Assessing Risk and Protective Factors of Self-Injurious Behavior

（自傷行為のリスク及び保護要因の検討）

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Abstract

Non-suicidal self-injury (NSSI) refers to the direct, deliberate destruction of one's own body tissue without the intent to die (Nock & Favazza, 2009); it does not include drug or alcohol overdoses (Pattison & Kahan, 1983). The affect regulation hypothesis suggests self-injury expresses or controls intolerable negative feelings (Suyemoto, 1998). NSSI is common among young people and is a troubling phenomenon, because people hurt themselves for reasons that are complex and hard to treat (Klonsky et al., 2011; Prinstein, Guerry, Browne, & Rancourt, 2009). The repetition of self-injury episodes is associated with an increase of suicide risk, thus a strong predictor of suicide (Skegg, 2005).

Childhood trauma, lack of coping skills to deal with intolerable situations, depressive mood, and lack of support have been associated with self-injury (Muehlenkamp & Gutierrez, 2004; Pattison & Kahan, 1983). Self-injury is remarkably common and widespread across the world (Prinstein et al., 2009). The current research focused on samples of university students, as NSSI has been increasing among college students (Muehlenkamp, 2005). The current study sampled Japanese and Indonesian students.

The first study, in Chapter 2, examined self-injurious behavior and suicide attempts among college students in Indonesia. It reports the prevalence of these behaviors and investigated risk factors that might distinguish between the two groups. Anonymous self-report questionnaires measuring self-injury, suicide attempts, mood regulation expectancies, depression, and childhood maltreatment were administered in class. Of the 307 participants, 38% had injured themselves, and 21% of those with a self-injury history also reported a suicide attempt. The groups differed significantly on level of mood regulation expectancies, depression, and child neglect.

Chapter 3 focused on NSSI, examining risk factors, as well as the potential buffering effect of mood regulation expectancies on the relationship between childhood maltreatment and NSSI. Study 2a presents data from 313 Japanese students; 10% were self-injurers. Regression analysis examined risk and protective factors: childhood maltreatment, depression, and mood regulation expectancies. Building on that study, Study 2b used the Indonesian data from Chapter 2. Results suggested strong beliefs regarding mood regulation buffered the effects of childhood maltreatment, reducing the severity of self-injury.

To further understanding how the factors may contribute to increased or reduced NSSI, Chapter 4 examined multiple factors contributing to the maintenance of self-injury in a single model, focusing on the pathway from childhood maltreatment through mood regulation expectancies and expectancies for social support to self-injury. The first study, Study 3a, assessed 377 Japanese students, and Study 3b assessed 328 of Indonesian students. Prevalence of self-injury was 20% among Japanese and 30% among Indonesians. Results demonstrated mood regulation expectancies intervene in the relationship between childhood maltreatment and self-injury. Results of the path analysis suggested that strong expectancies for social support from peers increase one's confidence in regulating emotion, which in turn is a protective factor for reducing self-injury.

Across the Japanese and Indonesian samples, lifetime prevalence rates for NSSI ranged between 10% and 38%. Overall the findings suggest that NSSI is common among Asian university students. Childhood maltreatment is a strong predictor that increases the risk for self-injurious behavior. However, expectancies for social support and mood regulation seem to be potential protective factors. Knowledge from this thesis may increase awareness and understanding of NSSI, suggesting approaches for prevention and intervention of NSSI.

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Overview

In recent years there has been a rapid increase of interest in nonsuicidal self-injury (NSSI), not only in the mental health area but also in popular movies and dramas (Klonsky et al., 2011). Among college student samples in non-clinical settings, lifetime prevalence rates range from 7% to 56% (e.g., Hilt et al., 2008). NSSI represents a serious clinical concern and is common among young people (Gratz, 2007), including in Japan (Izutsu et al., 2006) and Indonesia (Tresno & Satiadarma, 2005). However, this phenomenon has received little empirical study.

There are many terms used to refer to self-injurious behavior. This lack of clarity in terminology has led to inconsistencies and serious confusion in the clinical research (Claes & Vandereycken, 2007). Recently, the consensus has developed to use the term *self-injury* as the most descriptive one. Self-injury methods range from methods that cause little tissue damage (e.g., pinching, hair pulling) to methods that cause severe tissue damage (e.g., cutting, burning) (Nixon & Heath, 2009).

Evidence suggests that a majority of individuals who injure themselves do so to alleviate negative affect (e.g., Klonsky, 2007, 2009): most self-injurers report difficulties with mood regulation. Trauma in childhood is considered an important risk factor that may lead individuals to develop poor interpersonal relations and impaired emotion-regulation, which in turn lead to the use of a non-adaptive coping strategies such as self-injurious behavior (Crowell et al., 2009). Depression is mentioned as a key factor associated with an increase of self-injury episodes and also suicide risk (Hawton et al., 1999). Understanding how these variables correlate with NSSI is crucial for early identification of individuals at risk for NSSI, and for guiding intervention before severe consequences occur. Many questions remain

unanswered in the literature. What are the risk factors for NSSI, and what are aspects of people that protect them from engaging in self-injury (Skegg, 2005)?

This thesis is intended to answer some of these questions. It comprises four studies. Study 1 asked what distinguishes self-injury with the presence of a suicide attempt from nonsuicidal self-injury, in a sample of Indonesian students. While most self-injurers do not intend to die, the literature suggests that 7% to 50% of those engaging in self-injury report having made a suicide attempt (e.g., Gordon et al., 2010). Those who report self-injury with a suicide attempt show more impairment than individuals with NSSI (Wong et al., 2007). Results of the current study support this. Self-injurers with the presence of suicide attempt history reported more maltreatment in childhood, lower confidence in regulating negative emotions, and reported more depression. In addition, the number of self-injuring methods used, and especially using self-cutting, increased the risk for a suicide attempt. Discovering what factors relate to self-injury and suicide attempts provides insight that may assist identification of vulnerable individuals. Childhood maltreatment is a strong predictor of self-injury, however not all who have a history of abuse in the past engage in self-injury. Therefore, Study 2 examined risk factors that increase the likelihood of self-injury and protective factors that lessen the likelihood of self-injury, even if the individual experienced maltreatment as a child.

Study 2a in Chapter 3 compares, among Japanese students, an NSSI group with those who have never self-injured. The levels of childhood maltreatment, depression, and negative mood regulation expectancies distinguished NSSI from non-self-injury (NoSI) individuals. Since not all who were maltreated in the past develop NSSI, this study found that a strong belief in one's ability to regulate negative mood buffered the effect of child maltreatment on self-injury. Those with

greater maltreatment and stronger expectancies for regulating negative mood had only modest increases in NSSI frequencies. Study 2b replicated Study 2a on an Indonesian sample using the data from Study 1. Results are consistent with those of Study 2a. Some survivors of child maltreatment apparently develop resources and skills to protect them from engaging in maladaptive behavior. Negative mood regulation expectancies appears to be an important protective factor that keep individuals from self-injury and suicidal risk, leading to the question on what factor contributes to develop more confidence on adaptive mood regulation.

Studies in Chapter 4 assessed interpersonal features related to NSSI in addition to emotion regulation to explain the pathways by which childhood maltreatment may lead to self-injury (e.g., Muehlenkamp et al., 2013; Nock, 2008). The research shows that child maltreatment is associated with a range of impairments including difficulties in emotion regulation and poor peer relationships (Cicchetti & Lynch, 1993; Yates, 2009). Individuals who exhibit poor mood regulation within an unsupportive environment may face difficulties managing strong negative emotional experiences in adaptive ways (Adrian et al., 2011). Social support, particularly family and peer support, has been suggested as an external resource that protects against maladaptive or suicidal behavior (Catanzaro & Laurent, 2004; Fortune et al., 2008).

Study 3a assessed participants' reasons for engaging in self-injury. It tested an integrated model showing a link from childhood maltreatment, as distal factor, to self-injury, through perceived social support and negative mood regulation expectancies. Perceived social support in Study 3a included perceived support from father, mother, and peers. Results were that childhood maltreatment was indirectly linked to self-injury through perceived social support and negative mood regulation

expectancies, confirming the hypothesis. In addition, expectancies for social support were indirectly linked with self-injury through negative mood regulation expectancies. It appears that perceived support from father and peers increases one's confidence in regulating difficult emotions, which in turn reduces risk for NSSI.

The integrated model was tested again using an Indonesian sample in Study 3b: the model included perceived social support from family and friends. Insufficient support especially from friends was indirectly associated with self-injury through mood regulation expectancies. Trauma in childhood may lower adaptive skills for regulating emotion, which in turn increases the use of maladaptive coping such as self-injury. However, greater emotional support expectancies for friends may enable maltreatment survivors to build more confidence and learn more adaptive ways to cope with emotional distress. Believing that someone will provide emotional support is important to building more positive coping, which in turn lower the risk for self-injury or suicide.

Overall findings of my thesis suggest that childhood maltreatment increases risk for self-injury among maltreatment survivors. However, strong beliefs in regulating negative emotion may reduce the severity of self-injury. A supportive environment, especially family and friends, may also help to develop positive and adaptive coping when facing stressful events, which in turn may reduce the use of maladaptive coping behavior. These findings can be applied to early identification and intervention with self-injury or other maladaptive behavior.

Chapter 1

Introduction to Self-Injurious Behavior

1. 1 What is Nonsuicidal Self-Injury

Various terminology has been used to describe self-injurious behavior, and numerous definitions have been reported in the literature. This behavior was discussed in the psychiatric literature by Menninger as early as 1935 (Connors, 2000; Favazza, 1996; Walsh & Rosen, 1988), but it relatively received less attention until the late 1970s (Yates, 2004). Pattison and Kahan developed a differential classification of self-injurious behaviors: the *direct/indirect* dimension refers to one's awareness and conscious intent to harm oneself; *the lethality* dimension refers to the likelihood that death will result; and the *repetition* dimension refers to how many episodes there are of the behavior. A gunshot to the head resulting in suicide would be classified as a high lethality, single episode, direct self-harming act (1983, Favazza, 1996).

Favazza (1996) broke down self-injurious behavior into three categories: *major, stereotypic,* and *moderate/superficial. Major* self-injury refers to acts that result in significant destruction of body tissue, such as amputation of body parts; it is commonly associated with psychosis. *Stereotypic* self-injury refers to repeated acts that are often rhythmic, such as head banging, which is commonly reported in persons with autism or mental retardation. *Moderate/superficial* self-injury is the most common type of self-injury, referring to episodic or repetitive acts of low lethality with less tissue damage. This behavior is the focus of the current research; it includes methods such as skin cutting, skin carving, interference with wound healing,

bone breaking, self-punching, hair pulling, and nail biting.

1. 1. 1 Defining Nonsuicidal Self-Injury (NSSI)

In recent years the interest on this topic has increased significantly, tripling in the past 10 years as measured by keywords such as self-injury, self-harm and self-mutilation (Nock, 2010). Most often, this act is performed to temporarily alleviate overwhelmingly negative emotions (Nock, 2009; Klonsky, Muehlenkamp, Lewis, & Walsh, 2011). Additional terms, such as parasuicide, deliberate self-harm and self-cutting, have all been used to describe some aspects of self-injury (Nixon & Heath, 2009).

In Japanese, self-injury is known as *jishoukoui* (Yamaguchi et al., 2004), which initially referred specifically to *wrist-cutting syndrome* as an act of self-mutilation (Nishizono & Yasuoka, 1979; Takeuchi, Koizumi, Kotsuki, Shimazaki, & Miyamoto, 1986). Wrist-cutting was firstly recognized in the 1960s in psychiatric settings, when professionals identified cases of repetitive wrist cutting distinct from suicide (Walsh & Rosen, 1988). Some patients cut their forearms or legs and not their wrists (Rosenthal, Rinzler, Wallsh, & Klausner, 1972).

Adopting a clear and reliable classification system for self-injury is crucial, as the terms can lead to miscommunication and wildly different research results (Claes & Vandereycken, 2007; Klonsky et al., 2011). Some prior studies have included drug overdoses, self-poisoning, and suicide attempts as self-injury. The lack of standardized definitions has led to difficulties determining prevalence rates for self-injury (Yates, 2004), particularly distinguishing those with suicidal intent (Nixon & Heath, 2009). *Parasuicide* implies suicidality, which is the opposite of the intent

behind self-injury. *Wrist cutting* includes cutting as method of self-injury that meets definition of NSSI, however sometimes wrist cutting is used to attempt suicide (Nixon & Heath, 2009).

Self-mutilation (Favazza, 1996; Rosenthal et al., 1972; Walsh & Rosen, 1988) was once a common term for self-injury, but currently it is considered inaccurate, as many forms of self-injury do not involve mutilation (e.g., head-banging or punching oneself) (Connors, 2000; Klonsky et al., 2011). *Self-harm* is often used synonymously with self-injury, although the two terms may refer to different behaviors and have different meanings (Claes & Vanderecyken, 2007). *Deliberate self-harm* includes a broad range of behaviors, including self-injury, substance abuse to harm oneself, and sometimes suicidal behaviors (Nixon & Heath, 2009; Klonsky et al., 2011). A summary of the differences between the different terms is presented in Table 1 (adapted from Klonsky et al., 2011, p. 4).

Table 1

Alternative Terms of Self-Injury

Term	Differences from NSSI
Self-mutilation	Sometimes includes major self-injury associated with psychosis, such as limb amputation; has a more pejorative connotation
Deliberate Self-harm	Sometimes includes suicidal behaviors
Parasuicide	Most often includes suicidal behaviors
Wrist Cutting	Sometimes includes suicide attempts made by wrist cutting; only one of many potential NSSI behaviors
Self-abuse	Equates NSSI with "abuse" of oneself, which may not be an accurate or useful connotation
Self-inflicted Violence	Sometimes includes suicidal behaviors or other forms of self-directed violence

In recent years, the term *self-injury* is considered the most appropriate and descriptive, for moderate marring of the body surface such as cutting and carving into the skin, compare to the other terms that may lead to confusion and miscommunication (Connors, 2000; Claes & Vanderycken, 2007; Klonsky et al., 2011); it will be used in the current study. Self-injury is also called nonsuicidal self-injury (NSSI) in the literature (Rotolone & Martin, 2012). It refers to direct and intentional physical harm to one's body without conscious intent to die (Nock, 2009). It is crucial to include the absence of suicidal intent in defining self-injury (Claes & Vandereycken, 2007). The term NSSI emphasizes the distinction between suicide attempts and nonsuicidal forms of self-injury (Klonsky, 2007a), as self-injury may

enhance suicide risk and some self-injurers have a history of suicide attempts (Khan, 2005; Whitlock et al., 2006).

Five components of self-injury were defined by Alderman (1997). Self-injury is an act that is (1) done to yourself, (2) done by yourself, (3) includes physical violence, (4) does not to attempt suicide, and (5) is an intentional act with purpose. The current definition of self-injurious behavior does not include drug or alcohol overdoses, acts of self-starvation, self-poisoning, tattooing or piercing, rejection of medical treatment, or excessive risk taking. It excludes high lethality cases such as hanging and jumping from heights (Claes & Vandereycken, 2007; Nixon & Heath, 2009; Nock, 2009; Pattison & Kahan, 1983; Yates, 2004).

1. 1. 2 Methods of Self-Injury

Self-injury includes various methods to injure oneself, with some methods' causing severe tissue damage (e.g., cutting, burning), and other methods' causing little or no tissue damage (e.g., pinching, interfering with the healing of wounds, hair pulling) (Nixon & Heath, 2009). The most common self-injury methods involve the skin, such as cutting the skin with sharp objects (e.g., knife, razor, shard of glass, scissors) (Favazza & Conterio, 1988; Ross & Heath, 2002; Nock, 2009; Tresno & Satiadarma, 2004; Yamaguchi et al., 2004), scratching or scraping, skin picking, nail or lip biting, interfering with the healing of wounds, or burning the skin using matches or cigarette (Alderman, 1997; Connors, 2000; Izutsu et al., 2006).

Other forms include the use of force against the body, such as slapping oneself, punching oneself or a wall, breaking bones, head-banging, or hitting oneself with objects (Connors, 2000). Other self-injury forms are needle sticking,

hair-pulling, and using a stapler on one's finger (Tresno & Satiadarma, 2004; Whitlock, Eckenrode, & Silverman, 2006). The most commonly reported self-injury methods are cutting, scratching, and punching/hitting oneself (Gratz, 2001; Nixon & Heath, 2009; Whitlock et al., 2006). Among psychiatric patients, skin-cutting is the most commonly reported method of self-injury (e. g. Adrian, Zeman, Erdley, Lisa, & Sim, 2011). The most commonly reported parts of the body injured during NSSI were the arms, followed by the legs and the hands. A majority of the self-injurers covered their wounds resulting from NSSI, hiding them from others (Murray, Warm, & Fox, 2005).

Self-injurious behavior varies from mild to severe. Individuals who report low frequency and less severe NSSI are classified as mild NSSI. Moderate NSSI entails more frequent and severe NSSI or requires medical attention. High frequency, severity, and resulting impairment indicate severe NSSI (Nock, 2010). Many people engaging in self-injury use more than one method in repeated episodes. A majority have only performed the behavior once or a few times, whereas some individuals increase their frequency and severity, or engage in hundreds incidents of self-injury (Gratz, Conrad, & Roemer, 2002; Paivio & McCulloch, 2004; Ross & Heath, 2002; Whitlock et al., 2006). In multiple episodes, frequency of self-injury can be classified by the number of acts per day, week, or month. The duration of self-injury can also span from one day to months or years (Claes & Vandereycken, 2007).

Self-injury acts involving cutting to injure oneself are often confused with suicide attempts (Klonsky et al., 2011). Emergency room personnel who discover cutting may see self-injury as a suicide attempt, as the scars and wounds appear similar (Connors, 2000).

1. 1. 3 Self-Injury and Suicide Attempts

It is often difficult to distinguish injuries resulting from NSSI and injuries from a suicide attempt (Alderman, 1997). *Suicide* is defined as "the act of intentionally ending one's life" (Nock, Borges, Bromet, Cha, Kessler, & Lee, 2008, p. 134). This includes behaviors like overdosing, hanging, jumping from a height, or drowning (Akyuz, Sar, Kugu, & Dogan, 2005). *Suicide ideation* refers to "thoughts of engaging in behavior for the purpose of ending one's life." *Suicide plan* is the planning of a specific method by which one intends to die. *Suicide attempts* refers to "engagement in potentially self-injurious behavior in which there is at least some intent to die" (Nock et al., 2008, p. 134).

Contemporary research has distinguished self-injurious behavior from suicidal behavior (Yates, 2004). Both acts typically represent a struggle against unresolved, overwhelming pain that results in physical harm and may represent a cry for help. Suicide is intended as a final escape from distress, whereas self-injurers intend to stay alive, to reduce distress, and to keep going after getting temporary relief (Connors, 2000; Domino, Gibson, Poling, & Westlake, 1980; Pattison & Kahan, 1983). To avoid confusing self-injury and suicide attempts, researchers have suggested that the intent or motive underlying the behavior is the key distinction between the two behaviors (Nixon & Heath, 2009). They suggest that people may actually engage in self-injury to avoid suicide or to prevent themselves from attempting suicide (Connors, 2000; Jacobson, Muhlenkamp, Miller, & Turner, 2008; Suyemoto, 1995).

Lethality of method distinguishes self-injury from suicide. Self-injury typically uses a non-lethal method; for example, cutting a location away from a potentially fatal part of the body (Claes & Vanderyecken, 2007). Self-injury methods

are typically less severe and less life threatening than suicide attempt methods, which often result in severe medical damage. It is common for self-injury to be performed several to hundreds of times, but it is unusual for someone to attempt suicide more than a few times (Klonsky et al., 2011).

It is crucial to include the absence of suicidal intent in the definition of self-injury, however a clear distinction between the two constructs is often difficult to make. For instance, what is perceived initially as a suicide attempt may turn out later to have occurred without an intention to die (e.g., overdose). On the other hand, individuals who frequently nonsuicidally self-injure at other times may harm themselves with suicidal intention (Claes & Vanderycken, 2007). Although self-injury is not typically a suicidal gesture and is a distinct in term, somehow the two behaviors are related. It is not a certain that self-injurers will never engage in suicidal acts (Walsh & Rosen, 1988). In addition, self-injury act may result in accidental severe harm or fatality. For example, cutting the skin more deep than planned. Researchers have found that those who engage in self-injury are more likely to consider or attempt suicide (Khan, 2005; Whitlock et al., 2006). Some assume that self-injury episodes may be a rehearsal for an actual suicide attempt (Takeuchi et al., 1986). Individuals with repeated engagement in self-injury may become more daring, and more steadfast in the process toward an attempt to end their life (Joiner, 2005).

Self-injury may enhance suicide risk. This topic has been widely discussed among researchers. Those who are at higher risk for suicide report a more extensive history of self-injury and using more self-injury methods (Klonsky et al., 2011; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). In psychiatric settings, patients who self-injure and also attempted suicide were more often diagnosed with depression (Takeuchi et al., 1986). Depression increases the risk for suicide and may

lead someone to decide to end his or her life (Alderman, 1997; Muelenkamp & Gutierrez, 2007).

Regardless of the differences between self-injury and suicide attempts, there still seems to be a great deal of overlap between the two behaviors, particularly within psychiatric samples. Among hospitalized patients, adolescents who engaged in self-injury had significantly more suicide attempts (Adrian et al., 2011). Regardless of whether self-injury and suicidal behaviors are present at the same time, there are individuals who hurt themselves and engage in acts of suicide at some point in their lives (Lofthouse, Muehlenkamp, & Adler, 2009). Within psychiatric samples, Nock et al. (2006) discovered 70% of adolescent inpatients had attempted suicides. Walsh and Rosen (1988) found that 31% of self-injurers had made serious suicide attempts during or shortly before treatment. Jacobson et al. (2008) reported that 18% of outpatient self-injury individuals had a suicide attempt history.

Within community samples in the United States, a history of suicide attempts was found among 7% to 50% of individuals engaging in self-injury. Among self-injurers, Gordon et al. (2010) found that 47% of participants had attempted suicide. Lloyd-Richardson, Perrine, Dierker, and Kelley (2007) found that self-injurers who had made a suicide attempt exhibited more moderate to severe self-injury and reported more self-injury methods. Murray et al. (2005) identified 50% of their youth self-injurers as having had at least one previous suicide attempt, suggesting that self-injurers should be considered at life-threatening risk. Nock et al. (2006) and Whitlock et al. (2006) reported that self-injurers with a suicide attempt history showed more psychiatric treatment or hospitalization, greater suicide ideation and use of more methods of self-injury, and they reported more complex reasons for self-injury than did NSSI individuals.

Self-injury with the presence of suicide attempts has been reported among Japanese adolescents (Yamaguchi et al., 2004) and Indonesian young adults (Tresno & Satiadarma, 2005). In a German adolescent sample, Brunner et al. (2007) found repetitive self-injury (more than 4 episodes) was related to increased suicidal behavior. The relation between self-injury and suicide is a complex one requiring clinical and empirical attention (Klonsky et al., 2011).

1. 1. 4 Who Self-Injures?

