement as the balance of anticipated and actual rewards and punishments following certain behaviours. The second stipulation of social learning theory states that a target behaviour is differentially reinforced, in other words, it is reinforced in the contexts that will ultimately lead to greater NSSI engagement. Although researchers have clearly shown that self-injurers often associate with other self-injurers, there remain important questions about the nature of the reinforcers that are encouraging NSSI among youth. As it applies to NSSI, there are several reasons why

adolescents would be more frequently exposed to the reinforcers associated with this behaviour. One of the major reasons includes the media exposure of NSSI.

Whitlock and Knox (2009) likened the emergence of NSSI in popular culture to that of the glamorization of anorexia nervosa in the mid-1980's, with attempts to educate youth about the dangers of self-injuring backfiring and instead portraying the behaviour as a potential outlet for adolescents. Media attention has been increasing considerably over the last few decades (Derouin & Bravender, 2004; Purington & Whitlock, 2010), with an alarming increase noted particularly on the internet (Whitlock, Powers, & Eckenrode, 2006). According to the researchers, the number of message boards on the internet dedicated to NSSI has neared 400 over the past five years. Furthermore, an estimated 14 celebrities have come forward to discuss their NSSI openly, including such powerful figures as Princess Diana, Angelina Jolie, Johnny Depp, and Christina Ricci (Whitlock & Knox, 2009). Interestingly, many of the television shows and movies that have featured NSSI are those that are targeted at a younger adolescent population, such as Grey's Anatomy, House M.D., Seventh Heaven, Family Guy, Nip/Tuck, and Degrassi: The Next Generation (Whitlock & Knox, 2009, Whitlock et al., 2009).

The glorification of NSSI is amplified in the media and can present youth with a positive, vicariously reinforcing view of NSSI. More commonly, popular movies and television shows portray self-injurers as troubled yet glamorous, thereby nullifying the gruesomeness of the act itself. Additionally, much of the media normalizes the behaviour and sends a message to youth that NSSI is a reasonable outlet (Purington & Whitlock, 2010). After all, if it was the chosen method for many years for such successful and idolized celebrities as Angelina Jolie and Johnny Depp, might it not also be effective for today's young adolescents?

Although evident that non-suicidal self-injury is a presence in the mass media, it is still unclear whether young adolescents who are exposed to this behaviour will later imitate it. After all, seeing an image of scars or wounds on the wrist is powerful, but is it enough to entice curious adolescents to try it for themselves? As it turns out, it is. A news story printed shortly after *Degrassi: The Next Generation* featured a main character cutting herself, reported that 10 elementary students did the same. The students, aged 10 to 13 years, engaged in acts of NSSI which included cutting themselves along the wrist with protractors ("Hull Students", 2004). More empirical evidence has also found a link between media portrayals and subsequent increased NSSI rates in the general population, suggesting that youth are not only observing NSSI but also considering it (Purington & Whitlock, 2010).

Aside from media exposure, adolescents are also exposed to NSSI from their friends. Although less frequent, group NSSI can be a powerful learning agent for those adolescents who have yet to try it; both as a normalizing factor and as a result of the powerful peer influences that are involved. In fact, Nock (2008) discussed NSSI as a possible form of affiliation with others, or as a means of bonding with another person or group. In this way, NSSI may be serving a social positive reinforcement function for the individual (Nock & Prinstein, 2004), or provide him or her with a reward for engaging in the behaviour. This type of social reinforcement, or group inclusion, may also be an important factor emerging in the proliferation of NSSI behaviours among youth. For instance, a study conducted with individuals who were part of a Goth group in the UK suggested that acts of DSH were associated with group membership (Young, Sweeting, & West, 2006). The earlier cited study by Claes and colleagues (2009) reported that self-injuring youth were more likely to know other self-injurers. The authors suggested that these youth might be attracted to other youth with similar self-concepts, or

perhaps, these youth are more vulnerable to copying the NSSI behaviour they are exposed to in an attempt to cope with their situation or obtain status among their peers (Claes et al., 2009).

In psychiatric samples, females involved in episodes of contagion cited being part of the group as the major reason for their self-harming behaviour (Taiminen, Kallio-Soukainen, Nokso-Koivisto, Kaljonen, & Helenius, 1998). However, in more normative samples of self-injuring young adults, NSSI has also been reported as a group activity for 20% of university students (Holly, 2007). Although this percentage does not represent the majority of youth, it does nevertheless represent an alarming number of young adults for which NSSI may be serving as a type of social bond or show of solidarity. Based on these findings, Whitlock and Knox (2009) warn that the phenomenon of NSSI acting as the gateway to group membership needs to be considered when planning prevention efforts. After all, adolescence may be a particularly vulnerable time for adopting a new behaviour, such as NSSI (Lloyd-Richardson et al., 2009).

On an individual level, a recent study by Hilt, Nock, Lloyd-Richardson and Prinstein (2008) examined the quality of interpersonal relationships of high school students who engaged in NSSI. Consistent with their interpersonal model of NSSI, they found that those students who engaged in NSSI reported an increase in the quality of their relationships with their fathers over time. This influence was only documented between self-injurers and their fathers, suggesting that an adolescent's relationship with his or her father may be less stable than with his or her mother. One important note is that the researchers did not specifically ask the self-injurers about the functions their NSSI served; therefore the behavioural change noted in the paternal relationship is inferred based on information collected at two separate time points. Additionally, the researchers did not specify whether the fathers were present in the home during the time of study. Future studies should more directly examine this link to further develop our

understanding of the social functions involved in adolescent NSSI. Despite the need for future studies in all the areas discussed in this section, the results do point to very real avenues through which NSSI is reinforced via media attention, peer groups, and even family members.

Definitions. Finally, Akers (1998) described definitions as the attitudes and meaning that an individual will attach to certain behaviours. Not surprisingly, favourable definitions are more likely developed as a direct result of the reinforcers associated with certain behaviours (Akers, 1998). Apart from the effects of reinforcement, the period of adolescence may be an extremely receptive time for the adoption of favourable definitions to non-suicidal self-injury, as evidenced by the countless reports of NSSI beginning during this stage of development (Whitlock & Knox, 2009). In fact, the developmental context of adolescence is characterized by periods of social and sexual maturity that can involve intense stress, confusion, and a search for an independent identity to take with them into adulthood. As a result, adolescents might be more open to learning new behaviours and adopting new identities in an attempt to deal with the overwhelming emotions associated with this life stage. It is conceivable then, that youth at this developmental stage would be more likely to adopt others' attitudes and beliefs based on the strong relationships between peer groups and the importance of belongingness. Much like differential reinforcement, where youth are reinforced for engaging in a certain behaviour, the same youth will also be reinforced for the ideas, attitudes, and meanings they attach to that behaviour.

In fact, the exchange of information about NSSI has risen drastically over the last few decades, as a result of increasing viral communication. Research findings are beginning to suggest that NSSI may not be as private a behaviour as once believed, particularly given the ease with which youth can access information and other self-injurers through the internet (Whitlock &

Knox, 2009; Whitlock et al., 2009). While also providing differential association and differential reinforcement, this avenue of communication encourages youth to share their thoughts and experiences, thereby reinforcing the definitions associated with NSSI in online communities.

The internet has provided a forum for self-injurers to discuss their emotions, ideas and behaviours while still maintaining anonymity (Adler & Adler, 2008). In an in-depth investigation of self-injury in cyber worlds, Adler and Alder found that many self-injurers formed intimate relationships with others online, as the internet provided them with a safe haven where they could find, and identify with, various online communities. Sharing information and ideas via the internet was the predominant way in which these youth formed their bonds. In fact, the previously mentioned study conducted by Hodsgon (2004) found that the majority of the sample reported continuing to learn about NSSI even after they had started, primarily via the internet. The next section will examine how personality factors such as self-control and social learning might both play a role in a greater frequency of NSSI among adolescents and young adults.

Self-Control, Social Learning, and NSSI

As noted previously, Vowell and Chen (2004) found only a moderate relationship between low self-control and academic misconduct, or cheating, among college students. However, not mentioned earlier was how another important element was introduced to this relationship that added significant predictive value to the relationship between self-control and cheating behaviour; that of differential associations, an element of social learning theory. Researchers found that differential associations accounted for the most variance in whether or not students would engage in academic misconduct; in other words, students were most likely to cheat if their friends also cheated. As we know from the results of Vowell and Chen's study, those students

who engaged in academic misconduct as a result of the rationalization, neutralization techniques, attitudes, and motivations of their friends (i.e., favourable definitions), also possessed lower self-control than the average student. It is conceivable therefore, that certain individuals with low self-control are more prone to the effects of social learning than are those individuals with higher levels of self-control.

In fact, Higgins and colleagues (2006) argued for the integration of self-control theory and social learning theory. At its core, the construct of self-control is inevitably influenced by the opportunities, limitations and motivations of the environment (Higgins et al., 2006). Elements of social learning theory such as differential peer associations and differential reinforcements can play a role in the development of self-control. In turn, an individual's level of self-control will lead them to choose certain peer groups over others, influencing that individual's vulnerability to the effects of social learning, with respect to the opportunities and constraints placed on them by their peer group. Social learning processes will also influence an individual's development of self-control, particularly situational self-control, as associations with certain peer groups can lead to the development of favourable definitions to deviancy or crime. For example, an individual with low self-control may be more prone to seek out friends who engage in risky behaviours (Prinstein et al., 2010), and as a result of peer associations, reinforcements and sharing of favourable definitions about such behaviours, the individual may be more likely to engage in risky behaviours over time. As addressed earlier, the features that characterize an individual with low self-control are relatively stable throughout one's lifetime and will be largely influenced by that individual's situational and motivational factors (Gottfredson & Hirschi, 1990). The types of behaviours an individual with low self-control would be most drawn to include those that are impulsive, risky, and provide immediate gratification. In addition,

behaviours such as NSSI would be even more appealing given the focus on the physical and the inherent sense of excitement and risk that goes along with engaging in such an extreme behaviour.

Past research has shown a link between impulsivity and NSSI (Evans et al., 1996); however, no studies to date have examined impulsivity as part of a larger personality construct, such as self-control. Given the established links between self-control and social learning (Higgins et al., 2006; Vowell & Chen, 2004), examination of both social learning and self-control (which includes, but is not limited to impulsivity as a subsidiary trait) should allow for a more complete profile of the type of individuals that may be more prone to engaging in NSSI.

Summary

Non-suicidal self-injury, or the intentional destruction of one's body tissue, is arguably one of the most dangerous trends to emerge among today's youth. In addition to causing immediate harm to the individual, NSSI has been linked to poorer health outcomes in general. Past studies suggested a higher rate of anxious symptoms among high school students who reported engaging in NSSI (Laye-Gindhu & Schonert-Reichl, 2005; Ross & Heath, 2003). On a broader level, NSSI has also come at a cost to the healthcare system. A recent examination of crisis presentations at a Canadian hospital found that 50% of patients had engaged in self-injury in the hours leading up to their visit to the emergency room (Cloutier, Martin, Kennedy, Nixon, & Muehlenkamp (2010). Prevalence rates obtained by numerous researchers have found that anywhere from 11% to 40% of university students have engaged in NSSI at least one time in their lifetime (Gratz, 2006; Gratz et al., 2002; Hasking et al., 2008; Heath, Schaub et al., 2008; Whitlock et al., 2006). Worse still, the rates appear to be increasing; with much of the literature pointing to an upward trend of NSSI among adolescents and young adults in both community

and clinical settings (Classen et al., 2006; Derouin & Bravender, 2004; Fortune & Hawton, 2005; Klonsky et al., 2003; Lloyd-Richardson et al., 2007; Maughan et al., 2005; White Kress, 2003; Yates et al., 2008).

Although the reason for this increasing trend toward NSSI is unclear, many have speculated that a contagion element is at play, as many self-injuring individuals report knowing others who have also self-injured. This social influence of NSSI has been consistently reported by researchers working with this population (Deliberto & Nock, 2008; Hodsgon, 2004; Holly, 2007; Morey et al., 2008; Nixon et al., 2008; Yates et al., 2008).

While there is an abundance of research available on some of the risk factors (i.e., emotion regulation) that make certain youth more likely to engage in NSSI, related bodies of literature suggest that another possible risk factor, self-control, may also affect their likelihood of NSSI. Although valuable, this information is only part of the puzzle. In fact, understanding the profiles of youth who are most likely to engage in NSSI at some point in their lives tells us little about how those individuals come to understand and define NSSI on a personal level. Are all risk factors equally dangerous, or do some predict different severity of NSSI engagement? What are the factors that lead an individual to shift from simply talking or thinking about NSSI to actually trying it? In the related field of suicide research, Insel and Gould (2008) have argued for the inclusion of social learning theory as well as the examination of neurological factors, such as the executive inhibitory control of behaviours in individuals at risk, to address similar questions that face the NSSI literature. The present study addressed these questions by examining the risk factors that make youth more vulnerable to the influences of NSSI; the learning processes involved, and the possible combination of factors that lead to acts of non-suicidal self-injury.

Objectives of Present Study

To understand the mechanisms underlying non-suicidal self-injury among adolescents, the present study examined which factors (emotion regulation, self-control, or social learning) played a role in the initiation, as well as continuation, of this behaviour with a sample of young adults. The constructs of emotion regulation and self-control were assessed using self-report measures that had been psychometrically validated, while the social learning of NSSI was assessed using items tapping participants' differential associations, differential reinforcements, and definitions relative to NSSI, adapted from research in related fields.

The present study had four primary research objectives. The first objective was to determine the prevalence of NSSI among a sample of first year undergraduate students. Although studies in undergraduate populations have yielded prevalence rates hovering around 11% (Heath, Schaub et al., 2009), other researchers surveying university populations have found much higher rates (Gratz, 2006). Based on past studies using a similar population and methodology (Schaub, 2007), it was expected that approximately 10% of the population would indicate engagement in non-suicidal self-injury at least once throughout their lifetime.

The second objective of the present study was to examine differences between a group of self-injurers and non-self-injurers on measures of emotion regulation, self-control, and social learning. Specifically, the risk factors that were investigated included those that have been supported by the literature (e.g., emotion regulation difficulties) as well as those that were theoretically relevant (e.g., self-control theory and social learning theory). The elements of social learning theory that were assessed included differential associations, differential reinforcements, and definitions. Group differences were examined between those reporting current or past engagement in NSSI and a group of non-self-injuring students, who were matched

with the self-injurers on age, gender, and academic faculty. It was expected that among the NSSI group, there would be higher levels of emotion regulation problems, lower levels of self-control, and a higher presence of social learning than among the non-self-injuring group.

The third objective of the present study was to investigate the individual factors (e.g., emotion regulation, self-control, or social learning), or combination of factors, that were most predictive of being a self-injurer. Each factor was examined with respect to its ability to predict the likelihood of membership in the NSSI group versus the control group, in order to establish the unique contribution each variable (e.g., emotion regulation, self-control, social learning) had on the presence of NSSI. To examine this relationship, the predictive power of the three variables on likelihood of engagement of NSSI was tested using a sample of both self-injuring and non-self-injuring participants. It was expected that each of the three variables would play a unique role in predicting NSSI. Although emotion regulation was expected to be the strongest predictor of NSSI group membership based on previous research (Briere & Gil, 1998; Favazza & Conterio, 1989; Ross & Heath, 2002; Suyemoto, 1998), both self-control and social learning were also hypothesized to be predictors of one's likelihood of engaging in NSSI, however to a lesser degree.

The fourth objective of the present study was to examine which variables best predicted frequency of NSSI. Rather than investigating these variables in relation to the presence of NSSI, the objective was to determine which variables, or combinations of variables, best predicted a higher frequency of NSSI among a group of self-injuring participants. It was expected that high frequency NSSI would be best accounted for by difficulties with emotion regulation, based on previous research in the area (Chapman et al., 2006; Gratz & Roemer, 2004; Haines & Williams, 2003; Klonsky, 2007). Given the link between self-control and social learning with non-

normative behaviours in the literature (Higgins et al., 2006; Vowell & Chen, 2004), it was expected that both self-control and social learning would predict higher frequency of NSSI among self-injurers. The expected overall outcome was that this combination of factors (i.e., individuals with emotion regulation difficulties, low self-control, and indications of social learning), would lead to a greater frequency of NSSI engagement over a lifetime. The effects of self-control and social learning were expected to be separate from that of emotion regulation difficulties alone; a known risk factor in the continued engagement of NSSI.

Chapter III: Methodology

Participants

The participants for the present study were divided into specific samples based on the predetermined criteria for each analysis. The data for this study were collected in two phases; Phase I used a screening measure to identify non-suicidal self-injurers from a total sample of university students, while Phase II required selected participants from the Phase I sample to complete more comprehensive psychosocial questionnaires online (see Appendix A). Below is a detailed description of the Phase I sample of university students who were screened, and the Phase II samples, which consist of both self-injuring (Phase II NSSI Sample) and non-self-injuring students (Phase II Control Sample).

Phase I Sample. The participants forming the Phase I sample were recruited through visits to undergraduate classrooms across the university. More detailed information about sample recruitment can be found in the procedures section of this chapter. Of the 4322 screening surveys that were collected from undergraduate classes, only those that were sufficiently complete with regard to demographic information and use of coping strategies were used in the total sample. Thus, the total Phase I sample consisted of 4272 participants (38.6% male, 61.45% female) young adults, aged 18 to 25 years (mean age 19.74 years). In addition to identifying self-injurers, the screening questionnaire administered in Phase I also collected basic demographic information for the sample, such as gender, age, native language, country of residence, as well as select information regarding engagement in risky behaviours and non-suicidal self-injury. The most common academic faculty of undergraduate students surveyed was Arts (43.0%), followed by Science (20.2%), Engineering (14.1%), Management (11.4%), Education (3.2%) and Medicine (1.8%). Other less common programs included Agricultural and

Environmental Studies (.9%), Music (0.3%), and Religious Studies (0.1%). The majority of the sample (79.4%) spoke English at home, with a notable percentage (9.2%) speaking French at home. The remaining 11.4% percent of the sample indicated other languages, such as those categorized as Eastern European, Asian, African, or Middle Eastern dialects. In terms of country of residence, 77.1% of the sample listed Canada, while 12.2% indicated living in the USA, and the remaining 10% cited other countries, such as those in Asia (4.7%), Europe (2.9%), the Middle East (1.2%), South and Central Americas (0.9%), Africa (0.6%), and Australia and New Zealand (0.3%). Similarly, the most frequent country of birth was Canada (59.7%) and the USA (12.0%), as well as countries from the following regions of the world: Asia (12.0%), Europe (8.3%), Central and South Americas (2.3%), Africa (1.7%), Australia and New Zealand (0.6%), and the Middle East (0.1%). The faculty, spoken language, and country of origin/ permanent residency of the total sample was comparable to other university-wide samples recruited in previous studies (Holly, 2007).

