An investigation into stress-induced analgesia and pain during non-suicidal self-injury

Katie Dykes
BSc(Hons)

Submitted in fulfilment of the requirements for the degree of PhD

University of Tasmania

June 2014

Submitted as a partial requirement for the degree of Doctor of Philosophy

at the University of Tasmania.

Declaration of Originality

I declare that this thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by another person except where due acknowledgement is made in the text of the thesis, nor does the thesis contain any material that infringes copyright.

_____

Katie Dykes

Authority of Access

This thesis may be made available for loan and limited copying communication in accordance with the Copyright Act 1968.

_____

Katie Dykes

Acknowledgements

I would like to thank my supervisor, Dr Janet Haines, for her supervision and support during the development, execution and writing of this thesis. I found both her guidance and knowledge to invaluable.

I would also like to thank my family and friends for their support and understanding during this process. In particular, a special mention to my husband, Will, for his encouragement and support.

Finally, thank you to the individuals who participated in my study. I appreciate their cooperation, time commitment, and willingness to share with me details of their personal stories.

Table of contents

List of Tables

List of Figures

List of Appendices

Abstract

The present study investigated the mechanisms of non-suicidal self-injury (NSSI) and the differences in the experience of pain during the act. In particular, the study investigated the potential explanations as to why some individuals experience pain during NSSI whereas others report an absence of pain during the act. Of particular interest was the impact of dissociative experiences and a history of trauma on the experience of pain during NSSI. A personalised, staged guided imagery methodology was employed to assess the psychological and psychophysiological reactions of 20 individuals with a history of NSSI. Furthermore, a cold pressor test was used to investigate individual's responses to painful stimuli. Unexpectedly, both individuals who do and do not feel pain during the act experienced a consistent pattern and strength of tension reduction following NSSI. Additionally, when investigating responses to painful stimuli in individuals who do and do not feel pain during NSSI, there were no significant differences in threshold, tolerance or perception of pain. When considering the impact of dissociation on the experience of pain during NSSI (n = 30), contrary to the hypothesis, there were no differences in the strength or frequency of individuals' dissociative experiences. The relationship between trauma and pain during NSSI was then investigated in 52 individuals. It was found that individuals who experience a lack of pain during NSSI reported significantly more childhood abuse and trauma, higher levels of neglect and punishment, and a more negative home environment than individuals who feel pain during the act. The results add to the literature on, and provide interesting insights into the complex relationship between childhood abuse and trauma, NSSI and pain.

CHAPTER 1

INTRODUCTION AND OVERVIEW

Introduction

When an individual experiences feelings of anxiety or distress they will seek a means of ameliorating such negative emotional and physiological states (Foster, 1998; Werry, Carlielle, & Fitzpatrick, 1983). Individuals will seek strategies, both adaptive and maladaptive, that soothe, provide comfort and reduce negative emotional states (Berkson, 1968; Foster, 1998). Self-soothing behaviours such as rocking, thumb sucking or chewing on an object are universal and observed in both infants and adults (Foster, 1998). Less adaptive self-soothing behaviours, such as chewing on lips, skin or nails, banging one's head and trichotillomania, are observed in more unusual contexts, are persistent, maladaptive, and self-injurious (Berkson, 1968; Foster, 1998). These less adaptive behaviours have been shown to be directly linked to negative mood states and are thought to assist the individual in managing increased levels of distress, anxiety and other negative emotions (Foster, 1998; Werry et al., 1983).

It has been reported that some individuals engaging in non-suicidal NSSI (NSSI) may experience stress-induced analgesia or a lack of pain during the act. However, it is unclear as to why some individuals report a loss of painful sensations whereas others do not. The endorphin model of NSSI fails to entirely account for the behaviour in the absence of pain. The purpose of the current study is to investigate stress-induced analgesia and pain during NSSI.

Definition of the problem

NSSI is thought to be a maladaptive coping mechanism utilised by individuals to ameliorate psychological distress (Haines & Williams, 2003). Evidence has shown that NSSI produces a tension reduction effect which is self-soothing and provides a sense of emotional quiescence (Brain, Haines, & Williams, 1998, 2002; Haines, Williams, Brain, & Wilson, 1995). As the levels of negative emotions increase, many individuals report feelings of depersonalisation (Haines et al., 1995). When the negative emotions reach a level the individual is no longer able to tolerate they engage in NSSI (Brain et al., 1998), with many experiencing little or no pain (Starr, 2004). This may be due to an increase in endogenous opiates such as β-endorphins and encephalins (Darche, 1990).

It has been suggested that NSSI which results in a bleeding injury is associated with greater stress related arousal and greater feelings of depersonalisation prior to injury followed by strong tension reduction subsequent to the injury (Haines & George, in preparation). Therefore, it can be speculated that more severe NSSI can occur because the greater level of distress is triggering a stronger depersonalisation response associated with the experience of stress-induced analgesia. It is the purpose of this review to investigate the antecedents and consequences of NSSI. More specifically, the aim is to consider the explanations for the presence or absence of stress induced analgesia (SIA) during NSSI.

Overview of the thesis

The aim of the thesis is to investigate the mechanisms of NSSI and to explore the differences in the experience of pain during the act. In particular, the thesis investigates the potential explanations as to why some individuals experience pain during NSSI whereas others report no pain during the act. Firstly, it is necessary to determine why individuals engage in NSSI and of what benefit this behaviour serves. This is done by reviewing the literature regarding the mechanisms and benefits for engaging in such behaviour. Much of the recent literature supports a tension reduction model of NSSI which proposes that individuals engage in the act to ameliorate high levels of negative mood states and physiological distress. Furthermore, it is necessary to investigate the concept of pain, the theories as to what cause this and why individuals' experience pain differently.

The major focus of this thesis will be to examine the reasons why some individuals engage in NSSI with the experience of pain whereas others report a lack of painful sensations. The methodology selected will examine individual's reactions during NSSI by considering psychological and physiological reactions to memories of these events using a guided imagery methodology. Additionally, cold pressor tests will allow for individuals' responses to painful stimuli to be measured and recorded, thus, investigating whether these individuals, in fact, differ in their responses and reactions to pain.

This thesis is divided into four separate studies which will investigate the possible explanations for the differences in the experience of pain during NSSI. The first study aims to investigate the underlying mechanisms behind NSSI. More specifically, the study was designed to examine whether the tension reducing

properties of NSSI differ between individuals who do and do not feel pain during the act. Given the notion that NSSI is a maladaptive coping strategy it was thought to be necessary to examine the reported levels of daily hassles and stressful life events these individuals have experienced. The second study aimed to investigate differences in pain threshold, tolerance and perceived pain in individuals who do and do not feel pain during the act. It may be that individuals who do and do not feel pain during the act differ in their responses to painful stimuli, although this has not been examined previously. The third study aimed to investigate a further possibility that it is an individual's propensity to experience dissociation during times of high stress which allows them to engage in painless NSSI. Given that there may be a relationship between NSSI, dissociation and trauma, the fourth study aimed to investigate the differences in the experiences of trauma and abuse of individuals who do and do not feel pain during the act.

In undertaking this examination of NSSI and pain, it is the aim, firstly, to consider the recent literature related to NSSI. Specifically, what antecedents are involved in the adoption of this behaviour as well as the mechanisms involved in the actual act will be examined. The literature regarding the various models of NSSI will be presented with a specific focus on the tension reduction model of NSSI.

CHAPTER 2

NON-SUICIDAL SELF-INJURIOUS BEHAVIOUR

Non-suicidal self-injurious behaviour

A lack of agreement of the definition of NSSI has resulted in widespread confusion in the literature. NSSI is often used interchangeably with terms such as self-mutilation, NSSI, parasuicide, self-abuse, deliberate self-harm, self-wounding, symbolic self-wounding and self-cutting. For research to be effective and results to be generalised a consistent definition needs to be agreed upon. Furthermore, a number of different types of behaviour are sometimes included under the same definition or NSSI including: serious self-inflicted NSSI such as amputation and eye nucleation (van Moffaert, 1989); repetitive, harmful, non-suicidal cutting behaviour (Darche, 1990); a behaviour reflecting suicidal gestures and/or attempts (Brittlebank et al., 1990); and a repetitive nonsuicidal behaviour such as burning, hitting oneself or biting (Herpertz, 1995).

Favazza (1999) defined NSSI as involving an individual causing harm to one's own body with enough severity to cause tissue damage but without suicidal intent. This definition appears to be the most accurate explanation of this behaviour. However, there is a lack of agreement and consistency in the terminology used to describe non-suicidal self-injurious behaviours (Ross & Heath, 2002). The term NSSI is now the most commonly used terminology for such behaviours in the literature (Nock & Favazza, 2009).

The lack of consensus surrounding a definition has resulted in a wide range of behaviours (e.g., tattoos, piercings and disordered eating) being included in NSSI research. However, many of these behaviours are now not regarded as fitting the definition of non-suicidal self-injurious behaviour and this results in challenges when attempting to review the existing literature.

Previously, there has been a misunderstanding of the clear distinction between NSSI and attempted suicide resulting in many studies including suicidal behaviours in their investigation of NSSI (Brittlebank, Cole, Hassanyeh, Kenny, Simpson, & Scott, 1990). The terminology used previously has caused confusion with the term 'self-harm' being used interchangeably to describe both self-injurious behaviour and suicide attempts, such as, overdose and self-poisoning (Milnes, Owens, & Blenkiron, 2002; Sampson, Mukherjee, Ukoumunne, Mullan, & Bullock, 2004). Additionally, some practioners and researchers have viewed self-injurious behaviour as limited to cutting or viewed it as only a symptom of borderline personality disorder (Favazza, 1998; Zlotnick, Mattia, & Zimmermann, 1999).

When investigating NSSI, it is important to distinguish these behaviours from others which do not fit the accepted definition. These include suicidal attempts, socially accepted NSSI, indirect NSSI, imitation of self-injurious behaviours, NSSI during stereotyped behaviours, NSSI in individuals with intellectual disabilities and NSSI during psychosis (Klonsky, 2007). It is necessary to separate the act of NSSI as a means to reduce negative emotions with NSSI used to express spirituality or, in some cultures, where it is used to heal an individual (Favazza, 1996). Furthermore, NSSI also needs to be distinguished from acts where the aim is to enhance an individual's beauty or as a way of belonging to a particular group (Favazza, 1996).

It is difficult to compare studies on NSSI because of the large number of different populations used (e.g., hospital, outpatient, community, inpatient) (Darche, 1990; Haines, Williams, Brain, & Wilson, 1995; Suyemoto & MacDonald, 1995), the varied behaviours included (e.g., suicide attempts, eating disorders, substance abuse) (Walsh & Rosen, 1988), and the confusion with suicide (Brittlebank et al., 1990).

Previous research has included individuals with suicidal ideation, attempted suicide or completed suicide in their study of NSSI.

The distinction between NSSI and suicide attempts

There has been confusion and misinformation in the literature about the extent to which attempted suicide and NSSI can be distinguished (Zlotnick, Donaldson, Spirito, & Pearlstein, 1997; Starr, 2004). Early research examining NSSI viewed the behaviour as a symbolic suicidal gesture (Menninger, 1935). Nevertheless, it is now commonly accepted that NSSI occurs in the absence of suicidal intent (Starr, 2004). Therefore, it is necessary to differentiate between these two very different behaviours.

It is proposed that an individual uses the act of NSSI so that depersonalisation and reintegration will occur, not to end their life (Simpson, 1976). Favazza (1998) proposed that individuals engage in NSSI to improve negative mood states whereas individuals attempt suicide to end all feelings. It is understood that both NSSI and suicide attempts act to provide a state of emotional relief. However, they differ in a number of other important ways. An explanation for a suicide attempt is often to reduce the burden on others whereas NSSI is often engaged in for emotional regulation, anger expression or distraction (Chapman & Dixon-Gordon, 2007). The wish or intent to die during a suicide attempt is also a crucial distinction between that and NSSI where the intent is to reduce negative emotions. Interestingly, research has also shown that feelings of boredom and emotional numbness prior to the act are significantly stronger in individuals who engage in NSSI compared with individuals

who attempt suicide. Chapman and Dixon-Gordon (2007) found that no individuals reported boredom following the act of NSSI.

Previously, it has been proposed that NSSI and suicide are on a continuum rather than being two distinct behaviours (Zlotnick, Donaldson, Spirito, & Pearlstein, 1997). However, current research has shown that NSSI and suicide can coexist (Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2001). Several studies have shown that repeated NSSI is the best predictor of both suicide attempts and completed suicide in the future even after controlling for psychopathology, gender and age (Gunnell & Frankel, 1994). At present, most researchers draw clear distinctions between the two acts, with both having very distinct aetiologies and recommendations for treatment (Starr, 2004).

The literature includes three criteria which distinguish between NSSI and suicidal behaviours: lethality, repetition and intention (Guertin et al., 2001). Non-suicidal self-injurious behaviour is generally repetitive, involves low lethality behaviours and is performed without suicidal intent. Furthermore, individuals who engage in NSSI are shown to discriminate it both cognitively and affectively from suicide attempts (Allen, 1995; Simpson & Porter, 1981).

Types of NSSI

There is an extensive variety of non-suicidal self-injurious behaviours described in the literature. The most common behaviours reported in the literature include cutting, biting, scratching, punching self or objects, biting nails and/or cuticles and drawing blood, trichotillomania, burning, pinching, stabbing and cutting off body parts (Briere & Gill, 1998). Research has suggested the most common self-

injurious behaviour is cutting and/or scratching (Langbehn & Pfohl, 1993; Nixon,

Cloutier, & Aggarwal, 2002).