Prevalence of Self-Injury

Self-injurious behavior is common among youth and young adults, such as middle to high school and university students. A number of studies across countries provide prevalence data on self-injury in clinical and community samples. Many researchers have reported that self-injury rates have increased, as evidenced by higher rates of self-injury among young people (Klonsky et al., 2011). However, the process of establishing the prevalence rates of NSSI is complicated for several reasons (Rodham & Hawton, 2009). The lack of consistency in terminology makes it difficult to compare and interpret rates across studies (Nock, 2010; Klonsky et al., 2011). For example, Hawton and Harris (2008) included self-poisoning, hanging, and drowning in self-injury. Identification of the increase in NSSI rates may be attributable to an increased understanding of the behavior through empirical study (Klonsky et al., 2011)

The rates of self-injury vary considerably depending on whether acts of food restriction or drug overdose are included; how self-injury is measured, such as using self-injury checklists by questionnaire or open-ended questions on interview; sample

selection; and whether self-injury is lifetime prevalence or within the past year prevalence (Heath, Schaub, Holly, & Nixon, 2009). Clinical settings tend to present a higher prevalence of self-injurious behavior than do community settings (Heath, Schaub et al., 2009). For example, Nock and Prinstein (2004) identified 82% of their participants who had injured themselves in the past year. Jacobson et al. (2008) found 48% of outpatients reported at self-injury.

A majority of studies in community settings of young adults use samples of college students (Heath, Schaub et al., 2009). Lifetime prevalence rates among college students in non-clinical populations range from 16% to 56% (e.g., Hilt, Cha, & Nolen-Hoeksma, 2008; Muehlenkamp & Gutierrez, 2004). Ross and Heath (2002) assessed lifetime prevalence of self-injury among Canadian adolescents and confirmed that 14% of the participants had a history of self-injury. Among girl participants**,** 56% of young adolescents engaged in self-injury (Hilt et al., 2008). A recent study among Swedish adolescents reported that 36% of participants engaged self-injury (Zetterqvist, Lundh, Dahlstrom, & Svedin, 2014).

Among college students, Muehlenkamp and Gutierrez (2004) found 16% reported self-injury. Polk and Liss (2007) found 20% of college students, and Gratz and colleagues (2001; 2002) reported 35% to 38% of students admitted to self-injury. In Canada, Paivio and McCulloch (2004) reported 41% of female students had engaged in self-injury.

In non-Western countries, 11% of Hong Kong adolescents had reported self-injury (Wong, Stewart, Ho, & Lam, 2007). Among Turkish high school students, 10% had injured themselves (Zoroglu et al., 2003). Data collected in junior high and high school in Japan identified 10% of students with a self-injury history (Matsumoto & Imamura, 2008). Among undergraduate students in Japan, the

reported self-injury rates range from 7% to 38% (e.g., Gotoh & Sato, 2006; Yamaguchi et al., 2004). Kakumaru (2004) identified a 19% rate of self-injury among Japanese university students. Various rates have been reported in different countries, however there are still limited studies of self-injury in less-developed countries (Heath, Schaub et al., 2009). Table 2 presents rates of self-injury prevalence among community samples.

Table 2

Prevalence of Self-Injury among non-Clinical Settings

Study	Time Frame	Sample	Prevalence	Gender Differences
Brausch & Gutierrez, 2010	Lifetime	High school, USA	21%	No
Brunner et al., 2007	Past year	9th grade, Germany	15%	-
Brown et al., 2007	Current & past	College students, USA	18% past, 10% recent	No
Cawood & Huprich, 2011	Lifetime	College students, USA	34%	No
Gotoh & Sato, 2006	Lifetime	University students, Japan	38%	No
Gratz et al., 2002	Lifetime	College students, USA	38%	No
Heath et al., 2009	Lifetime	University students, Canada	12%	-
Hilt et al., 2008	Lifetime	Young adolescent girls, USA	56%	-
Kakumaru, 2004	Lifetime	University students, Japan	19%	-

Lloyd-Richardson et al., 2007	Past year	High School, USA	47%	No
Matsumoto & Imamura (2008)	Lifetime	Junior/senior high school, Japan	10%	-
Muehlenkamp & Gutierrez, 2004	Lifetime	High School, USA	16%	No
Muehlenkamp & Gutierrez, 2007	Lifetime	High School, USA	23%	No
Muehlenkamp et al., 2010	Lifetime	College students, USA	18%	Yes
Muehlenkamp et al., 2013	Lifetime	College students, USA	15%	Yes
Paivio & McCulloch, 2004	Lifetime	Undergraduate students, Canada	41%	-
Polk & Liss, 2006	Lifetime	College students, USA	20%	-
Ross & Heath, 2002	Lifetime	High School, Canada	14%	Yes
Rotolone & Martin, 2012	Current & Past	University Students, Australia	38%	Yes
Whitlock et al., 2006	Lifetime	College Students, USA	17%	Yes
Whitlock et al., 2011	Lifetime	University Students, USA	15%	Yes
Yamaguchi et al., 2004	Lifetime	Undergraduate students, Japan	7%	-
Zetterqvist et al., 2014	Lifetime	High School, Sweden	36%	Yes
Zoroglu et al., 2003	Lifetime	High School Turkey	10%	No

Gender Differences in Self-Injury

Researchers have reported mixed findings regarding the differences between men's and women's rates of self-injury. Some studies of self-injury assume this behavior is more common among women (e.g., Jacobson et al., 2008; Suyemoto & MacDonald, 1995). It is likely that for women it is socially unacceptable to express their anger to others directly, which in turn they harm themselves to express their anger without hurting anyone else (Levenkron, 1998; Ross & Heath, 2002; Whitlock et al., 2006; Wong et al., 2007). Another noteworthy finding in reviewing the literature on prevalence of self-injurious behavior is that there are greater gender differences in clinical samples than in community samples (e.g., Jacobsen et al., 2008; Nixon, Cloutier, & Aggarwal, 2002). This may be possible because women are more likely to seek help than men are. However, recent research has shown equal rates among men and women (e.g., Gratz et al., 2002; Izutsu et al., 2006; Muehlenkamp & Gutierrez, 2004; Nock & Prinstein, 2004). Rodham and Hawton (2009) suggested that self-injury incidences by men is more common than was previously thought, as many studies found similar rates between men and women.

When Does It Start ?

The prevalence of self-injury varies across different age groups. Research on self-injury concurs that the age of onset is typically during the adolescence, begin between the ages of 13 and 15 (e.g., Muehlenkamp & Gutierrez, 2007; Ross & Heath, 2002). This period is marked by many conflicts with parents and friends that may cause frustration and distress (Ng, 1998; Pattison & Kahan, 1983). In some cases, self-injury may begin before age of 13 (Heath, Schaub et al., 2009). For example,

Japanese adolescents reported the age of first injury as approximately 12 years (Izutsu et al., 2006).

After beginning during early adolescence, self-injury can persist or even increase into young adulthood (Connors, 2000). Sometimes it begins in early adulthood (e.g., Whitlock et al., 2006). Adolescents who have peers or family members who have harmed themselves are at increased risk of engaging in this behavior in the future (Fortune, Sinclair, & Hawton, 2008). Generally, self-injury lasts only for a limited period of time. Once the distressing situations are resolved, self-injurers may not feel the urge to hurt themselves anymore. However, some others may continue to self-injure, due to continuing stressful events or emotional difficulties (Ross & Heath, 2002).

1. 1. 5 Why Do People Engage in Self-Injury?

People who engage in self-injury are often stigmatized as severely mentally ill or attention-seeking, or are misunderstood as attempting suicide (Klonsky et al., 2011). Self-injury is considered a secretive behavior, as the majority of those who engage in self-injury keep it hidden so that no one is aware of their act (Levenkron, 1998; Whitlock et al., 2006). They are still able to live apparently normally within the community, largely hidden from society (Conterio, Lader, & Bloom, 1998).

The most common reported reasons for self-injury include "to try to get reaction from someone," "to get control of a situation," and "to stop bad feelings," a way to manage their own emotions (Lloyd-Richardson et al., 2007). The reasons seem complex. Those who injure themselves are motivated by something stronger than the pain that make them capable to ignore or endure the pain from the injury.

Understanding why people injure themselves is essential (Klonsky et al., 2011; Levenkron, 1998). Self-injury may serve different purposes for the same person at different times. As Suyemoto (1998) noted, "One of the most difficult tasks in attempting to understand any pathological behavior is discerning why this *particular* behavior, at this *particular* time, serves this *particular* function, for this *particular* patient" (p. 537).

For some people, self-injury may serve more than a single function (Lloyd-Richardson, Nock, & Prinstein, 2009). The most commonly reported explanation for why people hurt themselves is for emotional release, to decrease or escape from overwhelming negative affect. This represents an attempt at affect regulation.

Emotional Release

The most commonly endorsed reason for engaging in NSSI was to cope with uncomfortable feelings (Muehlenkamp et al., 2013). Interpersonal stressors often precede engagement in self-injury, such as feeling rejected, or having conflict with a family member, partner or peer, that produces negative emotions (Prinstein, Guerry, Browne, & Rancourt, 2009). Many of those who engage in self-injury reported high levels of negative affect, especially anger (Cawood & Huprich, 2011; Polk & Liss, 2007). The majority of those who injure themselves have difficulties regulating or controlling their emotions. It is difficult for them to identify, express, or release their overwhelming emotions (Adlerman, 1997; Conterio, Lader, & Bloom, 1998).

The concept of emotion regulation refers to "the ability to manage and

modify one's emotional reactions to achieve goal-directed outcomes" (Matsumoto, 2006, p. 421). It has been assumed that regulating emotion is the primary function of self-injury. Most of the literature supports the hypothesis that self-injury is performed as a method of non-adaptive coping strategy for dealing with uncontrollable and intolerable negative feelings (Klonsky, 2007b; Rotolone & Martin, 2012; Suyemoto, 1998).

Negative feelings such as anger, frustration and loneliness are likely to precede self-injury. Self-injury helps to decrease these negative feelings by providing an outlet for these emotions. It also creates a physical wound that can later be nurtured and healed (Alderman, 1997; Levenkron, 1998). After self-injury, people typically report feeling relieved, calm, and satisfied. Feeling guilty or disgusted is also occasionally reported (Klonsky, 2007b; Suyemoto, 1998). Gordon and colleagues (2010) noted that the repetition of self-injury was associated with feeling less afraid, more relieved, and more soothed. This is similar to other unhealthy coping strategies, such as smoking and abusing drugs or alcohol (Alderman, 1997; Connors, 2000).

Social Connectedness

Approximately 80% of self-injury participants reported that they often or always hid their scars from others (Murray et al., 2005). However, self-injury can serve as a way to communicate feelings, as many self-injurers have difficulty expressing their emotions to others. Self-injury discloses to others their inner pain. In this case, self-injury indirectly communicates a "cry for help" to others by exposing scars and wounds. However, this act may be misinterpreted as a suicide attempt, drug abuse, or mere attention seeking (Alderman, 1997; Connors, 2000). This disclosure

function is particularly found among girls, whom self-injury may help feel more connected to others (Hilt et al., 2008).

Self-Punishment

Self-injury as a way to punish oneself is also common among self-injurers (e.g., Laye-Gindhu & Schonert-Reichl, 2005; Nixon et al., 2002). Directing one's anger and negative feelings toward the self may express a need for self-punishment (Connors, 2000). Many of those who engage in self-injury have experienced maltreated in the past. It is possible that child abuse survivors blame themselves or believe they deserve punishment. Self-blame leads to injuring themselves (Alderman, 1997). Glassman, Weierich, Hooley, Deliberto, and Nock (2007) discovered that the relationship between child maltreatment and adolescent self-injury is mediated by self-criticism. Those who are critical of self are at risk for self-injury for the purpose of self-punishment.

Establishing Control

Self-injury may also be used to establish control, as many episodes of self-injury are triggered by feelings of lack of control. Particularly those who were abused in the past tend not to have a sense of control over themselves. Through self-injury, one may feel more in control over one's body, thoughts and emotion (Alderman, 1997).

In extreme cases, self-injury can be use to establish a sense of control or to gain control over dissociative state. *Dissociation* is "used to describe a psychological state in which the individual experiences an alteration in consciousness, memory, and

sometimes identity" (Alderman, 1997, p. 37). A fairly mild dissociation level is commonly seen daily life, such as tuning out during a conversation. Dissociation caused by high tension may be experienced prior the self-injuring episode and leads to feeling numb. A dissociated state may reduce one's awareness that the injuring was more severe or serious than planned. The level of dissociation decreases after an episode of self-injury (Alderman, 1997).

1. 2 Associated Risk and Protective Factors

In recent years, both risk and protective factors have been investigated in developing strategies for suicide prevention and management of self-injurious behavior (Gutierrez & Osman, 2008). Klonsky and Glenn (2009) defined *risk factor* as a variable that increases the probability that a disorder will occur. However, risk factors do not necessarily cause a disorder. For example, although someone with an anxiety disorder is at higher risk for attempting suicide, many people with anxiety problems never attempt suicide.

Protective factors lessen the probability that a disorder will occur. These variables reduce the probability that a negative outcome to occur in the presence of elevated risk. Protective factors may increase resilience or the ability to bounce back against environmental stressors (Klonsky & Glenn, 2009; Nock et al., 2008). Protective factors are not simply the inverse of risk factors, even though risk and protective factors may usually be described in parallel (Skegg, 2005). In the current study, protective factors investigated are supportive resources (which can serve as mediators or moderators of the relationship between childhood maltreatment and

psychopathology) that have been linked empirically to decreased self-injury (Gutierrez & Osman, 2008; Nock et al., 2008).

1. 2. 1 Risk Factors

Klonsky and Glenn (2009) summarized the risk factors for NSSI, including *emotion dysregulation* (e.g., negative emotionality, dissociative experiences, alexithymia), *self-derogation* (e.g., low self-esteem), *psychiatric problems* (e.g., borderline personality disorder (BPD), depression, anxiety, eating disorders, substance disorders), and *childhood environmental and adversities* (e.g., familial neglect, child abuse, attachment difficulties). Eating disorders (e.g., bulimia, anorexia) and substance abuse may serve similar functions to self-injury, by temporarily helping to alleviate negative emotions (Alderman, 1997; Klonsky & Glenn, 2009; Levenkron, 1998).

According to Linehan's theory (1993), an invalidating environment, such as childhood maltreatment, is a risk factor that leads individuals to develop poor interpersonal and emotion-regulation skills, which in turn is associated with using maladaptive coping behaviors such as self-injury (cf. Klonsky & Glenn, 2009). Depression is mentioned as a key factor associated with an increase of self-injury episodes and also suicide risk (Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999). The self-destructive thoughts of depressed individuals that lead to self-injury may ultimately escalate to an attempted suicide (Muehlenkamp & Gutierrez, 2004; Wong, Stewart, Ho, Rao, & Lam, 2005).

Childhood maltreatment as an invalidating environment is a crucial risk factor that leads to impairments and increases the risk for self-injury or suicidal

behavior. A majority of past studies has demonstrated similar findings on the relationship between childhood maltreatment and self-injury. Many studies view self-injury behavior as maladaptive coping intended to overcome difficult emotions. Evidence shows that self-injurers tend to have more emotion regulation difficulties. Self-injury increases the risk for suicide attempts, and depression is often associated with increased suicide risk. The current study will focus on the roles of childhood environment, emotion regulation, and depression as key factors predicting self-injury, and will see how these associate with each other and with self-injury.

Childhood Environment and Maltreatment

Many self-injuring people come from a stressful home environment, in which there is a divorce or loss by death (Rosenthal et al., 1972). More than half of individuals engaged in self-injury report maltreatment (Whitlock et al., 2006). Childhood trauma or maltreatment has been considered an important risk factor in self-injury studies since the mid-1990s in both clinical and non-clinical samples, such that self-injury is related to prior traumatic events (Connors, 2000; Matsumoto, Azekawa, Yamaguchi, Asami, & Iseki, 2004). Research is generally consistent with Linehan (1993), who suggested that early invalidating environments may lead individuals to develop poor interpersonal and emotion-regulation skills. Later in life, this may lead to the use of maladaptive coping behaviors such as NSSI to deal with difficult emotions (Crowell, Beauchaine, & Linehan, 2009).

As a protective factor, positive interactions between parents and their children contribute positively to adolescent development (Pepin & Banyard, 2006). Child maltreatment, such as neglect and emotional abuse, creates an invalidating

environment (Klonsky & Glenn, 2009). There are numerous reasons for individuals not to develop a more healthy way of expressing emotions, largely distal risk factors such as child abuse (Alderman, 1997; Nock, 2009; Yates, 2004).

The term *child maltreatment* includes both abuse and neglect of children. Child abuse includes physical acts such as beating, sexually assaulting, or verbally abusing a child. Child neglect includes the inability to provide for a child's physical, emotional, medical, or educational needs. "Child abuse" is also sometimes used interchangeably with "child maltreatment," meaning both abuse and neglect (McCoy & Keen, 2009).

As shown in Figure 1, cases of child maltreatment in Japan have been increasing annually (Japan Ministry of Health, Labor and Welfare, 2011). Data from 2012 fiscal reached 66.807 cases, an increased of 6888 from the previous year (Miichi, 2013). In Indonesia, the attention to the topic of child maltreatment has been increasing. The Indonesian Child Protection Commission reported approximately 45 child abuse cases daily, and 3200 cases since 2013 (Fathahilah, 2014).

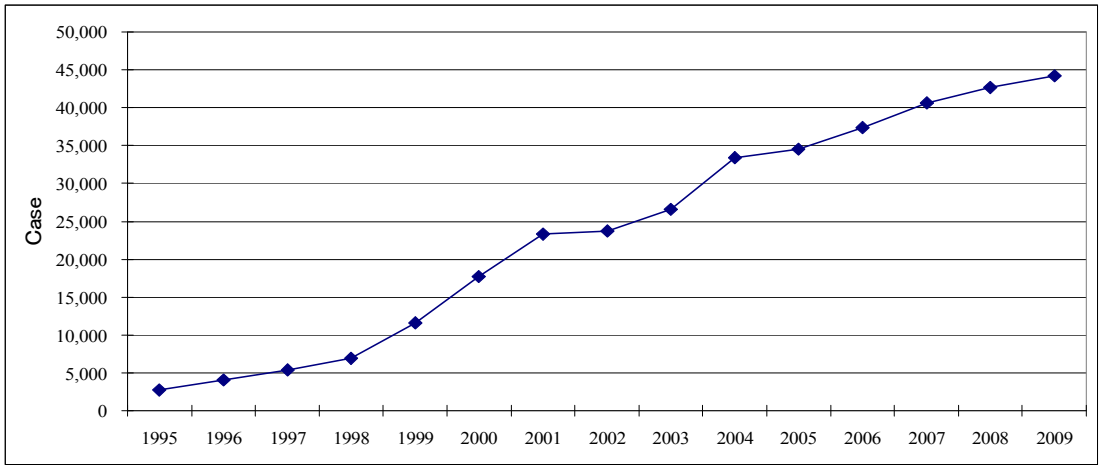

Figure 1. Child Abuse Cases in Japan.

The term child abuse is commonly equated physical abuse. This makes sense because it makes the most visible marks on its victims (McCoy & Keen, 2009). In Western countries, research has mostly focused on childhood sexual abuse as a strong predictor of self-injurious behavior, and still limited studies have focused on the potential contribution of child neglect or emotional maltreatment to NSSI behavior (Gratz et al., 2002; Yates, 2009). Some studies have found that individuals who self-injure are more likely to have experienced emotional or child neglect (e.g. Van der Kolk, Perry, & Herman, 1991; Yates, 2004; Yates, 2009). Child neglect is more likely to increases the rate of suicide attempt (Akyuz et al., 2005). There is some evidence that children ignored by their caregiver may have serious negative impairments for later ego-control, affect expression, and emotion regulation, which have been implicated in the etiology of self-injuring behavior (Gratz et al., 2002). In Japan, emotional or psychological maltreatment has been less studied (Matsumoto et al., 2004; Yamamoto, Iwata, Tomoda, Tanaka, Fujimaki, & Kitamura, 1999).

Trauma in childhood, especially emotional abuse, increases the risk for self-criticism that contributes to self-injury for some individuals (Glassman et al., 2007). The negative feelings from these traumatic experiences may not really go away, but rather will channel into disguise through repression (Levenkron, 1998). Research suggests that individuals engaging in self-injury report a lower quality of family environment compared to non-self-injurers. However, not all self-injurers are distinguished by a poor family environment (Klonsky & Glenn, 2009).

Poor Mood Regulation

In addition to poorer family environment, those who engage in self-injury typically have mood regulation difficulties that increase the risk of using self-injury

to cope with overwhelming negative emotions. Many researchers have focused on self-injury's emotion regulation function.

Researchers view self-injury as a maladaptive mood regulation strategy, used to alleviate negative emotions that precede the self-injury episode. This suggested that those with mood regulation difficulties are at higher risk for self-injury (Klonsky, 2007b; Klonsky & Glenn, 2009). Healthy emotion regulation involves (a) awareness, understanding, and acceptance of emotions; (b) ability to control the impulsive behaviors when dealing with negative emotions; (c) adaptively using appropriate or healthy strategies to reduce the intensity or extent of emotional responses; and (d) willingness to tolerate the experience of negative emotions as part of a meaningful life. Deficits in any of these areas may be considered indicators of emotion dysregulation (Gratz & Roemer, 2004).

Individuals with childhood trauma may suffer difficulties in emotion regulation, for example difficulties verbally expressing negative affect. Self-injury may be used as a way to express negative emotional states that is difficult to express by words (Polk & Liss, 2007). Studies of self-injury have documented numerous emotion difficulties in individuals who engage in self-injury. For example, self-injurers are more likely to suffer *alexithymia*, a difficulty in identifying or understanding their feelings, and verbally expressing their emotional states (Lesser & Lezzer, 1983; Paivio & McCulloch, 2004).

Suppression of emotions leads to "a vicious cycle of increased emotional arousal, leading to more unsuccessful attempts at suppression, which in turn contributes to growing psychological distress" (Barlow, Allen, & Choate, 2004, p. 217). Individuals who are incapable to identify and to regulate their negative emotions will have more negative emotions that may lead to more distress. Nock

(2008) described a process by which self-injury may follow a situation where it is difficult to communicate with others by words. When initial attempts at verbal communication are not successful, people may escalate the communication to yelling. If this is still unsuccessful, the person may change the way of communication as a way of seeking help, such as crying behavior. If this still fails, the person may attempt to increase the intensity to mild and more severe forms of harming one's own body.

Individuals who become highly emotional will be more likely to engage self-injury as a way to manage their emotional experience (Cawood & Huprich, 2011). During times of distress survivors of childhood trauma are at risk for maladaptive coping, including self-injury (Paivio & McCulloch, 2004). A history of maltreatment during childhood can prevent the child from learning adaptive and effective problem solving strategies or communication skills. This may in turn contribute to the interpersonal difficulties (Cloitre, Stovall-McClough, Miranda, & Chemtob; 2004; Nock, 2009). Improving skills for regulating emotions effectively is important. A study examining past and recent self-injury demonstrated past self-injurers still showed difficulty managing negative emotions, particularly feelings of hostility, guilt, and sadness (Brown, Williams, & Collins, 2007).

Negative mood regulation expectancies (NMRE) are an internal variable conceptualized in Rotter's learning theory (Catanzaro & Mearns, 1990; Kim et al., 2009). They are defined as people's beliefs to control the negative moods. The belief represents their level of confidence about being able to alleviate a negative mood states. NMRE have been demonstrated to be a useful construct in understanding the self-regulatory process, and for identifying individuals at risk for developing mood difficulties or disorders (Kassel, Bornovalova, & Mehta, 2006).