During classroom visits, the screening measure for Phase I was distributed to approximately 5000 first year undergraduate students, in order to collect demographic information about the sample and to identify self-injurers from the larger sample. At this time, participants were also given a contact information sheet where they could leave their name, phone number, and email address. Doing so indicated their desire to participate further in the study, which involved completing an online follow-up survey. Both the screening survey and the follow-up survey were introduced as studies examining coping strategies young adults used to deal with stress. They were not described as studies specifically on NSSI in order to prevent any stigmatization about NSSI, as well as avoid procuring a self-selected sample (Gratz, 2006; Hodgson, 2004).

An overall 52.5% consent rate was obtained from total sample of screened participants who agreed to be contacted for follow up questionnaires, which is comparable to studies conducted in the past using a similar methodology (Schaub, 2007). The Phase II portion of the study involved more thorough online questionnaires, and participants were invited to complete this second phase only if they met specific criteria. The first group, consisted of participants who endorsed engaging in non-suicidal self-injury formed the *Phase II NSSI Sample,* while the second group formed the *Phase II Control Sample,* and consisted of non-self-injuring participants who were matched with NSSI participants on specific demographic variables.

The participants for the NSSI sample and control sample were matched in order to ensure that the variables of concern (emotion regulation, self-control, and social learning) could be compared across groups that differed in only in terms of their engagement in NSSI. By ensuring that certain demographic variables, such as gender, age, and faculty, were held constant across groups, a greater level of control was achieved in the design of the study. Participants from the control sample were systematically pulled from the database (containing all screened participants from Phase I) if they did not endorse NSSI (i.e., answered never on NSSI screening item) and met criteria that allowed for a demographic match with an NSSI participant (e.g., gender: female, age: 17, faculty: arts). This process was repeated until 100 control-NSSI matches were established. To follow is a brief description of the *Phase II NSSI Sample, Phase II Control Sample,* and finally, the combined NSSI-Control sample used in the analyses for the second and third objectives.

Phase II NSSI Sample. The participants who formed the NSSI sample were recruited from the Phase I sample of the present study. From this Phase I sample, participants who indicated their willingness to participate in follow up questionnaires and reported engagement in NSSI

behaviours that were consistent with the ISSS definition of NSSI (n = 180) were invited to participate in the online follow up study (i.e., Phase II). Of those who were invited, 144 participants (80%) responded to the email invitation and agreed to complete the study. From this group, only 2 participants did not access the online survey, while 142 did access the survey and 136 completed it in full. Over the course of two years of data collection, 13 of 136 self-injurers (9.5%) who participated in Phase II of the study indicated a possible suicide risk, and were assessed by a licensed clinician. Upon closer examination of the completed surveys that were obtained by the research team, 14 participants were later excluded as their reported behaviours did not fit the operational definition of non-suicidal self-injury and another 2 participants were excluded based on inconsistencies and unusual responses in their data. The final *Phase II NSSI Sample* consisted of 120 participants (33 males and 87 females, M = 19.54 years, SD = 1.33).

The NSSI sample was comparable to the overall sample in terms of faculty distribution (Arts 58.3%, Science 19.2%, Engineering 5.8%, Management 5.0%, Education 3.3%, Agricultural and Environmental Studies 1.7% and Other 6.7%), language spoken at home (English 86.7%, French 5.0%, followed by Asian 5.8%, European 0.8%, and Middle Eastern dialects 0.8%), country of permanent residency (Canada 65.8%, USA 21.7%, Asia 8.4%, Europe 3.3%, and Australia and New Zealand 0.8%), and country of birth (Canada 49.2%, USA 23.3%, Asia 16.7%, Europe 8.3%, followed by Australia and New Zealand, Africa, and the Middle East all at 0.8%).

Phase II Control Sample. As with the NSSI Sample, the control sample was also drawn from the total sample of Phase I and matched on demographic variables with participants from the NSSI group. A selection of participants who indicated their willingness to participate in the follow up questionnaires but did not indicate any current or past engagement in NSSI behaviours were invited to complete the control version of the study (i.e., Phase II). As previously

described, the participants who were sent an email invitation were chosen based on three demographic characteristics (gender, age, and faculty) to match the participants of the NSSI sample.

In total, 185 non-self-injuring participants were invited to complete the online survey, and 109 participants (59%) responded to the email invitation agreeing to complete the study. From this group, 108 participants accessed the survey and 107 completed it in full. Despite no indication of NSSI engagement in the screening survey, 6 participants who completed the online survey reported engaging in NSSI during the course of the study, therefore were excluded from the study. One additional participant was excluded due to unusual responses in the data set. The final *Phase II Control Sample* consisted of 100 participants (27 males and 73 females, M = 19.44 years, sd = 1.28), who were matched on gender, age, and faculty with 100 participants from the NSSI sample described above, forming a Control-NSSI matched sample.

This Control-NSSI matched sample (n = 200; 100 control and 100 NSSI), was also comparable to the overall university sample and the NSSI sample in terms of faculty distribution (Arts 62.0%, Science 21.5%, Engineering 5.5%, Management 4.0%, Education 3.5%, Agricultural and Environmental Studies 0.5% and Other 3.0%), language spoken at home (English 86.7%, French 7.5%, followed by Asian 3.5%, European 1.5%, and Middle Eastern dialects 0.1%), country of permanent residency (Canada 68.5%, USA 21.7%, Asia 5.0%, Europe 4.0%, and Australia and New Zealand, Africa, and Central America all at 0.5%), and country of birth (Canada 53.0%, USA 22.0%, Asia 11.0%, Europe 10.0%, followed by the Middle East at 1.5%, Africa, Central and South America, and the Middle East all at 1%, and Australia and New Zealand at 0.5%). When examined separately, both the Control and NSSI participants in the Control-NSSI sample showed similar breakdowns in all areas listed.

In total, there were 220 participants who took part in Phase II of the study. These individuals were split into two groups; those who engaged in NSSI (n = 120) and those who did not (n =100). The target sample of 100-110 in each group was based on power analysis calculations, as well as recommended sample sizes for the analyses used in the present study (Hosmer & Lemeshow, 1989; Peduzzi et al., 1996; Tabachnick & Fidell, 2001). See Appendix K for more information about the determination of sample size for the present study. These two groups were compared on several measures of psychosocial functioning.

Procedure

The participants were recruited through their undergraduate classes at a large urban-based Montreal university. The research team contacted instructors of undergraduate courses offered at the university, and asked permission to visit their classes at pre-determined times to distribute the screening survey. Instructors were asked to set aside approximately 15-20 minutes for the voluntary completion of the survey by the students. Upon entering the classroom, the research team briefly introduced the study and described the purpose as investigating stress and coping strategies among undergraduate students. Participants were informed that all of the responses provided on the questionnaires would remain confidential. While students were encouraged to participate in the study, they were also informed of their option to withdraw their participation at any time. To this end, students were given the option of returning completed or blank survey packages, in the event that they declined to participate. Students were also informed that participation in this study was completely voluntary, and had no bearing on their performance in the course. This information was communicated orally, as well as in writing on the consent form attached to their survey package. The survey packages included a consent form, the screening measure, and a contact information sheet. Students were asked to read and sign the informed

consent form found at the top of the packet. This form reiterated the information presented orally. A copy of the informed consent form can be found in Appendix B.

The last page of the screening package was the contact information sheet which participants completed if they were willing to be contacted for a follow-up study (i.e., the Phase II part of the study). An incentive was provided to encourage students to participate in the follow-up study, which included a draw for all those participants selected to complete the Phase II. The draw involved one $200.00 gift certificate for a local shopping mall and two $50.00 gift certificates for HMV music stores (see Appendix C). When the students completed the screening survey, they were provided with the necessary debriefing information about the study. The debrief information sheet provided details about the purpose of the study, results from a past study also investigating NSSI in the same population, as well as numerous resources should they require further support (see Appendix D).

All participants engaging in NSSI in the Phase I part of the study, who indicated interest in a follow-up study, were contacted via email to complete the follow-up survey for Phase II. In addition, a control group was formed from the total sample of individuals who did not engage in NSSI but who were also interested in the follow-up study. The individuals forming the control group were selected based on specific criteria in order to match them with individuals from the NSSI group. This ensured that both groups were similar with regard to basic demographic variables and allowed for comparison across other psychosocial factors.

Participants from both the NSSI and control group received an e-mail invitation that briefly described the study and were asked to respond if they were interested in participating in the next phase. Those who expressed an interest were sent a link (including individual user name and password) to an online survey that took an average of 30 to 45 minutes to complete. Upon

accessing this link, participants viewed an informed consent page at the beginning of the online survey which stated that all information collected would remain confidential unless the participants indicated serious intent to harm themselves. The participants were also informed that they were free to withdraw from the study at anytime without penalty. Participants were be prompted to check a box at this time; either "Yes, I Consent" or "No". Participants were required to check the "Yes, I consent" box in order to complete the survey (refer to Appendix E for copy of the consent form).

The online format of the survey allowed participants the option of saving their information and logging in at a later time to complete the survey, should they find it too lengthy to complete in one sitting. Once participants completed the Phase II online follow-up survey, they received another e-mail thanking them for their participation. Included in this e-mail was the debriefing information for the study, as well as additional resources. See Appendix F and Appendix G for the debriefing sheets for the NSSI group and the control group, respectively. For any participants who endorsed contemplating current suicidal ideation or thoughts, a licensed clinician completed a suicide protocol as per the Research Ethics Board's requirements (see Appendix H for suicide protocol).

The next section includes a description of each of the measures the participants were asked to complete during both phases of the study. Phase I consisted of a screening measure, How I Deal with Stress (HIDS; Ross & Heath, 2008), which identified participants who engaged in NSSI from the total sample. Phase II was comprised of a series of three questionnaires, the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), the Self-Control Scale (SCS; Wiebe, 2006), and the Social Learning Questionnaire (SLQ), which was developed for the present study based on items used by previous researchers examining social learning. These

items were completed by both the NSSI and control group, in order to allow for comparison between the two groups on the measures of interest. Slight adaptations were made to the SLQ based on whether the participant was a self-injurer or non-self-injurer (see *Social Learning Questionnaire* for more information about adaptations).

Measures

Phase I: Screening Measure. *How I deal with stress*. All participants in this study were given the screening measure How I Deal with Stress (HIDS; Ross & Heath, 2008) in their undergraduate classroom from January 2009 to June 2010. The questionnaire was developed by Dr. Heath and her research team as a means of identifying self-injurers anonymously from a group. The questionnaire assessed the respondent's engagement in a variety of healthy and unhealthy coping strategies when dealing with stress, among which, NSSI was included. The coping strategies were determined through an extensive literature review where activities such as reading, listening to music, crying, smoking, engaging in risky activities (e.g., unprotected sex, reckless driving), or physically hurting themselves on purpose were listed as examples (Ross, Heath, & Toste, 2009). The HIDS was designed as a 4-point Likert scale on which respondents rated how frequently they used each of the 29 coping strategies listed (never, once, couple of times, or frequently), and was designed as a method of identifying self-injurers from a larger group without risking contagion effects (Hodgson, 2004). Additionally, by masking as a study on coping with stress rather than on NSSI, the format of the questionnaire prevented a self-selection bias.

If participants endorsed any of the three coping strategies "talk to someone", "do risky things", or "physically hurt myself on purpose", they were required to complete a section at the end of the questionnaire that asked more detailed information (i.e., type, frequently,

effectiveness) about the strategy. For the first strategy "talk to someone", the participants were asked to indicate with whom they spoke and how useful they felt this strategy typically was for them. The second strategy, "do risky things", required participants to indicate their preferred behaviour from a list of options (i.e., reckless driving, multiple sexual partners, alcohol or drug abuse), and how that behaviour made them feel. The last strategy that was probed, "physically hurt myself on purpose" asked the participant several questions about the method, frequency, duration, and severity of the NSSI. The questions used in this section were based on those taken with permission from the Deliberate Self-Harm Inventory (DSHI; Gratz, 2001); a behaviourally-based measure of non-suicidal self-injury. Preliminary psychometric information about the HIDS was obtained by the scale designers, and high test-retest reliability was obtained (r = .88) over a four-week period with a sample of 102 first year university students in a large mid-western university. Validity information is not yet available for this measure.

Phase II: Questionnaires. The *Difficulties in Emotion Regulation Scale (DERS)*, developed by Gratz and Roemer (2004), is a self-report measure that assessed various dimensions of emotion regulation such as awareness and understanding of emotions, acceptance of emotions, ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, as well as the access to emotion regulation strategies perceived as effective. The DERS provided a total score of emotion regulation difficulties, where higher scores represented more difficulties with emotion regulation. Furthermore, the scale examined six dimensions of emotion regulation and produced subscales, including Lack of Emotional Awareness, Lack of Emotional Clarity, Non-Acceptance of Emotional Responses, Difficulties Engaging in Goal Directed Behaviors, Impulse Control Difficulties, and Limited Access to Emotion Regulation Strategies. The Lack of Emotional Awareness dimension

assessed the participant's ability to acknowledge their emotions (e.g., "When I'm upset, I believe that my feelings are valid and important"), while the Lack of Emotional Clarity dimension related to the participant's ability to understand their emotions (e.g., "I am confused about how I feel"). The Non-Acceptance of Emotional Responses dimension assessed the participant's acceptance or denial of emotions (e.g., "When I'm upset, I feel guilty for feeling that way"). The Difficulties Engaging in Goal Directed Behaviors dimension assessed the participant's ability to function when overwhelmed with emotions (e.g., "When I'm upset, I have difficulty getting work done"), whereas the Impulse Control Difficulties dimension involved one's ability to control their emotions and reactions (e.g., "When I'm upset, I become out of control"). Finally, the Limited Access to Emotion Regulation Strategies dimension is related to the participant's ability to use varying methods to help regulate their emotions (e.g., "When I'm upset, I believe that I will remain that way for a long time"; Gratz & Roemer, 2004).

The instrument is composed of thirty-six items in a five-point Likert scale. Participants were asked to rate their agreement with each statement selecting the appropriate number: 1 (strongly disagree), 2 (mildly disagree), 3 (agree and disagree equally), 3 (mildly agree), 4 (strongly agree). The scores were then computed by averaging the level of agreement of each participant on the positive and negative statements.

Gratz and Roemer (2004) have established good internal consistency for the DERS (α = .93) and high test-retest reliability (r = .88) over a four- to eight-week period. In addition, the authors also found that the DERS had adequate construct validity (r = .60) when correlated with the Negative Mood Regulation scale (NMR; Catanzaro & Mearns, 1990), a commonly used emotion regulation measure.

The *Self-Control Scale (SCS),* is self-report measure developed and validated by Wiebe (2006) using items adopted from previous questionnaires reflecting self-control theory. The scale was created based on theoretical and empirical support for various factors shown to be predictive of delinquency. The SCS provided six subscale scores looking at specific factors. The factors included: Temper, Risk Seeking, Present Orientation (e.g., traits of impulsivity and short-sightedness), Selfishness, Diligence and Neutralization. The Temper subscale consisted of one item that assessed how easily the participant can lose his or her temper (e.g., "I lose my temper really easily"), and the Risk Seeking subscale assessed the participant's engagement in risky activity with one item (e.g., "Sometimes I take a risk just for the fun of it"). The Present Orientation subscale assessed the participant's impulsivity and short-sightedness (e.g., "A person should live for today and let tomorrow take care of itself"), while the Selfishness subscale examined the participant's level of selfishness (e.g., "I try to get the things I want even when I know it's causing problems for other people"). The Diligence subscale investigated the participant's determination and motivation to succeed (e.g., "Whatever I do, I try hard") and correlates negatively with delinquency. Finally, the Neutralization subscale assessed the participant's use of justification (e.g., "To get ahead, you have to do some things that are not right"). Participants were asked to read each of the 20 statements included on the scale and rate their responses on a 4-point Likert scale. The response options included: 1 (strongly agree), 2 (agree), 3 (disagree) and 4 (strongly disagree). On the Self-Control Scale, higher scores were indicative of lower levels of self-control.

The scale was found to have both content and predictive validity given the theoretical framework for which the scale was developed. Gottfredson and Hirschi's (1990) theory, simply put, proposes that certain traits associated with Self-Control Theory are predictive of criminal

activity. This was the case in Wiebe (2006), with all expected items on the scale predictive of later offending in both university and high school samples. In addition, the predictive ability of the scale was increased with the addition of items assessing the elements of Diligence and Neutralization, with Neutralization proving to be the strongest predictor of offending for both samples studied. No reliability data are available for the measure at this time.

Finally, a questionnaire entitled *Social Learning Questionnaire (SLQ)* was developed to tap into the social learning variables. The questionnaire included 18 items tapping into the social learning processes involved in the participant's exposure to, and perception of, NSSI. The items were based on adapted items from past research in the area of social learning (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979; Durkin et al., 1996; Krohn, Skinner, Massey, & Akers, 1985). For the present study, the items used to assess the elements of social learning theory were adapted from Durkin and colleagues (2005)'s study on the effects of social learning on binge drinking. In order to maintain the integrity of the scale's design, the terms "alcohol" or "drinking" were replaced with "NSSI" or "self-injuring". This procedure is consistent with other studies of social learning (Akers et al., 1979; Krohn et al., 1985) as there is no standardized measure available that can assess social learning theory directly.