Self-injurious behaviours can be further classified into two groups. NSSI may

involve compulsive behaviours such as trichotillomania, onychophagia and skin

scratching and picking. Additionally, it may occur episodically and repetitively and

includes acts such as burning, cutting, bone breaking, biting, self-hitting, wound

excoriation and insertion of objects under the skin (Favazza, 1996).

Individuals engaging in NSSI may target a number of bodily regions, most

commonly the legs and arms. However, NSSI may also involve the nose, ears, hair,

eyes, breasts, tongue, genitalia and limb amputation (Bennum, 1984).

The incidence of NSSI

It is difficult to ascertain a consistent and true representation of the incidence

or lifetime prevalence of NSSI. This is for a number of reasons including definitional

problems, underreporting of the behaviour, behaviours such as suicidal attempts or

gestures being included in the data, or the data being restricted to particular types of

NSSI such as cutting. Many individuals engage in NSSI on a regular basis but do not

present to doctors or hospitals for medical treatment, resulting in a lower reported

incidence. Furthermore, many individuals will not volunteer information about their

self-injurious behaviour unless they are specifically asked (Hawton, Harriss, Simkin,

Bale, & Bond, 2004; Rodham & Hawton, 2009).

NSSI is commonly reported in clinical samples with rates varying from 4.3%

to 44% (Darche, 1990; Doctors, 1981; Langbehn & Pfohl, 1993; Jeffery & Warm,

2002). When considering an adolescent sample of an inpatient population it is

estimated the prevalence of NSSI is between 40 and 60% (Darche, 1990;

DiClemente, Ponton, & Hartly, 1991). It is believed that the behaviour is

underreported in community samples (rate of 4%) due to the stigma attached and the

secretiveness of the behaviour. The incidence of NSSI is estimated to be between 14

per 100,000 population per year and 750 per 100,000 (Favazza & Conterio, 1989;

Simpson, 1976), although estimates as high as 1,400 per 100,000 have been made

(Favazza, 1996). Favazza and Conterio (1989) suggested that the incidence of NSSI

in individuals between the ages of 15 and 35 is approximately 1800 per 100,000.

Many studies have proposed that the onset of NSSI occurs during

adolescence (Favazza & Conterio, 1988; Suyemoto & MacDonald, 1995), although

other research has suggested that the incidence during this time is quite low at only

1.2% (Guertin et al., 2001). More recently, Kumar, Pepe, and Steer (2004) found that

the average age that adolescent inpatients first engaged in NSSI was 13.5 years.

The characteristics of individuals repeatedly engaging in NSSI have been

extensively documented in the literature. The characteristics of individuals who are

most often identified as engaging in NSSI are females, in their early twenties, with a

history of early illness or surgery, a history of physical or sexual abuse, accident

proneness, body dissatisfaction, perfectionistic, and an inability to express emotions

(Darche, 1990; Herpetz, 1995). Some researchers have proposed that between 75%

and 85% of adolescents who engage in NSSI are female (Groholt, Ekeberg,

Wichstrom, & Haldorsen, 2000; Hawton, Fagg, Simkin, Bale, & Bond, 2000). In

comparison, other researchers have reported the ratio as 1.4 females to every one

male who engages in NSSI (Hawton, Fagg, Simkin, Bale, & Bond, 1997; Hurry &

Storey, 2000).

Despite the large body of literature, research has failed to identify the specific factors which contribute to the adoption of NSSI as a habitual behaviour (Brain, Haines, & Williams, 2002; Favazza & Conterio, 1989; Starr, 2004). NSSI can occur in conjunction with a range of psychiatric conditions despite the symptom of NSSI only being listed in the diagnostic criteria of borderline personality disorder (APA, 2013). Non-suicidal self-injurious behaviours are observed in individuals with psychiatric diagnoses including major depression (Cohen, Lavell, Rich, & Bromet, 1994), bipolar disorder (Brown, Beck, Steer, & Grisham; 2000), panic disorder (Hirschfeld, 1996), borderline personality disorder (Zanarini, Gunderson, Frankenberg, & Chauncey, 1990), schizophrenia (Caldwell & Gottesman, 1992), and substance use disorders (Forman & Kalafat, 1998). It has been found that 86% of individuals with dissociative disorders also engage in NSSI (Saxe et al., 1993). Additionally, research has found that, in a sample of individuals who engage in NSSI, 56.4% had mood disorders, 30.4% had anxiety disorders including 4.3% with posttraumatic stress disorder, and 4.3% had eating disorders. There is no longer the belief that NSSI occurs exclusively as a component of borderline personality disorder (Saxe et al., 1993).

As shown above, the literature and figures related to the incidence and characteristics of individuals engaging in NSSI are unclear and varied. There is a heavy reliance on clinical populations, especially for data relating to the incidence of NSSI. The concern with this is that clinical samples do not represent the large number of individuals who engage in NSSI but do not have contact with medical, psychological or other care services (Hurry, 2000). It is necessary for further research to include individuals other than those in clinical samples to obtain clearer understanding of the underlying mechanisms and functions of NSSI in the general

population. There has been much research investigating the reasons for the adoption of NSSI. These will be discussed below.

Precipitants and antecedents of NSSI

It is widely accepted that the primary antecedent of NSSI is increased levels of tension. The combination of depression and anxiety are commonly reported to be experienced by individuals engaging in NSSI, but the combination of tension and anxiety have been found to have a stronger link (Klonsky, Oltmanns, & Turkheimer, 2003).

Further, high numbers of individuals engaging in NSSI have reported increased levels of both anxiety and hostility prior to the act (Ross & Heath, 2003). Increased levels of extrapunitive hostility (e.g., cynical, resentful, easily angered) and intropunitive hostility (e.g., self-doubt, guilt, self-criticism) have also been expressed by individuals engaging in NSSI. An individual's propensity to become more easily angered paired with increased levels of self-dislike and guilt may result in the hostile feelings being directed towards the individual. Results such as these support a hostility model of NSSI (Herpertz, Sass, & Favazza, 1997). Research involving a female inmate population found that the most common emotion preceding NSSI was anger, with 45.16% of individuals reporting the experience of anger prior to the act (Chapman & Dixon-Gordon, 2007).

A number of factors have also been reported to be involved with the act of NSSI. These include interpersonal conflict, rejection, separation, self-hatred, depression, loneliness and abandonment that may be threatened, real or imagined. As the self-injurious behaviours become habitual, they may be precipitated by more

minor events (Bennum, 1984; Simpson, 1976; Starr, 2004). For NSSI to become repetitive and habitual, the behaviour needs to serve some purpose. It is proposed that the act of NSSI has a number of positive consequences for the individual and these will be further discussed below.

A number of antecedent factors have been identified in the literature. An association between antisocial behaviour and NSSI has been consistently found in the research (Chowanec, Josephson, Coleman, & Davis, 1991; Simeon et al., 1992). Additionally, individuals who engage in NSSI often report high numbers of physical illnesses or complaints (Herpetz, 1995) and/or sexual dysfunction (Dulit et al., 1994; Simpson, 1975). Individuals who engage in NSSI often come from home environments where there is divorce or neglect (Pattison & Kahan, 1983; Simpson & Porter, 1981).

Investigations into individuals' maladaptive schemas found that individuals who engage in NSSI could be distinguished from control individuals on the basis of poor self-control and impulsivity. It was concluded that the increased levels of impulsivity may impair an individual's ability to cope in an adaptive manner with strong negative affect and distressing cognitions (Castille et al., 2007).

It has been suggested that a significant risk for engaging in NSSI is the presence of dissociative episodes (Gratz, Conrad, & Roemer, 2002). Certainly, increased levels of unreality and numbness immediately prior to NSSI have been extensively reported (Haines et al., 1995; Nock & Cha, 2009; Nock & Pristein, 2005; Weierich & Nock, 2008).

Individuals engaging in NSSI have been found to have poor coping and problem solving skills. Feelings of low self-worth, self-esteem and optimism about life have been demonstrated to be particularly problematic areas (Favazza, 1989;

Walsh & Rosen, 1988). Individuals who engage in NSSI were also found to have a greater tendency to engage in problem avoidance behaviours and experience less perceived control concerning problem solving options. It was proposed that individuals who self-injure are not able to successfully use adaptive problem solving strategies once their stress levels reach a particular threshold (Haines & Williams, 1997).

It has been investigated whether individuals engaging in NSSI also utilise other maladaptive coping strategies prior to the act. It has been shown that people who engage in NSSI experience difficulties using future-orientated problem solving skills during times of high stress (Favazza, 1998) and report using avoidance coping strategies (Andover, Pepper, & Gibb, 2007).

In contrast, research investigating the coping and problem-solving strategies of prisoners who engage in NSSI, prisoners not engaging in NSSI and non-prisoner groups found that although the individuals who engage in NSSI have more deficiencies in coping skills than other groups, there were, in fact, no significant differences between the groups (Haines & Williams, 2003). This suggests that individuals who engage in NSSI are not necessarily deficient in coping skills but choose self-injurious behaviours as they are more effective.

Stressful life events and daily hassles as an antecedent to NSSI

The large number of definitions of stress has caused considerable confusion in the literature. Stress may be viewed in two ways: a result or a cause. To rectify this confusion the term stressor often refers to the cause and stress to the result. Lazarus and Folkman (1984) defined stress as an event or experience in which environmental

and/or internal demands overwhelm the adaptive resources of an individual. Although stress is often viewed as a risk factor for psychopathology and maladjustment, at times it also serves as a source of personal growth and development (Compas, Grant, & Ey, 1994).

It is widely accepted that increased levels of stress is a precipitant for self-injurious behaviour. More specifically, psychosocial stress has been shown to be linked to the aetiology and maintenance of both internalising and externalising behaviour, particularly in adolescents (Cicchetti & Toth, 1991; Rutter, 1989). It has been proposed that NSSI originates as an experimental method to manage stressful life events in adolescence but is maintained due to more chronic life stressors in adulthood (Ross & Heath, 2002).

It is important to distinguish between life events and daily hassles when discussing the concept of stress. Stressful major life events are those that are thought of as critical or traumatic which are outside the realm of everyday normal experiences. Daily hassles refer to day-to-day disruptions or annoyances to an individual's life. Daily hassles often occur more frequently than stressful life events (Williams & McGillicuddy-De Lisi, 2000). Both perceived daily stress and hassles have been linked to daily negative affect (DeLongis, Folkman, & Lazarus, 1988; Watson, 1988). This has particular importance to the study of NSSI as self-injurious behaviour is thought to be used as a mechanism to reduce or ameliorate negative emotions (Haines & Williams, 1997; Selby, Anestis, & Joiner, 2008). Daily hassles and stressful life events do not necessarily occur independently of each other and may co-exist. Additionally, the experience of more major stressful life events may increase an individual's propensity to be affected by daily hassles or cope with these adaptively (Kessler, Price, & Wortman, 1985).

Stress during adolescence and young adulthood has been shown to significantly affect an individual's psychological state as well as their general functioning. High levels of stress at this age may play an important role in the adoption of NSSI if the individual is already vulnerable to stressful experiences and lacks adaptive and appropriate coping strategies and problem solving techniques. Major stressful life events as well as more minor events have been shown to be related to internalising factors such as depression, anxiety and somatic complaints. Additionally, both major and minor causes of stress have been linked to externalising factors such as behavioural problems and school non-attendance (Compas, Malcarne, & Fondacaro, 1988; Windle, 1992; Yarcheski & Mahon, 1999). However, there are a large number of adolescents and young adults who experience major stressful life events and do not have a negative reaction to these (Goodyer & Altham, 1991). Research involving adolescents has shown that the experience of daily hassles is related to adjustment, with the experience of daily hassles being a stronger predictor of adjustment than the effects of more major stressful life event (Wagner, Compas & Howell, 1988). In comparison, adults' experience of daily hassles was shown to be linked to more positive outcomes than the experience of stressful life events (Kanner, Coyne, Schaefer, & Lazarus, 1981). There is a lack of research investigating the relationship between NSSI, daily hassles and stressful life events in nonclinical samples of adults. This is an area which requires further investigation.

Consequences of NSSI

NSSI is thought to be a maladaptive coping mechanism used by individuals to ameliorate the distress caused by a range of factors including rejection,

abandonment, interpersonal conflict and separation (Feldman, 1988; Rosenthal,

Rinzler, Walsh, & Klausner; Simpson, 1976). It is thought that NSSI serves four

main purposes. Firstly, it is a way of re-enacting some type of trauma. Secondly,

NSSI is a way of expressing feelings which are directed against the individual such

as guilt, shame or rage. Thirdly, it may be used to regain emotional and physical

homeostasis. Fourthly, NSSI may be used as a way of managing or maintaining

dissociative processes. Therefore, by engaging in NSSI the individual is able to

regulate their intolerable and distressing feelings and emotional state (Connors, 1996;

Starr, 2004). Individuals who engage in NSSI commonly report the behaviour

reduces intolerable anxiety and/or tension (Kemperman, Russ & Shearin, 1997;

Wilkins & Coid, 1991). Additionally, studies have found that NSSI acts to reduce

feelings of anger, anxiety, depression, shame and sadness (Kemperman et al., 1997).

It is widely accepted that NSSI is used by individuals as a way to

communicate the degree of pain they are experiencing. Research has shown a strong

relationship between NSSI and a schema of social isolation and alienation (Castille et

al., 2007). It is thought that individuals who engage in NSSI feel they have no one

who is able to give them emotional support, comfort, understanding and affection.

This leads these individuals to use extreme ways to communicate their levels of

distress.

The tension reduction model of NSSI

A pattern of tension reduction has been demonstrated following the act of

NSSI. The tension reduction model of NSSI proposes that self-injurious behaviours

act to reduce tension in individuals experiencing increased levels of negative

emotions. The reduction in negative emotions acts to reinforce the self-injurious behaviour. This increases the likelihood that individuals will again engage in NSSI (Brain, Haines, & Williams, 1998; Haines et al., 1995; Jeffrey & Warm, 2002).