According to social learning theory, people's beliefs and their motivations combine to predict their behavior. NMRE influence mood regulation via two pathways: (a) indirectly through coping behavior, resulting in more effort to cope, and (b) directly. Simply believing that one can regulate one's mood results in improved mood (Catanzaro & Mearns, 1990; Mearns et al., 2013). Children who experienced maltreatment and had an insecure attachment showed lower capacities for management of negative emotions. This may lead to functional impairment in work or social areas (Cloitre et al., 2008), and is perhaps related to the use of maladaptive coping such as self-injury. Individuals with a self-injury history indicated lower expectancies for being able to regulate negative emotions (Tresno, Ito, & Mearns, 2010). NMRE are expectancies that develop based on one's past experience. Stronger NMRE individuals are more likely to engage in more adaptive coping strategies and are less vulnerable to being overwhelmed by the negative consequences of life distress. In contrast, lower NMRE individuals are less likely to cope in adaptive ways and exhibit more depressive symptoms (Kassel et al., 2006; Mearns & Cain, 2003).

Psychopathology

Co-occurring psychopathology also increase the risk for self-injury. Such disorders include borderline personality disorder (BPD), anxiety, depression, dissociative experiences, and self-derogation (e.g., low self-esteem). Eating disorders (e.g., bulimia, anorexia) and substance abuse may increase the risk for self-injury, as these serve similar functions as self-injury (Alderman, 1997; Klonsky & Glenn, 2009). Among self-injury studies, it was noted that 50% to 60% among self-injury studies reported the presence of eating disorder, whether the individuals manifest

eating disorder before or after engage in NSSI (Muehlenkamp, 2005; Tresno & Satidarma, 2005). Both of eating disorder and substance abuse may temporarily help to change mood state or alleviate negative emotions (Levenkron, 1998).

Self-injuring acts often are listed among BPD diagnostic criteria. Although BPD can occur without NSSI, and NSSI can occur without BPD, frequently BPD and NSSI co-occur. Perhaps, both BPD and NSSI are often related to difficulties regulating negative emotions, such that emotion dysregulation is a crucial factor of both BPD and NSSI (Klonsky et al., 2011).

A relationship has been documented between NSSI and anxiety. Adolescents with a self-injury history showed significantly greater levels of anxiety than non self-injuring adolescents. Ross and Heath (2002) suggested that NSSI may function to control or reduce feelings of tension when facing stressful events.

Individuals with high self-derogation are more likely to engage in NSSI, as NSSI is often used as a way to punish oneself or direct anger toward the self. Self-injury is often identified with lower self-esteem (Klonsky & Glenn, 2009; Klonsky et al., 2011). Compared to those with no NSSI history, self-injuring individuals significantly reported lower self-esteem (Cawood & Huprich, 2011). Those who are still injuring themselves also demonstrated lower levels of self-esteem than past self-injurers who already had stopped engaging in NSSI episodes (Rotolone & Martin, 2012).

Dissociation is often related to NSSI. Dissociation refers to "a psychological state in which the individual experiences an alteration in consciousness, memory, and sometimes identity" (Alderman, 1997, p. 37). In some cases NSSI may be used as a way of coping to gain control over a dissociative state and increase awareness.

Alternatively, dissociation may also be used as a coping strategy to numb or lessen the pain caused by NSSI. The high tension that occurs before NSSI may alter consciousness and cause a dissociated state in which the person may feel numb before injuring oneself (Alderman, 1997). Among self-injuring participants, 24% reported the function of NSSI was to stop feeling numb and to feel more alive; this is consistent with one function of NSSI to control the state of dissociation (Polk & Liss, 2005).

It has been widely discussed in the literature that self-injury is associated with depression. Self-injurers tend to report higher level of distress compared to nonself-injury individuals (Matsumoto et al., 2004; Muehlenkamp & Gutierrez, 2004; Nixon et al., 2002; Nock et al., 2006; Ross & Heath, 2002; Whitlock et al., 2006). The repetition of self-injury also associated with higher depression compare to the non-repeaters (Hawton et al., 1999). Before the self-injury episode, 87% reported feeling depressed. Self-injuring individuals tend to report feeling sad, lonely, and alone prior to and while injuring themselves (Brunner et al., 2007; Ross & Heath, 2002). For some individuals, self-injury is used to cope with depression (Murray et al., 2005). The present research will focus on depression, as it is considered as a key factor associated with deliberate self-injury and increased suicide risk, both of which need early identification (Hawton et al., 1999).

1. 2. 2 Protective Factors

There are protective factors against the risk for NSSI or suicidal behaviors, however less attention has been paid to this topic, compared to studying risk factors (Gutierrez & Osman, 2008; Klonsky & Glenn, 2009; Rotolone & Martin, 2012). Social connectedness, problem solving, protected young adults from serious suicide

attempts (Donald, Dower, Correa-Velez, & Jones, 2006; Nock & Mendes, 2008). Effective management of negative emotions, family and social support, and resiliency (Brausch & Gutierrez, 2010; Cawood & Huprich, 2011; Klonsky & Glenn, 2009; Rotolone & Martin, 2012) are example of potential protective factors against self-injury.

Protective factors lower the probability that a disorder will develop. Protective factors may be interpreted as variables that increase resilience, the ability to "bounce back" within a stressful environment (Klonsky & Glenn, 2009). These supportive resources, which can be direct factors, or function as mediators or moderators, have been linked empirically to decreased self-injury (Gutierrez & Osman, 2008). A variable may function as either a moderator or a mediator depending on the research question and the theory being tested (Frazier, Tix, & Barron, 2004). The current study will focus on supportive resources that may potentially serve as mediators or moderators of the relationship of self-injury with childhood maltreatment.

Moderation presents as an interaction, in which the effect of a predictor on an outcome variable is changed by the level of the moderator variable. This interaction effect is important for intervention studies, investigating why interventions may be more effective for some people than for others (Baron & Kenny, 1986; Dearing & Hamilton, 2006; Frazier et al., 2004). Cha and Nock (2009) define protective factors as a third variable that modifies the strength or direction of the relation between a risk factor and behavior. Their study reported that emotion intelligence moderates the relation between child abuse and suicidal behaviors, serving as a protective factor that reduces the occurrence of suicidal ideation and attempts.

On the other hand, a mediator explains "how" or "why" one variable predicts an outcome variable. A mediator is defined as an intervening variable that explains the pathway between a predictor and an outcome through a mediating relationship. In other words, mediator analysis suggests mechanisms of how a predictor influences an outcome variable. Mediation may be used to test what makes an intervention effective, by exploring the mechanisms behind that relation (Baron & Kenny, 1986; Dearing & Hamilton, 2006; Frazier et al., 2004). As an example, negative mood regulation expectancies mediated the relationship between insecure attachment and functional impairments (Cloitre et al., 2008).

In addition, a given variable may function as either a moderator or a mediator, based on the research question and the theory being tested. Social support conceptualized as a moderator determines that intervention might be differentially effective for participants with high and low level in social support. At the same time, social support could also be conceptualized as a mediator. Why counseling is effective is explained by increased social support (Frazier et al., 2004).

Protective factors such as effective mood regulation, resilience, and strong social support may lessen the reliance on self-injury (Klonsky & Glenn, 2009; Rotolone & Martin, 2012). Social problem solving is recognized as a potential protective factor against suicidal behavior (Gutierrez & Osman, 2008). Potential mediators such as perceived social support seem to protect against suicidal behavior (Nock et al., 2008). Dubow, Kausch, Blum, Reed, and Bush (1989, cited in Moran & DuBois, 2002) considered social support to be an interpersonal resource that could reduce the risk of engaging in problematic behavior. Identification of protective factors may help develop new and effective approaches to managing suicidal or self-injurious behavior (Gutierrez & Osman, 2008). Perceived social support is an

essential factor for understanding both risk for and intervention against NSSI (Muehlenkamp et al., 2013).

Problem Solving

Among adolescents, self-injury participants show deficits in several social problem-solving abilities (Nock & Mendes, 2008). Individuals who engage in repetitive episodes of NSSI report a passive-avoidance problem solving style. They seem more likely to avoid difficult situations as much as possible, feeling pessimistic and pre-occupied with the problems (McAuliffe et al., 2006). Among college students, social problem solving moderated the relationship between NSSI and suicidal behavior (Walker, Rowe, Tindell, Jeglic, & Hirsch, 2010). Individuals with more adaptive skills, who have the ability to use a range of problem-solving strategies, show decreased risk for intentional suicide attempts (Gutierrez & Osman, 2008).

Resiliency

Children who survive maltreatment with fewer negative effects are often referred to as resilient children. This resilience can come from inside the person or from outside, in the form of supportive resources from a caregiver. The resilient child is less likely to develop impairments, compared to those without these resources (McCoy & Keen, 2009). Resiliency is considered a protective factor that predicts self-injury. A study comparing current self-injurers and past self-injurers who ceased self-injury found level of resilience distinguished the two groups. Furthermore, both past and current self-injurers showed significantly lower levels of resilience compared to non self-injury participants (Rotolone & Martin, 2012).

Social Support

Social support is an external resource provided by others. The presence of social support may increase psychological adjustment, overcome frustration or challenge when dealing with conflicts or difficult problems (Kim, Lee, & Kim, 2009). Cobb (1976) defined social support as "information leading the recipient to believe that he or she is cared for, loved, esteemed, and a member of a network of mutual obligations" (p. 300). A number of studies have documented the link between greater social support and various positive outcomes. Higher social support increases self-esteem, which reduces aggression and delinquent behavior among adolescents (Moran & DuBois, 2002). Among Japanese participants, perceived emotional support showed positive effects on well-being and health. They reported more positive affective states such as feeling happy, elated, calm, and relaxed (Uchida, Kitayama, Mesquita, Reyes, & Morling, 2008).

Cohen (1992) described *perceived social support* as the perception of that one's social relationships will provide a resource for emotional support. Survivors of child abuse who report greater perceived social support show better developmental outcomes following maltreatment. When facing difficulties, the feeling or perception that friends and family are available to offer support seemed more important than the actual quantity of received support (Pepin & Banyard, 2006). Greater perceived support from friends also contributes to reducing burn-out among school teachers (Kim et al., 2009). Family support moderates risk of alcohol use in adolescents (Catanzaro & Laurent, 2004).

The need for social support is particularly critical when individuals feel threatened or overwhelmed (Hoffman, Ushpiz, & Levy-Shiff, 1988). It was assumed that the lack of supportive resources may increase the intensity of negative emotions,

which in turn increase the risk for NSSI to temporarily cope with emotional distress (Klonsky et al., 2011). Social support from family and peers is considered a potential protective factor that may decrease the risk of suicide or self-injurious behavior (Gutierrez & Osman, 2008). In contrast, feelings of isolation or social disconnection from others appear to precede self-injury and may increase suicide risk (Muehlenkamp et al., 2013; Suyemoto, 1998). Recent studies report that having family members or friends who provide support may reduce the risk of suicide attempts or self-injury (e.g., Fortune et al., 2008; Brausch & Gutierrez, 2010; D'attilio, Campbell, Lubold, Jacobson, & Richard; 1992; Eskin, 1995; Muehlenkamp et al., 2013). Those who are greater risk for suicide reported fewer social contacts and being less satisfied with social support from peers and family members (D'attilio et al., 2002).

Factors that prevent adolescent self-injury are discussing concerns with others and having someone to talk to who will listen and provide support. Care from family members is an important source of support. In addition, having a peer in school to provide support helps (Fortune et al., 2008). A study by Klonsky and Glenn (2008) among college students with self-injury history found that the thing that was most helpful to students in resisting self-injury urges was finding someone understanding. Other commonly reported methods for resisting urges were "keeping busy", "being around with friends", and "talking to someone about how you feel".

Likewise, support from parents and family is associated with lower suicide risk in adolescents (Eskin, 1995). In other studies, children who engage in nonsuicidal self-injury, rather than making suicide attempts, reported more parental support (Brausch & Gutierrez, 2007; Muehlenkamp & Guttierrez, 2007). Suicide attempters report less support than children with only suicide ideation (Smith & Anderson, 2000).

A recent study of self-injury among university students found that individuals with no self-injury history reported significantly higher levels of overall social support, family support, and peer support, compared to self-injurers. Furthermore, those who had previously practices by since given up self-injury reported more family support compared to current self-injurers (Rotolone & Martin, 2012). Improving social support appears to promote a better adjustment for emotional-focused coping to stressful events, and be a valuable strategy for both therapy and preventive programs for reducing self-injury (Cohen, 1992; Rotolone & Martin, 2012). Perceived social support, as an interpersonal resource that may linked to negative emotions and may potentially decrease the risk of engaging in maladaptive behaviour, will be the focus in this study.

1. 2. 3 Connecting the Association to Self-Injury

The factors associated with self-injury discussed above help explain pathways by which self-injury may occur. To establish effective treatment and prevention, research has focused on developing models to explain why NSSI occurs and how the behavior is maintained (Muehlenkamp et al., 2013). Nock (2009; 2010) proposes an integrated model based on the literature (Figure 2). This model explains why distal factors, such as childhood abuse, are associated with self-injury: (a) NSSI serves functions of regulating one's emotional/cognitive experiences and of communicating with others; (b) risk for self-injury is increased by the presence of distal factors, such as child abuse, that contribute to affect regulation difficulties and interpersonal communication; and (c) self-injury specific factors (e.g., social modeling, self-punishment) affect the functions that NSSI may serve.

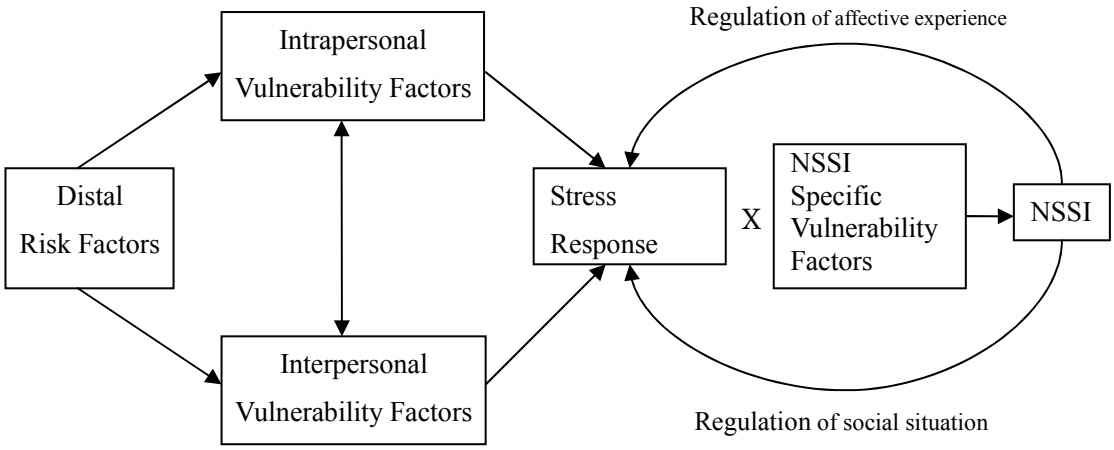

Figure 2. Integrated Theoretical Model of the Development and Maintenance of NSSI (Nock, 2009; 2010).

Nock's model suggests that individuals develop intrapersonal (e.g., high negative emotion, negative cognitions, poor distress tolerance) or interpersonal vulnerabilities (e.g., lack of communication skills, inadequate social problem-solving strategies) that cause them to respond to stress with affective or social dysregulation resulting in NSSI. Distal factors such as childhood trauma may prevent a child from learning and developing effective social problem solving or communication skills, and may result in increased emotional reactivity and incapability of managing emotional impulses. As a result, they may use maladaptive coping strategies such as NSSI to deal with stress response (Nock, 2009; 2010).

A study by Adrian et al. (2011) suggested an integrated model based on risk factors that serve an important role among adolescence NSSI. The model illustrated the complex relationships between individuals' environment and their adaptation, how NSSI behavior may develop through a cycle of difficult relationships, emotional problems in unsupportive environment to manage the distress (see Figure 3).

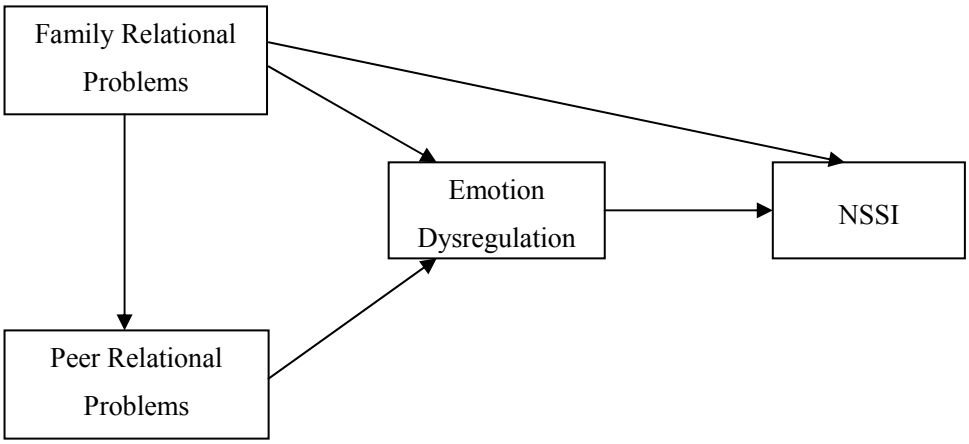

Figure 3. Interpersonal Problems, Emotion Dysregulation, and NSSI (Adrian et al., 2011)

Adrian's model features emotion dysregulation as a core factor in NSSI. Family and peer interpersonal problems have direct negative effects on emotional dysregulation, which in turn influence NSSI. This link highlights that difficulties regulating negative emotions in an unsupportive environment increases the risk of responding to strong negative emotions in a maladaptive ways.

Interpersonal skill deficits may result in difficulties maintaining meaningful social relationships and may lower perceived social support (Muehlenkamp et al., 2013). Relationship with peers play an important role in later adolescence. Study 3 adds childhood maltreatment as a distal factor to examine the roles of mood regulation difficulties and social support in the maintenance of self-injury.

1. 3 Affect Regulation Model

Among self-injury studies, the most discussed models explaining self-injurious behavior are based on emotion regulation and tension reduction theories. Evidence suggests that a majority people's primary intent when hurting themselves is to alleviate negative affect (e.g., Klonsky, 2007; 2009). This will be the focus of the current study.

People with a history of maltreatment tend to develop a whole range of problems, with long-term effects on the person's social development and emotional well-being (Alderman, 1997; Muehlenkamp et al., 2013). For example, overprotective and less caring parents are related to borderline personality disorder (Machizawa-Summers, 2007). It is not uncommon that child maltreatment is associated with a range of problems and disorders, such as depression, anxiety, difficulties in emotion regulation, poor peer relationships, trouble adapting to school, substance abuse, being socially withdrawn and self-injury (Cicchetti & Lynch, 1993; Yates, 2009).

Many studies have suggested that trauma during childhood may predict later self-injury through a variety of mechanisms (e.g., Yates, 2004), primarily through the emotion regulation function of self-injury (Prinstein et al., 2009). Seventy-nine percent of self-injurers reported a childhood history of abuse or neglect (Van der Kolk et al., 1991).

Persons with self-injury and those who have experienced childhood maltreatment report significant difficulties with mood regulation compared to non-injurers. These traumatic events may cause a person to respond less adaptively to stressful events or to have less confidence about facing painful emotions (Muehlenkamp, Kerr, Bradley, & Adams Larsen, 2010), particularly anger

(Suyemoto & MacDonald, 1995). Child maltreatment as distal factor contributes to problems with affect regulation and with interpersonal communication. Distal factors such as childhood maltreatment increase the vulnerability to respond to difficult problems in non-adaptive ways (Nock, 2009; 2010).

Self-injury may be used to express one's emotion and conflict, whether directed at self or at others, and also to achieve a sense of control over intolerable negative emotions (Suyemoto, 1998; Suyemoto & MacDonald, 1995). Eighteen studies on self-injury support the affect regulation function. Klonsky (2007b) summarized the stages of the affect regulation process: 1) intense negative emotions precede the NSSI episode; 2) decreased negative emotions and sense of relief come after self-injury; 3) self-injury is mostly performed for the function of alleviating negative affect; and 4) negative affect and tension are reduced by injuring oneself.

This affect regulation model predicts that child maltreatment results in impairments in developing critical competencies such as emotion regulation skills, which later creates vulnerabilities for coping maladaptively with distressing problems in life (Muehlenkamp et al., 2010). Attachment theorists suggest that trauma in childhood tends to reduce the capacity for supportive interpersonal experiences or healthy emotional regulation strategies later in life. This theory is consistent with the emotion regulation function conception of NSSI. According to this theory, early interpersonal experiences such as childhood trauma have an indirect effect on NSSI through an individual's incapability to cope with emotional distress (Prinstein et al., 2009).

1. 4 Main Purpose of Current Study

1. 4. 1 Why This study is Important

Self-injurious behavior is a concerning behavior that represents a critical health service issue. There are complex reasons that people hurt themselves without the intent to die (Klonsky et al., 2011). Even for professionals, self-injury is considered difficult to understand and effectively treat (Walsh & Rosen, 1988). The rates of self-injury continue to rise among adolescents and young adults. Individuals who engage in self-injury cause physical harm, which often causes distress to their friends and family, and they are at higher risk for an actual suicide attempt. This problem makes necessary effort for early identification and prevention.

Understanding why people engage in self-injury may provide information for developing interventions for similar harmful or unhealthy behaviors such as alcohol and substance abuse (Matsumoto et al., 2008; Nock, 2010). Certain risk factors contribute to the development and maintenance of self-injury. It is important to obtain information on factors that increase the risk for self-injury (Klonsky & Glenn, 2009). Demonstrating the etiological contribution of maltreatment to self-injury may facilitate understanding (Yates, 2009).

Child maltreatment often plays a strong role in the etiology of self-injury, but this is not always the case. Many individuals who have survived child maltreatment do not engage in self-injury or high-risk behaviors. Similarly, not all who self-injure were abused in the past. There is a need to clarify the factors that distinguish between maltreated individuals who engage in self-injury and those who do not engage in self-injury, as well as self-injurers without history of maltreatment. Identifying protective mechanisms that mediate positive outcomes may enhance

further understanding of the behavior and lead to ways to identify at-risk adolescents who would benefit from interventions (Klonsky et al., 2011; Yates, 2004, 2009). However, to date little research has focused on the pathways by which child maltreatment leads to self-injury, and on what protective factors limit the effect of child maltreatment on self-injury.

Not just risk factors are important. Protective factors that protect individuals from engaging in self-injury or other maladaptive behavior need to be explored further (Skegg, 2005). A majority of studies of protective factors come from studies that focused on suicidal behavior (Klonsky & Glenn, 2009; Weierich & Nock, 2008). Nock (2010) strongly suggested an examination on the process through which interpersonal factors (e.g., support from others) play role in the development and maintenance of NSSI. Cha and Nock (2009) recommended researching how mood regulation interacts with social support as potential protective factors to reduce suicide risk. Paivio and McCulloch (2004) examined the intervening role of mood regulation between child maltreatment and self-injury but it did not examine social support. Another study by Adrian et al. (2011) examined family conflict, social support, mood regulation and self-injury, but it did not include child maltreatment. Further research assessing social support as an interpersonal predictor of NSSI, in conjunction with emotion regulation, is needed as to develop prevention and intervention strategies (Muehlenkamp et al., 2013).

1. 4. 2 Main Purpose

Self-injury is a concerning behavior that is prevalent among youth and young adults across cultures. The apparently rising rates of this behavior motivate researchers to search for ways to predict, understand, and treat self-injury (Yates,

2009). However, little is still known about why people purposely hurt themselves. Based on review of the literature, the primary purpose of this study is to achieve more understanding of the behavior, including risk and protective factors that contribute to increasing and decreasing the rate of self-injury. Ultimately, this research may suggest implications for intervention with self-injurers.