Numerous researchers in the fields of sociology and criminology have adapted Akers' (1998) version of social learning theory, which views the larger theory as a collection of elements. Specifically, the items included in the Social Learning Questionnaire (SLQ) tap into three different areas of social learning: Differential Associations, Differential Reinforcement, and Definitions of the participants engaging in NSSI. For each of the three scales, higher scores represented a higher level of social learning involvement. See Appendix I and J for the Social Learning Questionnaire for both the NSSI group and the Control group.

The first scale, *Differential Associations*, assessed the participants' direct association with other individuals who engage in NSSI, as well as their exposure to different norms and consequences relating to the behaviour. Using items adapted from Durkin and colleagues (2005), participants were asked to provide information about the number of close friends who engaged in NSSI, either in the past or currently. In previous studies examining binge drinking among college students, Durkin and colleagues (2005) obtained a good internal consistency (.92) for their original scale. Participants answered questions about their level of exposure to NSSI via friends, as well questions about their friendship (e.g., how long they've known each other and how frequently they associated with one another). The response options provided for the participant for the differential associations section include 0 friends, 1 friend, 2 to 5 friends, 6 to 9 friends, or more than 10 friends.

The next scale of the SLQ, *Differential Reinforcements*, assessed the participants' differential reinforcements of NSSI behaviours, or the balance of anticipated and actual rewards or punishments following engagement in NSSI. This scale on the SLQ is made up of two areas. The first area of the *Differential Reinforcements* scale required participants to rate how positively their closest friends would have reacted to knowledge of their engagement in NSSI, at the time that the behaviour was first emerging (e.g., "How would your closest friend react if he/she discovered that you were engaging in self-injury?"). In 2005, Durkin et al. obtained good (.86) internal consistency for the original two-item subscale in a study investigating binge drinking among college students. The responses for these items were rated on a 5-point Likert scale, with the response options including: 1 (very negatively), 2 (negatively), 3 (neutral), 4 (positively), and 5 (very positively). In addition to rating how their close friends would react, participants also rated how the majority of their friends would have reacted to the discovery of their NSSI (e.g.,

How would most of your friends react if they discovered that you were engaging in self-injury?). This was done in order to establish the saliency of the subsequent reinforcement for the participant (i.e., close friend versus acquaintance friends).

The second area of the *Differential Reinforcements* scale required the participant to rate the cost and benefits of NSSI as assessed using six statements about NSSI. For the original six item subscale assessing binge drinking, Durkin and colleagues (2005) obtained an acceptable (.73) internal consistency measure. For these items, participants were asked to read six statements about the potential costs (e.g., "NSSI can lead to serious injury") and benefits (e.g., "My self-injuring helps me fit into groups better") of NSSI. Ratings for these responses was also on a 5-point Likert scale, and included: 1 (strongly disagree), 2 (disagree, 3 (neutral), 4 (agree), and 5 (strongly agree).

Finally, the last scale of the SLQ, *Definitions*, assessed the participants' definitions of NSSI, or the attitudes, beliefs, or meaning that they attach to NSSI. For this scale, two items tapping general definitions (e.g., "most people will try self-injury at least once in their lifetime."), four items tapping techniques of neutralization (e.g., "if I keep my self-injuring under control, it is not that dangerous"), and one item specifically assessing the participant's definition of NSSI (e.g., "there is really nothing wrong with self-injuring once and a while"), were adopted from other scales examining binge drinking with Cronbach's alpha ranging from .73 to .78 (Durkin et al., 2005). An example of how the scale was adopted is as follows: the item, "There is really nothing wrong with having several drinks in a sitting" was modified to read, "There is really nothing wrong with self-injuring once and a while". For each of these statements, participants indicated their level of agreement on a 5-point Likert scale. Response options for these items included: 1 (strongly agree), 2 (agree), 3 (neutral), 4 (disagree), and 5 (strongly disagree).

Two internal consistency estimates of reliability were computed for the Social Learning Questionnaire. Both a split-half coefficient expressed as a Spearman-Brown corrected correlation (r = .71) and coefficient alpha (r = .64) indicated satisfactory reliability for the overall measure. In addition, the dimensionality of the SLQ was analyzed using maximum likelihood factor analysis. The number of factors chosen for rotation were based on prior theoretical justification in the literature, examination of the scree test results, as well as the interpretability of the factor solution. Based on these criteria, three factors were chosen for rotation using the Varimax rotation procedure. Results revealed that the three-factor model was an acceptable fit with the data, x^2 (102) = 206.65, p < .000, supporting the validity of the scale. The rotated solution, as displayed in Appendix J, yielded three interpretable factors consistent with the subscales of the SLQ: differential associations (13.20% of item variance explained), differential reinforcements (13.00% of item variance explained), and definitions (10.00% of item variance explained).

Chapter IV: Results

Data Analysis

All data were analyzed using the *Statistical Package for the Social Sciences 16.0 (SPSS 16.0)*. Means, standard deviations, and ranges were computed. A correlation matrix was computed using all the total and subscale scores. A frequency count was conducted in order to assess the prevalence of NSSI in the screening university sample from the Phase I section of the study. Second, three Multivariate Analyses of Variance (MANOVAs) were conducted using groups of self-injuring versus non self-injuring young adults (matched on age, gender, and faculty) to test for group differences on measures of emotion regulation, self-control, and social learning. In addition to understanding the differences between groups of self-injurers and non-self-injurers on the variables of interest, an objective of the current study was to examine the variables, or combination of variables, that would be predictive of individuals belonging to one group or another. To test this objective, emotion regulation, self-control, and social learning were first entered into a logistic regression in order to gain a more comprehensive understanding of how well the variables acted alone, or in combination, to predict an individual's likelihood of being a self-injurer. Finally, these same variables were then tested as predictors of engaging in high frequency NSSI, using Multiple Hierarchical Regression analysis, in order to establish the factors that are most predictive of an individual continuing to self-injurer once the behaviour has begun.

First Objective: Prevalence of NSSI in Screening Sample

The first objective of the study was to assess the current prevalence rate of NSSI among a sample of first year undergraduate students. To meet this objective, the data were examined with respect to the frequency of NSSI in order to establish the prevalence of NSSI in this population.

The frequency was obtained from item 21 on the HIDS, which participants completed in the Phase I portion of the study. The item was transformed into a dichotomous variable, with 0 representing all non-self-injurers and 1 encompassing all self-injurers, collapsing between those that indicated NSSI only once, a few times, occasionally, and frequently. The responses were collapsed in this way in order to obtain the full sample of self-injurers, including both one-time and more frequent self-injurers. The frequency of NSSI was run using all included HIDS surveys from the total university screening sample in Phase I, which included 4272 participants (Males = 1648, Females = 2624). Within this sample of first-year undergraduate students surveyed, 338 or 7.9% (2.8% Males, 5.1% Females) reported that they had physically hurt themselves on purpose at least once as a coping strategy for stress. Of the 92.1% who reported never engaging in NSSI, 35.8% were male, and 56.3% were female.

Second Objective: Group Differences

To assess the study's second objective, three one-way multivariate analyses of variance (MANOVAs) were conducted to compare a group of self-injurers and non-self-injurers on mean scores for three variables: emotion regulation (DERS), self-control (SCS), and social learning (SLQ). The NSSI-Control sample (n = 200) used in this analysis consisted of both self-injurers (n =100) and non-self-injurers (n = 100), who were matched on gender, age, and faculty to ensure that no major group differences existed prior to examining the variables of interest. A more detailed description of the matching process used can be found in the Participants section of the Methodology Chapter.

Data cleaning led to minor alterations of moderate outliers for 11 of the variables to ensure the scores fell within the acceptable range as per examinations of the stem-and-leaf and histogram distributions, based on recommendations by Mertler and Vannatta (2002). As

suggested by Mertler and Vannatta, the moderate outliers (i.e., high scores) identified by the stem-and-leaf and histogram distributions were changed to reflect the highest scores within the acceptable ranges for each of the variables. For example, for a distribution of scores that ranged from 5 to 10, an outlier of 11 would be changed to 10, thereby still representing a high score in the group but allowing for a more normal distribution. This alteration was only performed for mild to moderate outliers and prevented the need for major data transformations (Mertler & Vannatta, 2002).

No extreme outliers were found when the data were examined as a total group, or split into the NSSI and Control groups separately. Although the Kolmogorov-Smirnov test was still significant for several of the subscales following the alterations of outliers, the skew and kurtosis statistics were closer to zero and examination of normality plots and histograms suggested the distributions were more normal. Skew statistics ranged from 0.02 to 0.99 and kurtosis statistics ranged from 0.04 to 1.12 for the altered variables, and only two variables obtained kurtosis statistics that were greater than one following the alteration of moderate outliers described above, indicating only slightly non-normal distributions. Recommendations by Kline (1998) argue that non-normality is only problematic when skew and kurtosis statistics are above 3 and 10, respectively. Additionally, the variables in question were to be included in a robust test (e.g., MANOVA), therefore, no further transformations were deemed necessary. To follow are the results for each multivariate analysis, including the appropriate tests of assumptions for each variable. Means and standard deviations for all subscale and total scores are provided in Table 1.

Table 1.

Means (SD) for Non-Suicidal Self-Injury and Control Groups on Phase II Measures.

	Control (n = 100)	Self-Injury (n = 100)
Variable	*M* (*SD*)	*M* (*SD*)
DERS Total Scale	81.63 (19.11)	98.77 (20.93)
DERS Nonacceptance Subscale	12.73 (4.71)	15.75 (5.46)
DERS Goal Directed Subscale	16.08 (4.15)	17.74 (4.47)
DERS Impulse Subscale	10.79 (4.03)	14.79 (4.33)
DERS Emotional Awareness Subscale	14.14 (5.00)	14.95 (4.75)
DERS Limited Access Subscale	15.85 (5.13)	21.67 (6.02)
DERS Clarity Subscale	11.48 (2.76)	12.47 (3.18)
SCS Total Scale	42.36 (10.01)	46.77 (10.47)
SCS Temper	2.24 (1.14)	2.62 (1.25)
SCS Risk Seeking	2.68 (1.25)	3.09 (1.22)
SCS Present Orientation	8.55 (2.31)	8.86 (2.23)
SCS Selfishness	7.04 (2.40)	7.55 (2.83)
SCS Diligence	8.94 (2.69)	10.35 (3.41)
SCS Neutralization	12.87 (4.30)	14.19 (4.04)
SLQ Total	32.83 (5.53)	39.87 (7.23)
SLQ Differential Associations	1.20 (1.76)	2.22 (2.24)
SLQ Differential Reinforcement	20.45 (2.72)	19.35 (2.91)
SLQ Definitions	11.18 (3.05)	18.27 (4.57)

Note. DERS = Difficulties in Emotion Regulation Scale, SCS = Self-Control Scale, and SLQ = Social Learning Questionnaire.

Emotion Regulation. Correlation analyses run on the subscales of the DERS (excluding the total score) ranged from low to high positive correlations between the dependent variables, (e.g., Non-Acceptance of Emotional Responses, Difficulties Engaging in Goal-Directed Behavior, Impulse Control Difficulties, Limited Access to Emotion Regulation Strategies, Lack of Emotional Clarity, and Lack of Emotional Awareness) with coefficients ranging from .21 to .73. Despite this range, the majority of the correlation coefficients clustered around the moderate level. Intercorrelation coefficients for the subscales of the DERS are presented in Table 2. Scatterplots were examined to ensure appropriate linear relationships among all variables, and linearity was established. Box's Test of Equality of Covariance was then examined, to test homogeneity of variance at the $p < .001$ significance level (Mertler & Vannatta, 2002). Results indicated that Box's Test was non-significant ($F(21, 144192.25) = 1.78$, $p = .015$), indicating no violations in homogeneity of variance. As such, the test statistic Wilks' Lambda was used in the subsequent multivariate analysis.

MANOVA results revealed significant differences among the self-injurers and non-self-injurers on the DERS, Wilks' $\Lambda = .75$, $F(6, 193) = 10.56$, $p < .001$, multivariate $\eta^2 = .25$. Univariate analyses revealed significant differences on five of six subscales on the emotion regulation measure. Significant differences were found between self-injurers and non-self-injurers on measures of Non-Acceptance of Emotional Responses ($F(1, 198) = 17.65$, $p < .001$, $\eta^2 = .08$), Difficulties Engaging in Goal-Directed Behavior, ($F(1, 198) = 7.44$, $p < .007$, $\eta^2 = .04$), Impulse Control Difficulties, ($F(1, 198) = 45.61$, $p < .001$, $\eta^2 = .19$), Limited Access to Emotion Regulation Strategies ($F(1, 198) = 54.08$, $p < .001$, $\eta^2 = .22$), and Lack of Emotional Clarity ($F(1, 198) = 5.63$, $p = .019$, $\eta^2 = .03$). Non-significant differences were found between the groups for Lack of Emotional Awareness ($F(1, 198) = 1.48$, $p = .225$, $\eta^2 = .01$). As presented in

Table 1, the NSSI group obtained higher mean scores than the control group on all subscales of the DERS, representing more difficulties.

Table 2.

Summary of Intercorrelations for Subscale Scores on the DERS.

DERS Subscales	1	2	3	4	5	6
1. Non Acceptance	-	.37*	.45*	.62*	.47*	.30*
2. Goal Directed		-	.45*	.57*	.22*	.06
3. Impulse Control			-	.73*	.41*	.24*
4. Access to ER Strategies				-	.45*	.21*
5. Emotional Clarity					-	.52*
6. Emotional Awareness						-

Note. DERS = Difficulties in Emotion Regulation Scale

*$p < .01$.

Self-Control. Correlation analyses run on the subscales of the SCS (excluding the total score) indicated low to moderate positive correlations among the dependent variables (e.g., Temper, Risk Seeking, Present Orientation, Selfishness, Diligence, and Neutralization), with coefficients ranging from .22 to .55. Intercorreltation coefficients for the SCS are presented in Table 3. Examination of scatterplots suggested that a weak linear relationship existed for two subscales (Temper and Risk Seeking); both subscales with only one item, reflecting possible problems with scale design. However, Box's Test of Equality of Covariance was then examined at the $p < .001$ significance level and results were non-significant ($F(21, 144192.25) = 1.20$, $p = .239$). This suggested no violations in homogeneity of variance. As such, the test statistic Wilks' Lambda was used in the subsequent multivariate analysis.

MANOVA results revealed significant differences among the self-injurers and non-self-injurers on the SCS, Wilks' $\Lambda = .920$, $F(6, 193) = 2.789$, $p = .013$, multivariate $\eta^2 = .08$. Univariate follow-up on the subscales on the measure of self-control revealed that four of six subscales differed significantly between self-injurers and non-self-injurers; Temper ($F(1, 198) = 5.04$, $p = .026$, $\eta^2 = .03$), Risk Seeking ($F(1, 198) = 5.511$, $p = .020$, $\eta^2 = .03$), Diligence subscale ($F(1, 198) = 10.64$, $p < .001$, $\eta^2 = .05$), and Neutralization ($F(1, 198) = 5.03$, $p = .026$, $\eta^2 = .03$). Non-significant subscales included: Present Orientation ($F(1, 198) = 0.89$, $p = .346$, $\eta^2 = .004$), and Selfishness ($F(1, 198) = 1.86$, $p = .175$, $\eta^2 = .009$). An examination of means showed higher mean scores for the NSSI group than the Control group for all subscales on the SCS, as presented in Table 1.

Table 3.

Summary of Intercorrelations for Subscale Scores on the SCS.

SCS Subscales	1	2	3	4	5	6
1. Temper	-	.22*	.31*	.45*	.67*	.38*
2. Risk Seeking		-	.24*	.26*	.23*	.43*
3. Present Orientation			-	.29*	.42*	.45*
4. Selfishness				-	.28*	.55*
5. Diligence					-	.31*
6. Neutralization						-

Note. SCS = Self-Control Scale

*$p < .01$.

Social Learning. Correlation analyses run on the subscales of the SLQ (excluding the total score) indicated low positive correlations between the dependent variables (e.g., Differential Associations, Differential Reinforcements, and Definitions), with coefficients ranging from .11 to .31. Intercorrelation coefficients for the SLQ are presented in Table 4. Examination of scatterplots also suggested that a weak linear relationship existed for the subscales. Box's Test of Equality of Covariance was then examined at the $p < .001$ significance level and results were significant ($F(6, 284044.08) = 4.50$, $p < .001$). As there were violations in homogeneity of variance, the more robust MANOVA test statistic, Pillai's Trace, was used in the following multivariate analysis (Mertler & Vannatta, 2002).

MANOVA results revealed significant differences among the self-injurers and non-self-injurers on the SLQ, Pillai's Trace = .52, $F(3, 196) = 70.02$, $p < .001$, multivariate $\eta^2 = .52$.

Univariate analyses on the social learning measure revealed significant differences between self-injurers and non-self-injurers in all three areas, Differential Associations ($F(1, 198) = 12.71$, $p < .001$, $\eta^2 = .06$), Differential Reinforcements ($F(1, 198) = 7.55$, $p = .007$, $\eta^2 = .04$), and Definitions ($F(1, 198) = 158.04$, $p < .001$, $\eta^2 = .44$). As shown in Table 1, examination of group means revealed that the NSSI group showed higher levels of social learning in the areas of Differential Associations and Definitions, but lower levels of social learning in Differential Reinforcements.

Table 4.

Summary of Intercorrelations for Subscale Scores on the SLQ.

SLQ Subscales	1	2	3
1. Differential Associations	-	.11	.31*
2. Differential Reinforcements		-	.11
3. Definitions			-

Note. SLQ = Social Learning Questionnaire

*$p < .01$.