As negative emotions increase in severity, they reach a level which the individual is no longer able to tolerate. These individuals commonly report experiencing depersonalisation characterized by feeling numb, unreal and withdrawn (Haines et al., 1995; Starr, 2004). The individual will then engage in NSSI (Brain et al., 1998). The severity of the self-injurious act may range from superficial cuts to deep lacerations requiring medical attention and sutures (Starr, 2004).

The self-injurious behaviours often occur in the absence of or with little pain. The sight of blood is believed to have a significant effect on the change in mood of people who engage in NSSI. The sight of blood results in feelings of relief. When relief is not felt instantaneously it is often due to inadequate bleeding. Some individuals will then continue to engage in NSSI until there is sufficient blood to aid the change in mood. In some instances the sight of blood is said to facilitate repersonalisation (Simpson, 1976).

NSSI may be thought of as therapeutic. The act results in a decrease in tension, repersonalisation and feelings of relief. The majority of individuals who engage in NSSI know what is necessary for the negative feelings and depersonalisation to end. Once the act of NSSI has been completed, the individuals will appear that they are functioning sufficiently well (Rosenthal, Rinzler, Wallsh, & Klausner, 1972; Walsh & Rosen, 1988).

The reduction in tension felt by the individual is believed to be the factor that maintains it (Bennum, 1984). NSSI does not affect the underlying psychopathology that may generate the behaviour, but temporarily decreases the negative feelings

associated with that psychopathology. The individual learns that amelioration of distress follows NSSI. Therefore, when an individual again experiences tension or distress they will once more engage in NSSI in an attempt to decrease these negative feelings (Haines et al., 1995).

There are methodological and ethical problems associated with recording the psychophysiological responses of individuals during the act of NSSI. Guided imagery is often utilised when it is not possible to record psychophysiological responses of an individual at the time of NSSI. Certainly, research has shown that a psychophysiological response to an image or memory simulates the responses experienced during the actual act (Lang, 1979). Previous research has demonstrated the effectiveness of guided imagery and its utility in assessing psychophysiological states has been well documented. During guided imagery, information is presented to the individual in stages which allow arousal levels associated with specific behaviours to be accurately measured and documented (Brain et al., 1998, 2002; Haines et al., 1995).

A stage based guided imagery methodology has been used to investigate the ability of the tension reduction model to explain the maintenance of NSSI (Brain et al., 1998, 2002; Haines et al., 1995). The research has indicated that engaging in NSSI has an immediate effect of reducing psychophysiological arousal, with this arousal change being maintained after the act has been completed (Brain et al., 2002). Additionally, a significant reduction in negative feelings is apparent following an act of NSSI. Individuals respond differently to control imagery when compared to NSSI imagery. Interestingly, research has shown that NSSI participants respond in a non-aberrant way to imagery concerning everyday events and accidental injuries. The psychophysiological arousal patterns of individuals who engage in self-injurious

behaviours and those no longer engaging in the behaviour could not be differentiated (Brain et al., 1998).

It has been suggested that it is the decrease in psychophysiological arousal which acts to reinforce the behaviour (Brain et al., 2002). The strength of the relaxation response to NSSI is such that it increases the likelihood of the individual again engaging in the maladaptive behaviour when they experience a similar negative emotional state (Haines & Williams, 1997). Research has indicated that it is the decrease in psychophysiological arousal which acts to reinforce and maintain the self-injurious behaviour, not the psychological responses to the behaviour (Haines et al., 1995). It is unlikely that individuals stop the act of NSSI just because it does not result in a decrease in tension and negative emotions. For the self-injurious behaviour to cease it is necessary to alter the underlying psychopathology or symptomatology of the individual so the need to engage in the maladaptive behaviour is reduced (Brain et al., 1998).

As discussed above, some individuals engage in NSSI with the absence of or with little pain whereas others report painful sensations during the act. It is unclear if individuals experiencing SIA have the same pattern of physiological tension reduction and reduction of negative emotions as those who feel pain during NSSI. There is a lack of agreement in the literature as to why some individuals experience SIA whereas others do not. This is discussed further below.

Alternative models of NSSI

A number of researchers have postulated that the mechanism of affect regulation, including the expression and control of affect, can explain the relationship

between early childhood experiences, further experiences of stress and NSSI (Suyemoto & MacDonald, 1995). The literature includes two affect regulation models, the expression and the control models. An expression model explains self-injurious behaviour as an expression of overwhelming and internally intolerable affect in which the individual redirects anger towards others onto themselves (Darche, 1990; Raine, 1982). In contrast, the control model views NSSI as a way to gain control by focusing anger previously directed at an abandoning object onto themselves (Raine, 1982). These models are consistent with those proposed by a number of other theorists who have also proposed that NSSI is related to difficulties with affect regulation (Bennum, 1984; Favazza & Favazza, 1987; Rosen, Walsh, & Rode, 1990).

In contrast, Yates (2004) proposed a traumagenic model of NSSI. This model identifies childhood maltreatment and trauma as playing a pivotal role in the development of self-injurious behaviours. It is widely accepted that trauma and abuse negatively affects childhood development including affect regulation and the development of interpersonal relationships. Yates (2004) proposed that NSSI is a coping strategy that plays a compensatory, regulatory and relational role in the regulation of negative emotions and interpersonal relationships. A number of researchers have shown a relationship between NSSI and childhood trauma, lending support to the traumagenic model (Favazza & Conterio, 1989; van der Kolk, Perry, & Herman, 1991). However, this model does not account for the large number of individuals who engage in self-injurious behaviour with no previous history of childhood trauma or abuse.

The experiential avoidance model (EAM) of NSSI focuses on the role of emotional experiences in both triggering and reinforcing the behaviour. This model

proposes that NSSI is maintained through negative reinforcement whereby the behaviour results in a reduction or escape from negative or unpleasant emotions (Chapman, Gratz & Brown, 2006). Similarities can be drawn between this model and the tension reduction model of NSSI. Although very similar, the key difference is the EAM model proposes that the act of NSSI is maintained through negative reinforcement by avoiding the negative emotions rather than attempting to control or reduce the emotions (Chapman et al., 2006). This model focuses on the process of avoidance which the tension reduction model does not.

Suyemoto (1998) proposed that there are six major functional models of NSSI: environmental, antisuicide, sexual, affect regulation, dissociation and boundaries. These six models can be categorised into four major areas: environmental, drive, affect regulation, and interpersonal. She proposed that the environmental models stem from behavioural and systemic theories, the drive models (sexual and antisuicide) from psychoanalytic theories, the affect regulation models (dissociation and affect regulation) from ego and self-psychology and the boundaries model from self-psychology and object relations.

The environmental model concentrates on the relationship between the individual and their environment while attempting to identify causes for the initiation and continuation of the behaviour. This model proposes that NSSI is initiated through the family modelling abusive behaviour leading the individual to pair pain and care. Furthermore, it is proposed that an individual may begin to engage in NSSI because they have learnt the benefits of self-injurious behaviour through vicarious reinforcement. It is thought that the behaviour is reinforced by the feelings of relief following the act or through reinforcement from family and/or friends (Suyemoto,

1998). The reinforcing factors discussed by Suyemoto (1998) are consistent with the tension reduction model of NSSI (Bennum, 1984).

The antisuicide model of NSSI proposes that the behaviour acts as a replacement for suicide. Furthermore, it acts as a compromise between life and death. The sexual model is also encompassed under the drive models of NSSI. This model proposes that NSSI originates from conflict over menstruation or sexuality (Suyemoto, 1998).

Suyemoto (1998) proposed an alternative functional model of NSSI, the affect regulation model. This is further broken down into the affect regulation model and the dissociation model. The dissociation model states that self-injurious behaviour acts to end or manage dissociative experiences caused by strong emotions or distress. The affect regulation model proposes that NSSI is caused by the need for the individual to express or control negative emotions which they are not able to manage in alternative ways. The affect regulation model or models proposing similar functions to this are the most widely accepted in the literature.

The fourth functional model of NSSI discussed by Suyemoto (1998) is the interpersonal or the boundaries model. In this model, NSSI acts to create boundaries between the self and others. More specifically, the self-injurious behaviour acts to protect the individual from being overwhelmed by fear or loss of identity.

The serotonin system and NSSI

Some research has focused on investigating the role of serotonin in NSSI. Serotonin is a neurotransmitter which is involved in the regulation of mood, appetite, sleep, temperature, sexual activity and aggression. Depression, emotional distress

and aggression are linked to low levels of serotonin. Research has suggested that individuals who engage in NSSI may have lower levels of serotonin than individuals who do not engage in such behaviours. More specifically, it has been shown that individuals who engage in NSSI have less serotonin activity in the brain's synapses (Herpertz, Sass, & Favazza, 1995; Simeon, Knutelska, Nelson, Guralnik, & Schmeidler, 1992). This suggests that individuals who are identified as having low levels of serotonin are at higher risk for engaging in NSSI than individuals with normal levels of serotonin.

One of the major effects of low levels of serotonin is elevated aggression and irritability. It has been proposed that individuals are then more likely to act on this increased irritability in an impulsive and/or aggressive way such as engaging in NSSI (Coccaro, Berman, & Kavousii, 1997).

In summary, NSSI is thought to be a maladaptive coping mechanism used by individuals to ameliorate psychological distress and provide a tension reduction response. NSSI is distinctly different from a suicide attempt and, instead, is engaged in to obtain relief from high levels of distress, feelings of numbness and depersonalisation. It is hypothesised that low levels of serotonin increase an individual's emotional distress and over time these individuals are more vulnerable to engaging in maladaptive coping strategies such as NSSI in order to manage their distress. Although the various models and theories of NSSI provide possible explanations as to the reasons and benefits of engaging in self-injurious behaviours, little is still known as to why some individuals feel pain during the act whereas others experience a lack of pain sensations.

CHAPTER 3

PAIN

Pain

Pain is viewed as an unpleasant experience which often triggers a negative emotional response. The perception of pain is a subjective experience which occurs as a result of physical stimuli (McGrath, 1994). The concept of pain is complex as people can experience pain with little or no tissue damage or injury and, conversely, can suffer an injury without the presence of pain (McGrath, 1994).

Pain can be classified into three categories, acute, recurrent, or chronic. Acute pain is often thought of as an adaptive response to a noxious stimulus, in that individuals learn to avoid situations which have caused physical harm in the past. It is brief in that it has a quick onset and reduces as the injury heals. Given that acute pain generally abates more quickly and does not cause prolonged pain or disruption to routine it does not normally result in long term emotional distress (McGrath, 2004). The pain experienced from a cold pressor test would be classified as acute pain. In contrast, recurrent pain refers to the experience of frequent periods of painful experiences, for example, migraine or tension headaches. Often recurrent pain is not caused by an underlying medical disorder, but rather the episodes of pain occur as a result of environmental factors of levels of stress (McGrath, 2004). Chronic pain is often caused by disease, injury and psychological factors. McGrath (2004) has suggested that chronic pain results from a number of noxious stimuli caused by the disease as well as treatments, with the specific source of the stimulation often unknown. Research has shown that the level of unpleasantness felt following a painful stimuli can be reduced if the individual has sufficient information about the painful stimuli, as well as the likelihood that they can avoid the stimuli (Price, Barrell, & Gracely, 1980).

It is important to recognise that pain perception can vary between children and adults. Both a child's age and level of development can influence their perception of pain (McGrath, 1990; Ross & Ross, 1988). The child's ability to understand pain, cope with the pain, and the impact of the pain all increase with age (Gafffney, 1993; Harbeck & Peterson, 1992). Furthermore, cognitive, behavioural and emotional factors can all have an important affect on a child's level of pain and distress (Ross & Ross, 1988).

The understanding of the underlying biological reactions to pain has developed over the years from the belief that the sensory system is relatively simplistic, to the knowledge that it is a complex integrative system (McGrath, 2004; Wall & Melzack, 1994). The perception of pain relies on both excitatory and inhibitory neural interactions. A number of psychological and emotional factors trigger activity in the descending pathways of the central nervous system, causing interactions between the nociceptive and non-nociceptive impulses in ascending pathways resulting in the perception of pain (McGrath, 1990; Price, 1988).

Research investigating pain sensitivity has shown those individuals who are highly sensitive to pain display more frequent and stronger activation of the primary somatosensory cortex, the prefrontal cortex, and the anterior cingulate cortex (Coghill, McHaffie, &Yen, 2003). Pain sensitivity can be identified using reports from the individual in conjunction with psychophysiological data and functional magnetic resonance imaging (Coghill et al., 2003).

The nociceptive system is not rigid and passive, but has the potential to respond differently to different painful stimuli. Additionally, it is thought to be a plastic system wherein responses to the same level of tissue damage can change over time (McGrath, 1994). A number of factors influence how an individual's

nociceptive system will respond to injury or tissue damage. These factors can be further divided into stable factors which affect the way an individual interprets the pain sensations and variable factors which are influenced by context. Age, gender, level of cognitive ability, prior pain experiences, familial factors and cultural influences are all thought of as stable factors. In contrast, situational (e.g., expectation of the pain, level of control, relevance), behavioural (coping style, parental response, overt distress) and emotional factors (level of fear, anger and frustration) are thought to be dependent on context and have a significant effect on the perception of pain (McGrath, 1994).