The first objective was to provide descriptive data on the prevalence and characteristics of self-injury in a sample of university students. The second objective was to identify the potential risk and protective factors for self-injury. Among self-injury studies, there are many factors that have been linked to this behavior. The current study will focus on the most important factors that commonly show a strong association with self-injury: child maltreatment, mood regulation, depression, and social support. Child maltreatment is the strongest predictor of self-injury. It may limit children's capacity to regulate emotion well, which increases the risk of self-injury for affect regulation purposes. Depression has also been linked to increased self-injury and suicide attempts. Social support has been discussed as a potential protective factor, but it has been less studied. Moreover, the integration of pathways among associated factors is still not well understood.

The third objective was to investigate potential protective factors, including interactions of multiple factors that may buffer the effect of child maltreatment. Although child maltreatment has been proposed as a distal factor that strongly predicts self-injury, many of the survivors do not manifest self-injury. Thus, protective factors in the environment or the individual may help some achieve more positive outcomes. Only few studies have examined the links between multiple factors in a single model. The third objective will evaluate the contributions of several variables in a single model.

1. 4. 3 Target Participants and Methodology

The present study will focus on samples in a nonclinical, community setting, such as schools and colleges (Whitlock & Knox, 2009). To date, the literature reports less descriptive information about community samples, as the majority of studies on self-injurious behavior have been conducted in clinical or psychiatric settings (Gratz et al., 2002; Muehlenkamp & Gutierrez, 2004; Ross & Heath, 2002; Suyemoto, 1998). Examination of community samples is important, since many of those with self-injury do not seek help or come to health professionals (Zetterqvist et al., 2014). University students will be the focus of the present study, as self-injury may persist into young adulthood or begin during young adult years (Klonsky et al., 2011). College-age students are in a period of transition that is approaching the end of adolescence and entering young adulthood.

Although self-injurious behavior is a concerning behavior across countries, most studies on self-injury and suicidal behavior have focused on Western countries; less studied are non-Western countries, including Japan and Indonesia (Khan, 2005; Vijayakumar, John, Pirkis, & Whiteford, 2005; Matsumoto, Imamura, Chiba, Katsumata, Kitani, & Takeshima, 2008). It is possible that East Asian cultures are more group oriented, requiring individuals to adjust their behavior to the group, rather than to personal wishes. They emphasize values such as conformity, fitting in, and harmony with the group, such as avoiding experience of anger (Markus & Kitayama, 1991; Matsumoto, 2006). Studies of suicidal behaviors among Hong Kong residents (e.g., Wong, Stewart, Ho, & Lam, 2007) and Chinese adolescents (e.g., You, Lin, & Leung, 2013) found similar findings to those in the West. Among Chinese students, the primary reason for NSSI was affect regulation. Similarities between Japan and Indonesia may emerge in current study.

All data were collected using anonymous self-report measures. Self-injury is a secretive behavior and people are unlikely to reveal self-injury publicly. Many of the other people around self-injurers are not aware of the behavior. Thus, lifetime prevalence of self-injury is difficult to assess accurately (Suyemoto, 1998; Whitlock et al., 2006). Prior study of self-injurious behavior in Indonesia was conducted through interviews of a small sample, so the rates in a community setting remain unknown (Tresno & Satiadarma, 2005). Victims of child maltreatment are more hesitant to talk about their experience openly (Ono et al., 1996). Data from questionnaire-based methods offer promising preliminary results (Prinstein et al., 2009) and, therefore, were used as the methodological approach in this study.

1. 5 Thesis Outline

The introduction and literature review in Chapter 1 introduce the definition, characteristics and prevalence of self-injurious behavior, as well as the associated risk and protective factors. As self-injury is associated with serious maladaptive outcomes, and potentially suicide, it is important to find ways to prevent and intervene with it.

Although self-injury is not suicidal behavior and is distinct in terms of motivation and severity, self-injury is related to suicide attempts. While there are clear differences between the two, self-injury often co-occurs with suicide attempts, and those who engage in self-injury are at higher risk for suicide attempts. Chapter 2 examines self-injurers who had attempted suicide, and distinguishes nonsuicidal self-injury from self-injury with a history of suicide attempts to identify the risk factors that increase suicidality. This chapter identifies the relationships among child maltreatment, mood regulation expectancies, depression, and self-injury among

Indonesian students. Following chapter need to identify protective factors that minimize the effect of child maltreatment and lessen the likelihood of self-injury.

Chapter 3 presents further analysis of the relationships among child maltreatment, depression, mood regulation expectancies, and nonsuicidal self-injury. Data from Japanese and Indonesian students were analyzed and presented in Study 2a and Study 2b, respectively. Child maltreatment has been identified as a strong predictor for self-injury between Indonesia and Japan, and also as increasing the risk for suicide attempts. However, not all maltreated individuals develop self-injury. This chapter attempted to identify protective factors that could buffer the effect of child maltreatment and reduce the severity of self-injury, such as mood regulation expectancies. The findings suggest an identification on factors that contribute to increase one's mood regulation expectancies, and how the connection between factors that may lead to NSSI.

The study in Chapter 4 explored differences between individuals with and without self-injury. This chapter tested an integrated model that linked child maltreatment, as distal factor, to self-injury. Study 3a presents data from a Japanese sample, and Study 3b presents data from an Indonesian sample. Preliminary findings identified the roles of mood regulation expectancies and expectancies for social support that influence how child maltreatment leads to self-injury. A section on reasons for self-injury is also included in this chapter.

Chapter 5 presents a summary of the overall findings in this thesis. The contribution, implication, limitation and future direction are discussed in this section.

Chapter 2

Self-Injurious Behavior and Suicide Attempts

2. 1 Introduction and Aim of Study

There are both differences and similarities between nonsuicidal self-injury (NSSI) and suicidal behavior. Both acts often co-occur: individuals who engage in NSSI are at higher risk for suicide and many self-injurers report suicide attempts (Klonsky et al., 2011). Self-injurious acts may result in unintentionally severe harm or even accidental death. In some cases, those who engage in self-injury are more likely to consider or attempt suicide (Khan, 2005; Whitlock et al., 2006).

It is well known that high levels of depressive symptoms are associated with greater risk for suicide (Muehlenkamp & Gutierrez, 2004; Wong, Stewart, Ho, Rao, & Lam, 2005). Depressed individuals tend to experience self-destructive ideas and have the sense that life is not worth living. Over a period of time, such thoughts may lead to specific plans that culminate in a suicide attempt (Emery & Oltmanns, 2000).

Wong et al. (2007) suggested that self-injury with the present of suicide attempt (SI+SA) represented the greatest pathology compared to other groups, particularly in terms of emotional difficulties and depression. This conclusion was supported by Stanley, Gameroff, Michalsen, and Mann (2001) and Whitlock et al. (2006) who also found self-injurers who have considered or attempted suicide had high level of distress. However, Muehlenkamp and Gutierrez (2004) reported no difference between self-injury only individuals and people who have attempted suicide, with both experiencing high level of distress. The authors concluded that self-injury may be used to deal with overwhelming feelings.

A study among Japanese adolescent suicide attempters reported that they were more likely to have a poor family environment, be victims of neglect and emotional abuse, have excessive demands placed on them, feel alone, alienated, depressed and less emotionally supported through difficult moments, and have a past history of self-harm (Murase et al., 2004). Muehlenkamp and Gutierrez (2004), Stanley et al. (2001), and Zoroglu et al. (2003) found a significant positive relationship of number of types of trauma with suicide attempt and self-injury. Individuals who had attempted suicide reported more severe childhood trauma than did self-injurers. Thus far, data regarding causes of self-injury are only correlational. Some cross-cultural studies link suicide attempts with more severe childhood trauma (Stanley et al., 2001; Zoroglu et al., 2003). However a meta-analysis by Klonsky and Moyer (2008) found no association between child abuse and NSSI.

The first act of NSSI typically occurs between 13 and 15 years old (Muehlenkamp & Gutierrez; 2004), at a time when adolescents have distressing conflicts with parents or friends (Ng, 1998). Across cultures, the most frequently reported form of injury is cutting the skin with sharp objects, followed by hitting or punching oneself (Ross & Heath, 2002; Rotolone & Martin, 2012). The majority of people engaging in self-injury use more than one method in repeated episodes (Gratz et al., 2002). Women seem more likely to injure themselves than men (Ross & Heath, 2002; Whitlock et al., 2006). However, some studies have reported no sex differences in self-injury (Gratz et al., 2002; Muehlenkamp & Gutierrez, 2004).

NSSI is associated with emotional dysregulation, and NSSI individuals have difficulty expressing their emotions openly (Gratz et al., 2002). Polk and Liss (2004) found that non-self-injury (NoSI) individuals had better emotion regulation than did an NSSI group. Self-injury with a suicide attempt (SI+SA) is associated with the

most severe emotional pathology, particularly depression (Stanley et al., 2001; Whitlock et al., 2006; Wong et al., 2005).

Despite the seriousness of the risk of self-injury, the prevalence of individuals' injuring themselves remains unclear, and less studied in developing countries (Khan, 2005). The current study aimed to replicate previous, mostly western, research by reporting the prevalence of self-injury and suicide attempts in a sample of college students in one developing country, Indonesia. It also sought to examine whether NSSI, SI+SA, and NoSI groups differed in level of negative mood regulation expectancies, depression, and history of childhood trauma.

I hypothesized that the SI+SA group would report higher levels of child maltreatment, depression, and lower mood regulation expectancies than the other groups would. I further predicted that NSSI individuals would report more childhood maltreatment and lower mood regulation expectancies than the NoSI group.

2. 2 Method

2. 2. 1 Participants

A total of 314 college students majoring in psychology at a private university in an Indonesian metropolitan area participated in this study. Seven individuals who attempted suicide alone without engaging in self-injury were not included in the analysis, leaving data from a total of 307. Of that number, 76% (n = 234) were women. The mean age of the participants was 19.78 (SD = 1.66), with age ranging from 16 to 27 years.

In classes, participants completed four questionnaires that assessed risk factors linked to self-injurious behavior. The original questionnaires were in English

and were translated into the native language using a back translation procedure and discussion among bilingual professionals. To address cultural differences, small modifications were made. A pilot study (n = 54) suggested that the questions were well understood. All participants completed and returned the questionnaires anonymously and voluntarily. Participants received small souvenirs in exchange for their participation.

2. 2. 2 Measures

Deliberate Self-harm Inventory (DSHI) (Gratz, 2001). The DSHI consists of 17 dichotomous items assessing frequency, duration (including age of the first episode of NSSI and when was the last engagement in NSSI), severity, and type of self-injurious behavior. Participants were classified as self-injurers if they answered "yes" to any of the items. The sum of participants' frequency scores represented overall self-injury frequency. Participants who answered "no" to all self-injury behaviors were assigned to the NoSI group. The Cronbach's alpha for the Indonesian DSHI was good (.76).

NMRE. Measurement of mood regulation expectancies was done by the *Negative Mood Regulation (NMR) Scale* (Catanzaro & Mearns, 1990). Participants' confidence in their mood regulation abilities was measured using the 30-item NMR Scale. Statements regarding one's beliefs about one's ability to alleviate negative mood states are rated on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). All statements start with "When I'm upset, I believe that…." Example items are "I can do something to feel better" and "I'll feel better when I understand why I feel bad." This scale potentially serves as a useful tool for

identifying individuals at risk for developing affective distress or mood disorder (Kassel, Bornovalova, & Mehta, 2006). In the current sample, this scale showed high internal consistency (alpha = .87). Higher NMR Scale scores reflect higher confidence that one can regulate one's negative emotions—stronger NMR expectancies (NMRE).

Center for Epidemiological Studies-Depression Scale (CES-D). Originally a 20-item scale by Radloff (1977). This scale is now widely used in non-English-speaking and developing countries (Mackinnon, McCallum, Andrews, & Anderson, 1998). A shorter, 10-item CES-D was later created (Cheung, Liu, & Yip, 2007; Andresen, Malmgren, Carter, & Patrick, 1994). Respondents indicate the frequency of 10 depressive symptoms, all starting with statement "During the past week…," using a scale ranging from 0 (*less than 1 day*) to 3 (*5-7 days*). A total score of 10 or greater for the 10 items indicates depression. Cronbach's alpha for this study was high (.81).

Child Abuse and Trauma (CAT) (Sanders & Becker-Lausen, 1995). The CAT assesses the severity of maltreatment experienced in the home environment during childhood and adolescence. The CAT contains 38 items comprising 3 subscales: neglect/negative home atmosphere (14 items), punishment (6 items), and sexual abuse (6 items). Due to cultural prohibitions against discussing sexuality (Ikeda, 1987), the sexual abuse items were not included in this study. Responses ranged from 0 (*never*) to 4 (*always*). Example items are, "As child or teenager, did you feel disliked by either of your parents?" (Neglect/negative home atmosphere); "When you were punished as a child or teenager, did you understand the reason you were punished?" (Punishment). The CAT has satisfactory internal consistency, with alphas of .82 and .73 for the negative home environment/neglect and punishment

subscales, respectively.

Suicide attempts. Suicide attempt history was obtained by asking, "Have you ever attempted to end your life?" Participants who answered "yes" to this question and reported at least one self-injury method were categorized as in the SI+SA group. Those reporting a suicide attempt also answered two open ended questions assessing age and method used for the suicide attempt.

2. 3 Results

2. 3. 1 Prevalence of Self-injury and Suicide Attempts

Of the 307 participants, 38% (n = 117) reported at least one intentional self-injury; 72% of the self-injurers were women (n = 84). The average age of first self-injuring act was 14.39 (SD = 3.70). Five participants' (2 men and 3 women) injuries resulted in hospitalization or medical treatment; 21% reported making at least one suicide attempt (n = 25), with 76% (n = 19) of attempts being by women. The mean age of first suicide attempt was 15.60 years (SD = 3.39). There were no gender differences for engaging in NSSI, $\chi^2(1, 282) = 2.36$, *n.s*. Likewise, rates of suicide attempts were equal between genders, $\chi^2(1, 215) = .11$, *n.s.*

Cutting was the most common self-injury method, endorsed by 35% of the NSSI group, followed by punching oneself (30%). Only carving pictures into the skin was more common among men, $\chi^2(1, 92) = 8.81$, $p < .05$. In the SI+SA group, cutting (60%) and banging one's head (44%) were the most reported self-injury methods (see Table 3 for frequencies of methods of self-injury and suicide attempts). The most common method for suicide attempt was wrist-cutting (32%), followed by poisoning, overdosing, and jumping from a height (each 12%). The average duration

of self-injury was 1.38 years (*SD* = 1.38). Most of the self-injury participants--15% of the NSSI group and 16% of the SI+SA group--reported NSSI episode in the past year.

Table 3

Descriptive Statistics for Method of Self-injury and Suicide Attempt

	NSSI (*n*=92)		SI+SA (*n*=25)	
	n	%	*n*	%
Self-injury Methods:				
Cutting	32	35	15	60
Burning with cigarette	2	2	1	4
Burning with lighter or match	1	1	0	0
Carving words into skin	14	15	5	20
Carving pictures into skin	8	8	3	12
Severe scratching	27	29	6	24
Biting	21	23	10	40
Rubbing sandpaper	0	0	0	0
Dripping acid on skin	0	0	1	4
Using bleach or oven cleaner to scrub skin	0	0	0	0
Sticking pins, needles	21	23	10	40
Rubbing glass into skin	5	5	0	0
Breaking bones	1	1	0	0
Banging head	24	26	11	44
Punching self	28	30	10	40
Interference with wound healing	15	16	7	28
Other forms of self-harm (skin- pinching, hair- pulling, punching wall)	24	26	7	28

Multiple Methods	52	57	20	80
Self-injury Frequency:				
1x	12	13	1	4
2-10x	66	72	12	48
11-20x	5	5	6	24
>20x	8	9	6	24
NSSI in the past 1 year	14	15	4	16
Resulted in hospitalization	3		2	

2. 3. 2 Risk Factors for Self-injury and Suicide Attempts

I conducted a multivariate analysis of variance (MANOVA) with self injury group (NSSI, SI+SA and NoSI) as the independent variable and risk factors as the dependent variables to compare the relative association of the predictors with the group (see Table 4). The MANOVA showed a significant multivariate effect among the 3 groups, $F(8, 602) = 11.09$, $p < .01$. A univariate ANOVA showed significant differences for the NMR Scale, $F(2,304) = 5.50$, $p < .05$: the SI+SA group had lower NMRE ($M = 102.88$, $SD = 14.01$) than the NSSI ($M = 107.71$, $SD = 13.00$) and NoSI ($M = 110.55$, $SD = 10.95$) groups. Contrary to my prediction, NSSI individuals did not differ from the NoSI group in NMRE. A univariate ANOVA for depression was also significant, $F(2,304) = 10.09$, $p < .01$. Consistent with Wong et al. (2007), the SI+SA group showed more depressive symptoms ($M = 11.88$, $SD = 6.54$) than the other two groups. Level of depression did not differ between the NSSI ($M = 8.48$, $SD = 5.07$) and NoSI groups ($M = 7.31$, $SD = 4.59$). This was also similar to Brodsky, Cloitre, and Dulit's (1995) finding that these groups did not differ on level of depression.

Table 4

Comparison of Self-injury Risk Factors by Self-injury Group

	NSSI (*n*=92)	SI+SA (*n*=25)	NoSI (*n*=190)	
DSHI	8.98 (19.18)	15.42 (14.79)		
NMRE	107.71 (13.00)	102.88 (14.01)	110.55 (10.95)	*F* (2, 304)=5.42* SI+SA < NoSI
CES-D	8.48 (5.07)	11.88 (6.54)	7.31 (4.59)	*F* (2, 304)=9.80** SI+SA > NSSI, NoSI
CAT-Total	28.21 (13.87)	43.84 (18.86)	20.65 (10.20)	*F* (2, 304)=43.87** SI+SA > NSSI > NoSI
CAT-Neglect	22.38 (12.82)	37.04 (17.99)	15.13 (9.65)	*F* (2, 304)=44.53** SI+SA > NSSI > NoSI
CAT-Punishment	5.83 (2.48)	6.80 (2.24)	5.52 (2.31)	*F* (2, 304)=3.37* SI+SA > NoSI

Note. NSSI = non-suicidal self-injury. SI+SA = self-injury with suicide attempt; NoSI = non-self-injury. DSHI = Deliberate Self-Harm Inventory. NMRE = Negative Mood Regulation Expectancies. CES-D = Center for Epidemiological Studies-Depression. CAT = Child Abuse and Trauma.

*p<.05. **p<.01.

An ANOVA for childhood trauma revealed that the three groups significantly differed on neglect, $F(2, 304) = 45.34$, $p < .01$, and punishment, $F(2, 304) = 3.40$, $p < .05$. The SI+SA group reported more childhood trauma ($M = 43.84$, $SD = 13.84$) than the two other groups; in addition, the NSSI group ($M = 28.21$, $SD = 13.84$) was higher than the NoSI group ($M = 20.65$, $SD = 10.19$). As expected, the SI+SA group displayed more severe levels of each risk factor than did the other two groups; the NSSI group had more childhood neglect than the NoSI group.

The vast majority of NSSI individuals had injured themselves more than one time (87%), and 57% reported using multiple NSSI methods. The longest duration of NSSI was 15 years, while average years of engagement was 1.38 years (*SD* = 2.73), and 15% (*n* = 14) reported having injured themselves within the past 12 months. In the SI+SA group, the longest duration was 16 years, and 16% (*n = 4)* reported a history of self-injury within the past 12 months. In this group, 94% had injured themselves in multiple episodes, and 80% used more than one self-injury form.

Finally, the SI+SA group reported more cutting than did the NSSI group, $t(115) = -2.31$, $p < .05$, and more self-injury methods, $t(115) = -2.29$, $p < .05$. Regarding the number of NSSI episodes, the SI+SA group reported more frequent self-injury (*M* = 15.42, *SD* = 14.79) than the NSSI group (*M* = 8.98, *SD* = 19.18), but there was no significant difference in the number of self-injury episodes, $t(114) = -1.53$, *n.s.*

Further examination was performed to find possible differences between NSSI and NoSI groups on level of NMRE and depression**.** Ninety-nine self-injurers with more than 10 incidences of self-injury in the past were classified into a severe self-injury group (SSI). Self-injury studies by Lloyd-Richardson et al. (2007) and Nock and Prinstein (2004) reported self-injury frequencies from 0 to multiple episodes more than 10 times. Individuals endorsing moderate/severe self-injury were likely to engage in more types of self-injury. Comparing SSI with NoSI groups revealed significant differences on NMRE, $t(205) = -3.10$, $p < .05$, and depression, $t(205) = 3.48$, $p < .05$. The SSI group had lower expectancies for mood regulation (*M* = 101.1; *SD* = 18.76), and more depressive symptoms (*M* = 10,6; *SD* = 5.46) than non-self-injurers. This suggests that more frequent self-injury episodes are associated with more depression and lower mood regulation skill.

2. 3. 3 Correlational Analyses

Individuals with a self-injury history were analyzed to investigate the relationship between self-injury and associated risk factors. The injury frequency score from the DSHI was positively skewed; a logarithm was used to transform it. Correlation coefficients were computed to determine the association between self-injury and the each factors. Table 5 displays correlations separately by self-injury group. The majority of the risk factors had moderate relationships with self-injury frequency for the combined self-injury group. Self-injury was negatively correlated with NMRE, $r(117) = -.23$, $p < .05$, and positively correlated with CAT neglect, $r(117) = .51$, $p < .01$.

All risk factors were also associated with each other, except for punishment, which did not correlate with self-injury or depression. NMRE negatively correlated with depression and childhood trauma, indicating that greater confidence in mood regulation is associated with lower depression levels and fewer traumas in childhood. In contrast, depression positively correlated with childhood trauma: greater childhood trauma was associated with more depression.

I also examined the association between self-injury and risk factors for NSSI and SI+SA groups separately as the two groups represent two different categories of behavior. The NoSI group was not included in this analysis. In the SI+SA group, NMRE were not associated with self-injury, but depression was highly correlated with self-injury, $r(25) = .75$ $p < .01$; neither NMRE nor CAT punishment were not associated with self-injury in the NSSI group.

Table 5

Intercorrelations of Scale Totals by Self-injury Group

		1	2	3	4	5
1	DSHI					
2	NMRE	-.23*				
		-.18				
		<u>-.24</u>				
3	CES-D	.32***	-.54***			
		.11	*-.54****			
		<u>.75***</u>	<u>-.48*</u>			
4	CAT-Neglect	.51***	-.25**	.31**		
		*.42****	*-.19*	*.09*		
		<u>.51*</u>	<u>-.27</u>	<u>.55**</u>		
5	CAT- Punishment	.14	-.21*	.11	.36***	
		.15	*-.18*	*.04*	*.33***	
		<u>-.14</u>	<u>-.24</u>	<u>.19</u>	<u>.34</u>	

Note. DSHI = Deliberate Self-Harm Inventory. NMRE = Negative Mood Regulation Expectancies. CES-D = Center for Epidemiological Studies-Depression. CAT = Child Abuse and Trauma. Correlations in Roman text are the combined NSSI and SI+SA groups (n = 117); *italicized* correlations are NSSI only (n = 92); <u>underlined</u> correlations are SI+SA only (n = 25).

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

2. 4 Discussion

Among college students in Indonesia, I found a 38% lifetime prevalence of self-injury, which is consistent with Gratz's (2001) report that 35% to 38% of American students admitted this behavior. A sobering finding was the great number of self-injurers who had attempted suicide (21%).

I found the first act of self-injury occurred on average at 14 years old, similar to the West (Muehlenkamp & Gutierrez, 2004). Likewise, the average age of

first suicide attempt was 15 years old. Most participants no longer were engaging in self-injury, even though some had injured themselves for 15 to 16 years. This supports Ross and Heath's (2002) contention that self-injury serves as a temporary method of coping. Also self-injurious behavior was not more common in women, replicating studies reporting no gender difference (Gratz et al., 2002; Muehlenkamp & Gutierrez, 2004). Rates of suicide attempts were also equal between men and women (Eskin, 1995).