Third Objective: Predicting NSSI Engagement

In order to examine the level of predictability each variable (emotion regulation, self-control, social learning) had on the likelihood of engagement in NSSI, a Binary Logistic Regression was computed. Specifically, the most common method, Forward Logistic Regression was used to determine which independent variables were predictors of NSSI engagement. The predictor variables included the total scores for each of the measures given during Phase II of the study; the DERS, the SCS, and the SLQ, while the criterion variable was a dichotomous variable assessing participants' engagement in NSSI (group membership in control or NSSI sample). In accordance with this Forward Logistic Regression method, all three IVs were entered and the likelihood-ratio was used to determine variable selection (Mertler & Vannatta, 2002). The NSSI-Control sample (n = 200) used in the previous multivariate analysis was also used for this regression analysis, and included self-injurers (n = 100) who were matched on demographic variables with non-self-injurers (n = 100). See the Participants section of the Methodology

Chapter for more information regarding the matching process used to form the sample used in this analysis. Earlier data screening was completed for the previous multivariate analyses that resulted in the alteration of minor outliers to fit acceptable ranges, as per the stem-and-leaf diagrams. Additionally, a preliminary multiple regression was computed to ensure that the assumption of multicollinearity was not violated. No cases were eliminated based on the chi-square critical value, x^2 (3) = 16.27, p < .001.

Regression results indicated that the overall model fit of two predictors (emotion regulation and social learning) was statistically reliable in distinguishing between self-injurers and non-self-injurers (-2 Log Likelihood = 208.45; χ^2 (2) = 68.81, p < .001). The model correctly classified 73.50% of cases. Hosmer and Lemeshow's Test of goodness-of-fit was non-significant (χ^2 (8) = 12.59, p = .127), suggesting a well-fitting model. Regression coefficients are presented in Table 5. Wald statistics indicated that two of the three variables entered (emotion regulation and social learning) significantly predicted likelihood of being in the self-injurer or non-self-injurer groups. Using the Forward Logistic Regression method yielded social learning as a significant predictor at the first step, with emotion regulation adding significant predictive power to the model in the second step. Self-control was not a significant predictor in the model at the first step (p = .548) and also failed to significantly predict group membership at the second step (p = .540). Odds ratios for the significantly predictive variables were above 1.0, suggesting a well-fitting model.

Table 5.

Summary of Logistic Regression Analysis for Variables Predicting Likelihood of NSSI Engagement at First and Second Step (N = 200)

Variable	*B*	*Wald*	*Df*	*P*	Odds Ratio
Step 1					
Social Learning	.168	37.824	1	<.001	1.183
Step 2					
Emotion Regulation	.034	14.875	1	<.001	1.034
Social Learning	.149	28.453	1	<.001	1.161

Note. Self-Control was removed from equation due to non-significant predictive value at both steps (Step 1: $p = .548$, Step 2: $p = .540$)

Fourth Objective: Predicting NSSI frequency

The fourth objective was to examine the predictive power of the same three variables (emotion regulation, self-control, and social learning) with respect to frequency of NSSI. A Hierarchical Multiple Regression was computed to answer this research question and determine the overall predictive power of the variables as well as the unique contribution of each variable, and combination of variables, on NSSI frequency. For this analysis, only participants from the NSSI Sample ($n = 120$) were used. The dependent variable used for this analysis was a variable from the participant's Phase II survey assessing how many times the participant had engaged in NSSI throughout their lifetime. Again, the independent variables included the total scores for each of the measures given during Phase II of the study; the DERS, the SCS, and the SLQ.

The method of hierarchical multiple regression was chosen for this analysis as substantial theoretical and empirical support for relationship between emotion regulation and self-injury suggested that emotion regulation would be the most powerful predictor of NSSI. Additionally, given the exploratory nature of both self-control and social learning with regard to NSSI, the unique contribution of each variable was sought above and beyond that of emotion regulation. This method and order of variable entry ensured that elements of self-control or social learning were not actually tapping those more appropriately understood as emotion regulation, and resulting in an inflated predictive relationship. As such, the total score of the DERS was entered into the first block, based on support in the literature for the relationship between emotion regulation and NSSI. The order of entry of the SLQ and SCS variables was based in part on the results from the earlier logistic regression. SLQ was entered in the second block, and SCS was entered in the third block, as this variable had no significant predictive power in the final model of the logistic regression. Data cleaning led to the removal of one extreme outlier from the NSSI group after calculation and examination of Mahalanobois Distance. Therefore, the total sample used in this analysis included 119 self-injurers. Tolerance statistics were all well above 0.1, therefore indicating no violation of the assumption of multicollinearity. The examination of residual plots indicated some violations of linearity and normality, however, given the large sample size used for this analysis, no further transformations were deemed necessary on the variables included (Mertler & Vannatta, 2002).

Regression results indicated that the overall model significantly predicted frequency of NSSI engagement, $R^2 = .054$, $R^2_{adj} = .046$, $F(1, 117) = 6.74$, $p < .05$. However, neither the second step ($R^2 = .060$, $R^2_{adj} = .043$, $F(2, 116) = 3.68$, $p = .028$) nor the third step ($R^2 = .061$, $R^2_{adj} = .037$, $F(3, 115) = 2.50$, $p = .064$) achieved a significant squared multiple correlation (R^2). Thus, only

the variable of emotion regulation ($\beta = .226$ $t(116) = 2.49$, $p < .05$), significantly contributed to the model. The variables of social learning and self-control were not significant predictors in the model at any step. The regression coefficients for all variables, along with bivariate and partial correlation coefficients are presented in Table 6 and 7, respectively.

Table 6.

Model Summary of Multiple Regression Analysis for Variables Predicting Frequency of NSSI Engagement (N = 119)

Step	*R*	R^2	R^2_{adj}	ΔR^2	F_{chg}	*P*	df_1	df_2
1.Emotion Regulation	.233	.054	.046	.054	6.735	.011	1	117
2. Emotion Regulation Social Learning	.244	.060	.043	.005	.640	.426	1	116
3. Emotion Regulation Social Learning Self-Control	.247	.061	.037	.001	.179	.673	1	115

Table 7.

Coefficients for Final Model in Multiple Regression (N = 119)

	B	*β*	*t*	Bivariate *r*	Partial *r*
Emotion Regulation	.007	.221	2.408*	.233	.219
Social Learning	.006	.066	.718	.096	.067
Self-Control	.003	.039	.423	.083	.039

*$p < .05$.

Chapter V: Discussion

Non-suicidal self-injury is a phenomenon that some experts in the field have identified as one of the most compelling challenges for today's youth. In fact, a significant percentage of university students have reported engaging in some form of NSSI over the course of their lifetime, with prevalence rates ranging from 11% to 40% (Gratz, 2006; Gratz et al., 2002; Hasking et al., 2008; Heath, Schaub et al., 2009; Whitlock et al., 2006). For the purposes of the present study, NSSI was defined as "the deliberate, self-inflicted destruction of body tissue resulting in immediate damage, without suicidal intent and for purposes not socially sanctioned" (Nixon & Heath, 2009).

The factors that lead an adolescent to engage in NSSI are potentially endless, yet the areas of emotion regulation, social factors, and impulsivity have received both theoretical and empirical attention recently. As a start, the present study sought to examine several carefully chosen constructs, in the expectation that they would shed some additional light on the reasons youth might consider trying, and possibly continuing, NSSI. The results for each of the four objectives of the present study are interpreted below and discussed with respect to relevant research findings in the NSSI literature, as well as related fields.

Prevalence of NSSI in Screening Sample

The frequency of NSSI was examined from the total university screening sample during the first phase of the study. The rate of NSSI among first-year undergraduate students surveyed in the first phase of the study was approximately 8%, and comparable to other studies using similar populations and survey techniques (Bureau, Martin, Freynet, Poirier, Lafontaine, & Cloutier, 2009; Heath, Schaub et al., 2009). Despite some higher prevalence rates reported in the literature among university students, clear differences in the methodology and definitions used

must be considered when interpreting these results. For instance, studies that have reported rates of NSSI over 35% (Gratz, 2006, Gratz et al., 2002; Hasking et al., 2008) were those that had recruited their samples by advertising the study as one examining self-injury. The subsequent high rates obtained can therefore be attributed, in part, to a self-selected sample. Previous work in the field of self-injury has clearly shown that a subgroup of self-injurers exist that are more prone to coming forward to discuss their experiences given the opportunity. For example, an 1985 airing of the *Phil Donahue* television show discussing self-mutilation as a topic led to a remarkable response from the general public; over one thousand self-injurers came forward and subsequently completed a survey about their self-harm (Favazza & Conterio, 1988). Another study that advertised as one investigating mental health found a lower, yet still relatively high, prevalence rate of just under 20% (Whitlock, Eckenrode et al., 2006). While that rate more closely resembles the results of the current study, it is possible that some type of self-selected sample was acquired using this recruitment strategy. Although plausible that some self-selection occurred with the present study, the deception used at the outset of the study (e.g., study on coping with stress) allowed for a more anonymous recruitment of self-injurers. In the same way that self-injurers might be attracted to a study on self-injury, individuals who have some mental health issues may be drawn to participating in a study on mental health and wellbeing. In fact, studies have shown that self-injurers have higher scores on measures of depression and anxiety (Ross & Heath, 2002), and eating disorders (Claes et al., 2005; Solano et al., 2005; Stein et al., 2004), and self-injury has long been considered a symptoms for psychiatric disorders such as borderline personality disorder (American Psychiatric Association, 2000). Apart from the possible co-occurrence of other mental health problems, it is also conceivable that an individual engaging in NSSI would simply have a heightened sense of awareness and curiosity for topics

related to mental health, and therefore, be more likely to agree to participate in a study addressing these topics.

In addition to advertising as a study on self-injury or mental health, other design features related to participant recruitment might explain the high rates of NSSI reported. For Haskings et al. (2008), one particularly relevant difference is the location of participant recruitment, which included counselling centers and private clinics in addition to university classrooms. Clearly, the recruitment of participants from mental health facilities complicates the picture, and results in inflated rates of NSSI. Additionally, the age range of participants in Hasking et al.'s study was wider, including participants up to age 30 years, a range of 5 years greater than the current study, which limited the age range from 18-25 years.

Finally, another explanation for such discrepancies in prevalence rates between the current study and several others concerns the breadth of the operational definition used. A commonality among the studies that obtained higher than average prevalence rates was the inclusion of a wide range of behaviours in a checklist format. In addition to widening the range of what behaviours were operationalized as NSSI (e.g., pinching, bone breaking, hair pulling), this also may serve to prime participants to report a higher number of methods. Listing a wide range of behaviours on survey measures consistently leads to higher rates of incidence reporting (Heath, Schaub et al., 2009).

In summary, the present results of 8% are consistent with rates obtained by studies using a similar population, age range, and methodology (Bureau et al., 2009; Heath, Schaub et al., 2009). This clarification of the factors involved in the discrepancies among studies on prevalence of NSSI has aided in the understanding and interpretation of current, as well as past, rates of NSSI among university students. As this study has demonstrated, the rate of NSSI among university

students who are anonymously surveyed is just under ten percent. These results suggest that a smaller percentage of the overall university student population are engaging in NSSI than previously reported (Gratz, 2006, Gratz et al., 2002; Hasking et al., 2008; Whitlock, Eckenrode et al., 2006). Although still concerning, the smaller percentage of self-injurers obtained in this study indicate that NSSI may not be as widespread in university populations. Indeed, the lower prevalence obtained in this study might suggest that resources and attention are better aimed at groups with consistently higher rates of NSSI, such as those reported among mental health centers, or high school populations (Claes et al., 2009; Laye-Gindhu & Schonert-Reichl, 2005; Ross & Heath, 2002; Zoroglu et al., 2003).

Group Differences

Significant differences were found on measures of emotion regulation, self-control, and social learning between a group of self-injurers and non-self-injurers. As expected, there were higher levels of emotion regulation problems, lower levels of self-control, and a higher presence of social learning among the NSSI group compared to their non self-injuring peers, with the exception of one subscale assessing social learning.

Emotion Regulation. Emotion regulation has been given a considerable amount of attention with regard to populations of youth who engage in NSSI. Emotion regulation refers to the awareness, understanding, and acceptance of emotions, as well as to the ability to control impulsive behaviours, access effective emotion regulation strategies, and behave in accordance with desired goals when experiencing negative emotions (Gratz & Roemer, 2004). Overall, the results from this study are consistent with past research findings that have shown that self-injurers experience more difficulty regulating emotions than non-self-injurers (Chapman et al., 2006; Gratz & Roemer, 2004; Haines & Williams, 2003; Klonsky, 2007). In line with the

current research in the field, differences were found between self-injurers and non-self-injurers on measures of Non-Acceptance of Emotional Responses, Difficulties Engaging in Goal-Directed Behavior, Impulse Control Difficulties, Limited Access to Emotion Regulation Strategies, and Lack of Emotional Clarity.

Upon closer examination of the subscales that differentiated between self-injurers and non-self-injurers, items revealed that self-injurers on average reported more negative experiences with emotions, doubted their ability to control strong emotions, and disliked the consequences they suffered as a result of experiencing an overwhelming emotional state. In addition to replicating findings from previous research studies within this population, the current results also provide additional evidence for a popular model of emotion regulation. The Experiential Avoidance Model (EAM), as proposed by Chapman and colleagues (2006), suggested that these differences regulating difficult emotions lead individuals to engage in NSSI, in part, as a strategy to reduce unwanted, overwhelming emotions. Numerous studies have reported that self-injurers typically reported unpleasant or negative emotion prior to an episode of NSSI (Briere & Gil, 1998; Favazza & Conterio, 1989; Klonky, 2007; Ross & Heath, 2002; Suyemoto, 1998), and later report feelings of relief or calm following an episode of NSSI (Briere & Gil, 1998; Haines & Williams, 2003; Suyemoto, 1998). Across most research studies examining motivations for NSSI, the majority of self-injurers cited the desire to alleviate negative emotional states as the primary motivating factor for NSSI (Klonsky, 2007). For the overall construct of emotion regulation, these results provided further confirmation for the role of emotion regulation problems in this population.

Overall, self-injurers reported more difficulties with emotion regulation than did non-self-injurers. However, one area was not shown to differ significantly between self-injurers and non-

self-injurers. The area of Lack of Emotional Awareness was comparable for both groups. This result is consistent with previous research examining emotion regulation and NSSI among university students. A study by Schaub (2007) that also used the DERS found differences in all areas of emotion regulation, except for Lack of Emotional Awareness. While the results for the current study suggest that both the self-injurers and non-self-injurers reported an awareness of their emotions, they differed with regard to their ability to accept, tolerate, and manage their emotional reactions. Similarly, Gratz (2006) found that self-injurers typically rate themselves higher on measures of emotional inexpressivity. Despite the clear differences in all other areas of emotion regulation, results suggest that self-injurers do not differ in any significant way from non-self-injurers in terms of their emotional awareness.

An examination of the items that make up the subscale in question can help to further clarify this finding. The items that are included in the Lack of Emotional Awareness subscale can be described as those that tap into whether or not participants are capable of attending to their emotional states. As the results highlight, there are no differences in self-injurers' ability to attend to their emotions as compared to non-self-injurers, however, self-injurers do show more difficulty when it comes to understanding and regulating those emotions. Comparison of the items from the Lack of Emotional Awareness and Lack of Emotional Clarity subscales clearly shows that self-injurers are attentive and conscious of their emotional states, however, they have a harder time than non-self-injurers tolerating them. This finding is consistent with results from a recent study by Gratz (2006) who found that female college students who reported engaging in NSSI showed a greater inability to express emotions than did non-self-injuring female students. In other words, self-injurers certainly *feel* their feelings, but struggle to make sense of them. More recent research in the field has begun to suggest that emotional awareness is less of a risk

factor for self-injurers, and that more important areas of emotion regulation include affect intensity and reactivity to emotional states (Gratz & Chapman, 2007). Self-injurers are also more likely to rate themselves lower on emotional stability, as demonstrated by a study by Claes et al. (2009) with high school students.

Self-Control. The second risk factor targeted in the analysis was the concept of self-control, a personality trait that characterizes an individual as impulsive, risk taking, insensitive, short-sighted, non-verbal, and more likely to engage in physical acts, such as binge drinking or unsafe sexual activities (Gottfredson & Hirschi, 1990). To date, no studies have directly examined whether self-injurers would show less self-control than non-self-injurers, however related studies have reported some association with impulsivity, a subsidiary trait of self-control (Casillas & Clark, 2002; Evans et al., 1996; Hargus et al., 2009; Herpetz et al., 1997; Matthews et al., 2008; Milligan & Waller, 2001). While the current results do support the hypothesis that self-injurers show lower levels of self-control than non-self-injurers in the areas of temper, risk-seeking, diligence, and neutralization, no significant differences were observed in two areas of self-control: present orientation and selfishness.

An examination of the items making up the Temper and Risk Seeking subscales suggest why significant differences would be likely to emerge between self-injurers and non-self-injurers. The temper subscale, which taps into participants' ability to control their temper (e.g., "I lose my temper really easily"), reflects differences between groups in the ability to regulate strong, negative emotions. Self-injurers rated themselves as more likely to lose their temper, which is consistent with self-injurers also reporting more difficulties with emotion regulation, a result found both in the present study and in the literature (Gratz, 2006; Gratz & Roemer, 2004; Heath, Schaub et al., 2009). For the Risk Seeking subscale, the item "sometimes I take a risk

just for the fun of it" directly examined one of the distinguishing features of both groups involved in the study: engagement in a risky behaviour. According to Wiebe (2006), individuals with low self-control are more likely to seek out experiences that involve a level of risk or excitement. Indeed, as recent research suggests, self-injurers typically report engagement in other risky behaviours, such as uncontrollable alcohol or drug use, reckless driving, or risky sexual behaviours (Serras et al., 2010). Self-injurers often report engaging in substance use (Klonsky & Glenn, 2009), and this has long be considered a potential risk factor in the development of NSSI. Along the same lines, researchers have suggested that NSSI may develop over time as a more extreme form of communication when other, less effective behaviours have been unsuccessful (Nock & Cha, 2009). Combined, these research findings suggest that underlying differences might exist between self-injurers and non-self-injurers with regard to their desire to engage in risky behaviours. This is consistent with the results from the current investigation, with self-injurers rating themselves as higher than non-self-injurers in the area of risk-seeking.