An important factor in pain perception and sensitivity is stress. At times, stress can act to decrease pain sensitivity (al'Absi & Petersen, 2003), while at other times stress can increase pain sensitivity (al'Absi & Rokke, 1991). Stress-induced analgesia is thought to play an evolutionary role during times of high stress by assisting in the fight or flight response (Millan, 2002). Stress-induced hyperalgesia occurs as a result of increased vigilance to a threat in order to prevent potential harm (Martenson, Cetas, & Heinrichter, 2009). Research involving individuals with a history of childhood sexual abuse has shown they can develop both hyperalgesia in the form of fibromyalgia (Staud, Vierck, Cannon, Mauderli, & Price, 2001), and hypoalgesia which can be seen in some individuals with BPD (Bohus et al., 2004; Klossika et al., 2006).

The impact of psychological factors on the perception of painful stimuli has been widely studied. Situational variables including attention, level of predictability and relevance can directly alter the neural responses caused by noxious stimuli (Hayes, Dubner, & Hoffman, 1981). These situational factors do not only affect pain perception but also nociceptive activity (McGrath, 1994). A number of behavioural

factors are thought to increase the perception of pain including overt distress behaviours, inconsistent parental responses, prolonged emotional physical distress, lack of physical activity and a lack of peer and social activities (McGrath, 1993). There are also a number of emotional factors which have been shown to increase pain perception including anxiety and fear regarding diagnosis/treatment of an illness or disorder, general anxiety and stress, inability to identify and express emotions and high expectations for achievement (McGrath, 1993). The concept of pain will be further discussed in chapter five.

CHAPTER 4

STUDY 1: THE TENSION REDUCTION MODEL OF NSSI

Emotional regulation and NSSI

As discussed in Chapter two, the tension reduction model of NSSI proposes that these self-injurious behaviours act to reduce tension in individuals experiencing intolerable levels of negative emotions and distress (Haines & Williams, 1995; Haines et al., 1995). It may be that NSSI acts to regulate and reduce high levels of negative emotions in individuals who do not have the ability to do so using other coping strategies (Haines & Williams, 2003).

There is often a strong emphasis on the negative aspects of emotions, however at times they can be highly adaptive (Gross, 1999). Emotions have been shown to assist in decision making (Oatley & Johnson-Laird, 1987), to encourage learning (Cahill, Prins, Weber, & McGaugh, 1994), to assist in social situations by giving social clues and information about behavioural intentions (Fridlund, 1994), and to adjust an individual's cognitive style to situational demands (Clore, 1994).

Emotional regulation can be defined as the intrinsic and extrinsic processes which play a key role in monitoring, evaluating, and modifying emotional reactions (Thompson, 1994). Gross (1998) proposed that the process of emotional regulation is regulated at five points: selection of the situation, modification of the situation, deployment of attention, change of cognitions, and modulation of responses. It may be that following a stressful experience, individuals who engage in NSSI fail to regulate their emotions at one of these key points. This may result in their levels of distress and negative emotions reaching an intolerable level requiring them to utilise a strategy known to produce a tension reducing response. Evidence has suggested that self-injurious behaviours may occur as a result of emotional dysregulation, but

that these behaviours may also play a role in emotion regulation (Chapman et al., 2006).

Selby et al. (2008) proposed that emotional cascades are associated with NSSI and other behavioural dysregulation such as binge-eating. An emotional cascade refers to the process where an individual ruminates on their negative affect, in turn causing a further increase in the intensity of their negative emotions, they then ruminate on the increased negative affect which results in further escalation of their negative emotions and so on. Research has suggested that repeatedly thinking about the causes and consequences of an emotional experience acts to further increase the level of negative emotions experienced (Donaldson & Lam, 2004). Selby et al. (2008) suggested that emotional dysregulation may occur as a result of not only increased ruminations when distressed, but also catastrophising and thought suppression.

It has been proposed that individuals engage in NSSI to distract themselves from their ruminations and to end the emotional cascade (Selby et al., 2008). It may be that the experience of pain or the sight of blood is enough to distract the individual from their ruminations. Given it has been proposed that distraction may be a goal of NSSI, it is unknown if individuals who do not feel pain during the act would experience the same decrease in negative emotions and tension reduction response as individuals who would be distracted by the experience of pain during the act.

The Four-Function Model of NSSI

More recently, Nock and Prinstein (2004, 2005) developed a four-function model of NSSI with proposes that the reinforcement following NSSI can be either

positive (e.g., presentation of a pleasant stimulus) or negative (e.g., removal of an unpleasant stimulus) and contingencies can be automatic (e.g., intrapersonal) or social (e.g., interpersonal). This model proposes that NSSI serves four distinct functions with the first being automatic negative reinforcement (ANR). In this way, NSSI allows the individual to remove or escape from an unpleasant or distressing affective or cognitive state. The second function is automatic positive reinforcement (APR), where NSSI is engaged in to generate feelings following the experience of numbness. The third function is social negative reinforcement (SNR), where NSSI is engaged in to gain attention or to access resources in the environment. Finally, the fourth function is social negative reinforcement (SNR), where NSSI is performed in order to remove interpersonal demands (Nock & Prinstein, 2004, 2005).

Previous research which has lent support to the tension reduction model of NSSI also provides empirical support for the four-function model of NSSI. For example, the findings of Haines et al. (1995) provide support for NSSI having an ANR function. More specifically, Haines et al. found that individuals who engaged in NSSI experienced decreased psychophysiological arousal when imagining engaging in an act of NSSI.

NSSI and endogenous opiates

It is unclear why some individuals are able to engage in painless NSSI while others report the experience of pain during the act. However, it is clear that endogenous opiates play an important role in the experience of pain or lack of pain during times of high stress. Sher and Stanley (2009) proposed that opioid deficiency may result for the experience of childhood stress, such as that caused by trauma,

abuse and neglect. They believed that the experience of trauma may act to reset the physiological levels of opioid or even create a state of deficiency. Conversely, Sher and Stanley (2009) proposed that individuals may habituate to higher levels of endogenous opioids caused by the experience of childhood trauma. The relationship between trauma and NSSI will be further investigated in study four.

It is widely recognised that the experience of high levels of stress or painful stimuli can increase the levels of endogenous opioids in the body causing stress-induced analgesia (Helmstetter & Fanselow, 1987). It has been found that individuals reporting a lack of painful sensations during NSSI had an increased mean plasma level of met-encephalins. This suggests that these elevated levels are a pain response to NSSI (Coid, Allolio, & Rees, 1983).

Although some differences in individuals have been found, it still remains relatively unclear as to why some individuals are able to engage in painless NSSI whereas others feel significant levels of pain during the act. It may be that the underlying mechanism of NSSI is distinctly different for these two populations.

The aim of the first study was to investigate the tension reducing properties of NSSI. More specifically, this study aimed to investigate the strength of tension reduction associated with NSSI for individuals who do and do not report experiencing pain during the act. This study also aimed to investigate the nature of the NSSI including the frequency and severity of the behaviours. It was hypothesised that both individuals who do and do not report experiencing pain during NSSI will demonstrate a psychophysiological and psychological tension reduction following the act. Individuals who engage in painless NSSI will have a stronger pattern of tension reduction, as shown by their psychophysiological and psychological responses, then individuals who experience pain during the act. Additionally, it was

proposed that both individuals who report pain during NSSI and those that do not will have normal reactions to both accidental injury and neutral events. In addition, it was hypothesised that individuals who engage in painless NSSI will have a higher frequency and severity of self-injurious behaviours than individuals who experience pain during the act.

Method

Overview of studies

This study involved 72 participants in total who were recruited from advertisement within the University of Tasmania and in local newspapers. Twenty of these participants were involved in studies one and two and were divided into two groups depending on their experience of pain during the act of NSSI. All participants were subjected to the same procedure.

The data consists of information from a NSSI behaviour checklist, psychological responses from Visual Analogue Scales (VASs), and physiological reactions from the converted heart rate recordings for the NSSI, accidental injury and emotionally neutral event analyses. Repeated measures analyses of variance (ANOVAs) were applied to the data in accordance with the design of each analysis. Furthermore, Huynh-Feldt corrections were applied and Fisher LSD post hoc analyses were conducted on the data which reached statistical significance. The NSSI checklist was analysed using T-tests and chi square analyses. A significance criterion of .05 was used.

As a guided imagery methodology was used in study one, rating of clarity of the images and accuracy of the script content was assessed. The mean ratings and

standard deviations are presented in Appendix A. Imagery ratings were considered to be within acceptable limits.

Study 1: The tension reduction model of NSSI

Participants

Twenty male and female participants were recruited from the University of Tasmania undergraduate population and the general population. The study consisted of two groups of participants, those who reported experiencing no pain during NSSI (*n = 10)* and those who report experiencing pain during the act (*n* = 10). The mean age of the individuals who experienced no pain sensations during NSSI was 30.2 years (*SD* = 12.4) and that of the individuals who experience pain during NSSI was 26 years (*SD* = 11.16). Group allocation was based on participants' reports of their experience of pain during the act of NSSI.

All participants had a self-reported history of NSSI, with some participants continuing to actively engage in the act while others had ceased the behaviour some time ago. Given the nature of the guided imagery methodology there was no requirement that participants be currently engaging in NSSI. The methodology used requires that the individual be able to imagine an act of NSSI in sufficient detail and be with adequate clarity so that their physiological and psychological responses can be obtained. As long as the event is representative of a real life event and can be recalled clearly there is no restriction on the time the individual last engaged in NSSI.

The study had approval from the Tasmanian Social Sciences Human Research Ethics Committee. The information sheet and consent form are presented in Appendix B.

Design

The first study involved two designs. The first was a Group [pain, no pain] x Script (NSSI, accidental injury, neutral) x Stage (setting the scene, approach, incident, consequence) mixed factorial design with repeated measures. The dependent variables included psychophysiological measures of heart rate and respiration rate and visual analogue scales (VASs) measuring unreality, anxiety, fear, tension, pain and anger. Control measures of clarity and closeness were included. The second was a group [pain, no pain] between subjects questionnaire study with the dependent variables being frequency and severity of NSSI.

Materials and apparatus

A checklist was devised by the authors and was administered during the preliminary interview stage to obtain demographic information and information regarding the nature of the self-injurious behaviours including the types of behaviours and the frequency of NSSI. This checklist is presented in Appendix C1

VASs (McCormack, Horne, & Sheather, 1988) were used to measure participants' subjective responses to guided imagery measuring unreality, anxiety, fear, tension, pain and anger. A VAS is an instrument which is used to measure an individual's subjective response or attitude which is not easily measured directly as it ranges across a continuum of values. In this study, the VAS consisted of a horizontal line measuring 100mm in length. Participants were requested to mark on the line the point which they believe represented their psychological state in question. A more negative experience was reflected in a higher score on these scales. VASs were also used to assess the individuals' ability to image scenes being presented to them (clarity) and how accurately the information mirrors their own experiences

(closeness). A higher score on these measures reflected a more positive experience. Copies of VASs are presented in Appendix C2

All participants were interviewed to gain information for personalised imagery scripts involving 3 separate events: a) an incident of NSSI; b) an accidental injury (e.g., accident with kitchen knife); and c) a low arousal neutral event (e.g., making a cup of tea). Only information regarding the period of time just preceding the event, the actual event in question and the time just following the event was used. Participants were asked to discuss the events in terms of the environment in which the event occurred, their behaviour at the time, and their emotional and psychophysiological reactions. Using this information, guided imagery scripts were formed which presented a chronological sequence of the events. Only information reported by the participants was included in the scripts in the wording used by the participants so they were not directed to experience reactions they had previously not recalled.

Each imagery script was divided into four stages: 1) setting the scene (a description of the environment in which the event occurred and the context of the situation); 2) approach (description of the events immediately preceding the incident); 3) the incident (description of the actual event as it occurred); and 4) the consequence (description of the events immediately following the incident and the resolution). Examples of scripts are presented in Appendix C3

Psychophysiological measures were gathered using chart 4.0 on a PC computer. Psychophysiological measurements were taken for heart rate (HR) using an electrocardiograph (ECG) and respiratory rate (RESP). The ECG was measured using two Geronics 7mm Ag/AgCl electrodes fitted at the second rib on both sides of each participant's torso. A miniature Geronics Ag/AgCl electrode was placed at the

left mastoid process to act as an earth reference. RESP was measured using a Pneumotrace respiration transducer which was fitted around the individual's upper torso.

Procedure

Participants initially attended a session where interviews were conducted to gain information to construct the three guided imagery scripts and the self-injurious behaviours checklist was administered. Participants then attended a second session where the imagery scripts were presented while psychophysiological responses to imagery were measured. During the presentation of the guided imagery scripts, participants were asked to close their eyes while a one minute pre-imagery baseline measurement was taken. During the presentation of the three scripts participants were asked to keep their eyes shut and concentrate closely on the imagery being presented. Each stage of each script was approximately 60 seconds. There was a 10 second pause between each of the four stages. Following the presentation of the entire script participants were reminded of the most important points of each stage. Following this, participants were required to complete VAS ratings for each stage of each of the scripts. Scripts were presented in a counterbalanced order to prevent order effects.

Results

Description of sample and questionnaire data

Descriptive statistics for the two groups are presented in Table 1. It is important to note that the mean for the frequency of NSSI in the no pain group is extreme as this includes older participants who had engaged in NSSI since adolescence on a daily basis. The NSSI checklist was analysed using T-tests and chi

square analysis. There were no significant differences between the groups in relation to the age of individuals, the last time they engaged in self-harm, the frequency of the behaviours, or the duration they have engaged in the behaviours.

Table 1

Descriptive statistics for the two groups of participants.