More than half of individuals in the NSSI and SI+SA groups used more than one method to harm themselves, in multiple episodes. The SI+SA group reported more variety in method of self-injury than the NSSI group did. This is consistent with Nock et al.'s (2006) prediction regarding Joiner's (2005) theory of suicide: that using more NSSI methods may increase the probability of suicide attempts. However, though the SI+SA group reported more NSSI episodes, similar to Nock et al., self-injury frequency did not significantly differ between self-injurers with and without suicide attempts. In addition, consistent with Ross and Heath (2002), the current study found skin-cutting to be the most common method used by both NSSI and SI+SA groups. Wrist cutting was the most reported suicide attempt method. I found that SI+SA individuals reported significantly more cutting methods than did NSSI only people. This suggests that individuals who cut themselves are at greater risk for suicide attempts and need greater consideration.

Correlational results confirmed moderate associations between self-injury and predictors–NMRE, depression, and childhood trauma. Self-injury was more strongly linked with neglect than with punishment. Participants with more severe neglect indicated less confidence in their affect regulation and more depressive symptoms. Comparison between NSSI and NoSI groups found a significant

difference in level of childhood trauma, but it failed to find significant differences in NMRE and depression. Comparing the three groups revealed that SI+SA participants had experienced more traumatic events in childhood, were more depressed and had poorer NMRE. These factors distinguished the SI+SA group from the NSSI group.

Further analysis of level of depression and NMRE between severe self-injury and non-self-injury groups demonstrated that more frequent self-injury episodes were linked to greater risk of depression and emotional difficulties. Those who suffered from some kind of traumatic events in childhood tended to have more impairment in social development and emotional well-being.

Childhood trauma, especially neglect, strongly predicts self-injury (Zoroglu et al., 2003). Van Orden, Witte, Gordon, Bender and Joiner (2008) found that a thwarted sense of belongingness predicted suicidal behavior. It is possible that, as they were punished and neglected, lacking affection from caregivers, individuals' affect regulation skills did not developed well, leading them to greater emotional disturbances and leaving them prone to becoming distressed (Polk & Liss, 2007; Whitlock et al., 2006). However, those with more supportive parenting may develop better emotion regulation, think more positively, and have better strategies to enhancing their mood (Catanzaro & Mearns, 1990).

The present study had several limitations. First, I only tested a small sample from one university, so the rates found in this study may not be representative of all young adults in Indonesia. Second, this study was cross-sectional and relied solely on self-report questionnaires. Thus, it is impossible to draw conclusions about cause: does self-injury precede a suicide attempt, or do suicide attempts increase the risk of later self-injury. Third, the measures were translated into Indonesian for this study; thus, while there is evidence for the validity of the English language versions, no

data exist for the Indonesian versions. Fourth, I removed the sexual abuse items from the CAT, which limits conclusions that can be drawn about abuse. Still, child maltreatment was associated with self-injury even without including sexual trauma items. Future research needs to explore the function of self-injury. In addition, it should examine other clinical pathways by which maltreatment may affect mood and behavior, such as stress vulnerability and the buffering effect of social support from family and friends.

Self-injury is a problem in developing countries, with similar rates as in developed countries. The current study identified the co-occurrence of self-injury and suicide attempts. Considering that risk factors for and frequencies of self-injury and suicide attempts among college students have been little studied in the developing world, these findings suggest that teachers and school counselors should be vigilant to identify students at risk for suicidal behaviors. This is especially true in junior high, as much literature reports that self-injury commonly begins in early adolescence, contemporaneously with increasing conflicts with friends and family.

As Khan (2005) suggested, children and their families are often ignorant about mental health services in most developing countries, and these services are often poor. Early identification could help prevent repetition, or mitigate the severity, of self-injury. It is important to introduce more healthy coping methods, so children learn better ways to regulate negative emotions and to find help in difficult situations.

Self-injurers with a history of suicide attempts suffered more impairments and trauma than NSSI and NoSI individuals, and having more self-injury episodes increased the risk for suicide attempts. However, not all who were abused in the past manifest NSSI. In an attempt to identify protective factors, the next study will

investigate predicted risk factors for NSSI among a Japanese sample and will test the possibility that NMRE buffer the relationship between childhood maltreatment and self-injurious behavior.

Chapter 3

Risk Factors for Self-Injury,

and Mood Regulation Expectancies as Protective Factor

3. 1 Introduction and Aim of Study

It is widely discussed in the literature that a history of childhood maltreatment is associated with nonsuicidal self-injury (NSSI). A majority of studies demonstrate a strong association between early traumatic events and later development of NSSI. Compared to those with no self-injury history, individuals engaged in NSSI experienced more traumatic events (Matsumoto et al., 2004). Glassman et al. (2007) described the role of childhood maltreatment--defined as neglect or abuse during childhood--in the development of NSSI. People who have suffered child abuse tend to develop impairments of affect expression and emotion regulation, which lead to the use of maladaptive coping methods, such as NSSI (Gratz et al., 2002; Yates, 2004). NSSI predominantly serves an affect regulation function, managing tension and overwhelming emotions (Suyemoto & Macdonald, 1995). During times of stress, neglected or abused children without adaptive coping skills tend to have difficulties self-soothing in response to distress, which contribute to engaging in NSSI (Paivio & McCulloch, 2004; Yates, 2004).

Paivio and McCulloch (2004) and Matsumoto et al. (2004) found that self-injurers typically indicated difficulties with emotion regulation. Compared to non-self-injurers, self-injurers report a higher level of negative affect and not knowing how to deal with the tension caused by the negative affect. They reported feeling relieved and relaxed following self-injury. In addition, Paivio and McCulloch

(2004) found among undergraduate students in Canada that difficulties with emotion regulation (including alexithymia) mediated the relationship between childhood trauma and self-injury. Cha and Nock (2009) revealed that a stronger ability to perceive and manage emotions is a protective factor against suicidal ideation and suicide attempts. Emotional intelligence moderated the relationship between childhood trauma, mainly sexual abuse, and suicide attempts.

Negative mood regulation expectancies (NMRE) represent people's confidence that they can control the negative moods they experience. High NMRE are associated with less depression. Those with more confidence in their emotion regulation may think more positively and use more adaptive strategies to enhance their mood (Catanzaro & Mearns, 1990; Mearns, Patchett, & Catanzaro, 2009). Previous research has shown NMRE to buffer the impact of stressors. In the U.S., Mearns and Mauch (1998) found among police officers that NMRE interacted with job stress, such that those with lower NMRE exhibited increasingly greater levels of distress as job stress increased; whereas those with stronger NMRE had only modest increases in distress as job stress rose. Thus, NMRE moderated the effects of job stress on distress.

NSSI has been linked with depression. Self-injurers often report feeling sad or lonely preceding the NSSI episode (Brunner et al., 2007). Glassman et al. (2007) found depression was an important factor in the relation between childhood maltreatment and later NSSI, especially for those who were emotionally abused. Matsumoto et al. (2004) and Ross and Heath (2004) found that NSSI individuals report more distress than non-NSSI individuals. Also, self-injurers were more depressed, and self-injurious acts may serve to cope with depression (Matsumoto et al., 2004). However, Brodsky et al. (1995), in a clinical setting, found no significant

differences in depressive symptoms between NSSI and non-NSSI groups, with both groups presenting as severely depressed.

Though individuals with a maltreatment history are at risk for NSSI, many survivors do not engage in NSSI (Matsumoto et al., 2004). Understanding the etiology of NSSI may facilitate identification of individuals at risk for this behavior. However, most studies of self-injurious behavior have been conducted with clinical or psychiatric samples (Muehlenkamp & Gutierrez, 2004). NSSI is a serious problem around the world but has been little studied in Japan (Glassman et al., 2007; Matsumoto et al., 2008).

The first study is intended to determine the prevalence of NSSI in a sample of college students in Japan and to extend earlier studies evaluating risk factors: NMRE, childhood maltreatment, and depression. In addition, whether NMRE could buffer the effect of childhood maltreatment on NSSI was examined. I predicted that NSSI individuals would score higher on childhood maltreatment and depression, and lower on NMRE, compared to non-NSSI people.

The second study is intended to replicate the first study to test whether NMRE may serve as a protective factor that moderates the effect of childhood maltreatment and decreases the risk for self-injury among a sample of college students in Indonesia.

3. 2 Study 2a: Japanese Sample

3. 2. 1 Method

3. 2. 1. 1 Participants

A total of 322 college students enrolled in psychology classes at a large

Japanese public university participated in this study. Nine incomplete questionnaires were excluded, leaving the data of 313 college students: 50% were women, 49% were men, and 1% were unknown. Their ages ranged from 17 to 25 years, with a mean of 19 (*SD* = .98). Necessary permission for carrying out the study was obtained from the institutional review committee of the university. The study was announced in class; participants completed the questionnaires voluntarily and anonymously in class. In exchange for their participation, participants received small souvenirs and in some classes extra credit.

3. 2. 1. 2 Measures

Deliberate Self-harm Inventory (DSHI). The DSHI (Gratz, 2001), consists of 17 dichotomous items assessing frequency, duration, severity, and type of self-injury. Items all start with the stem, “Have you ever intentionally… (without intending to kill yourself):" Examples include "Cut your wrist, arms, or other area(s) of your body" and "Severely scratched yourself, to the extent that scarring or bleeding occurred." This scale was translated into Japanese for the current study through back translation. Participants who endorsed self-injury on any of the 17 items were assigned to the NSSI group. The total of participants’ frequency scores on the frequency questions for each of the 17 items represented overall self-injury frequency. The DSHI demonstrated good internal consistency with Cronbach's alpha = .78.

Negative Mood Regulation Scale--Japanese (NMR-J). The NMR-J (Mearns et al., 2013) captures participants’ confidence in their ability to alleviate negative mood states. It consists of 40 items completing the stem, “When I’m upset, I believe that…”; items are rated on a 5-point scale from *strongly disagree* to *strongly agree*.

Example items are “I can do something to feel better” and “I’ll feel better when I understand why I feel bad.” Higher scores reflect greater confidence that one can regulate one’s negative emotions. The internal consistency for NMR-J in this sample was high (α = .88).

Center for Epidemiological Studies-Depression Scale (CES-D). The CES-D is a widely used screening tool for measuring depressive symptoms and is popular in non-English-speaking countries (Mackinnon et al., 1998). The Japanese version was published by Shima, Shikano, Kitamura, and Asai (1985), who reported alpha = .79. I used the short version of the CES-D (Andresen et al., 1994). It contains 10 items measuring depressive symptoms on a 0-3 scale. All items start with the statement, “During the past week….” Example items are, “I feel lonely” and “I felt hopeful about the future” (reversed). The short version of the Japanese CES-D has good evidence of reliability with an internal consistency of α = .79.

Child Abuse and Trauma (CAT). Sanders and Becker-Lausen (1995) developed the CAT, which is made up of fairly general questions about the frequency of different past experiences participants may have suffered as children and teenagers; it assesses the severity of maltreatment experienced in the home. I administered 32 items, including the neglect/negative home atmosphere (14 items) and punishment (6 items) subscales, translated into Japanese. The 6-item sexual abuse subscale was not included due to cultural prohibitions against discussing sexuality (Ikeda, 1987). Responses ranged from 0 (*never*) to 4 (*always*). Example items are: “As a child or teenager, did you feel disliked by either of your parents?” (Neglect/negative home atmosphere); “When you were punished as a child or teenager, did you understand the reason you were punished?” (Punishment). An overall score was obtained by averaging responses to all 32 items. The total CAT had

satisfactory internal consistency (α = .92); alphas were .90 and .76 for the negative home environment/neglect subscale and the punishment subscale, respectively.

3. 2. 2 Results

3. 2. 2. 1 Prevalence of NSSI

Of the 313 participants, 10% (*n* = 31) reported a history of self-injury: 55% (*n* = 17) of these were women. The average age of first self-injury was 12.43 (*SD* = 3.76) years old. The most frequently reported self-injury methods were severe scratching (52%), followed by cutting (39%), biting (32%), and sticking pins into the skin (32%). (See Table 6 for a summary of self-injury methods.) Another method of hurting oneself was punching hard objects. Seven NSSI methods--burning with a cigarette, lighter, or match; carving pictures into the skin; dripping acid on the skin; using bleach or oven cleaner to scrub the skin; rubbing glass into the skin; and breaking bones--were not endorsed by any participants.

The majority of those with a self-injury history reported that they used more than one method to injure themselves (52%); multiple episodes were endorsed by 70% of self-injuring participants. Total episodes of self-injury ranged from 1 to 200. Twenty-four percent (*n* = 8) of self-injurers had engaged in self-injurious behavior for more than one year, but the majority of those with self-injury experience were no longer injuring themselves. Self-injury episodes within the past year were reported by 13% of NSSI participants.

Finally, women and men did not differ from one another in incidence of NSSI, $\chi^2(1,311) = .24$, *n.s.* Likewise, there were no gender differences for the various methods used to injure oneself.

Table 6

Descriptive Statistics for Self-injury Methods

	Men		Women		Total (*n*=31)	
	n	%	*n*	%	*n*	%
Cutting	4	13	8	26	12	39
Burning with cigarette	0	0	0	0	0	0
Burning with lighter or match	0	0	0	0	0	0
Carving words into skin	1	3	2	7	3	10
Carving pictures into skin	0	0	0	0	0	0
Severe scratching	5	16	11	36	16	52
Biting	4	13	6	20	10	32
Rubbing sandpaper on skin	1	3	1	3	2	7
Dripping acid on skin	0	0	0	0	0	0
Bleach or oven cleaner to scrub skin	0	0	0	0	0	0
Sticking pins, needles, staples into skin	5	16	5	16	10	32
Rubbing glass into skin	0	0	0	0	0	0
Breaking bones	0	0	0	0	0	0
Banging head	3	10	1	3	4	13
Punching self	3	10	2	7	5	16
Interference with wound healing	2	7	2	7	4	13
Other forms (Punching floor or hard objects)	2	7	0	0	2	7
Self-injury frequency:						
1x	5	17	2	7	7	24
2-5x	3	10	8	28	11	38
6-10x	1	3	4	14	5	17
>10	4	14	2	7	67	21

3. 2. 2. 2 Correlational Analyses

Self-injury frequency was negatively associated with NMRE, $r(312) = -.19$, $p < .01$, and positively correlated with depression, $r(312) = .18$, $p < .01$, and childhood maltreatment, $r(312) = .24$, $p < .01$. Self-injury was only associated with neglect, $r(312) = .27$, $p < .01$, but not with punishment, $r(312) = -.02$, *n.s*. In addition, the risk and protective factors were correlated with one another, except for CAT-punishment (see Table 7). CAT-neglect was associated with more depressive symptoms and poorer NMRE.

Table 7

Intercorrelations of Scale Totals

		DSHI	NMRE	CES-D	CAT-T	CAT-N	CAT-P
1	DSHI	--					
2	NMRE	-.19**	--				
3	CES-D	.18**	-.46***	--			
4	CAT-Total	.24***	-.14**	.28***	--		
5	CAT-Neglect	.27***	-.16**	.29***	.98***	--	
6	CAT-Punishment	-.02	-.02	.09	.46***	.27***	--

Note. N = 313. DSHI = Deliberate Self-Harm Inventory. NMRE = Negative Mood Regulation Expectancies. CES-D = Depression. CAT = Child Abuse and Trauma. *$p < .05$. **$p < .01$. ***$p < .001$.

3. 2. 2. 3 Risk Factors for NSSI

I performed *t*-tests to assess differences between self-injury (NSSI) and non-injury (NoSI) groups. As shown in Table 8, the two groups significantly differed on NMRE, depression, child abuse total, and neglect. As expected, the NSSI group scored lower on NMRE, indicating that the NoSI group had more confidence that their mood regulation strategies would be successful. The NSSI group reported significantly more depressive symptoms and more severe childhood trauma, compared to NoSI individuals.

Table 8

Comparisons of Scale Totals between Self-injury (NSSI) and Non-injury (NoSI) Groups

	NSSI (n = 31)		NoSI (n = 282)		t
NMRE	159.03	23.54	170.98	19.97	$t(311) = -3.10$*
CES-D	13.65	5.74	10.14	5.28	$t(311) = 3.48$*
CAT-Total	30.10	15.92	22.64	11.86	$t(311) = 3.20$*
CAT-Neglect	24.84	15.37	17.63	10.84	$t(311) = 2.54$*
CAT-Punishment	5.26	2.18	5.01	2.60	$t(311) = .52$, *n.s*

Note. NMRE = Negative Mood Regulation Expectancies. CES-D = Depression. CAT = Child Abuse and Trauma.

*$p < .05$.

3. 2. 2. 4 Regression Analysis

I next conducted two simultaneous multiple regression analyses predicting frequency of self-injury (see Table 9).

Table 9

Hierarchical Multiple Regression Predicting Frequency of Self-injury

Predictor	b	β	*t*
	(Model 1: R^2 = .12****)		
CAT	.36	.30	5.41****
CES-D	.02	.01	.10
NMRE	-.09	-.13	-2.08*
	(Model 2: R^2 = .37****)		
CAT	.35	.29	6.25****
CES-D	-.13	-.04	-.83
NMRE	-.10	-.13	-2.64**
NMRE x CAT	-.03	-.51	-11.18****

Note. R^2 = .12 for Step 1; ΔR^2 = .25 for Step 2 (*ps* < .05).

CAT=Child Abuse and Trauma. CES-D=Depression. NMRE=Negative Mood Regulation Expectancies.

*p < .05. **p < .01. ****p < .0001.

In Model 1, I regressed self-injury on total CAT, CES-D and NMRE. The overall model was significant, R^2 = .12, $F(3, 311) = 13.84$, p < .0001. Both CAT (β = .30) and NMRE (β = -.09) were significant independent predictors of self-injury. In Model 2, I added the interaction term of CAT x NMRE to the variables in Model 1. This interaction was the product of centered CAT and NMRE. The addition of the interaction term dramatically increased the prediction of self-injury, R^2 = .37, $F(4, 310) = 45.76$, p < .0001. In Model 2, both CAT and NMRE remained significant predictors (β = .29 and -.13, respectively). Most notable was the very large increase in prediction that the CAT x NMRE interaction conferred (β = -.51). (This interaction

is depicted in Figure 4)

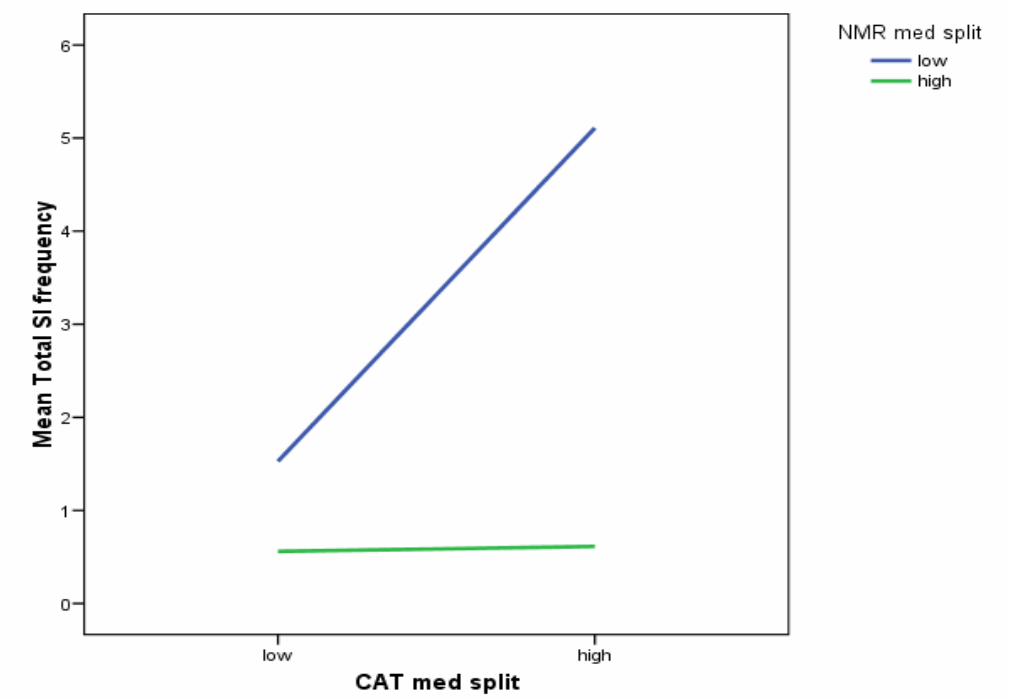

Figure 4. Child Maltreatment x NMRE Interaction as a Predictor of Frequency of Self-injury.

NMRE appeared to have an impact on self-injury for participants who had experienced both low and high levels of child maltreatment. In both groups, high NMRE participants experienced lower levels of self-injury. The impact of child maltreatment on NSSI was particularly striking for the low NMRE participants. In low maltreatment participants, mean self-injury incidence was 1.53 for those with low NMRE and .56 for those with high NMRE. But for high child maltreatment participants, mean self-injury incidence was 5.11 for low NMRE participants, and .61 for those with high NMRE. For those with strong NMRE, high child maltreatment did not result in more self-injury. Thus, strong NMRE appeared to buffer the effects of experiencing higher levels of maltreatment in childhood.

3. 2. 3 Discussion

In the present study, 10% of students had intentionally injured themselves at least once in their lifetime. In the literature, NSSI incidence among undergraduate students in Japan has ranged from 7% to 38% (Yamaguchi et al., 2004; Gotoh & Sato, 2006). My results are consistent with estimates in the lower end of the range.

I found that self-injurious behavior began at approximately 12 years old, which is consistent with Izutsu et al. (2006). More than half of those engaging in self-injury reported multiple methods and multiple episodes, also consistent with the literature (Gratz, 2001). Among the NSSI sample, only a few self-injurers reported engaging in self-injury in the last 12 months. As Ross and Heath (2002) stated, NSSI serves as temporary coping strategy. However, former self-injurers are still at risk for increased other mental health difficulties.

Addressing self-injury type, scratching was the most reported form--replicating Gotoh and Sato (2006)--followed by cutting, biting, and sticking pins into the skin. Scratching is one of the common reported NSSI form, and was also the most common reported form in a larger sample of college students (Whitlock et al., 2006). Regarding gender differences, supporting Gratz et al. (2002) I found the prevalence of self-injury to be the same for men and women.

My predictions of differences between NSSI and NoSI groups were supported: individuals with a self-injury history reported significantly more depression, lower expectancies for negative mood regulation, and greater childhood maltreatment, particularly neglect. These findings are consistent with the past literature showing that people who have experienced maltreatment, trauma and neglect display impairment in emotion regulation and more depressive symptoms,

which may increase the risk of NSSI (e.g., Tresno et al., 2012). Machizawa-Summers (2007) considered children of neglectful parents to be more vulnerable because of the invisibility of neglect, as compared to physical abuse.

Matsumoto et al. (2004) suggested that not all patients with childhood maltreatment develop NSSI. We found that negative mood regulation expectancies moderated the relationship between childhood maltreatment and NSSI: strong expectancies for negative mood regulation appeared to buffer the effects of child maltreatment on self injury, such that the relationship between child maltreatment and NSSI was stronger for those with lower NMRE and was attenuated for those with higher NMRE. For those with weaker NMRE, greater maltreatment was associated with more NSSI, whereas for those with stronger NMRE greater maltreatment was associated with only modest increases in NSSI. This was particularly true for those participants who had experienced higher levels of maltreatment.