The level of Diligence also differed between self-injurers and non-self-injurers, with self-injurers rating themselves as less diligent overall. According to Wiebe (2006), the Diligence subscale measures an individual's ability to persist and work towards accomplishing a goal. This persistence is typically in the absence of any immediate gratification, and involves completing a series of actions while working toward an ultimate goal. As it relates to NSSI, there are several examples of why self-injurers might rate themselves as lower in the area of diligence. First, the very act of NSSI is one that allows self-injurers to obtain immediate gratification, such as emotion regulation. Second, the behaviour of NSSI is notoriously difficult to treat, as self-injurers often have a difficult time persisting with a course of treatment that aims at reducing or

eliminating the behaviour (Nixon, Aulakh, Townsend, & Aherton, 2009). Finally, self-injurers may be more likely to rate themselves as lower than peers on a variety of measures, as evidenced by a study on self-esteem by Claes and colleagues (2009). Despite the fact that many self-injurers in school populations are high functioning overall, as evidenced by their status as university students (Heath, Schaub et al., 2009), recent findings have begun to suggest that self-injurers may have a lower sense of self-esteem or self-concept than non-self-injurers (Claes et al., 2009). With regard to the current study, the item "whatever I do, I try hard" on the Diligence subscale, was used as a means of tapping into participants' beliefs about their own level of tenacity. However, the responses obtained on this item may or may not reflect that individual's true ability or drive, but rather, participants perception of their abilities. This interpretation is consistent with other studies reporting that although self-injurers are sometimes as successful as their peers in academic and social realms, they still rate themselves as lower in the areas of academic intelligence and social skills (Claes et al., 2009).

The results from the group comparison also found self-injurers rated themselves as higher on the Neutralization subscale than non-self-injurers. The item "to get ahead, you have to do some things that are not right", can be directly related to acts of self-injury; where individuals will report that they cut or burn their skin in order to obtain the desired outcome (Klonsky, 2007). To date, no studies have examined differences in neutralization between self-injurers and non-self-injurers. However, as research has suggested that self-injurers also engage in other risky behaviours (Serras et al., 2010), it is possible that the choice to engage in NSSI is related to the individual's desire to go against the mainstream and try something others might not be able justify. This result suggests a possible avenue for future research.

The group differences between self-injurers and non-self-injurers in the areas of Diligence and Neutralization are consistent with the hypothesis of the current study and parallel the findings from related studies in criminology. In a study examining the predictive power of each subscale of the self-control scale by Wiebe (2006), the areas of Diligence and Neutralization were found to be most predictive of the likelihood of a student (ranging from high school to university) engaging in criminal activity. Although NSSI and criminal activity are clearly two distinct behaviours, both represent youth engaging in behaviours that are non-mainstream. Additionally, comparisons can be drawn between the behaviours with regard to the risk, gratification, and the negative consequences that are involved.

Although the overall level of self-control differed between self-injurers and non-self-injurers, there were no differences between the groups in two of the areas subsumed under self-control; Selfishness and Present Orientation. The Selfishness subscale assesses the individual's willingness to manipulate people or circumstances in order to obtain a desired outcome. For instance, one of the items on this subscale "I try to get things I want even when I know it's causing problems for others", suggests that the individual places more importance on their own success or enjoyment above the well-being or happiness of others. According to the theory of self-control proposed by Gottfredson and Hirshi (1995), individuals with low self-control are likely to be insensitive to others, based in part on the activities or behaviours they engage in. For example, individuals with low self-control have been linked with higher rates of criminal behaviours (Wiebe, 2006), drug or alcohol use (Feng, 2005; Gibson et al., 2004), cheating (Vowl & Chen, 2004) and digital piracy (Higgins et al., 2006); all of these behaviours are centered around the benefit to the individual, and harm others to varying degrees. Current results suggest that despite overall differences in self-control between the two groups, self-injurers do not differ

from their non self-injuring peers on levels of selfishness. Both groups obtained a mean score at the mid-point of the subscale range, indicating that the groups were average with regard to level of selfishness reported. In contrast to some of the acts described by Gottfredson and Hirshi as those performed by individuals with low self-control (and who are, according to the theory, insensitive), most acts of NSSI are performed in private (Walsh, 2006) and not intended to impact others negatively. This might explain why self-injurers do not differ from their peers in terms of selfishness. However, the possibility of social desirability may also account for the lack of difference between the groups. Given that both the control and NSSI groups responded similarly on the items assessing selfishness, it is possible that both groups responded in more socially acceptable ways to the items on the subscale.

The area of Present Orientation, according to the scale designer, encompasses the construct of impulsivity (Wiebe, 2006). Although some past research indicated a link between impulsivity and NSSI (Casillas & Clark, 2002; Evans et al., 1996; Hargus et al., 2009; Herpetz et al., 1997; Matthews et al., 2008; Milligan & Waller, 2001), more recently published studies have begun to challenge that notion. In fact, Janis and Nock (2009) found no association between impulsivity and NSSI in a recent study aimed at shedding light on this debated finding. Alternatively, it is possible that an association could be identified if one directly examined impulsivity levels relative to an individual's frequency of NSSI. Evans and colleagues reported differences in impulsivity with first-time and repetitive self-injurers, with repetitive self-injurers showing higher levels of impulsivity. For the present study, one time and repeat self-injurers were included together in the analysis and self-control did not differ between the groups. The findings may have changed if habitual self-injurers were compared to those who only self-injured once.

Another possible explanation for the lack of consistency may be attributable, in part, to the definitions and measures used to tap the construct of impulsivity. A recent examination of executive functioning among self-injurers found that those who reported low severity NSSI displayed impaired inhibitory control (Fikke, Melinder, & Landro, 2010). The authors interpreted this finding as supporting the theory of emotion regulation, rather than addressing inhibitory control, or impulsivity, as a separate construct completely. While part of the picture, the authors suggest that a lack of inhibitory control may also represent a difficulty regulating emotions, and that impulsiveness associated with NSSI might be just as accurately explained as "emotion-based rash action" (Fikke et al., 2010). With this perspective in mind, it is possible that inconsistencies in the impulsivity-NSSI link may be attributable to the measurement tools used to assess impulsivity, and how closely these tools overlap with concepts central to emotion regulation. According to the researchers' suggestion, the constructs of impulsivity and emotion regulation may be more similar than different in terms of assessment. If so, the measures used to assess these constructs may indeed be measuring aspects of the same construct. An important avenue for future research might be to investigate the potential overlap between impulsivity and emotion regulation with regard to measurement tools, as well as on a broader theoretical level.

As mentioned earlier, the construct of impulsivity is included in the Present Orientation subscale of the self-control measure used (Wiebe, 2006). Along with impulsivity, this subscale includes the construct of short-sightedness; a notion that one might sacrifice their future in order to enjoy their present. In other words, this subscale measures aspects of impulsivity and the need for immediate gratification. A closer examination of the items that make up this subscale is necessary in order to understand the similarity in responses between both the self-injurers and non-self-injurers. The four items included in the subscale are as follows: (a) a person should

really live for today and let tomorrow take care of itself; (b) I see no need for hard work; (c) an easy life is a happy life; and (d) I don't devote much thought and effort to preparing for the future." Overall, the items seem to suggest that the subscale is one that might be tapping into a present orientation that involves a laissez faire attitude, or perhaps even laziness or lack of self-initiation. Despite suggestions by the scale designer, the construct of impulsivity may be poorly represented in this subscale. Instead, there is a strong focus on the construct described by Wiebe as short-sightedness, which admittedly does involve an aspect of impulsivity. Given the objectives of the study to examine self-control as a whole (and not impulsivity as a distinct construct), the minimal representation of impulsivity in this subscale was not a factor in the decision to choose this measure.

Social Learning. The third risk factor examined was the concept of social learning, which involves the learning processes that lead an individual to engage in a particular behaviour based on their social associations, reinforcement contingencies, and attitudes towards the behaviour. Prior to the current study, social learning theory had not yet been studied in relation to NSSI, despite recent recommendations in the literature for such an application (Nock, 2010).

The elements known as Differential Association, Differential Reinforcements, and Definitions, were examined in order to ascertain their effect on NSSI, and results showed significant differences between self-injurers and controls in all three areas. While self-injurers reported more social learning in the areas of Differential Associations and Definitions, controls were found to be significantly higher than self-injurers in the area of Differential Reinforcements.

Differential Associations. As predicted, self-injurers reported higher levels of social learning of NSSI, in the form of Differential Associations, than did non-self-injurers.

Differential Associations, according to Akers (1998), is an individual's direct association with peers who engage in certain forms of conduct, which in turn, affect one's exposure to different norms and consequences. Differential Associations were measured using direct questions about the number of friends participants have who engaged in NSSI, further distinguished by level of closeness to the participants (e.g., close friend or acquaintance). Self-injurers in the current study reported knowing more friends who also engaged in self-injury than did non-self-injurers. This finding has been echoed in the literature, with youth often reporting that they discuss NSSI with their friends. Evidence of this social contagion, or spread, of NSSI has been documented by several studies in clinical, community, and internet settings (Adler & Adler, 2008; Fennig et al., 1995; Hargus et al., 2009; Prinstein et al., 2009; Rosen & Walsh, 1989; Walsh & Rosen, 1985). For these youth, the majority report first learning about NSSI from someone else who also engaged in NSSI, or from exposure in books, movies, television, music or the internet (Claes et al., 2009; Hodsgon, 2004; Holly, 2007; Yates et al., 2008).

Although it is clear that self-injurers typically report having some sort of association with other self-injurers, it is less clear how the sequence in which this association develops. In other words, are individuals trying NSSI as a result of exposure to peer NSSI, or are self-injurers seeking out other self-injurers after their behaviours are firmly established? This *chicken-or-the-egg* debate has begun to emerge in the field, with many researchers now looking at the developmental pathway through which NSSI emerges. Indeed, without direct investigation, the nature of this relationship may never be fully understood. However, as Bandura (1986; 1992) stated in his original discussion of social learning theory, the mechanisms by which individuals learn and grow are constantly evolving and influencing one another. As Bandura stated in his theory of reciprocal determinism, the relationship between the factors that influence our learning

(person, environment, behaviour) are interconnected and dynamic. Nevertheless, there may be an avenue for intervention if researchers can establish a pattern in the initial development of NSSI. Are youth more likely to associate with peers who also engage in NSSI before or after they themselves begin to self-injure? If it is the case that they associate with peers who self-injure before engaging in NSSI, this finding would point to a new and significant risk factor.

Although this research question has yet to be directly tested, several studies have provided suggestions about the nature of this relationship. One longitudinal study examined the impact of peer influence on an adolescent's decision to engage in NSSI and found that even just the perception of peer NSSI may have a strong influence on an adolescent's decision to also engage in NSSI. The authors found that for both a community and a clinically-referred sample of adolescents, actual and perceived reports of friends' engagement in NSSI predicted the target youth's engagement in NSSI. These socialization effects were particularly strong for adolescent girls, and younger cohorts (Prinstein et al., 2010). A similar study also demonstrated the impact of perceptions of peer behaviour, with researchers showing that participants increased the intensity of self-administered shocks in order to match that of their peers (Sloan et al. 2006, as cited in Prinstein et al., 2010). Finally, Prinstein et al. (2009) cited the work by Prinstein, Guerry, and Rancourt on NSSI contagion, which demonstrated that prospective NSSI was associated with best friend reports of NSSI engagement. Combined, these studies clearly suggest that for some, the decision to self-injure is largely tied to the perception of whether or not peers engage in NSSI.

Alternatively, another study by Claes and colleagues (2009) investigated the possibility that perhaps the opposite is true; self-injurers who have already adopted NSSI into their behavioural repertoire seek out other self-injurers. The authors arrived at the conclusion that this pathway

was unlikely, as they discovered that while most self-injurers report knowing other self-injurers, the level of familiarity amongst the self-injurers did not impact their own likelihood of engaging in NSSI. Given this low level of familiarity, it is unlikely that self-injurers are bonding with one another based on NSSI alone. Rather, as the authors suggest, self-injurers may seek out other individuals based on some other commonality, such as low self-concept (Claes et al., 2009). As the authors suggest, if familiarity with another self-injurer has little impact on an individual's own likelihood of self-injuring, the two individuals may be closely bonded in other ways; perhaps an undefined third variable may be at the core of the friendship. If so, the knowledge of the friend's engagement in NSSI (as evidenced by the participant's ability to report it) coupled with the relatively unfamiliarity with that friend, could suggest there is a powerful contagion effect of the behaviours.

Numerous studies conducted with adolescents and young adults have reported a majority of self-injurers citing social influence as the primary means of first learning about NSSI (Deliberto & Nock, 2008; Hodsgon, 2004; Holly, 2007; Nixon et al., 2008). Indeed, when asked about their social environments at the time they first started engaging in NSSI, most self-injurers cite learning about NSSI through social means. Of the 80% of university students who reported knowing someone else who also engaged in NSSI, only 10% indicated that they became friends after engaging in NSSI (Holly, 2007). Taken together, these results corroborate past reports that an adolescent's peer group may be one of the original contributors to the development of NSSI.

Differential Reinforcements. The second component of social learning theory is Differential Reinforcements, which Akers (1998) defined as the balance of anticipated and actual rewards and punishments following certain behaviours. This process was termed Differential Reinforcement as it refers to when a target behaviour is reinforced in the contexts that will

ultimately lead to greater engagement in that behaviour. Despite the study hypothesis of greater social learning amongst self-injurers than non-self-injurers, the opposite was found to be true for differential reinforcements. Non-self-injurers reported higher levels of differential reinforcements than self-injurers.

The items used to tap into Differential Reinforcements included two that assessed friends' reactions to discovery of NSSI (e.g., "how would your closest friend react if he/she discovered that you were engaging in self-injury?"), as well as items used to tap the costs and benefits of engaging in NSSI (e.g., "if they found out about my self-injury, my friends would judge me" and "self-injury helps me fit into groups better", respectively). One of the major issues that arose during data collection involved some misinterpretation of the response ratings for the items on this subscale. For instance, for the item "how would your closest friend react if he/she discovered that you were engaging in self-injury?", participants were asked to respond using the options *very negatively*, *negatively*, *neutrally*, *positively*, and *very positively*. Through additional information offered by a participant, it became apparent that the term "positive" was misunderstood to signify the friend responding in a supportive and helpful manner. Originally, this response option was intended to capture an instance of a friend thinking favourably of the behavior itself, rather than tap aspects about the quality of the friendship.

Issues of scale design aside, there are several other possible explanations as to why the non-self-injurers reported higher levels of Differential Reinforcement. One explanation may speak to the quality of peer relationships between the groups (Claes et al., 2009). It is possible that for non-self-injurers, it was easier to imagine a supportive and encouraging peer response despite disclosure of NSSI. In contrast, the self-injurers reported less differential reinforcement by peers, which may represent a perceived risk of self-disclosure as NSSI is typically a secretive

behavior (Walsh, 2006). For a relatively healthy individual, this hypothetical peer response may be, in part, a result of a healthier and more reciprocal peer relationship. In addition, non-self-injurers may be mislead by the media representation of NSSI (Whitlock et al., 2009), and therefore, perceive it to be less serious than it is. This normalization effect of the media may then result in non-self-injurers overestimating the positive feedback they would receive from those around them.

Another possible explanation for the results may be related to the peer group that participants were referencing while responding. As the literature clearly shows, most self-injurers begin to engage in NSSI during early- to mid- adolescence (Heath, Schaub et al., 2009). Given the retrospective nature of this study, most participants were responding about past behaviour. However, it is unclear whether or not participants were responding based on their current peer group, or the peer group they were part of when they were engaging in NSSI. Along the same lines, even current peer groups may differ with regard to setting and relevance. As addressed in more detail in the discussion regarding group differences in definitions of NSSI below, self-injurers are highly active in online communities where they can be afforded some anonymity while also identifying with other self-injurers (Adler & Adler, 2008; Whitlock & Knox, 2009; Whitlock et al., 2009). Another possible explanation for the results may be that self-injurers were responding with a real-life peer group in mind, rather than considering the community they were part of on the internet.

In sum, the results from the current study suggest that differential reinforcements are not a significant contributor in an individual's NSSI. However, given some of the methodological limitations, the results from the present study should be interpreted with caution. Future research should examine if any differences in peer reinforcement are present among online communities

or on NSSI-themed message boards. In addition, an investigation of peer reinforcement of NSSI should distinguish between peer support for the individual versus peer support for the behaviour itself. This distinction is crucial to more accurately understanding the reinforcement contingencies that act on NSSI.

Definitions. The area of social learning categorized as Definitions includes the attitudes and meaning that an individual attaches to certain behaviours (Akers, 1998). These Definitions are largely tied to the peer group and reinforcement that occurs in the overall process of social learning. Results from the present study supported the hypothesis, with self-injurers reporting more favourable Definitions related to NSSI than controls. Items that tapped into participants' Definitions, or attitudes, about NSSI included "NSSI is a new trend, it makes me unique and interesting" and "Most people will try self-injury at least once in their lifetime".

Since early Piagetian theories, developmental psychologists have agreed that peer influence in an incredibly powerful force in an adolescent's life. In fact, recent research has documented this influence among adolescents who self-injure (Prinstein et al., 2010). Researchers have argued that adolescence is one of the most receptive developmental periods for the adoption of NSSI, as most self-injurers report trying NSSI for the first time between the ages of 13 and 15 years old (Nixon & Heath, 2009; Whitlock & Knox, 2009).