Variable	Group		Statistic	t	df	p
Total number of acts of NSSI	Pain	M	118.9			
		s	144.2	1.0	18	*n.s*
	No pain	M	1595.4			
		s	4826.4			
Last act of NSSI (days ago)	Pain	M	527.4			
		s	967.5	0.9	18	*n.s*
	No pain	M	1652.1			
		s	3966.7			
Length of time engaging in NSSI	Pain	M	1186.0			
		s	1170.4	1.5	18	*n.s*
	No pain	M	3294.0			
		s	4436.4			
Frequency of NSSI (1/no of days)	Pain	M	14.6			
		s	13.6	0.0	18	*n.s*
	No pain	M	14.4			
		s	13.6			

A number of self-injurious behaviours were engaged in including cutting, burning, biting, hair pulling, banging, scratching, and other harmful behaviours such as electrocution. A range of instruments were used in NSSI. These included knives, razors, lighters, hot water, scissors, and rulers. The self-injurious behaviour involved

body regions including arms, legs, stomach, feet, chest, hands, wrists, and genitalia.

Descriptive statistics for the total sample are presented in Table 2.

Table 2

Descriptive statistics of self-injurious behaviour for the pain and no pain groups.

Variable	Level	% of pain group	% of no pain group	χ^2	p
Method of NSSI	Cutting	80.0	80.0	0.0	*n.s*
	Burning	40.0	50.0	0.2	*n.s*
	Hair pulling	10.0	20.0	0.4	*n.s*
	Banging body	20.0	10.0	0.4	*n.s*
	Scratching	20.0	0.0	2.2	*n.s*
	Biting	20.0	0.0	2.2	*n.s*
					n.s
Body regions	Arms	70.0	80.0	0.3	*n.s*
	Legs	50.0	80.0	2.0	*n.s*
	Stomach	20.0	50.0	2.0	*n.s*
	Hands/Wrists	50.0	10.0	3.8	*n.s*
	Feet	10.0	20.0	0.4	*n.s*
	Chest	0.0	20.0	2.2	*n.s*
					n.s
Instrument	Knife	60.0	70.0	0.2	*n.s*
	Razor	50.0	70.0	0.8	*n.s*
	Lighter	30.0	10.0	1.3	*n.s*
	Scissors	0.0	20.0	2.2	*n.s*
	Hot water	10.0	10.0	0.0	*n.s*

Psychophysiological and subjective responses to imagery

Analyses of variance (ANOVAs) were conducted and a Huynh-Feldt

correction applied for the psychophysiological and subjective data. Post-hocs were

then performed using Fishers LSD.

No significant script by stage by group interactions were found for any psychological or physiological measures with the exception of pain. More specifically, no significant differences were found between the groups in relation to the pattern or strength of their psychological or physiological tension reduction response. A significant script by stage by group interactions was found for the VAS measure of pain $F(4,75) = 3.009$, MSE $= 961.587$, $p < .05$. Figure 1 shows the variations in responses of both groups to the VAS measure of pain for each of the four stages of each script. The mean ratings and standard deviations are presented in Table 13 (Appendix D).
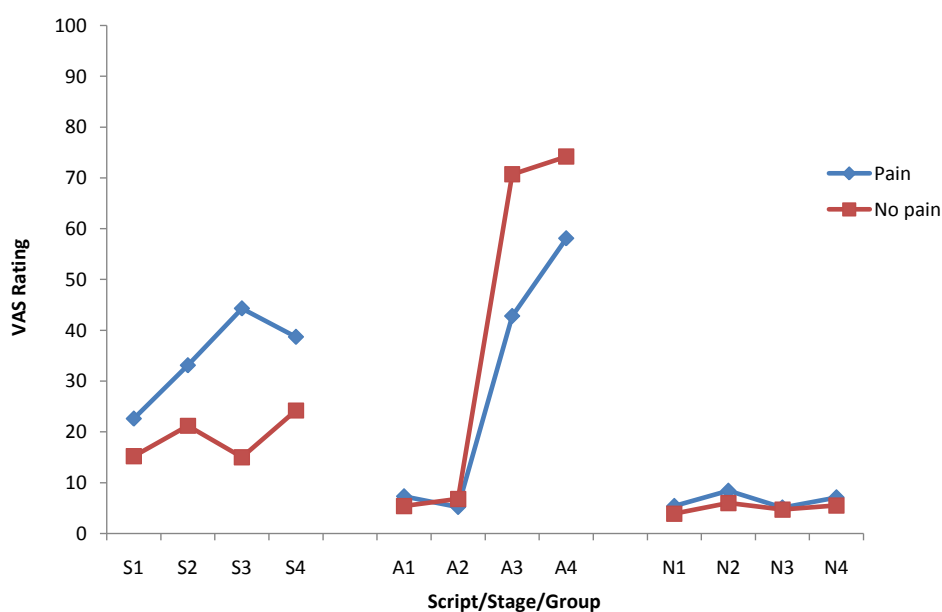
Figure 1. The mean ratings for pain each stage of the NSSI, accidental injury and neutral scripts for the pain and no pain groups. *Note:* S= NSSI script, AI= accidental injury script and N= emotionally neutral script.

Group differences at each stage of each script were compared using t-tests. A significant difference was found between the groups at the incident stage of the NSSI script, t(18) = 2.7, $p < .02$. The pain group was found to have a significantly higher pain rating than the no pain group during the incident stage. A significant difference was found between the groups at the incident stage of the accidental injury script, t(18) = 2.2, $p < .05$. The no pain group had a significantly higher pain rating than the pain group during the incident stage. No group differences were found for any stage of the emotionally neutral script.

Post-hoc analyses were conducted to investigate differences between stages of each script for each group for the VAS rating of pain. The results of the post-hoc analysis are presented in Table 3. The pain group was found to have significantly higher ratings of pain during the approach, incident and consequence stages of the NSSI script compared with the emotionally neutral script. The NSSI script elicited higher ratings of pain in the pain group during the approach stage compared to the accidental injury script. The accidental injury script elicited higher ratings of pain in the pain group during the incident and consequence stages compared with the neutral script. The no pain group reported higher levels of pain during the setting the scene stage of the NSSI script compared with both the accidental injury and emotionally neutral script. The no pain group reported higher levels of pain during the incident and consequence stages of the accidental injury script compared with both the NSSI and emotionally neutral script. Additionally, the NSSI script elicited higher ratings of pain during the consequence stage compared with the emotionally neutral script.

Table 3

Comparisons between scripts at each stage for the visual analogue scale of pain for the pain and no pain group.

Group	Stage	F(2,18)	MSE	p	Fisher	Differences
Pain	Scene	3.1	889.2	*n.s*		
	Approach	10.2	2331.2	<.002	14.2	NSSI>AI,N
	Incident	11.3	4933.6	<.0007	19.6	NSSI>N; AI>N
	Consequence	12.1	6626.5	<.0005	22.0	NSSI>N; AI>N
No pain	Scene	4.1	376.6	<.04	9.0	NSSI>AI,N
	Approach	3.0	731.7	*n.s*		
	Incident	37.1	12607.6	<.0001	17.3	AI>NSSI, N
	Consequence	32.8	12615.6	<.0001	18.4	AI>NSSI,N; NSSI>N

Comparisons were also made across the stages of each of the three scripts for the VAS rating of pain for both the pain and no pain group. The results of the post-hoc analyses are presented in Table 4. No significant changes across the stages were elicited for the emotionally neutral script or the NSSI script for either group. The accidental injury script elicited higher ratings of pain during the incident and consequence stages for both groups.

Table 4

Comparisons across stages of each script for the visual analogue scales measuring pain.

Group	Script	F(3,27)	MSE	*p*	Fisher	Differences
Pain	NSSI	2.4	857.1	*n.s*		
	Accidental Injury	14.9	6909.6	<.0001	19.8	3,4>1; 3,4>2
	Neutral	0.6	23.8	*n.s*		
No pain	NSSI	0.6	207.6	*n.s*		
	Accidental Injury	61.8	14698.1	<.0001	14.2	3,4>1; 3,4>2
	Neutral	0.3	8.5	*n.s*		

There was no other significant script by stage by group interactions found for any physiological or subjective measures other than pain. The means and standard deviations for the pain and no pain groups for each stage of each script are presented in Tables 14 and 15 (Appendix D). Control VASs were within acceptable limits and showed that participants were clearly able to imagine the scenes being presented to them and that the information accurately mirrored their own experiences.

There was no significant script by stage interaction for the physiological measure of heart rate. There was a significant script by stage interaction for the physiological measure of respiration rate, $F(5,85) = 19.91$, MSE $= 34.02$, $p < .0001$, r $= .5$. Figure 2 shows the variations in the physiological measure of respiration rate for each of the four stages of each script. The mean respiration rates and standard deviations are presented in Table 16 (Appendix D).
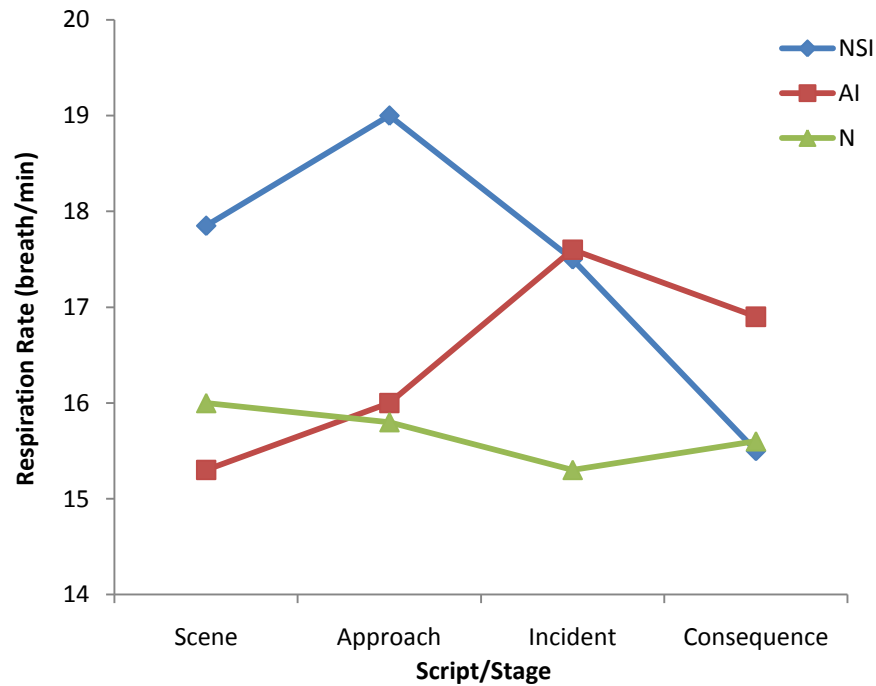
Figure 2. The mean respiration rate for each stage of the NSSI, accidental injury and neutral scripts. *Note:* S= NSSI script, AI= accidental injury script and N= emotionally neutral script.

Comparisons between scripts at each stage were then performed. The results of the post-hoc analyses are presented in Table 5. The NSSI script elicited a higher respiration rate than both the accidental injury script and the emotionally neutral script during the scene and approach stages. The NSSI script elicited a higher respiration rate than the emotionally neutral script during the incident stage. Additionally, during the incident stage, the accidental injury script elicited a higher respiration rate than the emotionally neutral script. The accidental injury script elicited a higher respiration rate than both the NSSI script and the emotionally neutral script during the consequence stage.

Table 5

Comparisons between scripts at each stage for the physiological measure of respiration rate.

Stage	F(2,38)	MSE	*P*	Fisher	Differences
Scene	16.8	35.6	<.0001	0.9	NSSI>AI,N
Approach	29.9	65.2	<.0001	0.9	NSSI>AI,N
Incident	8.3	33.0	<.001	1.3	NSSI>N; AI>N
Consequence	5.8	11.8	<.007	0.9	AI>NSSI,N

Comparisons were also made across the stages of each of the three scripts. The results of the post-hoc analyses are presented in Table 6. The NSSI script elicited a higher respiration rate during the setting the scene, approach, and incident stage compared with the consequence stage. The accidental injury script elicited a higher respiration rate during the incident and consequence stage. No significant changes across the stages were elicited for the emotionally neutral script.

Table 6

Comparisons across stages of each script for the physiological measure of respiration rate.