Previous research has shown that those with stronger NMRE cope more effectively with negative events (Mearns et al., 2009). Research shows that raising NMRE enhances adjustment in people who suffer from PTSD as a result of childhood maltreatment (Cloitre et al., 2004, 2008). Thus, enhancing NMRE among children who have experienced abuse or maltreatment should lessen the risk of their developing NSSI as a maladaptive way of regulating negative affect. Depression was correlated with NSSI when only the two variables were considered, but it was not a significant predictor of NSSI when child maltreatment and NMRE were taken into account.

There are several limitations of the present study. First, there are limits to the generalizability of the findings: the rate of NSSI found in the current study may

not reflect the rate among all Japanese college students, as my sample was relatively small and drawn only from one university. Second, all data in this study were self-report, which is vulnerable to potential bias. Results would be strengthened by collecting other forms of data, such as behavioral observations or ratings by knowledgeable others.

On the positive side, this study has implications for clinical research addressing self-injury, and for school teachers or counselors wishing to identify students who are at risk of self-injury. This is particularly true for junior high school teachers, as self-injury commonly begins in early adolescence, in conjunction with increased conflicts with friends and family. Early identification may lead to better strategies to mitigate the severity of self-injury. In addition, training children in methods for adaptively coping with uncomfortable feelings--which will raise their NMRE--should reduce the risk of children's using self-injury as a non-adaptive coping strategy for reducing negative affect. Stronger NMRE should buffer the risk for self-injurious behavior.

3. 3 Study 2b: Indonesian Sample

3. 3. 1 Method

3. 3. 1. 1 Participants

Data from 307 students in Chapter 2 was used in this study (76% women, mean age 19.78) to test whether NMRE also moderated the effect of child maltreatment among the Indonesian sample.

3. 3. 1. 2 Measures

Measures were the same as in Chapter 2 (see p. 48): the DSHI to measure life-time self-injury frequencies, CES-D to measure depression level, NMR Scale to measure mood regulation expectancies, and CAT to measure child maltreatment experience. Regression analysis was conducted to test the link between child maltreatment, NMRE, and self-injury frequencies.

3. 3. 2 Results

Two simultaneous regression analyses predicting frequency of self-injury among Indonesians were conducted. Model 1 was the regression of self-injury on child maltreatment, depression and NMRE. The regression was significant, $R^2 = .20$, $F(3, 302) = 25.77$, $p < .0001$, with child maltreatment being the only significant independent predictor of self-injury ($\beta = .35$). In Model 2, the interaction term of child maltreatment x NMRE was added to the variables in Model 1. The interaction term was created by centering child maltreatment and NMRE and multiplying them together. The inclusion of the interaction term added a significant increment to the prediction of self-injury, $R^2 = .27$, $F(4, 301) = 28.82$, $p < .0001$ (see Table 10).

Table 10

Hierarchical Multiple Regression Predicting Frequency of Self-injury among Indonesians

Predictor	b	β	*t*
	(Model 1: R^2 = .20****)		
CAT	.32	.35	6.42****
CES-D	.28	.11	1.84
NMRE	-.09	-.09	-1.44
	(Model 2: R^2 = .28****)		
CAT	.25	.28	5.11****
CES-D	.29	.12	1.99*
NMR Expectancies	-.02	-.02	-.32
NMRE x CAT	-.02	-.29	-5.52****

Note. R^2 = .20 for Step 1; ΔR^2 = .08 for Step 2 (*ps* < .05).

CAT=Child Abuse and Trauma. CES-D=Depression. NMRE=Negative Mood Regulation Expectancies.

*p < .05. ****p < .0001.

While child maltreatment remained a significant predictor (β = .28), in Model 2 depression's prediction rose to significance (β = .12). In addition, the child maltreatment x NMRE interaction also was a significant independent predictor β = -.29). In fact, the interaction was the strongest individual predictor.

Figure 5 depicts estimated self-injury scores for the significant child maltreatment x NMRE interaction from Model 2. Low child maltreatment participants reported a low incidence of self-injury, which did not differ by level of NMRE (low NMRE, *m* = 1.01; high NMRE, *m* = .99). In contrast, participants who

experienced a high level of maltreatment reported decreasing levels of self-injury as the strength of their NMRE increased (low NMRE, *m* = 8.60; high NMRE, *m* = 4.88). Depression was a significant predictor of NSSI when the interaction of child maltreatment x NMRE was considered.

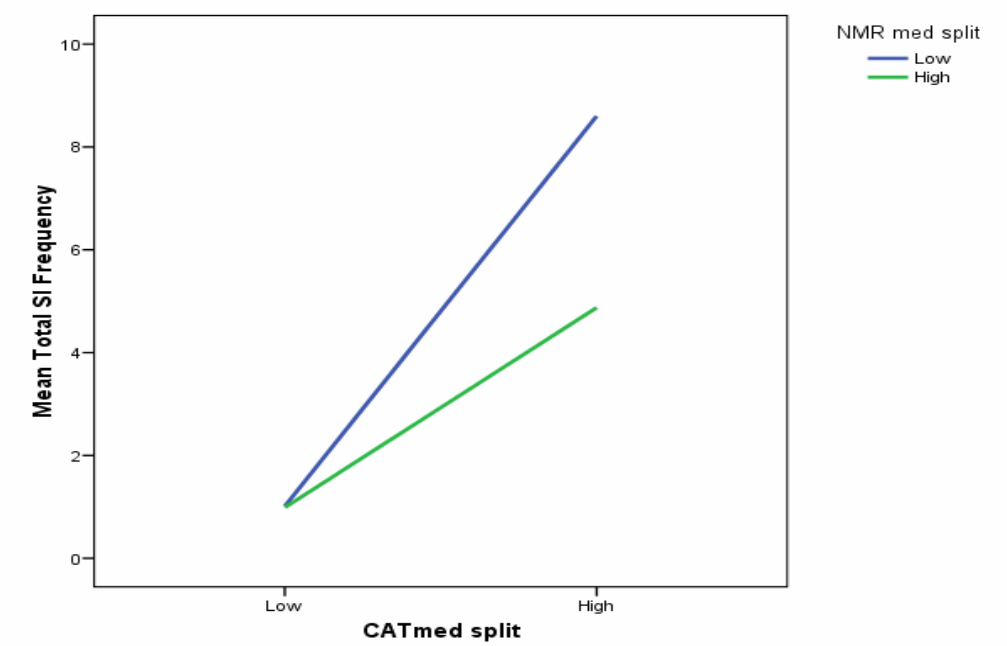

Figure 5. Child Maltreatment x NMRE Interaction as a Predictor of Frequency of Self-injury among Indonesians.

Thus, having experienced child maltreatment is associated with an increase in the tendency to engage in self-injury. However, this effect was moderated by NMRE. High NMRE appeared to reduce the impact of child maltreatment, reducing the likelihood that higher levels of maltreatment would lead to later self-injury. This protective effect of NMRE is consistent with previous findings that NMRE buffers the deleterious impact of a variety of stressors (e.g., Mearns & Mauch, 1998).

3. 3. 3 Discussion

Considering that not all those who were maltreated in the past develop NSSI, this study replicated the analysis of Study 2a among a Japanese sample to determine whether NMRE also moderates the relationship between childhood maltreatment and NSSI among Indonesians. Consistent with Study 2a, results revealed that NMRE moderates the relationship between child maltreatment and self-injury frequencies. Even though child maltreatment is associated with an increased risk of self-injury, NMRE moderated that effect.

Some survivors of child maltreatment were apparently able to develop self-protective, resourceful skills (Connors, 2000). Among participants who experienced a high level of maltreatment, those who developed strong confidence about regulating negative mood reported lower self-injury frequencies. In contrast, those with high level of maltreatment but low confidence in their mood regulation reported more self-injury. NMRE served as a protective factor, reducing the impact of childhood trauma by reducing the risk of engaging in self-injury as a form of maladaptive coping among Indonesians. This result supports Cha and Nock's (2009) finding that emotional intelligence--the ability to perceive, integrate into thoughts, understand, and manage one's emotions as protective factors--significantly moderated the link between child maltreatment and suicide attempts. Maltreated participants with lower emotional intelligence had more suicidal ideation and suicide attempts. However, there was no effect for participants with high emotional intelligence. The ability to understand and manage emotions is considered important in the treatment and prevention of suicidal behaviors (Cha & Nock, 2009).

The identification of protective factors may contribute to the prevention and treatment of individuals at risk for self-injury as a type of maladaptive coping.

Particularly, little is known about what factors may keep individuals from engaging self-injuring behaviors (Cha & Nock, 2009). The current research adds to my earlier findings and highlights the importance of identifying protective factors that could reduce the risk for self-injurious behavior and suicide attempts. Although participants who suffered maltreatment in the past are at higher risk of engaging in self-injury or attempting suicide, higher confidence in regulating negative moods may reduce the risk of using maladaptive coping.

Although the present findings are preliminary, the identification of protective factors that might keep students from engaging self-injury may suggest directions for further research on prevention efforts directed at keeping someone from engaging in self-injury, and reducing the risk for suicide. Further research on the interaction of stressful life events, importance of social support, and resilience in self-injuring individuals is necessary. In addition, research should compare past and current self-injurers to determine contributing factors that assist cessation of self-injurious behaviors.

3. 4 Overall Summary

Mood regulation plays role in predicting depressive symptoms. Individuals who hold low expectancies about their ability to successfully cope with negative affect are likely to experience more symptoms of depression (Kassel et al., 2006). The two studies in this chapter confirmed that child maltreatment, especially neglect, was a strong predictor of self-injury. However, not all maltreated individuals engaged in self-injurious behavior (Matsumoto et al., 2004).

Examination of protective factors in the two studies found that the

interaction of maltreatment x mood regulation expectancies buffered the effects of child maltreatment on self-injury. Although greater maltreatment was associated with greater NSSI frequency, greater NMRE was related to decreased NSSI. Results from two studies supported that those with better mood regulation cope more effectively with distress. These results were strengthened by finding the same significant interaction in both Japanese and Indonesian samples. It seems important to consider interpersonal factors as well as emotion regulation when explaining how NSSI behavior is developed and maintained (Muehlenkamp et al., 2013; Nock, 2008). Further research should investigate how childhood maltreatment may lead to self-injury, while assessing NMRE and interpersonal factors such as social support.

Chapter 4

The Effects of Expectancies for Social Support and for Mood Regulation on Self-Injury

4. 1 Introduction and Aim of Study

Over the years, the question of why people purposely harm themselves has been investigated by researchers in the self-injury literature. The previous study identified that NMRE moderated the effect of child maltreatment, by reducing self-injury frequencies. Even so, it is not clear how the associated risk factors may lead to self-injury, either alone or in combination with other factors (Nock, 2010). The risk of self-injury is increased by the presence of distal factors, such as childhood maltreatment, that may lead to vulnerabilities or impaired capacities to respond to life stress appropriately (Nock, 2009).

In Japan, the rate of NSSI cases among young adults in university samples has been reported to be between 7% and 38% (Yamaguchi et al., 2004; Gotoh & Sato, 2006). A number of studies of self-injury have demonstrated a strong link between childhood maltreatment and later mood regulation difficulties. Trauma in childhood has also been considered an important factor in later self-injury (Matsumoto et al., 2004). Most NSSI studies have aimed to associate NSSI with childhood maltreatment (Nock, 2009).

The term *child maltreatment* includes both abuse (physical, sexual, or verbal) and neglect of children (McCoy & Keen, 2009). Individuals who report a history of self-injury also tend to report maltreatment and neglect (Paivio & McCulloch, 2004; Van der Kolk et al., 1991). Trauma during childhood may

contribute to a vulnerability that prevents the child from learning effective skills for coping with emotional distress, which may result in the use of NSSI as an ineffective coping method (Nock, 2009). In addition, these individuals may have impaired interpersonal relationships and less trust in people that keep them from seeking help from others (Connors, 2000).

Pepin and Banyard (2006) were interested in the effects of social support on the development of college students who had been maltreated in the past. The authors found that a history of child maltreatment related negatively to perceived social support and developmental outcomes, such as trust, autonomy, or intimacy. In Paivio and McCulloch's (2004) study, alexithymia, the inability to identify and communicate one's feelings, mediated the relationship between childhood trauma and self-injury. Insufficient parental support among individuals with maltreatment and a neglectful environment created an incapacity to regulate emotion among college students in Canada, as the children did not learn effective ways for coping with their negative emotions.

The affect regulation model is the most common model used in self-injury studies. There is a link between emotion dysregulation and self-injury. Without healthy coping strategies during stressful times, individuals with maltreatment histories are at risk of maladaptive coping, such as self-injury (Paivio & McCulloch, 2004). Self-injury represents a maladaptive response to intolerable emotional pain.

In Japan, emotional or psychological maltreatment has been less studied. Unlike physical abuse that results in visible injuries, such as bruises, cases of psychological maltreatment may be hidden from the community (Yamamoto et al., 1999). Gotoh and Sato (2006) replicated Paivio and McCulloch's (2004) study among Japanese undergraduate students but found mood regulation difficulties did

not mediate the relationship between child maltreatment and self-injury status. No association was found between mood regulation difficulties and self-injury, or between maltreatment and mood regulation difficulties.

The effects of perceptions of family and peer support on self-injury have been less researched (Heath et al., 2009). Recent studies report that having family members or friends who provide support may reduce the risk of self-injury. Fortune et al. (2008) found that having someone to talk to, who listened to their problems and provided support, prevented individuals from engaging in self-injury. Students were more likely to consider talking to family members and friends as a source of support than talking to mental health professionals. In child maltreatment studies, survivors of child abuse who report greater levels of social support tend to show better psychosocial skill following maltreatment, such as developing more trust or autonomy (Pepin & Banyard, 2006). Perceived family support is a strong protective factor against adolescent suicide attempts: support from parents and family is associated with lower suicide risk (Brausch & Gutierrez, 2010**;** Eskin, 1995). Self-injuring individuals who report feeling connected to and supported by their parents appear more able to cope with stressors and to avoid more serious suicidal risk (Muehlenkamp & Gutierrez, 2007; Muehlenkamp et al., 2013).

Greater support from friends also contributes to reducing burnout among school teachers (Kim et al., 2009). However, in a study comparing NSSI, self-injury with suicide attempts, and nonself-injury adolescents, significant differences in friends' support were not seen between groups (Brausch & Gutierrez, 2010). However, in another study, nonself-injuring university students reported significantly greater friend support than did students who engaged in self-injury (Heath, Ross, Toste, Charlebois, & Nedecheva, 2009).

Crowell et al. (2009) suggest that emotional difficulties foster and maintain

self-injury in an unsupportive social environment. Social support can be seen as one of the potential mediators that may decrease the harmful effects of stress and enable individuals to carry out their social functions (Kim et al., 2009). A lack of supportive resources may increase the intensity of negative emotions, which in turn are regulated through NSSI as a maladaptive coping style (Klonsky et al., 2011). In a study of an adolescent psychiatric sample, Adrian and colleagues (2011) revealed that insufficient support from, and more conflict with, peers was indirectly associated with NSSI severity through mood regulation. They examined an integrated model of the associations among family problems, peer problems, mood regulation, and self-injury. Another study by Muehlenkamp and colleagues (2013) mirrored this finding, showing that poor mood regulation connect interpersonal difficulties with self-injury. However, child maltreatment was not a focus of their study. Recent work found both of family support and friend support distinguished self-injurers and individuals with no self-injury history (Rotolone & Martin, 2012).

Despite the prevalence of NSSI, why people engage in self-injury still remains unclear. Research examining factors influencing the development of NSSI is important for improving prevention efforts (Nock, 2009), particularly in terms of understanding how maltreatment may contribute to self-injury (Klonsky et al., 2011). Adding interpersonal factors such as perceived social support to emotion regulation is considered important for explaining how self-injury is maintained (Muehlenkamp et al., 2013; Nock, 2008). Some studies of self-injury have tried to clarify how child maltreatment may contribute to the development of self-injury and have proposed models of the mechanism (Klonsky et al., 2011).

The current study is intended to examine the links among child maltreatment, mood regulation expectancies, and expectancies for social support and self-injury among NSSI and nonself-injury (NoSI) groups. Furthermore, the current study will

examine the links among factors contributing to the maintenance self-injury in a single model, focusing on the roles of mood regulation expectancies and expectancies for social support.

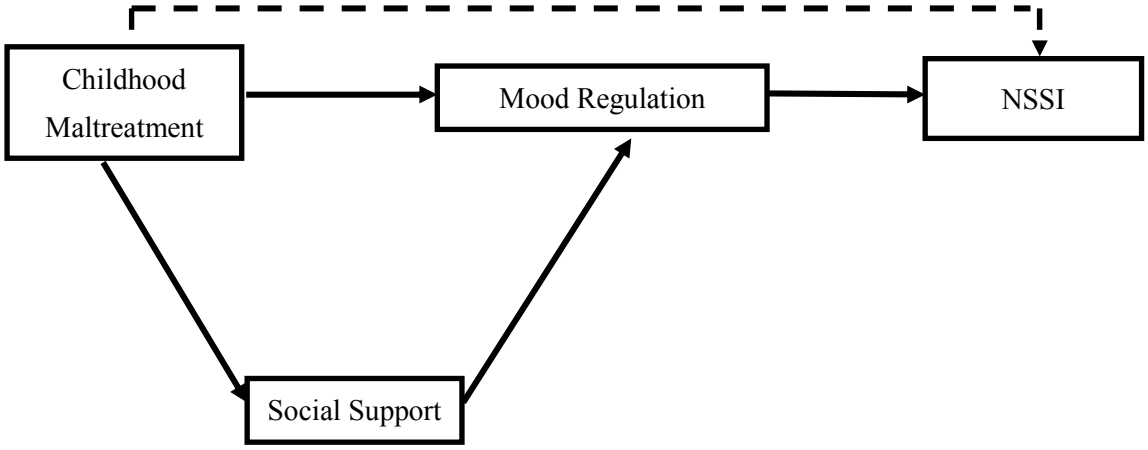

Figure 6. Proposed Model of the Pathway to Self-Injury

It is hypothesized that greater maltreatment experiences will be associated with poorer mood regulation expectancies and lower expectancies for social support. In addition, mood regulation expectancies should be an intervening variable in the relationship between child maltreatment and NSSI. The first study examined Japanese university students. The second study was conducted among university students in Indonesia.

4. 2 Study 3a: Japanese Sample

4. 2. 1 Method

4. 2. 1. 1 Participants

Data from 377 Japanese undergraduate students in the Aichi prefecture, enrolled in psychology classes were analyzed in this study. Participants ranged from age 18 to 25, with a mean age of 19 years (*SD* = .87); 52% were men and 46% women. Participants completed the anonymous self-report questionnaires voluntarily in class and were asked to identify their gender and age on the questionnaire's cover sheet. The procedure to carry out the current study was reviewed and approved by the Research Ethics Board of the University.

4. 2. 1. 2 Measures

Nonsuicidal self-injury (NSSI). NSSI was measured using a short form of Self-injurious Thoughts and Behaviors Interview (SITBI) that assesses presence, frequency, and characteristics of self-injurious behavior (Nock, Holmberg, Photos, & Michel, 2007). The SITBI has demonstrated strong inter-rater reliability, test-retest reliability, and concurrent validity. For the purpose of this study, only the items related to NSSI were used; they were modified to measure the frequency of using 11 self-injury methods, emphasizing on "purposely hurting yourself without wanting to die", the necessity of receiving medical treatment, and the reason for harming oneself: "as a way to get rid of bad feelings," "in order to feel something," "to communicate with someone else or to get attention," or "to get away from others." Using a scale of 0 (*never*) to 4 (*very much*), participants also indicated what problems lead to engagement in NSSI, such as problems with family, friends, and relationships, and problems with work or school. Lastly, they rated their likelihood of NSSI in the future. This scale was translated into Japanese for the current study through back translation.

Child maltreatment. The Child Abuse and Trauma (CAT) scale (Sanders & Becker-Lausen, 1995) is made up of fairly general questions about the frequency of different past experiences participants may have suffered as children and teenagers; it assesses the severity of maltreatment and neglect in the home. Thirty-two items were translated into Japanese. Responses range from 0 (*never*) to 4 (*always*). An overall score was obtained by averaging responses to all 32 items. The total CAT had satisfactory internal consistency (α = .89). The overall CAT score was used in the analyses.

Mood regulation expectancies. The Negative Mood Regulation Scale-Japanese (NMR-J) assesses participants' beliefs in their ability to alleviate the negative moods they experience. Negative mood regulation expectancies predict adaptive coping and buffer the effects of stress, resulting in less negative affect (Mearns et al., 2013). Starting with the stem "When I'm upset, I believe that…," the 40-items are rated on a 5-point scale from *strongly disagree* to *strongly agree*. Higher scores reflect greater confidence that one can regulate one's negative emotions. The internal consistency for the NMR-J in this sample was high (α = .88).

Expectancies for social support. The Scale of Expectancy for Social Support (SESS; Hisada, Senda, & Minoguchi, 1989) assessed participants' expectation of receiving emotional social support from others. Participants rated 16 items describing types of emotional support provided by father, mother, and friends. Total expectancy for social support was the sum of perceived support from parents (father and mother) and friends. Internal consistencies were excellent for the SESS total scale (α = .97).

4. 2. 2 Results

4. 2. 2. 1 Descriptive Statistics

Twenty percent of participants (n = 75) reported engagement in at least one episode of self-injury (51% women, 48% men). Age of first self-injury episode ranged from 6 to 19 years old, with an average onset of 13 years (SD = 3.02). Most of the self-injurers (89%) harmed themselves more than one time, and 76% reported multiple methods. The highest number of lifetime NSSI episodes was 50 times. This distribution is similar to Muehlenkamp et al.'s (2010). Four percent had received medical treatment.

The most frequently endorsed self-injury methods were hitting oneself (59%), pulling out hair (45%), picking at a wound (44%), cutting or carving skin (40%), biting oneself (20%), scraping skin (15%), inserting objects under nails or skin (7%), picking areas of body to the point of drawing blood (7%), burning (1%), and others (9%), such as kicking or punching a wall. Forty-three percent of participants who engaged in self-injury reported having injured themselves within the past year. A chi-square test was performed for participant gender: gender was not related to self-injury, χ^2 (1, 366) = .71, *n.s.*

4. 2. 2. 2 Reasons for Self-Injury

Regarding underlying reasons for harming themselves, the majority of participants endorsed "to get rid of bad feelings" (65%); others endorsed "to feel something" (17%), "to get away from others" (19%), "to communicate with someone else or to get attention" (15%). Twenty-eight percent endorsed other reasons, such as to make other people worry, to punish oneself, to feel worthless, and to restrain oneself from wanting to die. Eight percent of self-injurers reported that work or

school problems always led them to NSSI, and 15% reported that problems with family or friends frequently led them to NSSI (see Table 11). Regarding the likelihood of engaging in NSSI in the future, 40% endorsed *never,* 32% endorsed *almost never,* 21% endorsed *sometimes,* 5% endorsed *frequently,* and 1% endorsed *always.*

Table 11

Frequency with which Problems Lead to Engaging in NSSI

	Never	Almost never	Sometimes	Frequently	Always
Family	40%	21%	19%	15%	4%
Friends	37%	27%	16%	15%	4%
Relationships	55%	19%	15%	7%	4%
Work/ School	23%	21%	35%	12%	8%

4. 2. 2. 3 Group Differences and Correlational Analyses

I examined group differences in child maltreatment, mood regulation expectancies, and expectancies for social support. Mean scores, standard deviations, and comparisons between nonsuicidal self-injury (NSSI) and nonself-injury (NoSI) groups are presented in Table 12. Individuals with a self-injury history reported a significantly higher level of maltreatment in childhood, poorer NMRE, and less expectation of social support from father compared to the nonself-injury group. As shown in Table 12, pairwise comparisons showed that there were significant differences between the two groups for the level of child maltreatment, NMRE, total social support, and father social support. The nonself-injury group reported higher

expectancies for social support from mother and friends, however these differences were not significant.