The differences in NSSI Definitions between self-injurers and non-self-injurers are likely attributable to multiple factors. Aside from the influences of peer group, which is highly related to the participants' exposure to NSSI, the relative effectiveness of the behaviour for those who have tried it might also play a large role in subsequent attitudes toward it. As the majority of self-injurers report benefits from NSSI when dealing with overwhelming emotions (Chapman et al., 2006; Gratz & Roemer, 2004; Haines & Williams, 2003; Klonsky, 2007), it is likely that they

develop more favourable attitudes about the behaviour as they come to witness its effects first hand. A self-injurer who has used NSSI as a means of dealing with powerful emotional states would naturally have a different perspective when responding to the item "self-injury is the best way to deal with stress I've found so far". Unlike the non-self-injurers who may view NSSI as a strange or unusual act, individuals who've come to rely on NSSI to serve a multitude of functions seem to form a more positive or accepting outlook about the behaviour. Along similar lines, individuals may also develop more positive attitudes towards a behaviour as a means of alleviating any cognitive dissonance that occurs as a result of discrepant thoughts about NSSI and use of it behaviourally.

More broadly, the relative lack of awareness of NSSI in the greater community may be partially responsible for the group differences in Definitions of NSSI. Although awareness is certainly growing, many individuals have had little to no direct experience with the behaviour, and are therefore more likely to hold suspicious and doubtful opinions about the effectiveness of self-injury. The very act is one that involves a level of aggression that even some trained professionals have difficulty understanding (Nixon & Heath, 2009).

As a result of their unusual commonality, many self-injurers seek out communities of individuals who are similar to them, as evidenced by the numerous internet groups, message boards, and online communities that have emerged over the past several years (Whitlock & Knox, 2009; Whitlock et al., 2009). Adler and Adler (2008) examined the presence of NSSI on the internet, and found that the majority of self-injurers reported forming intimate bonds with others. The internet, according to the researchers, provided self-injurers with a safe haven, a place to discuss their emotions, ideas, and behaviours with other self-injurers. This community was free of judgment and allowed self-injurers to identify with one another with the cover of

anonymity. In this type of setting, self-injurers show more compassion and empathy towards others with whom they can identify. The results from the present study illustrate that this compassion is not limited to the cyber communities, as the results showed that participants who engaged in NSSI demonstrated a higher level of acceptance and tolerance about NSSI than their non-self-injuring peers.

Predicting NSSI Engagement

The third objective sought to explore the factors that would predict NSSI engagement, or membership in either the self-injury or non-self-injury group. The goal of this objective was to determine whether or not any of the variables of interest, emotion regulation, self-control, or social learning played a role in the likelihood of individuals engaging in NSSI throughout their lifetime.

According to the results, the strongest predictor of NSSI engagement was social learning, with emotion regulation adding significant predictive power to the overall model. Although more powerful than expected, the strong predictive power of social learning theory in NSSI engagement is a unique contribution to the study of non-suicidal self-injury. As noted in the previous exploration of group differences in levels of social learning between self-injurers and non-self-injurers, elements of an individual's social environment have a great impact on the cognitions, emotions, and behaviours of that person. Until now, there was no question that self-injurers reported knowing more people who also engaged in NSSI than did non-self-injurers (Claes et al., 2009; Hodsgon, 2004; Holly, 2007; Yates et al., 2008). However, the results from this investigation suggest that specific elements of social learning may be associated with youth choosing to engage in NSSI or not. Rather than simply reporting the social influences that

surround youth who engage in NSSI, the results from this analysis have allowed a more complete understanding about what learning processes are involved in the adoption of NSSI.

While it is evident that self-injurers are more likely to know other self-injurers, results from this study can now further expand on this knowledge, by suggesting that individuals are more likely to be a self-injurer if they are exposed to elements of social learning, such as associating with other self-injurers. In fact, numerous studies have documented a social contagion, or spread, of NSSI in clinical, community, and internet settings (Adler & Adler, 2008; Fennig et al., 1995; Hargus et al., 2009; Prinstein et al., 2009; Rosen & Walsh, 1989; Walsh & Rosen, 1985). However, despite the apparent spread of NSSI among peer groups, questions remained about whether this spread was motivated by peer NSSI or instead, if peers are sought out based on their common NSSI behaviours. Although the exact sequence is still unclear, many researchers suggest that befriending other self-injurers is a risk factor for youth to eventually begin to self-injuring (Holly et al., 2009; Prinstein et al., 2010; Prinstein et al., 2009). Evidence for this assertion comes from responses to actual and perceived friend NSSI, as well as retrospective self-report data citing knowledge of a friend's NSSI as a primary motivator for first engaging in the behaviour. However, there are also reports that youth continue to seek out other self-injurers once they have begun to engage in NSSI (Claes et al., 2009; Hodgson, 2004). While the current results do support the notion that self-injurers tend to know other self-injurers and develop favourable definitions about the behaviour, there is no evidence that peer reinforcement of NSSI plays a role in their engagement in the behaviour, based on the analysis of group differences. However, the results from this regression analysis suggest that individuals may be more likely to self-injure if they have befriended others who self-injure. Further research more directly examining this sequence is needed before a clear resolution can be obtained.

Overall, the contribution of social learning theory to the initiation of NSSI is an important finding in the field of non-suicidal self-injury. In addition to the well-documented impact of difficulties with emotion regulation on the development of NSSI, social learning theory is a new and more comprehensive lens through which social factors can be examined. As it relates to the state of the literature, this study has come at an ideal time, with several researchers calling for the inclusion of social learning theory in the examination of the development of NSSI (Insel & Gould, 2008; Nock, 2010; Prinstein, Guerry, Browne, & Rancourt, 2009).

Although not as powerful as hypothesized, this finding of emotion regulation predicting NSSI group membership is consistent with previous research that showed self-injurers typically had more difficulties regulating emotion (Briere & Gil, 1998; Chapman et al., 2006; Favazza & Conterio, 1989; Gratz & Roemer, 2004; Haines & Williams, 2003; Klonsky, 2007; Ross & Heath, 2002; Suyemoto, 1998). In addition to confirming that self-injurers show more difficulty with emotion regulation compared to non-self-injurers, this result also provides evidence that emotion regulation is a significant contributor in the decision to engage in NSSI or not.

Finally, self-control was not found to be predictive of the likelihood of NSSI engagement. Although impulsivity is only a small part of the construct of self-control, this result suggests that impulsivity may not be associated with one's decision to engage in NSSI, despite previous assertions about links with NSSI (Casillas & Clark, 2002; Evans et al., 1996; Hargus et al., 2009; Herpetz et al., 1997; Matthews et al., 2008; Milligan & Waller, 2001). One possible explanation as to why the results did not support the hypothesis might speak to the retrospective nature of the study. Most participants answered questions about their past NSSI and their current perspectives with regard to emotion regulation, self-control, and social learning. Therefore, it is possible that key elements in the constructs of self-control which were not found to differ between the groups

such as selfishness and present orientation, were more representative of a mature young adult, rather than a developing adolescent mind. However, given the relatively stable nature of self-control (Gottfredson & Hirschi, 1990), it is more likely that the result of this analysis reflects the lack of predictive power that self-control has in the decision to engage in NSSI.

In an attempt to clarify some of the misunderstanding surrounding the relationship of impulsivity and NSSI, the present study sought to apply a broader theoretical approach by examining the construct of self-control in relation to NSSI. Although not a predictive factor in the decision to engage in NSSI, there were group differences between self-injurers and non-self-injurers in overall levels of self-control, as discussed earlier. However, given that self-control did not significantly contribute in whether or not participants engaged in NSSI, it is clear that, as assessed in this study, self-control is not a significant risk factor in whether or not an adolescent will engage in NSSI. This result is consistent with some recent findings in the literature (Janis & Nock, 2009), however, is inconsistent with other reports of impulsivity distinguishing between self-injurers and non-self-injurers (Casillas & Clark, 2002; Evans et al., 1996; Hargus et al., 2009; Herpetz et al., 1997; Matthews et al., 2008; Milligan & Waller, 2001).

Although not found to predict group membership in the NSSI group for the current study, results suggest that self-control may play a role in a self-injurer's course of treatment, as self-injurers did report more difficulty with controlling temper, engaging in high risk behaviours, and were less diligent than their non self-injuring peers. Additionally, self-injurers rated themselves as higher at justifying their behaviours; suggesting a possible obstacle in the intervention process.

Predicting NSSI Frequency

The fourth objective of the present study sought to build on the third objective, by examining the relative predictive power of each of the three variables of interest (emotion regulation, self-control, social learning) on the frequency of NSSI among self-injurers. As expected, high frequency of NSSI was best accounted for by difficulties with emotion regulation. This finding was consistent with reports in the literature of self-injurers reporting more difficulties in emotion regulation (Briere & Gil, 1998; Chapman et al., 2006; Favazza & Conterio, 1989; Gratz & Roemer, 2004; Haines & Williams, 2003; Klonsky, 2007; Ross & Heath, 2002; Suyemoto, 1998). This finding, when coupled with the predictive power of emotion regulation in the engagement of NSSI, speaks to potential avenues for intervention with adolescents at risk for engaging in NSSI.

Although social learning was included in the final model (Step 2) that significantly predicted NSSI frequency, the unique variance that was accounted for by this variable was negligible (and non-significant). In contrast to the previous examination of predictors of NSSI engagement, social learning appears to play no role in the proliferation of the behaviour among young adults who already self-injure. Although contrary to the study's hypothesis, recent research suggests a possible explanation for this finding. Gratz and Chapman (2007) examined negative environmental conditions, such as childhood maltreatment, and emotion regulation among male university students who reported NSSI behaviours. The results showed that although adverse life events were related to the initiation of NSSI, they were less of a contributing factor in the continuation of the behaviour. In fact, the authors suggested that the regulatory benefits experienced once an individual engages in NSSI may be a more substantial contributor in the likelihood of that same individual engaging in the behaviour at a higher frequency over time (Gratz & Chapman, 2007). In other words, the authors suggest that

individuals may cite very different reasons for the initial appeal of NSSI than they do for later engagement in the same behaviour. This interpretation may be consistent with the present study's results for both the examination of predictors in the NSSI engagement, as well as the predictors in the frequency of NSSI over the lifetime. For some young adults, the motivations behind the decision to engage in NSSI may have been more closely tied to peer group influences, as evident by the results from the present study's third objective (predicting likelihood of engagement versus non-engagement). As the frequency of the behaviour increases, he or she may continue to use it for different functions, namely, that of emotion regulation. This potential interpretation is echoed in the literature, with other researchers suggesting that while the initiation of NSSI may be influenced by social factors (Nock, 2010; Yates et al., 2008), engagement in the behaviour likely continues for reasons that are more closely tied to automatic reinforcement functions (e.g., tension release; Nock & Prinstein, 2004).

In contrast to the expected outcome, but consistent with the results from the third objective, self-control was not found to be predictive of NSSI frequency among self-injurers. As explored in the previous section, the lower levels of self-control found among self-injurers compared to non-self-injurers were less related to whether or not an individual engaged in NSSI or not. Indeed, the results from the current objective further support that self-control is unrelated to whether or not a self-injurer will continue to engage in NSSI at a high frequency. Unlike behaviours that are common for individuals with low self-control such as gambling, cheating, crime, or substance use (Feng, 2005; Gibson et al., 2004; Higgins et al., 2006; Vowel & Chen, 2004; Wiebe, 2006), the benefits of NSSI may not be as readily apparent to individuals unfamiliar with the behaviour. On the surface, one would predict that NSSI would fit well with behaviours or activities that typically appeal to individuals with low self-control, which are often

characterized as those that meet the need for immediate gratification, involve some level of risk, and are physical in nature (Gottfredson & Hirschi, 1995). However, despite this apparent fit, NSSI may not be as socially accepted as some of the above mentioned behaviours that are more common among adolescents or young adults.

Although the results from this examination, coupled with the results from the previous section (predicting NSSI engagement) are inconsistent with the study's hypotheses, they do lend support to another study conducted by Hawton, Kingsbury, Steinhardt, James, and Fagg in 1999. In this study, the authors found no association between self-reported levels of impulsivity and deliberate self-harm. One of the interpretations Hawton et al. offered for this finding was that this inconsistency may reflect the relationship between impulsivity and the likelihood of the individual's first episode vs. repetitive NSSI engagement. This suggestion is consistent with one offered several years prior, by Evans et al. (1996). Indeed, both Evans et al. and Hawton et al. suggested over twenty years ago that the true relationship between impulsivity and self-injury is more tied to the frequency of NSSI (first time vs. repeat), rather than their NSSI in general. As the results from the present study clearly show, there is no evidence to suggest that impulsivity differs as a function of NSSI frequency. Therefore, some caution is warranted in the interpretations offered by Evans et al. and Hawton et al. However, given certain differences between self-injurers and non-self-injurers in many of the areas of self-control, there is a need for future research to explore and expand on these differences.

Chapter VI: Conclusions

Summary

Lifetime prevalence rates of non-suicidal self-injury, or the intentional destruction of one's body tissue, among university students has been reported as ranging anywhere from 11% to 40% (Gratz, 2006; Gratz et al., 2002; Hasking et al., 2008; Heath, Schaub et al., 2009; Whitlock et al., 2006). In addition, researchers have consistently reported increasing rates of NSSI among community populations of adolescents and young adults (Classen et al., 2006; Derouin & Bravender, 2004; Fortune & Hawton, 2005; Klonsky et al., 2003; Lloyd-Richardson et al., 2007; Maughan et al., 2005; White Kress, 2003; Yates et al., 2008). In particular, university students have reported engaging in NSSI at high rates, with up to 75% doing so more than just once during their lifetime (Gratz, 2006; Schaub, 2007). Clearly, this is not a phenomenon that can be dismissed as a transient behaviour, or phase.

The majority of adolescents and young adults surveyed in the literature report that they first thought of NSSI as a result of either knowing someone else who engaged in the behaviour or from hearing about in books, movies, television, music, or the internet (Deliberto & Nock, 2008; Hodsgon, 2004; Holly, 2007; Morey et al., 2008; Nixon et al., 2008; Yates et al., 2008). In fact, one of the proposed reasons for this increasing trend of NSSI is the suspected contagion effect of the behaviour (Walsh & Rosen, 1985). If it is indeed the case that an element of social contagion exists in proliferation of NSSI, there are many questions to be answered about the nature of this contagion. A plethora of information about the factors that can place youth at a greater risk of engaging in NSSI (i.e., risk factor literature) has been reported, however little information has been offered about how these associations developed in the first place. Despite information

about the risk factors associated with NSSI, there is little information about how they may differ for each adolescent.

The present study sought to advance the field by further developing a profile of youth who are most vulnerable to engaging in NSSI, as well as for those who continue to do so more frequently, based on self-reports from young adults. In line with the study's first hypothesis, the prevalence rate of NSSI was found to be comparable to previous studies in a sample of first-year undergraduate students. Also in accordance with the present study's hypotheses, group differences were found in all areas examined. In both emotion regulation and self-control, self-injurers rated themselves as experiencing more difficulties than non-self-injuring peers. In addition, self-injurers reported more social learning in some specific domains than non-self-injurers. To understand the mechanisms underlying NSSI engagement among adolescents, the present study examined which factors—emotion regulation, self-control, or social learning—played a role in the existence of this behaviour within a sample of young adults. In partial support of the hypothesis, both social learning and emotion regulation were found to predict whether or not a young adult had ever self-injured, while self-control was not a predictive factor in whether or not young adults engaged in NSSI. The results from the study shed light on a new way of understanding the learning processes involved in NSSI. Current results suggest that certain social influences related to social learning theory may in fact be predictive of NSSI engagement, and therefore support the further examination of social learning as a theoretical framework for the social contagion of NSSI.

Finally, the three factors were examined with respect to their predictive ability in the high frequency of NSSI among a group of self-injurers, and only emotion regulation was found to be a significant predictor of NSSI frequency. Although this finding was only in partial support of

the study's hypothesis, it is consistent with recent suggestions in the field stating that regardless of the initial motivations for NSSI, self-injurers typically continue as a result of automatic reinforcement functions (Nock, 2010; Nock & Prinstein, 2004).

Thus, the current investigation has significantly contributed to the field by further developing a profile of youth that may be more vulnerable to engaging in NSSI, as well as more closely identifying the social learning processes that support the decision to engage in NSSI. Prior to this direct examination of how social influences played a role in youth adoption NSSI, researchers could only speculate about the effects of exposure to NSSI through friends, media, or other social means. The application of social learning theory has provided a specific lens through which researchers can better organize and understand the reported social influences surrounding youth who engage in NSSI. Perhaps most importantly, this study has validated recent suggestions in the field about the functions that support high frequency NSSI, and identified a possible change in the functional reinforcement of NSSI; with both emotion regulation and social learning differentiating self-injurers from non-self-injurers, but only emotion regulation predicting high frequency NSSI.

A link between problems regulating internal states and NSSI has clearly been identified by the present study and numerous other reports in the literature. However, more recent examinations of the role of emotion regulation difficulties in the development of NSSI have suggested that problems with emotion regulation may also explain, in part, inhibitory (or impulse) control (Fikke et al., 2010). Fikke and colleagues are not the only researchers who have begun to examine the cognitive links to emotion regulation. While recognizing the importance of automatic functions in most NSSI, the four-function model of NSSI presented by Nock and Prinstein (2004) also includes a social function component. Using this model, a recent

study conducted by Nock and Mendes (2008) explored the role of social problem-solving among self-injurers who cited their NSSI as serving a social function. While seemingly different constructs, both emotion regulation difficulties and deficits in social problem-solving might be better conceptualized as manifestations of an underlying deficit in problem solving. For some individuals, this difficulty with problem-solving might center around emotions, whereas others might experience more social obstacles as a result. A possible avenue for future research might be to examine the relationship between problem solving ability and reported functions of NSSI, as they relate to either social or automatic functions.

Clinical Implications

Consistent with much of the literature on NSSI, the results confirmed that self-injurers have more difficulty regulating emotions than non-self-injurers. Notably, this difficulty with emotion regulation is apparent for both the decision to engage in the behaviour, as well as high frequency NSSI. Social learning was also a key factor in the decision to engage in NSSI or not, as evidenced by its ability to predict whether an individual was in the self-injuring or non-self-injuring group. With these results in mind, clinical recommendations are provided to aid in the prevention, assessment, and intervention of NSSI among youth.