Script	F(3,57)	MSE	*P*	Fisher	Differences
NSSI	23.0	43.8	<.0001	0.9	1>4; 2>1,3,4; 3>4
Accidental Injury	15.9	19.6	<.0001	0.7	3,4>1; 3,4>2
Neutral	1.8	1.4	*n.s*		

There were significant script by stage interactions for the subjective measures of unreality, $F(3,62) = 15.06$, MSE = 7290.43 $p < .0001$, anxiety, $F(3,58) = 31.77$,

MSE = 20941.42, $p < .0001$, fear, $F(4,67) = 15.30$, MSE = 8756.14, $p < .0001$,

tension, $F(3,53) = 30.56$, MSE = 24350.38, $p < .0001$, and anger, $F(3,50) = 23.89$,

MSE = 27520.76, $p < .0001$. Figure 1 summarizes the differences in responses to the

six VASs of unreality, anxiety, fear, tension, and anger for each of the four stages of

each script. The mean ratings and standard deviations are presented in Table 17

(Appendix D).
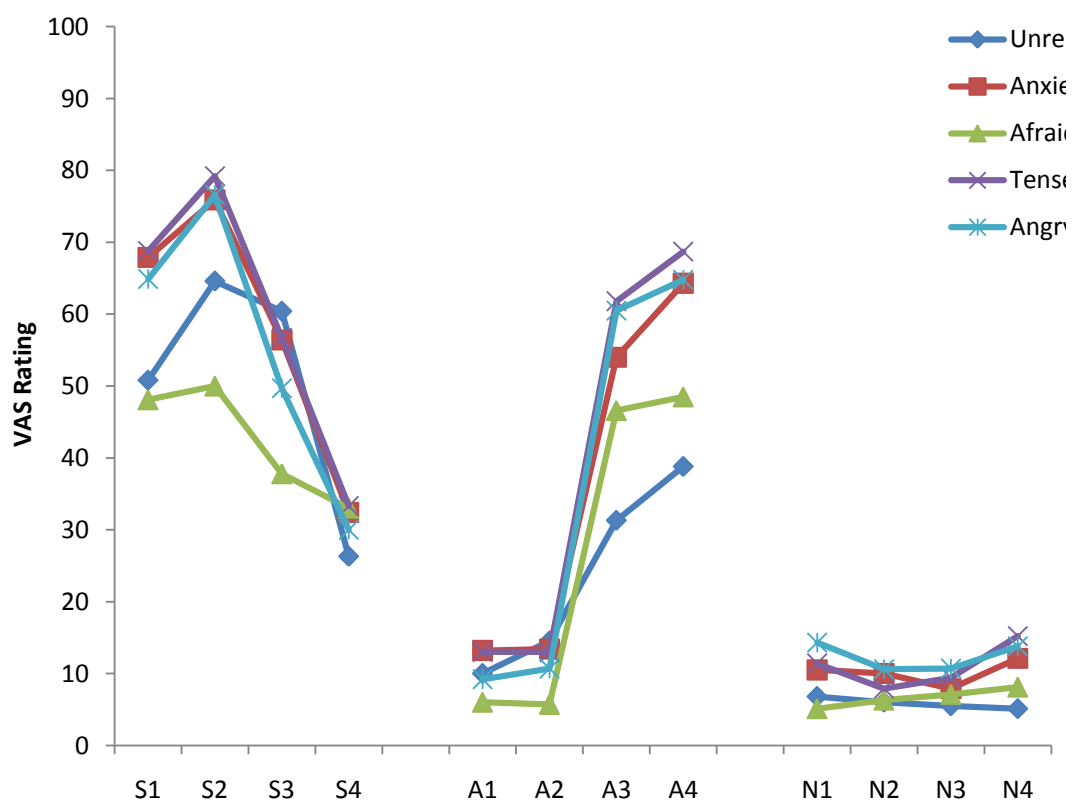
Figure 3. Variations in response to the visual analogue measure for each stage of
each script. *Note:* S= NSSI script, AI= accidental injury script and N= emotionally
neutral script.

Comparisons between scripts at each stage were then performed. The results

of the post-hoc analyses are presented in Table 7. The NSSI script elicited a higher

rating than the emotionally neutral and accidental injury scripts at the scene and

approach stages in relation to all VAS measures. The NSSI script elicited higher ratings than the emotionally neutral script at the incidence stage in relation to all VAS measures. The NSSI script elicited higher ratings of unreality than the accidental injury script at the incident stage. The accidental injury script elicited higher ratings than the emotionally neutral script at the incident stage in relation to all VAS measures. The NSSI script elicited higher ratings of unreality, tension, fear and anxiety than the emotionally neutral script at the consequence stage. The accidental injury script elicited higher ratings of anger, anxiety, fear and tension at the consequence stage than both the NSSI and emotionally neutral script. The accidental injury script and the NSSI script elicited higher ratings of unreality than the emotionally neutral script at the consequence stage.

Table 7

Comparisons between scripts at each stage for the visual analogue scales of unreality, anxiety, fear, tension and anger.

VAS	Stage	F(2,38)	MSE	*p*	Fisher	Differences
Unreality	Scene	37.8	12023.8	<.0001	11.4	NSSI>AI, N
	Approach	46.5	20040.2	<.0001	13.3	NSSI>AI, N
	Incident	44.0	15060.2	<.0001	11.8	NSSI>AI, N; AI>N
	Consequence	14.9	5786.3	<.0001	12.6	NSSI>N; AI>N
Anxiety	Scene	56.9	21101.3	<.0001	12.3	NSSI>AI, N
	Approach	104.1	28262.6	<.0001	10.4	NSSI>AI, N
	Incident	48.3	14929.5	<.0001	11.3	NSSI>N; AI>N
	Consequence	29.4	13848.5	<.0001	13.9	AI>NSSI, N; NSSI>N
Fear	Scene	33.1	12060.4	<.0001	12.2	NSSI>AI, N
	Approach	36.7	12748.0	<.0001	11.8	NSSI>AI, N
	Incident	13.5	8577.2	<.0001	16.1	AI>N; NSSI>N
	Consequence	19.4	8289.4	<.0001	13.2	AI>NSSI, N; NSSI>N
Tension	Scene	56.8	21388.0	<.0001	12.4	NSSI>AI, N
	Approach	269.8	31660.9	<.0001	6.9	NSSI>AI, N
	Incident	35.7	16711.0	<.0001	13.8	AI>N; NSSI>N
	Consequence	20.5	13646.3	<.0001	16.5	AI>NSSI, N; NSSI>N
Anger	Scene	35.7	18962.9	<.0001	14.7	NSSI>AI, N
	Approach	74.8	28952.1	<.0001	12.6	NSSI>AI, N
	Incident	18.5	13705.4	<.0001	17.4	AI>N; NSSI>N
	Consequence	18.2	13606.7	<.0001	17.5	AI>N, NSSI

Comparisons were also made across the stages of each of the three scripts. The results of the post-hoc analyses are presented in Table 8. The NSSI scripts elicited higher ratings during the setting the scene, approach and incident stages for the VASs of unreality, anxiety, tension and anger. The accidental injury script elicited higher ratings during the incident and consequence stages for all VAS

measures. No significant changes across the stages were elicited for the emotionally

neutral script.

Table 8

Comparisons across stages of each script for the visual analogue scales measuring unreality, anxiety, fear, tension and anger.

VAS	Script	F(3,57)	MSE	p	Fisher	Differences
Unreality	NSSI	11.4	5883.7	<.0001	14.4	1,2,3>4
	Accidental Injury	13.2	3710.5	<.0001	10.6	3,4>1; 3,4>2
	Neutral	0.4	10.0	*n.s*		
Anxiety	NSSI	14.7	7168.5	<.0001	14.0	1,2,3>4; 2>3;
	Accidental Injury	51.9	14387.3	<.0001	10.5	3,4>1; 3,4>2
	Neutral	2.1	70.9	*n.s*		
Fear	NSSI	2.4	1299.3	*n.s*		
	Accidental Injury	35.2	11591.1	<.0001	11.5	3,4>1; 3,4>2
	Neutral	0.4	33.2	*n.s*		
Tension	NSSI	14.1	7773.1	<.0001	14.9	1,2,3>4
	Accidental Injury	53.0	17624.6	<.0001	11.5	3,4>1; 3,4>2
	Neutral	2.2	199.8	*n.s*		
Anger	NSSI	10.6	8162.4	<.0001	17.6	1,2,3>4; 2>3
	Accidental Injury	36.0	18586.4	<.0001	14.4	3,4>1; 3,4>2
	Neutral	1.1	76.6	*n.s*		

Discussion

The present study used personalised guided imagery to compare the psychophysiological and psychological processes associated with NSSI. More specifically, the study aimed to investigate the strength of the tension reduction response associated with NSSI for individuals who do and do report experiencing pain during the act. Previous research examining NSSI has used clinical samples (inpatient populations) (Darche, 1990), specific diagnostic groups, especially borderline personality disorder (Schaffer, Carroll, & Abramowitz, 1982) and prison populations (Haines et al., 1995). There is a lack of research considering stress-induced analgesia and NSSI in non-clinical populations limiting the generalisability of results to the general population. The present study utilised a self-referred sample of male and female individuals who engage in painless NSSI as well as individuals who report feeling pain during the act. The present study included multiple types of NSSI and did not concentrate on specific behaviours, such as cutting, which is commonly the case.

As expected, both individuals who do and do not report experiencing pain during NSSI demonstrated a psychological tension reduction following the act of NSSI. This is consistent with previous literature where a tension reduction model of self-harm is widely supported (e.g., Brain, Haines, & Williams, 1998; Haines et al., 1995; Jeffrey & Warm, 2002). It is important to note that there was no change in the physiological measure of heart rate across the stages of the NSSI script. Although the results did not meet significance, a pattern of tension reduction was evident, with the measure of heart rate increasing in stages one and two, and decreasing in stage four. However, there was a significant reduction in individuals' respiration rate following

the act of NSSI. This indicates that there was a psychophysiological tension reduction following the act of NSSI although this was not true for all physiological measures. Immediately prior to the act it was seen that the levels of negative emotions rise and the individuals' respiration rate increases. These continue to rise until the individual engages in the act of NSSI where the negative emotions and physiological distress (increased respiration rate) are observed to reduce. It was observed that the level of negative emotions continues at this lower level following the act.

There are a large number of possible explanations as to why individuals engage in NSSI and experience high levels of negative emotions prior to the act. There may be a number of personal contributors including significant psychopathology, high levels of impulsivity, or a reliance on emotion focused coping or maladaptive coping strategies. Additionally, there may be a number of environmental factors such as increased life stress or daily hassles. These factors appear to impact all individuals who engage in NSSI, whether they feel pain during the act or not.

The pattern of tension reduction observed following the act is the mechanism which reinforces the behaviour and increases the likelihood that an individual will engage in NSSI in the future (Haines et al., 1995). The tension reducing properties of self-injurious behaviours offer a sound explanation as to why individuals continue to engage in them, even when personal discomfort or pain is felt during the act or a negative social response is obtained (Brain et al., 1998, 2002; Haines, 1995). High levels of feelings of numbness, unreality and withdrawal are consistent with a state of dissociation or depersonalisation (Favazza & Conterio, 1989; Winchel & Stanley,

2001). It is widely accepted that individuals often engage in self-injurious behaviour to attempt to end the dissociative experience and for repersonalisation to occur.

During stage one of the NSSI script, VASs showed that individuals were experiencing high levels of psychological distress. The NSSI scripts elicited high ratings on the measures of unreality, anxiety, tension and anger during the scene and approach stages. The measures of anxiety and anger were seen to decease during the injury stage of the NSSI script, with the measures of unreality and tension decreasing at the consequence stage. All of these measures continued at a low level during the consequence stage. The measure of fear was found to not differ significantly across the stages. The fear ratings were observed to be lower than other VAS measures during the NSSI script. Although NSSI is associated with increased distress, it does not appear that individuals are engaging in the behaviour because they are frightened. Furthermore, the behaviour is not eliciting a fear response.

Interestingly, although both groups reported the experience of a tension reduction response there were no differences in the strength or pattern of this response between the groups. It was observed that both groups had similar levels of reported distress and depersonalisation prior to the act of NSSI. The presence or absence of pain does not appear to have any influence on the level of subjective psychological distress felt prior to the act of NSSI. Furthermore, the absence of pain does not appear to facilitate a stronger tension reduction response. It may be that there is no need for the individual to experience a stronger tension reduction response if their levels of distress prior to the act are comparable. Furthermore, the presence or absence of pain during the act may be more closely related to other factors such as subjective pain perception, pain threshold and tolerance or dissociative experiences than the underlying mechanism and response to NSSI.

The groups were found to differ on the subjective measure of pain where a significant difference was found between the groups at the incident stage of the NSSI script. Individuals who experience pain during NSSI reported significantly higher pain ratings than those who do not experience pain during the act. This is to be expected and confirmed that the allocation of participants to each group was correct. It is important to note that this is referring to subjective pain ratings and is not a measure of pain threshold and tolerance. It is unknown whether individuals who engage in painless NSSI have higher pain thresholds and tolerances or whether their perception of pain is different to individuals who feel pain during the act.

When further investigating psychophysiological responses to the guided imagery scripts, there was no significant script by stage interaction for the physiological measure of heart rate. It is important to note that although the measure of heart rate did not reach significance, the tension reduction pattern was evident. Other NSSI studies have observed a stronger physiological tension reduction than what was observed in this study (Brain et al., 1998; 2000). This discrepancy in the strength of the tension reduction response may be due to the types of self-injurious behaviour included in the sample. In the present study, a range of self-injurious behaviours were included including hair pulling, skin picking and biting as well as cutting. It may be that particular types of NSSI, such as cutting or burning, produce a stronger physiological tension reduction response than other forms of NSSI. Currently, there is a lack of research investigating the differences in strength of the tension reduction response between types of NSSI with this warranting further investigation.

There was a significant script by stage interaction for the physiological measure of respiration rate. The NSSI script was found to elicit a higher respiration

rate in individuals during the setting the scene and approach stages of the NSSI script. Additionally, individuals were found to have a higher respiration rate during the incident stage of the NSSI script than the emotionally neutral script. This result was consistent with a physiological tension reduction response observed in previous studies (Brain et al., 1998; Haines et al., 1995). Although a reduction in respiration rate is often observed following the act of NSSI, it is believed that the primary reason to engage in the act is to ameliorate high levels of negative affect (Klonsky, 2007). It may be that some forms of negative affect are associated with increased arousal, whereas others, such as sadness, are not. A tension reduction model would expect a change in heart rate, which although observed in this study was not strong.

Statistically significant differences in psychological responses were noted in reaction to the guided imagery scripts where different psychological responses to the three scripts were observed. As expected, there was minimal variation across the four stages of the emotionally neutral script with participants' psychological arousal being maintained at a low level. Participants responded appropriately to emotionally neutral events and it was observed that they are not always experiencing high levels of distress and negative emotions which are observed prior to the act of NSSI. Furthermore, it may be concluded that individuals who engage in NSSI are capable of emotionally appropriate responses to events which do not induce strong emotional responses. It stands to reason that if an event is not evoking a strong emotional response or feelings of distress there will be no need for an individual to utilise coping strategies or affect regulation skills, therefore, allowing them to respond appropriately to emotionally neutral events, such as, making breakfast or brushing their teeth.