Table 12

Comparisons between NSSI and NoSI Groups

	NSSI (n = 75)		NoSI (n = 281)		t
	M	*SD*	*M*	*SD*	
CAT	37.37	(17.37)	32.12	(13.83)	t (352) = 2.73**
NMRE	116.42	(15.33)	127.35	(17.59)	t (351)= -4.82***
Total SESS	136.81	(26.46)	143.72	(25.94)	t (362)=-2.01*
SESS Father	41.08	(13.65)	44.27	(11.39)	t (365)=-2.06*
SESS Mother	47.52	(11.91)	49.47	(10.45)	t (370)=-1.30
SESS Friends	47.95	(9.29)	50.02	(8.94)	t (371)=-1.77

Note. NSSI = Nonsuicidal self-injury. NoSI = Nonself-injury. CAT = Child abuse and trauma. NMRE = Negative mood regulation expectancies. SESS = Scale of Expectancies for Social Support

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

Pairwise correlations were calculated to examine the associations between lifetime NSSI frequencies and other variables. As expected, lifetime NSSI frequencies were negatively correlated with childhood maltreatment and negative mood regulation expectancies. However, no significant correlation was found with any social support subscale. The CAT correlated negatively with NMRE and social support: overall social support expectancies, father, mother, and friends (see Table

13). Results suggest that individuals with childhood trauma are at risk for impairment in mood regulation expectancies and interpersonal relationships. Associations between NMRE and social support expectancies were positive: Higher NMRE significantly related to higher expectancies for overall social support, and support from father, mother, and friends.

Table 13

Intercorrelations of NSSI Frequencies and Associated Variables

		1	2	3	4	5	6	7
1	NSSI							
2	CAT	.15**						
3	NMRE	-.15**	-.27***					
4	Total SESS	-.07	-.37***	.40***				
5	SESS Father	-.07	-.35***	.32***	.87***			
6	SESS Mother	-.05	-.40***	.30***	.89***	.70***		
7	SESS Friends	-.05	-.16**	.41***	.71***	.38***	.49***	

Note. NSSI = Nonsuicidal self-injury. CAT = Child abuse and trauma. NMRE = Negative mood regulation expectancies. SESS = Scale of Expectancies for Social Support.

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

4. 2. 2. 4 Path Analysis

I tested a path model using AMOS to understand the connection between child maltreatment and self-injury and their links with NMRE and social support expectancies. This analysis required complete data for all participants (Byrne, 2010), leaving a total of 324 individuals. NSSI was entered as a categorical variable: NSSI versus NoSI. This model showed a good fit to the data, yielding an overall $\chi^2(4) = 2.42$, $p = .66$. Model fit statistics were: Goodness-of-Fit-Index (GFI) = .99, Comparative Fit Index (CFI) = 1.00, and Root Mean Square Error of Approximation (RMSEA) = .00, which is within the acceptable range (Byrne, 2010).

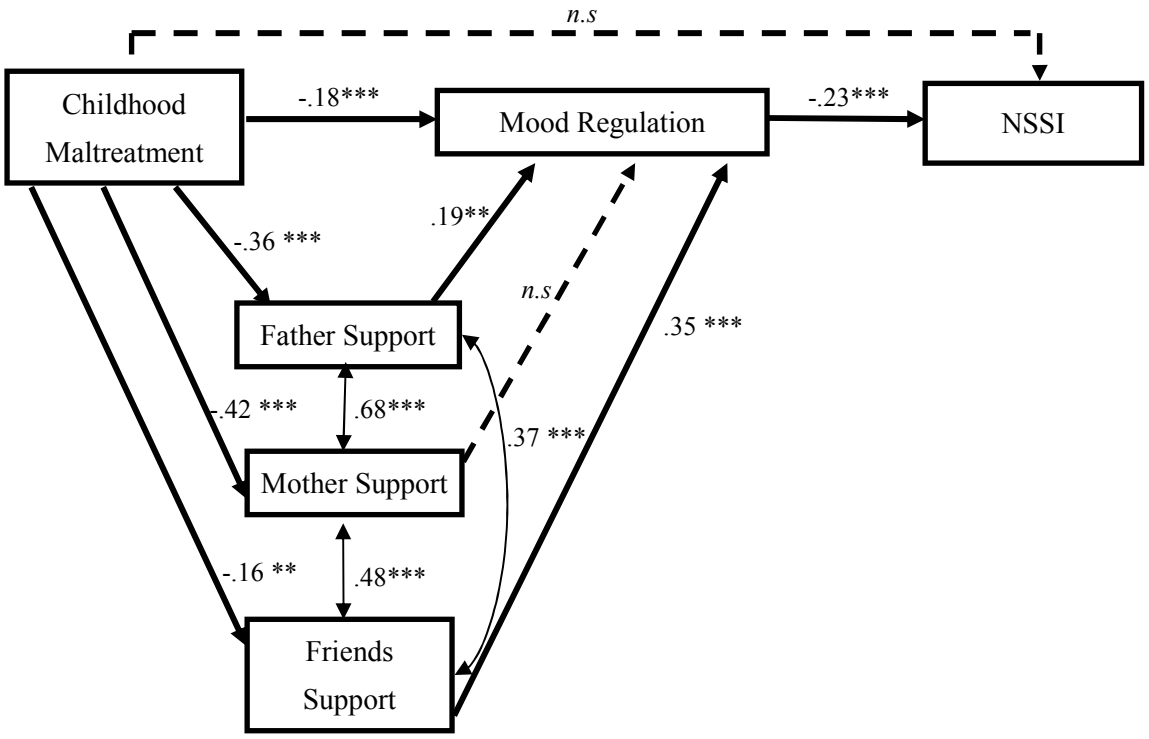

Figure 7. Standardized Path Coefficients between NSSI, CAT, NMRE, and SESS. *$p < .05$. **$p < .01$. ***$p < .001$.

The path analysis indicated that maltreatment in childhood was indirectly related to self-injury through NMRE (Figure 7). There was a direct effect between childhood maltreatment and NSSI (unstandardized coefficient = .01, standardized coefficient = .12, p = .032) before adding NMRE to the model. After adding NMRE, NSSI was directly predicted by poor mood regulation (unstandardized coefficient = -.01, standardized coefficient = -.23, p = .001). There was a direct effect of child maltreatment on NMRE (unstandardized coefficient = -.22, standardized coefficient = -.18, p = .001), and all subscales of expectancies for social support expectancies, father (unstandardized coefficient = -.29, standardized = -.36, p = .001), mother (unstandardized coefficient = -.31, standardized coefficient = -.42, p = .001), and friends (unstandardized coefficient = -.10, standardized coefficient =-.16, p = .004). More maltreatment in childhood was directly associated with lower expectancies for regulating emotions as well as lower expectancies for receiving social support. In addition, there was a direct prediction of increased confidence in regulating emotion by greater expectancies for social support from father (unstandardized coefficient = .28, standardized coefficient = .19, p = .008) and from friends (unstandardized coefficient = .68, standardized coefficient = .35, p = .001).

Tests of indirect effects were used to evaluate intervening variables. The direct effect between childhood maltreatment and NSSI was diminished after adding NMRE (standardized coefficient = .06, p = .31). More maltreatment and neglect during childhood predicted impairment in mood regulation expectancies, which then predicted NSSI. Supporting Paivio and McCulloch's (2004) findings, my results suggest that impairment in regulating one's emotions is an intervening variable in the relationship between childhood trauma and self-injury (standardized indirect effect = .06 , p =.001). All social support subscales were not directly related to self-injury, but greater expectations of being supported by father and especially by friends were

related to increased confidence in emotion regulation. (Social support from mother showed no significant association with NMRE.) In turn, greater confidence in regulating one's emotions was associated with reduced risk of engaging in NSSI.

4. 2. 3 Discussion

Understanding why people intentionally harmed themselves is necessary for several reasons. This understanding may aid identification of individuals at risk for unhealthy coping, such as alcohol or drug abuse (Nock, 2010). Results of the present study revealed that 20% of Japanese young adults had injured themselves at least once in their lifetime; the main reason was to cope with negative feelings. Problems with work or school led 8% of participants to NSSI, and problems with family or friends led 15% of participants to engage in NSSI.

A majority of NSSI individuals reported multiple episodes and multiple methods. Although other NSSI studies commonly reported cutting the skin with sharp objects as the most frequent method, including among Japanese (e.g., Yamaguchi et al., 2004), in the current sample self-hitting was the most endorsed NSSI method. Ross and Heath (2002) found that hitting oneself was the second most common form of self-injury following cutting. The average age of onset was 13 years old, in line with the literature, which reports an average age of first NSSI between 13 and 15 (e.g., Muehlenkamp & Gutierrez, 2007; Ross & Heath, 2002).

In my study, associations among variables paralleled others' findings of childhood maltreatment as a risk factor for self-injury and other impairment, such as reduced expectations of being able to regulate one's emotions and of social support (Cloitre et al., 2008; Paivio & McCulloch, 2004). Both trauma in childhood and lower confidence in regulating one's negative emotions were linked to an increased

risk of engaging in NSSI as an unhealthy coping strategy. NMRE and expectations of social support were positively associated. This result was similar to Kim et al.'s (2009) finding that support from colleagues and family was helpful for regulating negative emotions. However, similar to Heath, Ross et al. (2009), no relationship was found between self-injury frequencies and expected social support from parents or friends. Lower expectancies for social support were not directly linked to self-injury.

There were significant differences between groups with and without NSSI in level of child maltreatment and NMRE. Consistent with Paivio and McCulloch (2004), NSSI individuals showed a more negative home environment in childhood and reported more mood regulation difficulties. For social support, only overall scores and perceived support from father significantly differed between groups. As suggested by Fortune et al. (2008), having a family member or friend who provides care and support may reduce the risk for NSSI. In Japan, traditionally fathers spend more time at work and remain emotionally distant from the family at home (Tamura, 2001). It seems that a father who shows more communication, more involvement with the family, or becomes closer to his children is associated with more positive development, such as more confidence that one can cope with negative affect.

A path analysis testing the variables in a single model revealed that NMRE intervened in the relationship between childhood maltreatment and self-injury. As hypothesized, maltreated children appear to develop deficits in regulating emotions, which result in difficulties coping with painful negative feelings. Difficulties regulating negative emotions appear to increase the likelihood of engaging in NSSI. More severe maltreatment predicted lower mood regulation confidence, which in turn predicted greater NSSI. Moreover, in line with Adrian and colleagues' (2011) finding, insufficient friend support directly related to impaired mood regulation

expectancies, which in turn predicted NSSI.

Not all individuals who are maltreated in the past develop mood regulation difficulties (Alink, Cicchetti, Kim, & Rogosch, 2009). Many studies have suggested that social support from family or friends can be a strong protective factor against suicide risk or unhealthy behavior (e.g., Brausch & Gutierrez, 2010; Eskin, 1995). In the current study, childhood maltreatment appeared to reduce one's confidence about getting emotional support from others, however social support variables were not directly linked with self-injury. The current study suggests that social support contributes to increasing one's confidence in regulating difficult emotions. This is particularly true for support from father and friends. Thus, there is an indirect link between expectancies for social support and NSSI, through the influence of social support expectancies on NMRE. It appears that feeling connected to and supported by family and friends increases the likelihood of coping better with unpleasant emotions, and of avoiding the risk of NSSI or other unhealthy behaviors (Muehlenkamp & Gutierrez, 2007).

Pepin and Banyard (2006) highlighted the importance of the perception that someone–family or friends–is available to offer support. Such support provides a healthy network that may serve as a protective factor against impairment caused by childhood maltreatment. Many previous have suggested that being maltreated in childhood may contribute to interpersonal vulnerabilities, such as a lower capacity for supportive interpersonal experience (e.g., Cloitre et al., 2004). Future research on the effects of social support as protecting factors that increases resiliency in those who have suffered childhood maltreatment should be done.

The present study has several limitations. First, there are limitations to the generalizability of the findings, as the rate of NSSI in the sample was relatively small.

Furthermore, there were missing data, especially for self-injury frequencies. A complete data set was needed for path analysis; thus NSSI was entered as a categorical variable to maximized number of participants. Second, there is the potential bias that may occur in a self-report study. Third, the sample may not be representative of all Japanese university students. Fourth, the current study used the total score of childhood maltreatment to identify maltreatment history. Examining different forms of childhood maltreatment separately may give different results.

The current study adds to the literature on NSSI among young adults by showing the link between childhood maltreatment and NSSI through important factors of mood regulation expectancies and expectancies for social support from father, mother, and friends. The findings of current study revealed several important implications for understanding why people harmed themselves and showed a glimpse into how these factors may increase the risk for NSSI. Understanding the links between maltreatment, expectancies for social support and NMRE in a single model may help schools and health professionals to improve intervention efforts.

Perceived social support may serve as protective factor from negative effects of child maltreatment, helping one develop better confidence for dealing with negative emotions and better abilities to cope with distress, which may reduce the risk of using maladaptive coping. It is necessary to provide healthy support networks, especially early prevention efforts in junior high school, the average age of first occurrence of NSSI, and to assist vulnerable children to cope with difficulties.

4. 3 Study 3b: Indonesian Sample

4. 3. 1 Method

4. 3. 1. 1 Participants

Data from 336 participants were collected. Eight incomplete questionnaires were excluded from all analysis. The sample consisted of 328 Indonesian undergraduate students majoring in psychology. The mean age was 19.55 (*SD* = 1.26), with a range from 18 to 24 years old. Eighty percent of the sample was women and 18% men.

Participants voluntarily completed the anonymous self-report questionnaires measuring self-injurious behavior, childhood maltreatment, negative mood regulation expectancies, and perceived social support from family and friends. The questionnaires were distributed in class. The students were asked to identify their gender and age on the cover sheet.

4. 3. 1. 2 Measures

Deliberate Self-harm Inventory (DSHI). The DSHI (Gratz, 2001) assessed 17 NSSI methods and their frequencies, duration, and severity. Participants who answered "yes" to any of the 17 NSSI items were identified as belonging to the NSSI group. Total self-injury frequency was derived by adding the frequency of all reported self-injurious behaviors. It was translated into Indonesian by Tresno, Ito and Mearns (2012). The Cronbach's alpha of the DSHI in the current study was good (.78).

Negative Mood Regulation (NMR) Scale. The NMR Scale (Catanzaro & Mearns, 1990) assessed participants' confidence in their mood regulation abilities using 30 items. High internal consistency was obtained for the current sample (alpha

= .84). Higher NMR Scale scores represented higher that one can regulate negative emotions. The Indonesian NMR Scale shows good reliability (Tresno et al., 2012).

Child Abuse and Trauma (CAT). The CAT (Sanders & Becker-Lausen, 1995), assessed the severity of stress, maltreatment and neglect one experienced in the home environment during childhood. For this study, the sum of the overall scores reflected the severity of child maltreatment at home. The CAT was translated into Indonesian by Tresno et al. (2012). The overall CAT showed high internal consistency (alpha = .90).

Perceived Social Support (PSS). The PSS was originally developed by Procidano and Heller. A revised version (Procidano, Sakworawich, Cieslak, Kamens, Minahan, & Forgione, 2012) assessed the extent of perceived social support from family (PSS-Fa) and from friends (PSS-Fr). Examples are: "My family gives me a lot of encouragement" and "I rely on my friends for emotional support." Both of the subscales consists of 20 statements with 3 alternatives answers: *yes, no,* and *do not know*. This scale has been used widely in research and has demonstrated reliability across cultures. The PSS does not quantify the number of supporters or the amount of social contact, but captured individuals' confidence that adequate support would be available if it was needed (Barrera, 1986). Higher scores suggest greater levels of perceived support from family and friends. For the purpose of this study, this scale was translated into the Indonesian language using a back translation procedure. The PSS in this study has demonstrated adequate internal consistencies with alpha = .88 for PSS-Fa, and alpha = .84 for PSS-Fr.

4. 3. 2 Results

4. 3. 2. 1 Descriptive Statistics

Thirty percent (n = 98) reported engaging in NSSI at least once in their lifetime (78% women, 21% men). The majority (62%) of those who reported NSSI used more than one NSSI method, and 66% harmed themselves more than once. Eleven percent (n = 10) had injured themselves in the past year. No significant difference was found between men and women in the prevalence of NSSI, χ^2 (1, 320) = .99*, n.s;* and none of those who engaged in NSSI had ever received medical treatment for self-injury.

Among NSSI individuals, the most endorsed NSSI methods are: Cutting the skin with sharp object (34%), carving words in the skin (30%), sticking a sharp object into the skin (28%), excessive scratching (24%), biting oneself (24%), head banging (24%), punching oneself (22%), and hitting a wall or table (18%). Intercorrelations between lifetime NSSI frequencies and related variables are shown in Table 15.

4. 3. 2. 2 Group Differences and Correlational Analyses

Among the Indonesian sample, NSSI and NoSI groups differed significantly for all variables. Those who did not report engagement in NSSI had significantly less maltreatment and neglect, were more confident about regulating their negative emotions, and received more support from family and friends. Mean scores, standard deviations, and t-test results are presented in Table 14.

Table 14

Comparisons between Indonesian NSSI and NoSI groups

	NSSI (n =98)		NoSI (n =230)		t
	M	*SD*	*M*	*SD*	
CAT	38.37	(17.01)	29.62	(13.50)	t (326) = 4.52***
NMRE	107.10	(10.52)	110.72	(10.95)	t (326) = -2.68**
Total PSS	26.14	(7.58)	29.30	(7.37)	t (326) = -3.53***
PSS-Family	12.21	(5.01)	14.18	(4.99)	t (326) = -3.26**
PSS-Friends	13.93	(4.67)	15.13	(3.92)	t (326) = -2.27*

Note. NSSI = nonsuicidal self-injury. NoSI = no self-injury. CAT = child abuse and trauma. NMRE = negative mood regulation expectancies. PSS = perceived social support.
*p < .05. **p = <.01. ***p < .001.

NSSI frequencies significantly positively correlated with childhood maltreatment, r(327) = .14, p < .05, and negatively with family social support, r(327) = -.12, p < .05 (Table 15). Similar to Study 3a, maltreatment in the home environment and lack of family support were associated with a greater incidence of NSSI. In contrast to Study 3a, no association was found between NSSI frequency and mood regulation expectancies. Consistent with Study 3a, maltreatment in childhood was significantly associated with impairment in mood regulation expectancies and lower perceived social support. Confidence in regulating negative emotions was positively associated with social support.

Table 15

Intercorrelations among NSSI Frequencies and Associated Variables

		1	2	3	4	5	6
1	NSSI						
2	CAT	.15*					
3	NMRE	.00	-.19***				
4	Total PSS	-.09	-.54***	.30***			
5	PSS-Family	-.12*	-.61***	.17**	.85***		
6	PSS-Friends	-.02	-.23***	.34***	.77***	.33***	

Note. NSSI = Nonsuicidal Self-Injury. CAT = Child Abuse and Trauma. NMRE = Negative Mood Regulation Expectancies. PSS = Perceived Social Support.
**$p < .01$. ***$p < .001$.

4. 3. 2. 3 Path Analysis

The path model in Study 3a was replicated in this study, testing the links between childhood maltreatment, categorical NSSI status (yes or no), mood regulation expectancies as an intervening variable, and support from family and friends. The results demonstrated a good fit, $\chi^2(2) = .67$, $p = .72$. Three indicators of model fit were obtained: GFI = .99, CFI = 1.00, and RMSEA = .00. See Figure 8.

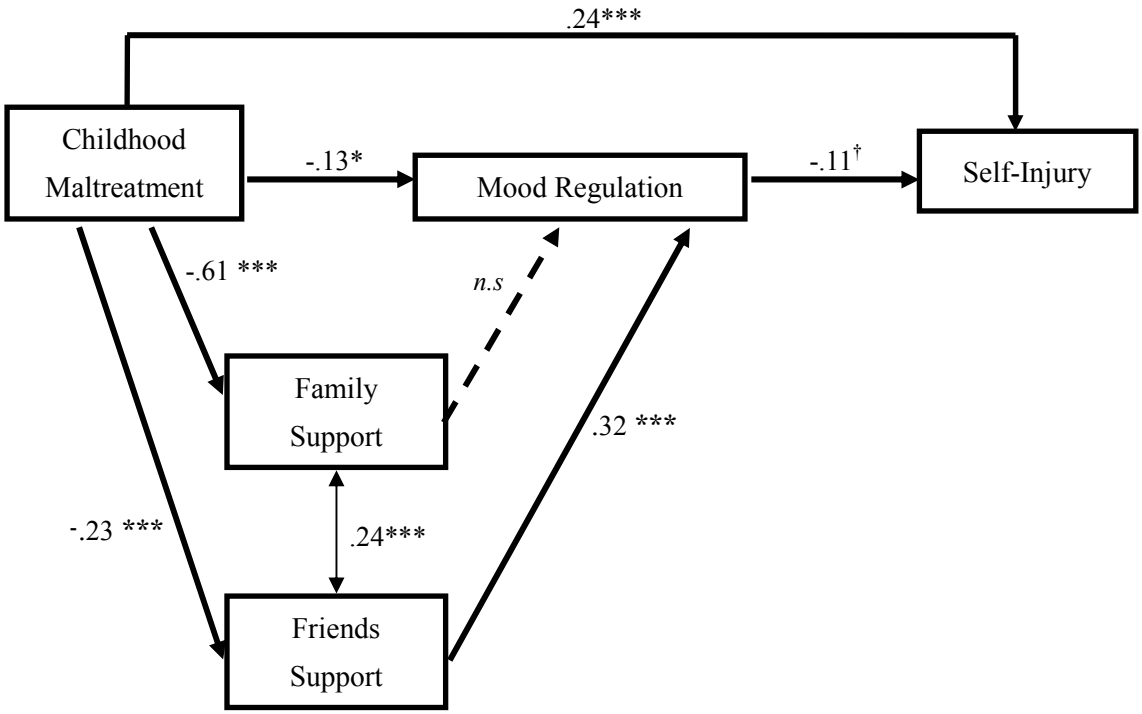

Figure 8. Standardized Path Coefficients between NSSI, CAT, NMRE, and PSS.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

To test the direct effects in the model for the Indonesian sample showed that NSSI was initially predicted by childhood maltreatment (unstandardized coefficient = .01, standard coefficient = .27, p = .001). After adding mood regulation expectancies, childhood maltreatment still significantly predicted self-injury (unstandardized coefficient = .01, standard coefficient = .24, p = .003), and poorer mood regulation expectancies predicted self-injury (unstandardized coefficient = -.01, standard coefficient = -.11, p = .053). In addition, the direct effect of friend support on confidence in regulating emotion was significant (unstandardized coefficient = .83, standard coefficient = .32, p = .001).

To test whether mood regulation expectancies intervened in the relationship between childhood maltreatment and self-injury, I evaluated indirect effects.

Analyses revealed that mood regulation expectancies served as a partial intervening variable (standardized indirect effect = .02, p = .036). The p-values for the direct (p = .003) and indirect effects (p = .036) were less than .05, indicating that mood regulation expectancies partially intervened in the path from childhood maltreatment to NSSI of the young adult sample in Indonesia.