Prevention Considerations. Although empirically supported treatments of NSSI have emerged in the literature recently, many have nonetheless emphasized the difficulty of eliminating or reducing NSSI once it has been adopted by youth (Nixon et al., 2009). Therefore, preventing NSSI is likely the most effective means of helping youth. The current results suggest several factors that might make youth more likely to engage in NSSI for the first time. First, youth with known difficulties in regulating emotional states are likely at a higher risk of adopting an unhealthy way to alleviate negative emotions. Teachers should aid in the identification of

students who experience difficulty in the face of stress, or emotional adversity. Indeed, for individuals who present with emotion regulation problems but have yet to self-injure, this may serve as a major predictor of future NSSI. At this stage, a universal prevention program (e.g., school-wide emotion regulation workshop) may be particularly beneficially as it would provide intervention to more individuals without the need to identify, and potentially stigmatize, youth at risk. These youth should be encouraged to seek one-on-one counselling or guidance with school professionals who can encourage the adoption of healthier and positive strategies to address this difficulty. Second, the results clearly showed the importance of social environments in the development of NSSI. The role of social learning in the engagement of NSSI is crucial information for practitioners and school professionals working with youth at risk for NSSI. As peers may serve as models of NSSI, it is vital that students are discouraged from openly showing scars or wounds, or discussing their self-injury at school. Identifying these youth based on social environments that might increase NSSI risk can allow for a more targeted preventative program. Given the possible shift to more emotion regulatory functions once NSSI has begun, it is imperative that more effort is expended at the prevention stage; before youth experience the automatic functions, or payoff, of NSSI. At this early stage, youth are likely less committed to the behaviour and may be more open to healthier alternatives to NSSI.

Assessment and Intervention Considerations. An assessment of an adolescent's NSSI should be conducted by a qualified professional, trained in the assessment of youth at risk. In some respects, the demeanour of the clinician conducting the assessment is as important as the tools he or she chooses to gather information. Clinical recommendations include maintaining a non-judgment and dispassionate demeanour in order to elicit the appropriate information, while avoiding inadvertent reinforcement of the behaviour, or negative rapport (Klonsky & Weinber,

2009). In addition to careful selection of assessment tools, clinical assessment of NSSI necessitates an appropriate suicide risk assessment.

Despite numerous psychological, behavioural, and pharmacological treatment options for NSSI, the most empirically supported treatment of NSSI thus far has proven to be Dialectical Behavior Therapy (DBT; Lynch & Cozza, 2009; Miller, Muehlenkamp, & Jacobson, 2009). This treatment focuses on increasing motivations to change, addressing behavioural antecedents and consequences, tackling difficulties in problem solving, and developing alternatives to NSSI. In addition to the best practices of NSSI treatment, the results from the current study suggest several factors might lead to a more comprehensive and effective treatment plan. The most notable difficulty reported by self-injurers was a problem with emotion regulation. Therefore, interventions should be specifically designed to address this difficulty.

Treatment modalities should provide tools and strategies to help self-injurers tolerate difficult emotional states, while also helping these individuals to better understand intense emotions. While research suggests that self-injurers are aware of their emotions, they have a difficult time living with them. This should be a central feature of any intervention program for a self-injuring individual. For individuals who have already established NSSI in their behavioural repertoire, treatment goals should consider the functional shift that may have occurred during the course of the development of NSSI. As the current results suggest, young adults report both emotion regulation and social learning as significant predictors in the likelihood of engagement in NSSI, but only emotion regulation as the primary contributor to the same behaviour at a high frequency. Therefore, focus should not rest solely on the motivations for the youth's initial experiences with NSSI (which may include some social factors), but rather, on the automatic reinforcements that may be maintaining the behaviour.

Treatment should also assess for differences in self-control that may prevent or interfere with the goals set in place for self-injurers. For instance, learning tools to aid in resisting urges, controlling temper, and challenging distorted cognitions that justify NSSI behaviour may significantly enhance the self-injurer's ability to adhere to treatment goals. In addition, individuals with low self-control are known to engage in other risky behaviours, such as drug use or criminal behaviour. Therefore, part of an individual's risk for NSSI assessment should address other behaviours that may put the individual at risk in some way.

Finally, intervention efforts should address influences of social learning for youth at risk. As the results clearly showed, self-injurers showed a higher propensity for certain aspects of social learning, particularly with regard to peer associations and attitudes about NSSI. Although peer reinforcement was not a significant factor in NSSI engagement, the likelihood of self-injuring was higher when individuals had other self-injurers in their peer group, therefore, this influence should be given careful consideration should during treatment.

Limitations and Future Directions

Several methodological problems related to scale design issues may have led to possibly questionable results. As addressed earlier, the terminology used in the Differential Reinforcements scale may have been misleading for some participants. In response to the item "how would your close friend react if he/she discovered you were engaging in NSSI?", one participant indicated that he interpreted the response option "positive" to represent a situation when his friend would be supportive and empathic, rather than the intentional meaning, which was to represent a friend responding favourably to the participant's NSSI behaviour. Additionally, participants were not given direct instructions to respond to items with a particular peer group in mind. Given that most participants were responding about past behaviours, the

questions about the participants' social environment around their first episode of NSSI should have also been in reference to peers from that time.

An important avenue for future research will be to more directly examine the sequence that occurs with regard to a person's likelihood of engaging in NSSI before or after knowing others who also engage in NSSI. Although some research points to peer NSSI as a contributor to initiating NSSI behaviour, the exact sequence is unclear. If more evidence supports the sequence of a peer's NSSI influencing an adolescent to engage in NSSI, possible intervention strategies could begin at the peer level. Additionally, a more objective examination of the reinforcement contingencies involved in supporting NSSI and other risk behaviours might help to elucidate the self-reported social reinforcements of NSSI. Although several researchers have identified social reinforcements among self-injurers, the results from the current study are inconsistent with these findings. Given the difficulties most participants have in describing the functions of their own behaviours (Nock & Cha, 2009), the use of self-report is another limitation of the current research. In addition to issues of social desirability, participants may have responded with a self-serving bias that acted to normalize their behaviour with regard to peer engagement or attitude about NSSI. Future research should aim to capture this information in a more objective manner.

Finally, although a preliminary investigation of the construct of self-control was conducted in the present study, a more thorough examination is necessary to fully understand the relationship between self-control and NSSI. Indeed, the results from the present study suggest that self-injurers do report lower levels of self-control. Although some of the differences observed between self-injurers and non-self-injurers within the realm of self-control were in line with predictions made based on related research (i.e., temper and risk seeking) a further examination of how self-injurers differ in terms of their ability to justify is crucial to

understanding the cognitive processes that support NSSI. A more complete understanding of the nature of this link is needed to elucidate the relationship between self-control and NSSI.

A clearer understanding of why adolescents first begin to engage in NSSI and how these reasons may change as they continue to engage in the behaviour, will aid in developing more effective prevention and intervention efforts. It is vital that practitioners, researchers, and those who work with youth (e.g., school professionals) recognize the factors that first support the development of NSSI among youth in order to identify youth at risk. In addition to asking more questions about what factors put youth at a greater risk of initiating NSSI, it is essential to formulate clear ideas about what learning processes are involved in the initiation of this behaviour. The present study has begun to tackle this large task, with results suggesting that self-injurers might start engaging in NSSI for certain reasons, but continue for very different ones. The present study demonstrated that social learning predicts a young adult's likelihood of being a self-injurer, and this link was established above and beyond a more commonly understood predictor of NSSI engagement: emotion regulation. It is now understood that some youth will engage in NSSI as a result of their social environment, while others do so for the emotion regulatory benefits associated with the behaviour. Once individuals begin to NSSI, however, they may be reinforced to continue self-injuring to obtain the automatic regulation they experience after an act of NSSI. Given this possibility, effective intervention efforts should address a possible shift in function. Understanding what factors lead an adolescent to first trying NSSI, as well as the factors reinforcing the continuation of the behaviour, can result in more comprehensive interventions that will provide adolescents with healthier and more positive alternatives to NSSI.

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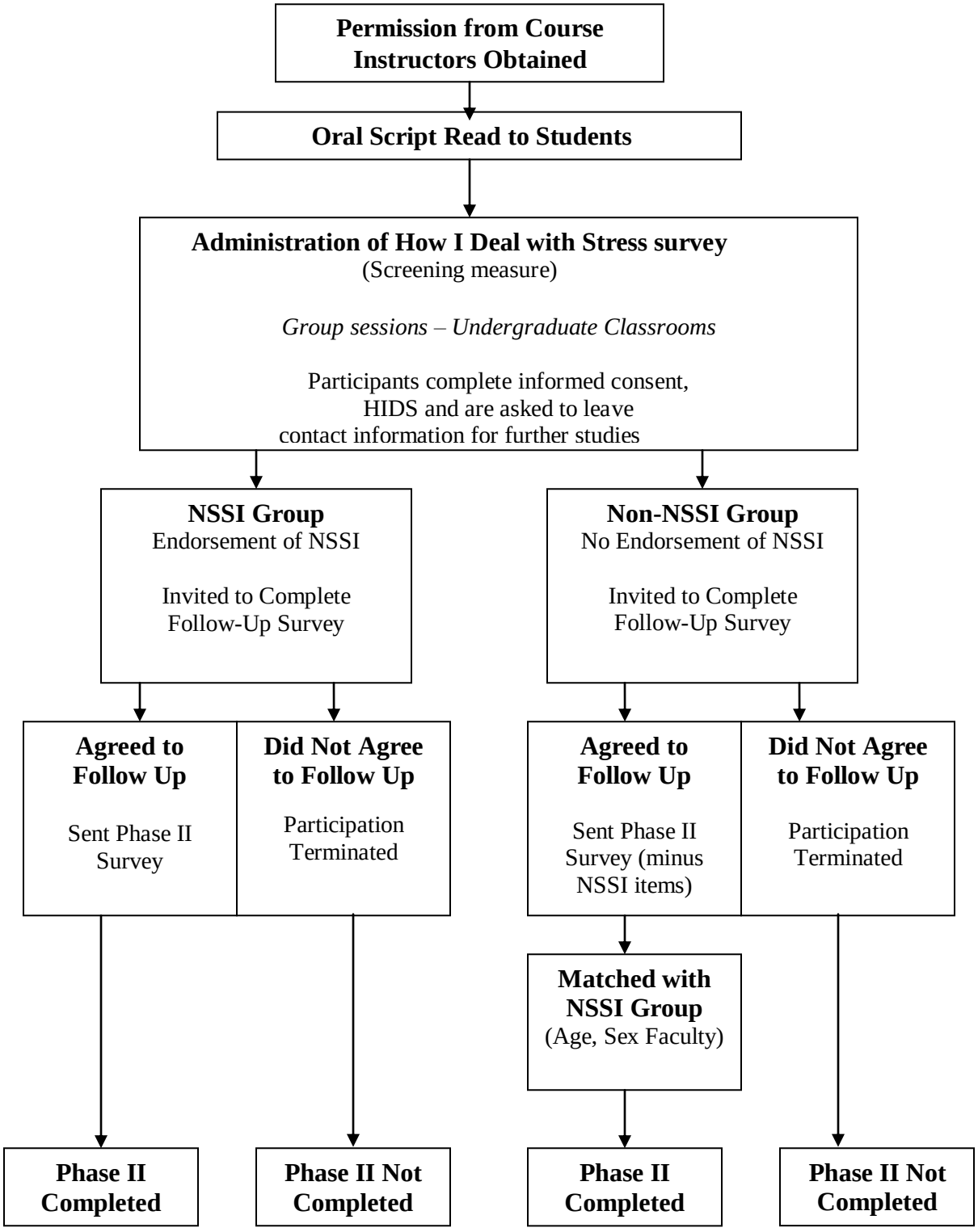
Appendix A: Data Collection Methodology



Appendix B: Phase I Informed Consent

HOW YOUNG ADULTS DEAL WITH STRESS

CONSENT TO PARTICIPATE IN RESEARCH

This is to state that I agree to participate in the research project investigating stress coping mechanisms conducted by the research team of Dr. Nancy Heath at McGill University. The purpose of this project is to examine the prevalence and type of specific coping strategies used by young adults in times of stress.

All of the information provided is kept completely confidential. The questionnaires will be kept entirely confidential, and consent forms will be stored separately, in a locked cabinet accessible only to the primary researcher. I understand that this will maintain my confidentiality and anonymity in this study. I fully understand that participation in this research is voluntary and will not, in any way, affect my grades or evaluation of my course work. Participation in this study will provide the participant access to resource information as well as help to develop our knowledge about behaviours related to stress and coping for young adults

The questionnaire I am being asked to complete will take approximately fifteen minutes. While there are no risks involved in participation in this research project, some participants might be sensitive to, or uncomfortable with, some of the questions. Should this issue arise, I am free to withdraw from the study, at any time, without penalty or prejudice. I am also free to not answer any item that makes me uncomfortable.

I understand the purpose of the study and know the risks, benefits, and inconveniences that are involved in this research project. I realize that the data will be used for the above stated research purposes and that I am invited to visit a study outcome website which will be shared with me upon completion of the study. If you have any questions or concerns about your rights as a research subject in this study, please contact the McGill Research Ethics Officer at 514-398-6831.

I have read the above and I understand all of the conditions. I freely consent and voluntarily agree to participate in this study.

Name (please print):_____

Signature: _____ Date:_____

Shareen Holly, M.A.
McGill University, Project Coordinator
Doctoral Student
(514) 398-1232
shareen.holly@mcgill.ca

Nancy Heath, Ph.D.
McGill University, Faculty of Education
Professor
(514) 398-3439
nancy.heath@mcgill.ca

Appendix C: Phase I Contact Information Sheet

Are you interested in participating in further research related to stress and coping in young adults?

Participants will be asked to complete a complete a 30-minutes online survey. Like the study you've just participated in, all the information provided in the second study is confidential. All participants in the second study will be automatically entered in a draw to win one of three gift certificates ($200 certificate from the Eaton Center, or two $50 certificates from HMV).
Participants will be given a $20.00 compensation for their participation in follow up questionnaires!

If you are interested, please provide us with your contact information.
This form will be stored separately from the questionnaire you have just completed. You are under no obligation to participate.

Name: _____

E-mail: _____

Phone # (required): _____

Appendix D: Phase I Debriefing Information Sheet

Thank you for participating in our survey on coping strategies!

The information you provided will help us to understand how young adults cope with stress. The purpose of this study is to examine the different ways in which students deal with stress, by looking at both adaptive and maladaptive (or risky) behaviours.

Previous studies from our research group have shown that university students engage in the following behaviours:

Coping Strategy	Frequency
Talk to Someone	93%
Try to Solve the Problem	98%
Listen to Music	88%
Physically Injure Self on Purpose	8%
Smoke	50%
Eat	21%

Many of the strategies are typical ways for young adults to deal with stressful situations. However, of particular interest to our team is the frequency with which young adults have endorsed physically hurting themselves on purpose. We will continue to investigate the use of this behaviour as a coping strategy, and invite you to contact our team if you have any questions or concerns about these findings.

If you are interested in knowing more about this study or the research conducted by the ***Research Team of Dr. Nancy Heath,*** please visit our website:

www.education.mcgill.ca/heathresearchteam

DR. HEATH'S RESEARCH TEAM
McGill University, Faculty of Education
Tel.: (514) 398-1232

Additional Resources

McGill Services

McGill Mental Health Service: 398-6019
McGill Nightline (6pm to 3am, daily): 398-6246
Sexual Assault Centre of McGill Students' Society: 398-8500

Mental Health Support

Tel-Aide Montreal: (514) 935-1101
Suicide-Action Montreal: (514) 723-4000
St-Mary's Hospital Crisis Clinic: (514) 345-3621

Stress Websites

Coping with stress: http://www.helpguide.org/mental/stress_management_relief_coping.htm
Stress handout: http://www.uiowa.edu/~ucs/copstress.html
Coping with stress: http://familydoctor.org/online/famdocen/home/common/mentalhealth/stress/167.html

Appendix E: Phase II Informed Consent

HOW YOUNG ADULTS DEAL WITH STRESS: PHASE II

CONSENT TO PARTICIPATE IN RESEARCH

This is to state that I agree to participate in the research project, investigating stress coping mechanisms among young adults, being conducted by the research team of Dr. Nancy Heath at McGill University. The purpose of this project is to examine the risk and protective factors of adaptive and maladaptive coping strategies.

All of the information provided is completely confidential, excluding any disclosure of serious intent to harm self or others. The survey will be entirely confidential – consent forms and e-mail addresses will be stored separately, in a locked cabinet accessible only to the primary researcher. I understand that this will maintain my confidentiality and anonymity in this study. I fully understand that participation in this research is voluntary. Participation in this study will provide the participant access to resource information as well as help to develop our knowledge about behaviours related to stress and coping for young adults.
The survey I am being asked to fill out consists of a series of six questionnaires and will take approximately thirty minutes to complete. The questionnaires will address issues surrounding childhood, family relationships, body image and engagement in risky behaviours. While there are no risks involved in participation in this research, some participants might be sensitive to or uncomfortable with, some of the questions. Should this issue arise, I understand that I am free to withdraw at anytime from the study, without any penalty or prejudice. I am also free to not answer any item that makes me uncomfortable. Participants are encouraged to refer to the research website should they require support during the course of the study. Resources will be provided at the following link _____.

I understand the purpose of the study and know the risks, benefits, and inconveniences that are involved in this research project. I realize that the data will be used for the above stated research purposes and that I am invited to visit a study outcome website which will be shared with me upon completion of the study. If you have any questions or concerns about your rights as a research subject in this study, please contact the McGill Research Ethics Officer at 514-398-6831.

I have read the above and I understand all of the conditions. I freely consent and voluntarily agree to participate in this study.