As anticipated, the psychological responses to the accidental injury were quite distinct to the emotionally neutral scripts. In response to the accidental injury script, it was observed that arousal levels were low during the first stage, with an increase during the incident stage which continued into the consequence stage. This is generally observed as an accidental injury is unexpected until the time of the incident, therefore, resulting in an increase in negative emotions only at and following this point. The results support previous research which shows that individuals who engage in self-injurious behaviours respond appropriately to injuries sustained accidentally (Brain et al., 1998; Haines et al., 1995). It may be that the behaviour needs to be deliberate in order to evoke a response as seen during NSSI.

As expected, it was found that both individuals who report pain during NSSI and those who do not had normal reactions to both accidental injury and neutral events. However, it was interesting to note that the pain group reported significantly higher levels of pain during the incident stage of an accidental injury than the no pain group. This is inconsistent with previous research which has found that individuals with BPD who do not feel pain during the act of NSSI experienced significantly less pain during a laboratory pain stimulus task than those who did feel pain during the self-injurious act (Russ et al., 1992). It may be that individuals who report experiencing pain during NSSI may, in fact, perceive or view pain differently to individuals who do not feel pain during the act. Furthermore, individuals who feel pain during the act may be more sensitive to pain sensations, differ in their threshold and/or tolerance to pain, or perceive pain as stronger than other individuals. This may be true regardless of the event as individuals who report pain during NSSI reported higher subjective pain ratings during both an act of NSSI and an accidental injury.

It is proposed that this difference in the experience and perception of pain may be accounted for by an individual's propensity to experience dissociation. It has been proposed that there are individual differences with one's propensity to experience dissociation. Additionally, one's life circumstances and history of trauma may also increase the likelihood individuals will have higher dissociative experiences. It may be that individuals who experience painless NSSI may be having more dissociative experiences than individuals who feel pain during the act. This may result in a higher pain threshold and tolerance than individuals who have low dissociative experiences during times of high distress.

It is important to note that there were no significant differences found between the groups for the VAS measure of unreality. Both groups reported similar levels of unreality during the NSSI script. Furthermore, the NSSI script elicited significantly higher levels of unreality than the control scripts for both groups. The increased feelings of unreality during the NSSI script may be due to the increased distress and negative affect which precedes the act. It may be that the NSSI script did not elicit high enough levels of distress to trigger a dissociative response and higher feelings of unreality in individuals with an increased propensity to dissociate accounting for the lack of significant differences between the groups.

It was found there were no significant differences relating to the descriptive data of the sample. That is, both individuals who engage in painless NSSI and those that experience pain had no significant differences in the frequency or severity of their self-injurious behaviour. It may be concluded that the lack of pain during the behaviour does not act to allow the individual to engage in more severe or frequent NSSI. Even when individuals initially experience painless NSSI they are not acting to increase their frequency or severity to a level any higher than individuals

experiencing pain during the act. It is likely that the benefit of engaging in NSSI and the amelioration of any psychological distress is greater than the cost of any pain the behaviour may cause. Additionally, it may be that the strength of the tension reduction response needed can be achieved without the need for more frequent or severe NSSI. This is consistent with previous research which found that a psychophysiological tension reduction following NSSI is evident from the first episode despite individuals obtaining only limited psychological benefits (Brain et al., 2002). Once the tension reduction is obtained there is no further need to engage in the act, even if they are able to do this with a lack of pain sensations.

Although a tension reduction pattern was observed over the NSSI script for both groups, there were no significant differences in relation to the strength of the tension reduction response between groups. The tension reduction response observed is consistent with the pattern found in other research (Brain et al., 1998; Haines et al., 1995). That is, there was an increase in feelings of negative emotions before the act occurs. During the act, there was a decrease in negative feelings, with this decrease continuing following the act. Therefore, it may be concluded that NSSI that occurs without pain or with the experience of pain has the same underlying mechanism in that it acts to improve an individual's psychological state. NSSI becomes a habitual behaviour due to these reinforcing elements. A process of negative reinforcement occurs when an action results in the cessation of an aversive state. The action that causes the end of the aversive state is reinforced (Bennum, 1984; Walsh & Rosen, 1988).

Research has shown a strong link between NSSI and the opioid system. Opioids are neurotransmitters which are linked to pleasure, euphoria, and pain relief. It has been proposed that individuals who engage in NSSI have an overactive opioid

system. Some individuals, such as those that engage in NSSI, may be predisposed to experience a release of opioids when they experience any pain (Coid, Allolio, & Rees, 1983; Russ, 1992). The act of NSSI causes the release of opioids which results in feelings of pleasure, calmness, pain relief and mild euphoria. This is thought to be one of the strongest reinforcing properties of the behaviour. The reduction in distress and the experience of these states increases the likelihood that an individual will once again engage in such behaviours. However, according to this argument, the no pain group would have been expected to experience stronger tension reduction than the pain group during the NSSI script. Given the results did not support this it is likely that there are other underlying mechanisms which account for the differences in pain sensations experienced during NSSI than just opioid activity.

The results of the current study also provide support for the use of guided imagery methodology to investigate and measure individuals' distress levels during a range of events. This methodology has been successfully used in the literature during the study of NSSI as well as to investigate other behaviours such as nail biting (Well, Haines, Williams, & Brain, 1999) and individual's responses to motor vehicle accidents (Holmes, Williams, & Haines, 1998).

The stage based approach used during the guided imagery methodology has allowed for an investigation into the development of responses to a particular event. This has allowed for further consideration of whether the strength or pattern of responses preceding, during and after NSSI changes if the individual experiences pain during the act. It may be concluded that the underlying mechanism for NSSI is the same for both groups with all individuals experiencing a similar tension reduction response. The absence of or presence of pain during the act does not allow the

individual to experience great tension reduction or engage in more frequent and severe NSSI.

Given the nature of the sample required for this study and the difficulties in obtaining participants, the sample size for this study is reasonable small. This results in the generalisability of the results being slightly more limited. However, it is important to note that it is common for research using a guided imagery methodology to have a smaller sample size while still providing reliable results. Furthermore, the retrospective nature of the study is a potential problem as information such as the frequency or severity of their self-injurious behaviour may be affected by memory recall difficulties or under reporting. However, many other NSSI related studies use similar methodologies and provide useful and accurate data.

The underlying mechanism causing this difference in pain sensations during NSSI is unknown. It may be that it is individuals' reactions and responses to pain that differ. Furthermore, it is proposed that individuals who engage in painless NSSI will respond differently to painful stimuli than those who feel pain during the act. It is thought that differences in individuals' threshold and tolerance to pain, as well as the subjective responses to the stimuli, will be observed between these groups. This will be investigated in study two.

CHAPTER 5

STUDY 2: NSSI AND PAIN

Pain and NSSI

NSSI behaviours often occur in the absence of or with little pain. In some instances deep lacerations and tendon damage may be inflicted without any painful sensations (Simpson, 1976; Starr, 2004). This may be due to an increased level of endogenous opiates such as β-endorphins and encephalins in the body. The release of these opiates is thought to be due to the stress reaction preceding the self-injurious event (Darche, 1990). The analgesic effect may be so complete that some individuals may undergo sutures and treatment following the act with little or no pain and no need for further anaesthesia. The sensations of pain often return minutes, hours or days following the act (Simpson, 1976).

Opioid activity is also closely linked to pain relief. Strong opioid activity may be an explanation for why some individuals are able to engage in NSSI with little or no pain. This is supported by research which shows that individuals are able to decrease their self-injurious behaviour when prescribed medication which blocks their opioid receptors (Roth, Ostroff, & Hoffman, 1996). It is thought that blocking the opioid response then inhibits the feelings of calmness and pleasure which normally follow the act of NSSI. This research lends support to both the role of opioids and the feelings of calmness and relief in the act of NSSI. However, it is important to note that the research investigating the use of this medication in the treatment of NSSI has been inconsistent and research is yet to show that individuals who engage in NSSI have a large increase in opioid activity when they harm themselves compared with the general population. There is less evidence for the role of opioids in NSSI as there is for the role of serotonin (Winchel & Stanley, 1991).

Nevertheless, a number of researchers have proposed that individuals who engage in NSSI experience increased activity in the opiate system as a result of

increased stress (Saxe, Chawla, & van der Kolk, 2002). This increased activity is proposed to result in an unpleasant state of dissociation and numbness. It is proposed that the act of NSSI causes pain or a physical stimulation which alters the state of dissociation and, in fact, can resolve this state (Simpson, 1975).

Individuals who engage in NSSI have been shown to have higher pain thresholds and dissociative symptomatology when compared with individuals who have no history of NSSI (Orbach, Mikulincer, King, Cohen, & Stein, 1997; Russ, Shearin, Clarkin, Harrison & Hull, 1993). When investigating specific populations of individuals with dissociative disorder diagnoses who engage in NSSI, it was found that they often report a lack of pain sensations during the act (Bliss, 1986).

Some research supports the theory that NSSI results from neurotransmitter abnormalities occurring in the brain, with endorphins playing a large role in this. Endorphins are complex molecules which are known to have a pain-relieving role. Endorphins are peptides that are produced by the pituitary gland. The pain-relieving effects of endorphins have been shown to resemble the pharmacological action of morphine. As a consequence of this, endorphins are known as the human body's 'natural painkiller' (Atkinson et al., 1983; Janal, Colt, Clark, & Glusman, 1984).

The endorphin theory of NSSI

A widely accepted theory is the endorphin theory of NSSI. It proposes that NSSI is associated with an insensitivity to pain which results from excessive activity of opioid peptides. Additionally, this theory proposes that NSSI stimulates both the production and release of peptides. It is concluded that NSSI is positively reinforced

by the release of endorphins and may be thought of as an addiction to endorphins (Deutsch, 1986).

The endorphin theory of NSSI suggests that the administration of opiate antagonists, such as Naltrexone, would be a suitable treatment for NSSI. It is thought that Naltrexone, or other similar drugs, would prevent the craving for endorphins experienced by individuals engaging in NSSI (Deutsch, 1986).

There are several flaws with the endorphin theory of NSSI. Firstly, the majority of research investigating NSSI and the relationship to endorphins has been carried out using a sample of individuals with learning disabilities or autism. There is a lack of studies utilising a sample of individuals with mental illness or severe psychopathology, such as, personality disorders. There is suggestion that there is a fundamental difference between the self-injurious behaviour of learning disabled and autistic groups and those whose behaviour is influenced by disturbed personality or psychopathology (Favazza, 1998; Winchel & Stanley, 1991).

Additionally, the research investigating the links between endorphins and NSSI fails to consider the long-term side effects of opioid antagonists. The research does not include placebo-controlled studies or double-blind studies with controls for episodic or repetitive NSSI. When viewing the literature, there is a distinct lack of conclusive evidence which supports the use of opioid antagonists in individuals who engage in NSSI.

A problem with the endorphin theory of NSSI is that it does not take into account the context in which individuals engage in NSSI. NSSI often occurs during times of increased levels of emotional distress and in response to certain circumstances and life events (Bennum, 1984; Simpson, 1976). If NSSI is caused by

an addiction to endorphins, as suggested by this theory, then it is difficult to account for why some individuals go for months or years without engaging in NSSI.

Research has investigated individuals' ability to cope and the relationship to pain and avoidance using the cold pressor test. It was found that individuals with high levels of experiential avoidance were less tolerant of pain and were more likely to utilise dysfunctional coping strategies. Individuals' sensitivity to pain and the ratings of pain intensity did not differ between the high and low avoidant groups (Zettle et al., 2010).

An alternative hypothesis was proposed after investigating the pain responses of females with Borderline Personality Disorder (BPD) who either do or do not experience pain during NSSI. It was found that individuals who do not report experiencing pain during NSSI discriminate more poorly between noxious thermal stimuli of a similar intensity than individuals who do experience pain during NSSI, individuals with BPD who do not engage in NSSI, and control females. Additionally, the BPD no pain group had higher ratings of dissociative symptoms and greater endurance to painful stimuli than other groups. It was suggested that analgesia experienced by females with BPD while engaging in NSSI is related to both neurosensory and attitudinal/psychological abnormalities (Kemperman et al., 1997)

At present, research examining the relationship between pain and NSSI has utilised individuals with a diagnosis of BPD, with a distinct lack of research using a non clinical sample of individuals. Russ (1992) suggests that individuals with BPD demonstrate irregular and paradoxical responses to self-inflicted painful sensations. That is, these individuals will report feelings of pleasure or a tension reduction response following an act of NSSI. However, a sense of pleasure, relief or a tension

reduction is what the tension reduction proposes, whether an individual has a diagnosis of BPD or not.

Animal models of pain and stress-induced analgesia

Researchers investigating animals' responses to pain have reported the experience of opiate-mediated and nonopiate-mediated antinociceptive reactions to both painful and fearful stimuli (Maier, 1986). It has been suggested that there are similarities between animal models of SIA and the behaviour of individuals who have experienced inescapable or uncontrollable stressors (Kolb, 1987). Individuals who have experienced increased levels of psychological or physical trauma may be at a higher risk for developing self-punitive, self-destructive, or self-injurious behaviours (van der Kolk, 1987).

Stress induced analgesia is thought to play an evolutionary role during the fight or flight response. During times of threat or stress pain sensitivity can decrease (Millan, 2002). The concept of stress induced hyperalgesia has been formed to account for a number of individuals who report increased pain sensitivity during times of stress. Hyperalgesia works to ensure the individual is vigilant to any potential threats and acts as a protective mechanism (Martenson, Cetas, & Heinrichter, 2009).