4. 3. 3 Discussion

Among Indonesian normative samples, 30% of young adults reported having engaged in at least one form NSSI behavior, and a majority reported engaging in multiple methods. Similar to other NSSI studies (Paivio & McCulloch, 2004; Tresno et al., 2012), cutting the skin with sharp objects was the most commonly reported method.

Correlational results found that severity of child maltreatment and insufficient social support from family were significantly related to higher NSSI frequencies. A more stable home environment and more family support may decrease the risk for NSSI. NSSI and NoSI groups significantly differed in the severity of maltreatment in childhood, confidence in regulating emotions, and both family and friend support. Similar to other NSSI studies (e.g., Brausch & Gutierrez, 2010; Heath et al., 2009; Tresno, Ito, & Mearns, 2013), the NSSI group reported more history of childhood maltreatment, more difficulties in regulating negative emotions, and less emotional support from their family and friends compared to the NoSI group. More trauma or stress in childhood, poorer mood regulation expectancies, and insufficient social support increased the risk of engaging in NSSI.

Trauma during childhood may prevent the child from learning effective ways of coping with emotional distress. Also, impaired interpersonal relationships

may result in NSSI (Connors, 2000; Nock, 2009). The findings from the path analysis among this Indonesian sample support the findings from the Japanese sample. Mood regulation expectancies was an intervening variable between childhood maltreatment and self-injury.

In addition to confirming previous research, this study expanded the proposed path model to an Indonesian sample, giving cross-cultural support for the findings. The results from the path analysis also attest to the contribution of social support. Similar to Adrian and colleagues' (2011) finding, insufficient support from friends was indirectly associated with self-injury through mood regulation expectancies. Trauma in childhood may decrease mood regulation skills, which increases the risk for maladaptive coping such as self-injury. However, greater emotional support, especially from friends, may protect maltreatment survivors, helping them to build more confidence and learn more effective ways to cope with emotional distress that in turn protect them from NSSI behavior.

The current study replicates earlier work on the mechanism of how childhood maltreatment may contribute to the development of self-injury through the role of social support and mood regulation expectancies. Perceived social support, especially from friends, appears very important. Having someone to talk to who will listen to one's problems may prevent someone from self-harm or using other maladaptive coping methods for dealing with distress.

4. 4 Overall Summary

A range of 20% to 30% of participants from Indonesia and Japan reported having engaged in at least one self-injury method in their lifetime. This number

strikingly calls for attention. More than 60% harmed themselves more than one time and used various self-injury forms. Among the Japanese sample, hitting oneself was the most frequently endorsed self-injury method, and self-cutting was the most reported self-injury method among the Indonesian sample. Both forms are often reported as typical methods among western self-injury studies. Men and women did not differ in rates of self-injury in either country.

Two studies in two different Asian countries showed that child maltreatment history is the most consistent predictor of self-injury, showing significant correlations in both countries; moreover, maltreatment distinguished between groups with and without a self-injury history. Path analyses were conducted to understand the links between factors that lead to the development and maintenance of self-injurious behavior. The findings were consistent between two samples of young adult students in Indonesia and Japan: mood regulation expectancies directly predicted self-injurious behavior. Supporting Matsumoto (2006), there is a possibility that Asian people are more likely to use suppression as a way of keeping their emotions hidden, so as to maintain in-group harmony. Results from the current two studies are consistent with Adrian et al. (2011) and Paivio and McCulloch (2004): mood regulation directly predicts self-injury and intervenes in the connection between child maltreatment and self-injury.

According to Cicchetti and Toth (2005), neglected children may suffer the absence of emotional learning in the home environment. Although child maltreatment is a strong predictor of self-injury, individuals who could obtain more emotional support or at least have more confidence in having someone's support may use better mood regulation strategies to cope with distress. Among young adult samples, greater support from friends has been found to be more beneficial. During

adolescence and the young adult period, peer contributions add to family support and provide potentially powerful opportunities for emotional development (Adrian et al., 2011; Pepin & Banyard, 2006).

Those with sufficient support, especially from peers, may learn more effective ways to cope with emotional distress. Better mood regulation, in turn, further reduces the risk for engagement in self-injurious behavior or maladaptive coping. Results from Study 3a and Study 3b suggest that social support and mood regulation expectancies are potential protective factors against the negative outcomes of child maltreatment and risk for self-injury. Individuals who can learn more positive ways to cope with emotional distress through peer support may have more positive development (Cohen, 1992). Increasing communication and social interaction with peers appear to be a valuable strategy for both therapy and preventive programs for reducing self-injury.

Chapter 5

General Discussion

5. 1 Summary of Overall Findings

The current research aimed to understand the characteristics of self-injurious behavior among university students, and identified the potential risk and protective factors that may increase or reduce the likelihood of engaging in this dangerous behavior. These aims have been accomplished through quantitative methods on samples from two Asian countries, Japan and Indonesia, by asking the participants to provide their retrospective reports of lifetime self-injury episodes through self-report questionnaires (Nock, 2010). This research expands existing work in the field, which has often ignored Asian countries.

The Prevalence

The prevalence of self-injurious behavior knows no geographic, cultural, or class boundaries, and the rates of this behavior vary considerably between countries (Conterio et al., 1998). Data from two countries in current study showed that 10% to 38% of university students in Indonesia and Japan engaged in self-injurious behavior at some time during their lives. These rates are striking and call attention to self-injury as a potentially serious problem among college and school age populations in community settings. In addition, 21% of self-injurers in Indonesia reported making a suicide attempt. Thus, engaging in self-injury is a potential risk factor for a suicide attempt in Indonesia.

Consistent with other studies, the most commonly reported self-injury methods across the samples were cutting, hitting, and severe scratching (Izutsu et al.,

2006; Ross & Heath, 2002; Whitlock et al., 2006). Of self-injurers, more than half to 89% had injured themselves more than one time, and 50% to 76% reported using more than one method. In the current study, using more self-injury methods and self-cutting specifically, increased the risk of suicide attempts. Across samples, self-injury typically started between 12 to 14 years old. As previous researchers have stated, adolescence is turbulent with distress from conflict with parents and peers. A majority of my participants are no longer engaged in self-injury, whereas others may continue to years due to more distress or difficulties (Ross & Heath, 2002). Although some self-injury studies reported this behavior is more common among women, across all samples in present study, men and women injured themselves at equal rates. This result is similar to previous research (e.g., Muehlenkamp & Gutierrez, 2004).

Risk and Protective Factors

Many studies have considered childhood maltreatment as an important promoter of self-injury: stressful home environment may lead to vulnerabilities such as poor mood regulation skills, poor interpersonal skills, and depression (Cicchetti & Lynch, 1993; Yates, 2004). Self-injury frequencies were strongly correlated with childhood maltreatment across all samples in both countries. More maltreatment was also significantly associated with poorer mood regulation and social support expectancies, and with a higher level of depression. Childhood maltreatment distinguished self-injury from nonself-injury groups both in Japan and Indonesia. In addition, level of childhood maltreatment distinguished nonsuicidal self-injury from self-injury with suicide attempt groups in the first study. Consistent with Van der Kolk et al. (1991) and other researchers, childhood maltreatment was strongly related to suicide attempts and self-injurious behavior.

Understanding the number and types of NSSI methods used is important for

determining suicide risk (Klonsky et al., 2011). The first study identified that using a greater number of NSSI methods, and using self-cutting specifically, was significantly associated with a higher risk for suicide attempts. Level of depression also distinguished self-injury alone participants from suicide attempters. More depression was related to more frequent self-injury. Mood regulation has been an important factor in self-injury studies, as a correlate of depression. The higher one's confidence in regulating one's emotions, the lower one's depression.

Greater maltreatment is associated with higher self-injury frequencies. However, not all of those with trauma in childhood manifest self-injury. In the Studies 2a and 2b, regression analyses pointed to factors potentially protecting against child maltreatment's effects on self-injury, revealing mood regulation expectancies to be a buffering factor in both Japan and Indonesia. Child maltreatment's effect on the severity of self-injury shifts depending on one's level of confidence in regulating one's negative emotions. Survivors of child maltreatment who develop better confidence in their mood regulation may cope more effectively with negative emotions, which in turn reduces the severity of self-injury.

Findings from Study 3a revealed a majority of participants endorsed using self-injury as a way to cope with negative feelings, consistent with other studies that considered affect regulation as primary function of self-injury. Both Study 3a and 3b suggest that lower confidence in regulating emotions also consistently predicted self-injury across both countries. Many studies have considered the experience of maltreatment as leading to a lack of ability to regulate emotions. My analyses of Japanese and Indonesian samples were consistent with past studies: mood regulation expectancies directly predicted self-injury and intervened in the relationship between child maltreatment and self-injury (Adrian et al., 2011; Paivio & McCulloch, 2004).

An examination of an integrated model of multiple factors contributing to

self-injury revealed that childhood maltreatment indirectly led to self-injury through the roles of mood regulation and social support expectancies. Maltreated children may develop various incapacities, however those who can obtain emotional support are likely to develop better adaptation and learn more adaptive mood regulation skills.

Perceived emotional support was related to increased positive affect among Japanese participants (Uchida et al., 2008). Emotional support from peers made a positive contribution to higher mood regulation expectancies, which in turn reduced the risk for self-injury in both Japanese and Indonesian samples. It is likely that individuals with more trust in their friends, who have received social support, may find more adaptive ways to cope with negative emotions. Preliminary results of my two studies demonstrated that social support expectancies, especially from friends, was a potential protective factor, reducing the impact of child maltreatment by enhancing mood regulation expectancies.

"Being around friends," "talking to someone about how you feel" and "keeping busy" were the most commonly reported methods used to resist the urge to harm oneself, endorsed by 74% to 82% of young adult self-injurers (Klonsky & Glenn, 2008). Most self-injurers had injured themselves most frequently when they were alone. Creating a support system and participating in activities with others may decrease feelings of isolation and alienation. Perhaps the presence of others may reduce the urge to injure oneself (Alderman, 1997). Intervention to improve communication skills such as adaptive assertiveness is needed to enhance one's ability to effectively seek help from social networks, such as practicing how to make requests or seek support from others (Klonsky et al., 2011).

Dialectical behavior therapy (DBT) is suggested as a potentially effective

treatment for people engaging in suicidal and non-suicidal self-injury. DBT consists of training in mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness (Linehan, 1998; Lynch & Cozza, 2009). A pilot DBT program for NSSI adolescents showed improved emotion regulation following the treatment (Geddes, Dziurawiec, & Lee, 2013). Treatments targeting emotion regulation to enhance one's ability to express emotions effectively may begin by practicing how to identify and label different emotional experiences, along with the environmental events. Being able to identify and understand the role emotions play in daily life is assumed to enhance emotional acceptance, in particular tolerating negative emotions without needing to engage in impulsive acts. Learning to increase positive experiences is important for balancing one's emotional life (Alderman, 1997; Klonsky et al., 2011). Role-playing exercise is suggested in practicing to verbalize distress in appropriate ways (Newman, 2009). It seems that emphasizing communication skills training and enhancing emotion regulation strategies may reduce NSSI behaviors (Muehlenkamp et al., 2013).

5. 2 Contributions to Understanding Self-Injurious Behavior

This research adds to the self-injury literature, by providing the prevalence and characteristics of self-injurious behavior in Japan and Indonesia, countries infrequently studied before. Research suggests that the majority of young people who injure themselves do not seek help and are largely hidden in the society (Conterio et al., 1998; Fortune et al., 2008; Whitlock et al., 2006). Results from this study are consistent with that notion, showing that self-injury is common in non-psychiatric settings. In addition, the current study examined self-injury with suicide attempts in an Indonesian sample. Suicidal behavior is a leading cause of death worldwide (Nock

et al., 2008). The current study found that 21% of self-injurers had made a previous suicide attempt. This finding supports the need of identifying potential suicide attempters among self-injuring individuals.

One of the major difficulties in understanding the functions of self-injury is the complicatedness of the behavior (Claes & Vandereycken, 2007). Assessing the reasons for self-injury in Chapter 4 Study 3a revealed "to get rid of bad feelings" as the most endorsed reason. This finding supports affect regulation as the primary function of self-injury. Considering that not all who were maltreated in the past manifest self-injury, and not all self-injurers have history of child trauma, an examination was conducted to find protective factors.

Identifying protective factors that may decrease the risk for self-injury is important for intervention and prevention (Klonsky et al., 2011; Yates, 2004; 2009). Focusing on child maltreatment and mood regulation as the most commonly reported predictors of self-injury, findings in Chapter 3 revealed mood regulation expectancies to be a protective factor that seems to buffer the negative effect of child maltreatment and to reduce the severity of self-injury.

Results from two samples in Chapter 3 revealed that greater maltreatment with poorer expectancies for negative mood regulation was associated with more numerous self-injury episodes. However, greater maltreatment with stronger negative mood regulation expectancies resulted in only small increases in self-injury episodes. These findings suggest that enhancing beliefs that one is able to regulate negative emotions among individuals who have experienced maltreatment in the past should lessen the risk of developing NSSI.

An examination of the etiological contribution of maltreatment to self-injury may suggest potential interventions (Yates, 2009). Significant advances may be

achieved only from examining the contributions and interactions of multiple factors (Nock & Cha, 2009). As suggested by some self-injury studies (e.g., Nock, 2010), the current studies attempted to gain an understanding of how this behavior may develop, and to identify how to prevent or reduce the risk of engaging in this behavior. As a way to develop prevention and intervention strategies, this research examined the influence of interpersonal factors in addition to intrapersonal emotion regulation when explaining the maintenance of NSSI (Muehlenkamp et al., 2013; Nock, 2008; Nock, 2010). Cha and Nock (2009) and Muehlenkamp et al. (2003) recommended conducting research that assesses mood regulation in conjunction with social support as a potential protective factor that might lessen suicide risk. Findings from Chapter 4 supported viewing the pathway by which child maltreatment leads to self-injury is through mood regulation and social support expectancies.

My analyses tested a complex model of self-injury predictors. Importantly, by identifying protective factors it adds to the existing literature on how childhood maltreatment leads to self-injury: the path runs through deficits in affect regulation and social support (e.g., Adrian et al., 2011; Paivio & McCulloch, 2004). Figure 9 combines the findings from Chapter 3 and Chapter 4 in a path diagram to show how the associated factors link to each other and to self-injury. Childhood maltreatment is a distal factor associated with impairments in regulating negative emotions and interpersonal difficulties, both of which increase the risk of harmful NSSI.

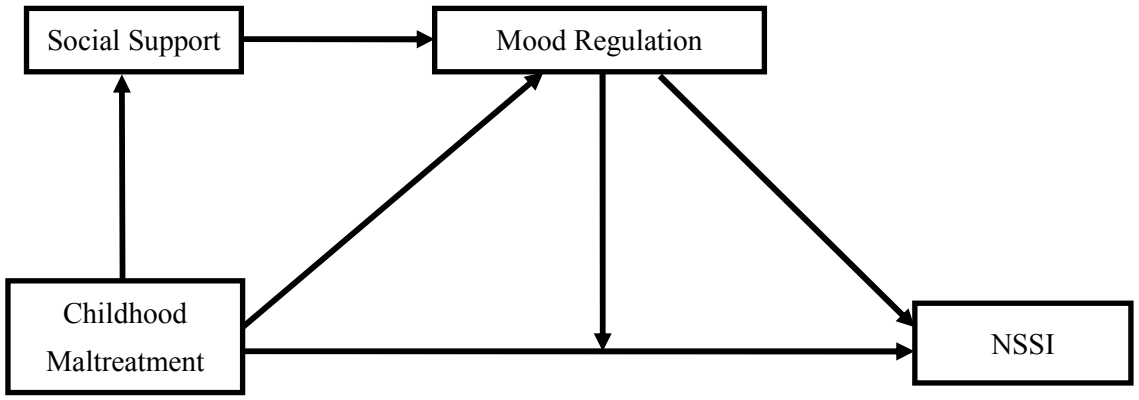

Figure 9. Preliminary Pathway Leading to Self-Injury.

Results of Chapter 3 suggest that mood regulation expectancies serve as protective factor that buffers the effects of child maltreatment, resulting in less self-injury. Mood regulation expectancies moderated the relation between childhood maltreatment and self-injury.

A path analysis in Chapter 4 confirmed that childhood maltreatment predicts self-injury, along with mood regulation expectancies and social support, as protective factors that reduce self-injury. Samples from two countries supported past studies (e.g. Adrian et al., 2011; Paivio & McCulloch, 2004). The results support the proposed model in which NMRE is a core feature that directly predicted self-injury and intervened in the relationship between childhood maltreatment and self-injury. Maltreated children appear to develop deficits in regulating their emotions, which result in difficulties coping with painful negative feelings that appear to increase the likelihood of engaging in self-injury. A lack of supportive resources may increase the intensity of negative emotions, which consequently are regulated through NSSI as a

maladaptive coping method (Klonsky et al., 2011).

In the current study, childhood maltreatment was associated with lower expectancies for getting support from others. Differences in level of perceived social support distinguished individuals with a self-injury history from those who never injured themselves. However, perceived social support from family and friends was not directly linked to self-injury. Instead, there was an indirect link between expectancies for social support and NSSI, through the influence of social support expectancies on NMRE. Insufficient perceived support, in particular from peers, related to poorer mood regulation expectancies, which in turn predicted NSSI.

The current study suggests that social support, particularly from friends, contributes to enhanced management of emotions. Feeling connected to someone who is available to offer support increases the likelihood of coping better with unpleasant emotions. More adaptive coping with unpleasant emotions should reduce the risk of NSSI or other maladaptive behaviors (Muehlenkamp & Gutierrez, 2007). A supportive environment that follows child maltreatment appears to lessen the impact of maltreatment by increasing the likelihood of more successful adjustment (Pepin & Banyard, 2006). In summary, maltreated individuals who could obtain more supportive resources and learn more positive ways to cope with distress may have more positive adjustment.

Results from Chapter 4 supported the importance of supportive environment. Increasing communication and interaction with peers also appears to be a valuable prevention strategy for reducing self-injury. Developing identification for factors that may increase and decrease the behavior is an important start for prevention strategies (Klonsky & Glenn, 2009).

5. 3 Implication, Limitation and Future Direction

Implication

The prevalence of self-injurious behavior among participants in this research suggests that self-injury deserves consideration and further investigation. My research suggests this behavior is common in university samples, and mostly began among adolescents in junior high school. Considering that a majority of those engaging in self-injury are likely to keep it hidden and not to seek help, teachers, school counselors, and school staff need to actively identify students at risk for this behavior and provide essential support. The individuals at risk for self-injury or maladaptive coping need someone to talk to them and listen to their problems.

There is a possibility that Japanese and Indonesians, as part of East Asian cultures, are more likely to adjust their behavior more to the group oriented than individual. For example, encourage the expression of emotions that maintain harmony of the group but keeping the internal feelings to themselves (Matsumoto, 2006). Communication and social interaction should enhance more positive development, particularly through adaptive mood regulation skills, which seems to be a valuable strategy for prevention and therapy (Rotolone & Martin, 2012). The current findings may also be relevant to prevention of similar maladaptive behavior in teens and young adults, such as substance abuse or eating disorders.

Limitation and Future Direction

There are a number of limitations to this study. The research is entirely based on self-report measures, which raises the possibility of biased responding. However, multiple samples in two countries gave similar results. In addition, samples

of university students enrolled in psychology courses may limit generalizing findings to community samples. Future research should include more diverse participants, including other majors than psychology. Because the participants were university students, the current research may have underestimated the percent of people who have experienced childhood maltreatment, as well as the intensity of maltreatment, particularly in the Japanese samples. It is widely assumed that individuals with more severe childhood maltreatment are less likely to enter higher education. Future research should go beyond focusing on university students to include a more diverse sample of young adults.

Another limitation of this research was that it was cross-sectional, which makes it impossible to make causal conclusions. For example, regarding the co-occurrence of self-injury and suicide attempts, it is not clear whether suicide attempts happened before or after self-injury. Future study should clarify this timeline. More importantly, longitudinal research is a must. The current study mainly focused on the overall score of childhood maltreatment, which reflects level of stress in the home environment during childhood and adolescence. A majority of the items represented neglect. Future investigation should assess different types of maltreatment, as they may predict specific kinds of self-injury (Yates, 2009).

Differences were found between perceived social support from mothers and fathers among the Japanese sample in Study 3a. As reported by Tamura (2001), it seems common that fathers in Japan spend more time at work and remain emotionally distant from the family at home. It is assumed that having a father who shows more involvement and is emotionally close with the family promotes more positive development. Future research should focus on the differences in social support between mothers and fathers. Assessing mother's and father's maltreatment

separately may also differentially predict outcomes. In addition, the current study assessed mood regulation and social support using negative mood regulation expectancies and perceived/expectancies for social support. Although these measures demonstrate good reliability and have been useful in predicting risk for self-injury, perhaps alternative measures of mood regulation and social support may determine more comprehensive results and findings.

The current study was limited to assessing only lifetime prevalence of self-injury episodes. The data are based on retrospective self-report measures. This method is widely used in the self-injury literature, since self-injury is difficult to observe directly because the behavior is episodic in nature and typically performed in private (Nock, 2010). However, the use of retrospective data prevents any causal conclusions from being made about the connections between factors associated with NSSI (Muehlenkamp et al., 2013). In the future, comparing past self-injurers to current self-injurers using either a self-report or qualitative study may provide a better understanding of risk or protective factors for self-injury.

The current study tested possible risk and protective factors through examining interactions between variables. Future research may test more combinations of potential interacting and intervening variables, including other potential protective factors such as resiliency, which is the ability to bounce back against environmental stressors. Research focusing on how past self-injurers were able to cease injuring themselves will be important. Rotolone and Martin (2012) reported that resilience significantly distinguished current self-injurers from past self-injurers who were no longer active.

The question remains how to build resilience in self-injurers. In addition, studying expectancies for social support from other adults, such as teachers or school

counselors, may be fruitful as findings may point to the possibility of interventions. Students spend much of their time at school, and they may look for a counselor to talk to during the school day (Fortune et al., 2008). Parents and teachers, and also other important adults, can play a very important role of detecting students' suicide and self-injury risk by providing support. In particular, teachers are a first line of defense in school suicide prevention (Leenars et al., 2001: see Takahashi, 1999; Pepin & Banyard, 2006).

This research examined possible risk and protective factors through testing interactions between variables. Different studies in the current thesis revealed that mood regulation expectancies can function as a moderator or mediator variable. As Frazier et al. (2004) suggested, a variable may function as either a moderator or a mediator depending on the research question and the theory tested. Moderator variables alter an outcome, so that the effect of the predictor shifts depending on values of the moderator (Dearing & Hamilton, 2006). On the other hand, mediators reflect a pathway by which one variable influences an outcome variable (Dearing & Hamilton, 2006; Frazier et al., 2004). Because of my findings, future research should test a moderated mediation model of mood regulation expectancies.

Despite the above limitations, this study also has some key strengths. The current findings add to the literature on self-injury, particularly in Japan and Indonesia, as self-injury and child maltreatment has been less studied in these countries. The findings show similarities to Western samples. Through self-report measures, the current study identified suicide attempters and factors that increase risk for suicide. Identifying not only risk but protective factors is important but less studied.

This research examined the contribution of mood regulation and social

support expectancies between child maltreatment and self-injury in a single model, shedding light on the complex relationships among these variables. Results demonstrated that mood regulation expectancies buffered the effects of child maltreatment and were associated with reduced self-injury. Moreover, findings identified a pathway by which maltreatment history may lead to self-injury through decreased social support and lower mood regulation expectancies. Feelings that family or friends are available to provide support positively influence individuals' confidence about coping with negative moods. The current research suggests that increasing social support and raising NMRE for maltreated children will lessen their use of self-injuring as a maladaptive way of coping with unpleasant emotions.

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