Please type name ➢

Sincerely,
Shareen Holly, M.A.
McGill University, Project Coordinator
Doctoral Student
(514) 398-1232
shareen.holly@mcgill.ca

Nancy Heath, Ph.D.
McGill University, Faculty of Education
Professor
(514) 398-3439
nancy.heath@mcgill.ca

Appendix F: Phase II Debriefing Information Sheet (NSSI Group)

Dear participant,

Thank you for taking part in our survey. Your participation will help us to better understand non-suicidal self-injury (NSSI) and other maladaptive behaviours. Research has shown that rates of NSSI are high among adolescents and young adults in the community, and furthermore, these rates appear to be increasing. The purpose of the study that you have participated in is to better understand the initiation and maintenance of NSSI among youth in terms of risk and resilience, the social learning processes involved, and the potential addictive features of NSSI among late adolescents and young adults. The findings of this study will aid to the growing knowledge we have about NSSI and help practitioners and researchers more effectively help youth engaging in NSSI through advances in prevention and intervention.

As a thank you for your time and cooperation, you will be entered in our draw for several gift certificates and we will contact you via email if you win. We are planning to conduct an additional study in this area in the coming months. Please let us know if you are interested in participating for monetary compensation.

Some of the items that you were asked to fill out deal with very personal and sensitive issues. For this reason, we are providing all of our participants with a list of resources for their own use. Although we do not endorse all of the information on these websites, we think they may be of interest to some of our participants. **Please make use of the resources below should you require any additional support. Do not hesitate to call our research team if you have any questions or concerns.**

Thank you,
The research team of Dr. Nancy Heath
(514) 398-1232

Participants are referred to:

Dr. Robert Franck
Mental Health Services
Student Services
BROWN Student Services Building
Telephone: (514) 398-6019

McGill Services
McGill Mental Health Service: 398-6019
McGill Nightline (6pm to 3am, daily): 398-6246
Sexual Assault Centre of McGill Students' Society: 398-8500
Non-Suicidal Self-Injury (NSSI) Websites
The S.A.F.E. program : http://selfinjury.com/index.html
Self-injury and related issues: http://www.siari.co.uk
Young people and self-harm: http://www.selfharm.org.uk
Addiction Websites
Addiction information: http://www.addictionrecov.org/addict.htm
Addiction information: http://www.addictions.co.uk/index.asp
Alcoholics Anonymous: http://www.alcoholics-anonymous.org/
Gamblers Anonymous: http://www.gamblersanonymous.org/index.html
Narcotics Anonymous: http://www.na.org/

Appendix G: Phase II Debriefing Information Sheet (Control Group)

Dear participant,

Thank you for taking part in our survey. Your participation will help us to better understand the various ways in each young adults, such as yourself, cope with stress. Our study focused on a variety of adaptive as well as maladaptive and risky behaviors that university students use when dealing with stress. We also looked at different risk and resilience factors, as well as some of the personality traits that may contribute to one's overall well-being.

As a thank you for your time and cooperation, you will be entered in our draw for several gift certificates and we will contact you via email if you win. We are planning to conduct an additional study in this area in the coming months. Please let us know if you are interested in participating for monetary compensation.

Some of the items that you were asked to fill out deal with very personal and sensitive issues. For this reason, we are providing all of our participants with a list of resources for their own use. Although we do not endorse all of the information on these websites, we think they may be of interest to some of our participants. **Please make use of the resources below should you require any additional support. Do not hesitate to call our research team if you have any questions or concerns.**

Thank you,
The research team of Dr. Nancy Heath
(514) 398-1232

Participants are referred to:

McGill Services
McGill Mental Health Service: 398-6019
McGill Nightline (6pm to 3am, daily): 398-6246
Sexual Assault Centre of McGill Students' Society: 398-8500

Mental Health Support
Tel-Aide Montreal: (514) 935-1101
Suicide-Action Montreal: (514) 723-4000
St-Mary's Hospital Crisis Clinic: (514) 345-3621

Stress Websites
Coping with stress: http://www.helpguide.org/mental/stress_management_relief_coping.htm
Stress handout: http://www.uiowa.edu/~ucs/copstress.html
Coping with stress: http://familydoctor.org/online/famdocen/home/common/mentalhealth/stress/167.html

Addiction Websites
Addiction information: http://www.addictionrecov.org/addict.htm
Addiction information: http://www.addictions.co.uk/index.asp
Alcoholics Anonymous: http://www.alcoholics-anonymous.org/
Gamblers Anonymous: http://www.gamblersanonymous.org/index.html
Narcotics Anonymous: http://www.na.org/

Appendix H: Suicide Protocol

Suicide Evaluation Protocol

Heath Research Team

If participant endorses "yes" to the following item on the HIDS during Phase II:

Have you ever hurt yourself with the intent to die/kill yourself?

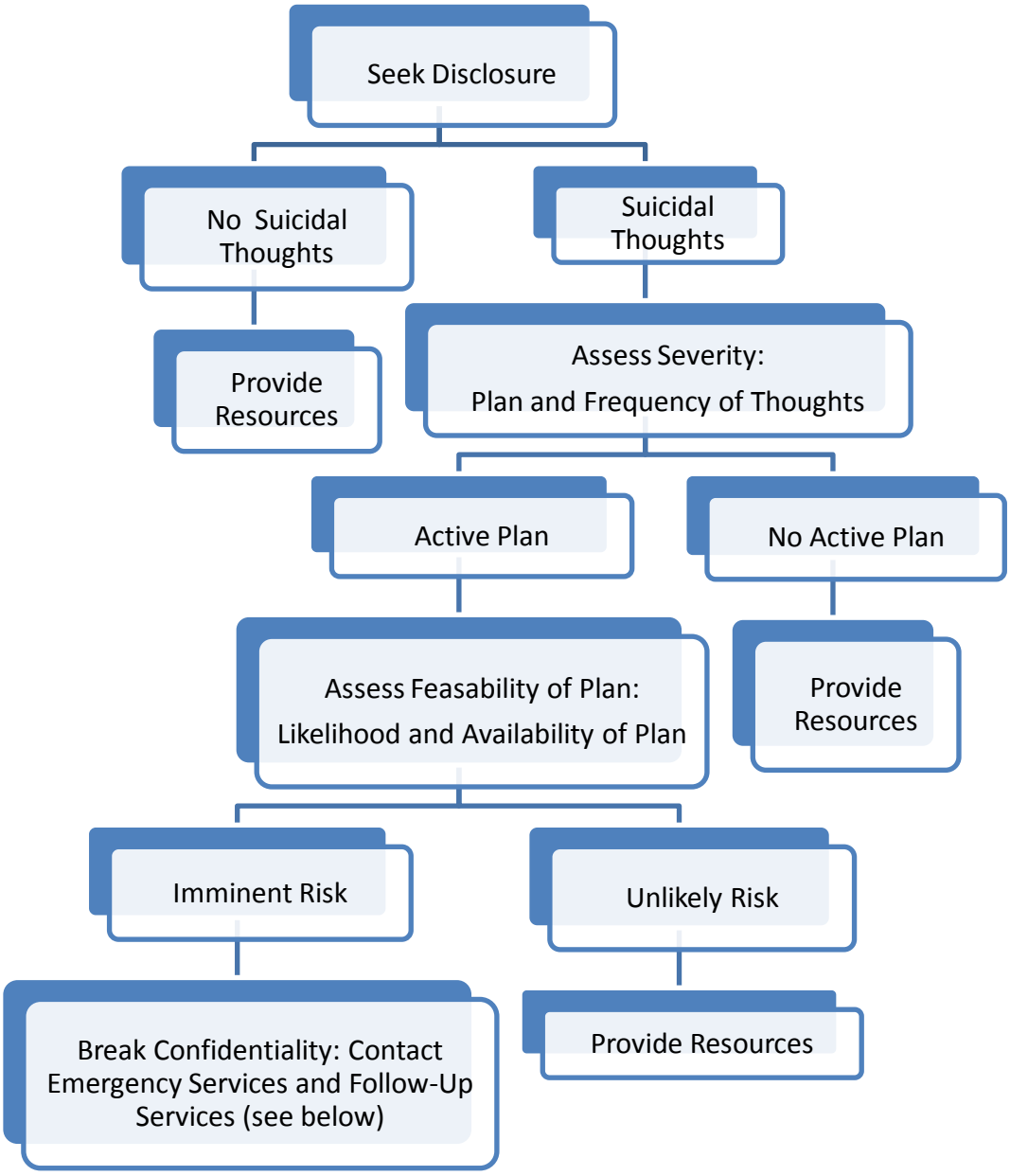
⇨Suicide Evaluation Protocol to be completed by **Dr. Shawna Atkins**. (In the event that Dr. Atkins is unable, Dr. Jack DeStefano or Dr. Shana Ross will complete the protocol).

If the participant does not come to the debriefing session, an attempt will be made by the research coordinator to contact them by telephone or email.

If they are not interested in coming to the research office receive the debriefing information or their compensation for participation at another time, they will be informed that they will receive an email providing all of the information for the study, along with referral sources. **[Send "Detailed Referral" information describing the services available at McGill Mental Health Service, along with the other referral sources.]**

If participant does come to the debriefing session, they will require a suicide evaluation during the debriefing session. **Dr. Atkins must complete all suicide evaluation protocols**. See following flowchart.

Suicide Evaluation Protocol



McGill Mental Health Services	514-398-5529
Suicide-Action Montreal	514 723-4000
911 Emergency Services	

Appendix I: Social Learning Questionnaire [NSSI Group]

SECTION V

For this next section, answer the questions while thinking about the time when you **first started** to engage in self-injury. ***Please read each statement below and indicate your response by typing an X in the appropriate column or space provided.***

Statement	0	1	2 to 5	6 to 9	10 +
1. How many of your close friends engaged in self-injury?					
2. Of your friends that self-injure, how many have you known the longest?					
3. Of your friends that self-injure, how many are you around the most?					

4. How would your close friend react if he/she discovered that you were engaging in self-injury?

	Very positively
	Positively
	Neutral
	Negatively
	Very negatively

5. How would most of your friends react if they discovered that you were engaging in self-injury?

	Very positively
	Positively
	Neutral
	Negatively
	Very Negatively

At the time you first self-injured, how would you have responded…?		**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
6.	Self-injury can lead to serious injuries.					
7.	Physically hurting myself makes me feel better.					
8.	If they found out about my self-injury, my friends would judge me.					
9.	My self-injuring helps me fit into groups better.					
10.	Self-injury is a new trend, it makes me unique and interesting.					
11.	I fear that one day my self-injury will get out of control.					
12.	Self-injury is the best way to deal with stress I've found so far.					
13.	Showing my wounds and scars impresses my peers.					
14.	If I keep my self-injury under control, it is not that dangerous.					
15.	Most people will try self-injury at least once in their lifetime.					
16.	Physically hurting myself is better than doing drugs or drinking alcohol.					
17.	Physically hurting myself is an effective way to get people's attention or help.					
18.	There is nothing wrong with engaging in self-injury once and a while.					

Appendix J: Social Learning Questionnaire [Control Group]

SECTION V

For this next section, answer the questions based on how you and your friends would react to situations of self-injury. ***Please read each statement below and indicate your response by typing an X in the appropriate column or space provided.***

Statement	**0**	**1**	**2 to 5**	**6 to 9**	**10 +**
4. How many of your close friends engaged in self-injury?					
5. Of your friends that self-injure, how many have you known the longest?					
6. Of your friends that self-injure, how many are you around the most?					

4. How would your closest friend react if he/she discovered that **you** were engaging in self-injury?

	Very positively
	Positively
	Neutral
	Negatively
	Very negatively

5. How would most of friends react if he/she discovered that **you** were engaging in self-injury?

	Very positively
	Positively
	Neutral
	Negatively
	Very Negatively

*How would **you** respond to the following statements…?*		**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
19.	Self-injury can lead to serious injuries.					
20.	Physically hurting yourself makes you feel better.					
21.	If I engaged in self-injury, my friends would judge me.					
22.	Self-injury helps you fit into groups better.					
23.	Self-injury is a new trend, it makes you unique and interesting.					
24.	I think that if you self-injure, it may get out of control.					
25.	Self-injury is the best way to deal with stress I've found so far.					
26.	If someone who self-injures shows wounds and scars, it impresses their peers.					
27.	If someone keeps their self-injury under control, it is not that dangerous.					
28.	Most people will try self-injury at least once in their lifetime.					
29.	Physically hurting yourself is better than doing drugs or drinking alcohol.					
30.	Physically hurting yourself is an effective way to get people's attention or help.					
31.	There is nothing wrong with engaging in self-injury once and a while.					

Appendix K: Sample Size Calculations

Multivariate Analysis

In order to determine the sample size needed for the multivariate analyses, a power analysis was computed for each of the multivariate tests conducted (see below for the full calculation). The following outlines the calculations for a multivariate test using six independent variables and one dependent variable, which is the highest number of variables that is used for the multivariate analyses (e.g., for the DERS analysis), therefore delineates the maximum number of participants needed to conduct the multivariate analyses. Several of the measures used in the present investigation have not been used in a multivariate investigation of NSSI in young adults, therefore, it is difficult to calculate the effect sizes that will result based on previous research findings. As such, approximations of Cohen's (1988) conventions for medium (i.e., $f^2 = .15$) effect size for multivariate analyses will be used in the following calculations of sample size. In addition, Cohen (1995) recommends a power level of .80 in social science research. The sample size necessary to detect a moderate effect (i.e., $f^2 = .15$) of a relationship between 6 dependent variables (e.g., DERS subscales) and 1 independent variable (e.g., engagement in NSSI) in a sample of young adults, with power level set at .80, is 98 participants. In other words, a sample of 98 individuals will have an 80% probability of rejecting the null hypothesis (at alpha = .05) in the relationship between the set of emotion regulation and NSSI variables if the effect size is moderate (i.e., $f^2 = .15$). Given past sample sizes recruited for similar projects in the past, the target sample size for the multivariate analyses alone would be 200 participants (100 in NSSI group and 100 in control group) in order to have sufficient power to obtain a medium effect size.

The calculations for sample size in multivariate designs are based on the procedures outlined by Cohen (1998, p. 514-517). The calculations are presented only for the multivariate test using the dependent variables for emotion regulation (6) and independent variables for NSSI (1), as this analysis requires the most participants due to the number of variables involved.

Equation 10.3.1

$\lambda = f^2 (u + v + 1)$

Table 9.4.2 (for alpha = .05; Cohen, 1988 p. 452) gives the λ necessary for power values of various degrees, and for various levels of u and v.

Parameters required for calculating N

$k_y = 6$ $s = 1$ (from Table 10.2.1)

$k_x = 1$ $f^2 = .15$ ("moderate" effect size convention)

alpha = .05 power = .80

$u = 6(4)\lambda_L = 25.9$ (for $v_L = 120$ – this is the convention)
$= 24$

$\lambda_U = 22.5$ (for $v_U = \infty$)

Equation 10.4.1

$$\text{Implied } v = \frac{\lambda}{f^2} - u - 1$$
$$= \frac{25.9}{.15} - 6 - 1$$
$$= 165.67$$

Equation 10.4.2

$$\text{Interpolated } \lambda = \lambda_L - \frac{1/v_L - 1/v}{1/v_L - 1/v_U}(\lambda_L - \lambda_U)$$
$$= 14.3 - \frac{1/120 - 1/167.67}{1/120 - 1/\infty}(14.3 - 13.6)$$
$$= 14.3 - \frac{.00833 - .00604}{.00833 - 0}(.7)$$
$$= 14.3 - 0.27(.07)$$
$$= 14.3 - 0.189$$
$$= 14.11$$

$$\text{Iterated } v = \frac{\lambda}{f^2} - u - 1$$
$$= \frac{14.11}{.15} - 6 - 1$$
$$= 94.07 - 7$$
$$= 87.07$$

Equation 10.4.3

$$N = \frac{1}{s}\left(v + \frac{u}{2} - 1\right) + \frac{k_Y + k_x + 3}{2}$$
$$= \frac{1}{1}\left(87.07 + \frac{6}{1} - 1\right) + \frac{1 + 6 + 3}{2}$$
$$= 1\,(92.07) + 5$$
$$= 97.07 \sim 98$$

Regression Analyses

For logistic regression, a common standard used for the calculation of sample size states that for each independent variable used in the analysis, there must be at least 10 subjects (Hosmer & Lemeshow, 1989; Peduzzi et al., 1996); less than the sample size needed for the multivariate analyses.

Hierarchical regression analysis requires a sample size that equals or exceeds the number of independent variables plus 104, according to a standard calculation proposed by Tabachnick and Fidell (2001, pg. 117). For the present study, use of the 3 total scores in this analysis would require 107 participants. Therefore, a target sample size of 110 participants for the NSSI group will be obtained.

Appendix J: Factor Loading for the Rotated Factors of the Social Learning Questionnaire (SLQ)

Items	Factor Loadings		
	1	2	3
How many of your close friends engaged in self-injury?		**.88**	
Of your friends that self-injure, how many have you known the longest?		**.93**	
Of your friends that self-injure, how many are you around the most?		**.63**	
Close friend reaction if he/she discovered that you were engaging in NSSI?			**.72**
Most of your friends react if they discovered that your NSSI?			**.99**
*Self-injury can lead to serious injuries.	**.39**		
Physically hurting myself makes me feel better.	.31		
*If they found out about my self-injury, my friends would judge me.	.09		
Self-injury is a new trend, it makes me unique and interesting.	**.38**		
*I fear that one day my self-injury will get out of control.	.23		
Self-injury is the best way to deal with stress I've found so far.	**.55**		
Showing my wounds and scars impresses my peers.	.29		
If I keep my self-injury under control, it is not that dangerous.	**.74**		
Most people will try self-injury at least once in their lifetime.	.32		
Physically hurting myself is better than doing drugs or drinking alcohol.	**.48**		
There is nothing wrong with engaging in self-injury once and a while.	**.73**		
My self-injuring helps me fit into groups better.	.29	.30	
NSSI is an effective way to get people's attention or help.	.14	.14	.17

**Note*. Items marked with * indicate reversed-scoring.