Research has shown that when an animal is under attack, the act of freezing is often accompanied by analgesia. This experience of analgesia is functional in that it allows for the animal's attention to be on defensive actions not on the perception of pain (Bolles & Fanselow, 1980). Siegfried, Frischknecht, and Nunes de Souza (1990) suggested that analgesia in animals is induced by innately recognised predators,

learnt danger signals and odours of stressful conspecifics. Alternatively, analgesia can be mediated by endogenous opioids and non-opioid mechanisms. Consistent with other research, Siegfried et al. (1990) found that endogenous opiate release in animals was associated with a reduction in fear and panic, a suppression and delay of emotional and/or escape behaviours, and an ability to cry for help which are all associated with inhibit reactions which would otherwise negatively affect defences. A number of researchers have drawn parallels between animal defence responses and trauma induced psychopathology in humans (Krystal et al., 1989; Ludwig, 1983).

When investigating SIA in animals, it was found that opiate mediated SIA was only experienced after the animal was exposed to an inescapable stressor (Maier, 1986). Similarly, it has been suggested that individuals with BPD have a history of high levels of psychological trauma, such as, physical, psychological, and/or sexual abuse (van der Kolk, 1987). Animal models of SIA include an element of stress controllability which is thought to be important to the behaviour of individuals with BPD. It has been proposed that individuals who have been repeatedly exposed to trauma would increase the antinociceptive response to uncontrollable stressors in the future. Additionally, is has been suggested that an individual with BPD will have a greater propensity to experience SIA following an uncontrollable stressor than control individuals as they have been 'primed' to experience SIA during times of uncontrollable stress, therefore, having a faster habituation to any subsequent pain.

Psychopathology and stress-induced analgesia

Investigations into SIA in psychiatric populations found higher plasma met-encephalin in individuals with BPD who engage in NSSI compared to control individuals (Coid, Allolio, & Rees, 1983). Similarly, researchers found that psychiatric patients experienced enhanced analgesia to a thermal pain procedure compared with control individuals. It was proposed that this was due to the psychiatric patients having higher levels of circulating or neural beta-endorphins or other endogenous opioids which were thought to act in an antinociceptive way (Janal, Colt, Clark, & Glusman, 1984).

It may be concluded that more severe NSSI can occur because the greater level of distress is triggering a stronger depersonalisation response associated with the experience of stress-induced analgesia. However, there is a lack of research investigating SIA in non clinical samples of individuals who engage in NSSI.

The link between painless NSSI and stress-induced analgesia has not been extended to account for the tension reducing properties of NSSI in non clinical samples. Additionally, research has not considered the differences in reactions for NSSI and accidental injury demonstrated by people in previous research (Brain et al., 1998, 2000; Haines et al., 1995) where reaction to accidental injury was found not to be aberrant. It may be that pain tolerance varies as a function of general emotional distress, such as the distress commonly experienced by people with Borderline Personality Disorder, but this has not yet been investigated.

The aim of the second study was to examine the relationship between pain sensations and stress-induced analgesia during NSSI. More specifically, the present study aimed to investigate responses during the cold pressor test during a stressful condition and a no-stress condition. The present study also investigated the personal factors which may contribute to the increased levels of negative emotions and

distress commonly reported prior to NSSI. It was hypothesised that individuals who report no painful sensations during NSSI will have higher pain tolerance during a cold pressor test associated with a stress induction condition but not a no stress induction condition when compared with individuals who do report painful sensations during NSSI. Additionally, individuals who report no painful sensations during NSSI will have higher pain threshold during a cold pressor test associated with a stress induction condition but not a no stress induction condition when compared with individuals who do report painful sensations during NSSI. It was hypothesised that the low pain group will report more stressful life events and great levels of psychological distress because of these life events compared with the group who report pain during NSSI.

Method

Overview of study

This study consisted of 20 participants in total who were recruited from advertisements within the University of Tasmania and in local newspapers. The size of the sample was impacted by the difficulty in finding participants who met the inclusion criteria. Participants were required to have engaged in NSSI, be comfortable discussing the behaviour, and experience pain or analgesia during the act. Each of the participants were subjected to the same procedure. The data consisted of the Stressful Life Events Inventory scores and the Daily Hassles Scale scores and measures of threshold, tolerance and subjective pain ratings using a cold pressor test methodology. Analyses of Variances (ANOVAs) were applied to the cold pressor data in accordance with the designs of each analysis. This was followed

by a Huynh-Feldt correction. The questionnaires were analysed using T-tests. A significance criterion of .05 was used.

<div align="center">Study 2: NSSI and pain</div>

Participants

Twenty male and female participants were recruited from the University of Tasmania undergraduate population and the general population. The study consisted of two groups of participants, those who reported experiencing no pain during NSSI ($n = 10$) and those who reported experiencing pain during NSSI ($n = 10$). The sample size of this study is consistent with previous research using similar methodologies (Brain et al., 1998, Haines et al., 1995). The mean age of the individuals who experienced no pain when engaging in NSSI was 30.2 years ($SD = 12.4$) and that of the individuals who experienced pain during NSSI was 26 years ($SD = 11.16$). There were no significant differences between the groups in relation to the age of the individuals or the nature of their NSSI.

Design

The second study included two separate designs. The first was a Group [pain, no pain] x Condition (no induction, recall of stressful experience) mixed factorial design. The dependent variables were time to pain sensation, the length of time in the water (up to a ceiling of 5 minutes), and ratings of pain severity. The second was a Group [pain, no pain] between subjects questionnaire study with the dependent variables being the reported number of stressful life events and daily hassles.

Materials and apparatus

The Schedule of Recent Experiences (Holmes, 1976) was used to provide a measure of major stressful life experiences. This schedule is divided in two parts. Part A gives 12 events and asks if the event has ever been experienced before. Part B

lists 30 common stressful events and requires the individual to list the number of times these have occurred. Each of the 42 items is assigned a mean value which is then combined to give a total score. The higher the score the more stress one has experienced. Holmes suggested that 80% of individuals with a score over 300 will becomes sick because of stress in the future. Fifty percent of individuals with a score of 150-299 and 30% of individuals with a score less than 150 will become ill in the future because of stress. The questionnaire is presented in E1.

The Daily Hassles Scale (DeLongis, Folkman, & Lazarus, 1988) was used as a measure of more minor but stressful life experiences. The Daily Hassles Scale allows participants to rate each hassle on a 6 point scale: 0 – did not occur, 1 – occurred; not severe; 2 – occurred; somewhat severe; 3 – occurred, moderately severe; 4 – occurred, very severe; 5 – occurred, extremely severe. This scale is designed to measure everyday stresses and annoyances over the past month. The questionnaire is presented in Appendix E2.

Participants were interviewed in order to construct a personalised stress induction guided imagery script. This involved the script being divided into four stages: 1) setting the scene (a description of the environment in which the event occurred and the context of the situation); 2) approach (description of the events immediately preceding the incident); 3) the incident (description of the actual event as it occurred); and 4) the consequence (description of the events immediately following the incident and the resolution. Only information regarding the period of time just preceding the event, the actual event in question and the time just following the event will be used. Examples of a script is presented in Appendix E3.

A cold pressor test (Efran, Chorney, Ascher, & Lukens, 1989) was used in order to measure pain tolerance and threshold. The test involves two tubs of water.

The temperature of one tub was maintained at 32°C to ensure that all participants commenced the trials at approximately the same hand temperature. The second tub was a cold-water tub containing water and crushed ice in order to maintain the temperature at approximately O°C. A meshed screen was placed in the tub in order to prevent the participants' hands from coming into contact with the ice. In order to measure participants' subjective responses to pain during this task they were asked to rate their discomfort on a 10-point scale from mildly unpleasant to absolutely intolerable. The duration of time the hand was placed in the water was measured with a stop watch up to a ceiling level of 5 minutes.

Procedure

Participants attended an initial session where interviews were conducted to gain information in order to construct the stress script to be read during the cold pressor test. Participants were then asked to attend a second session where the cold pressor test was administered. Initially, participants undertook three trials of the cold pressor test without imagining any stressful experiences. Participants were asked to place their non-dominant hand in the warm water up to the wrist for approximately one minute. The hand was then placed immediately in the ice water. The participants were asked to say 'now' when they first experienced a painful sensation (measure of threshold). They were then instructed to leave their hand in the water for as long as possible, for a maximum of five minutes (measure of tolerance). Participants rated their discomfort after each trial. In order to give participants a break between the no stress and stress trials they were asked to complete the necessary questionnaires. Participants were then read a script of a stressful experience and then asked to complete three trials of the cold pressor test using the same method. Participants were then asked to complete subjective ratings to pain relating to each trial.

The order of the trials were counterbalanced to prevent order effects. Consent was obtained before commencing the first session. Each step of the procedure was explained to all participants and each participant was fully debriefed at the conclusion of the study.

Results

Questionnaire Data

The questionnaire data were analysed using t-tests. The results of the analysis of the questionnaire data for the total sample are presented in Table 9. When interpreting the severity of the daily hassles, the higher the score the more severe these are perceived to be by the individual.

Table 9

Questionnaire data for the total sample of participants.

Variable	Level	Statistic	
Stressful life events	Total score	M	403.1
		s	249.1
Daily hassles	Number of hassles	M	15.7
		s	4.9
	Severity of hassles	M	30.6
		s	10.9
	Frequency of hassles	M	31.5
		s	10.3

No significant differences were found between the groups in relation to the number of stressful life events reported, number of daily hassles, severity of daily hassles, or frequency of daily hassles.

Cold Pressor Test Data

Analyses of variance (ANOVAs) were conducted and a Huynh-Feldt correction applied for the cold pressor test data. Post-hocs were then performed using Fishers LSD. The results found that there were no significant differences for the subjective pain rating, tolerance or threshold measures between individuals who do and do not experience pain while engaging in NSSI. Furthermore, no significant results differences were found for the measure of subjective pain rating during the stressful condition compared with the non-stress condition.

There was a significant effect for condition for the measure of threshold, $F(1,18) = 5.06$, MSE $= 4627.02$, $p < .05$, with individuals recording a higher pain threshold during the stressful condition compared with the non-stress condition. There was a significant effect for condition for the measure of tolerance, $F(1,18) = 8.49$, MSE $= 16227.20$, $p < .01$, with individuals recording a higher pain tolerance during the stressful condition compared with the non-stress condition. The mean cold pressor test measurements for the total sample are presented in Figure 4. The means and standard deviations for the measures of threshold and tolerance to pain are presented in Table 18 (Appendix F).
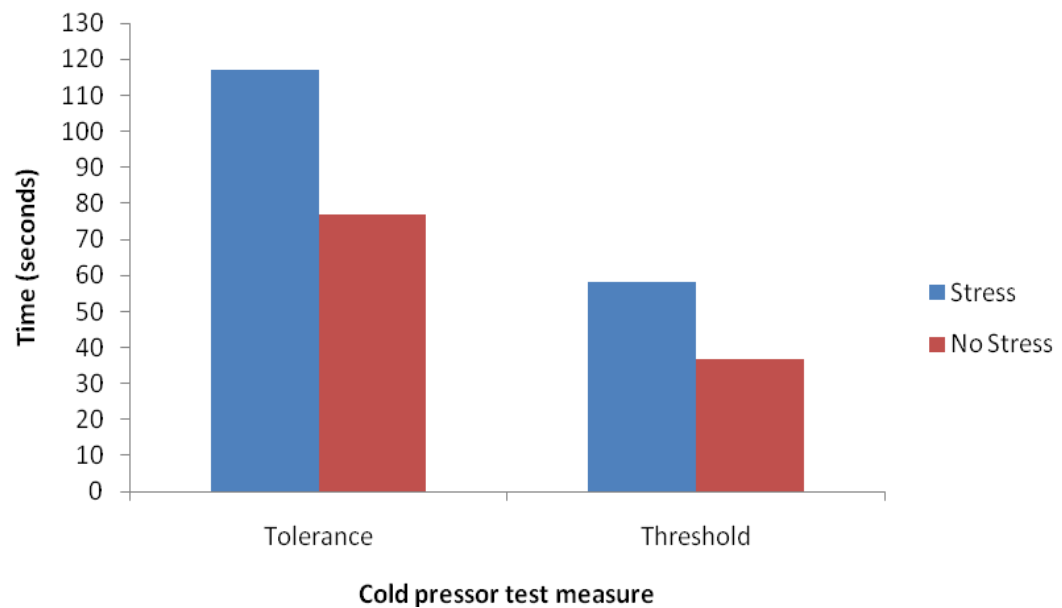
Figure 4. The mean threshold and tolerance measurements for the stress and no stress condition for the total sample of participants

Discussion

The aim of this study was to examine the relationship between pain sensations and stress-induced analgesia during NSSI. A cold pressor test was used to investigate individuals' responses to pain during a stress and a no-stress condition. Additionally, this study investigated the personal factors which may contribute to the high levels of negative emotions and distress observed in individuals who engage in NSSI.

It was expected that individuals who report a lack of painful sensations during the act of NSSI will have a higher pain threshold and tolerance during a stress condition of the cold pressor test. However, there was no evidence found to suggest that pain threshold or tolerance differed depending on the presence or absence of

painful sensations during NSSI. There were no significant differences found between the groups for either measure. It may be concluded that it is not an individual's pain tolerance or threshold during times of stress which allows them to engage in painless NSSI. As expected, there were no group differences in threshold or tolerance to pain during a no-stress condition. It is likely that during a no-stress condition, individuals' distress levels are not reaching the level necessary for the release of endogenous opiates which may be responsible for the change in the experience of pain for some individuals. Furthermore, given that the individuals would not be expected to be experiencing high levels of distress, they would not be triggering a dissociative reaction which may alter the perception or experience of pain in individuals with an increased propensity to experience dissociation. This results in both groups having comparable pain threshold and tolerance during situations which evoke low levels of stress and negative emotions.

Although there were no significant differences between the groups for the measure of pain threshold or tolerance, pain tolerance was found to be significantly higher when individuals were imaging a stressful event compared with a non-stress condition. More specifically, when individuals were recalling a stressful event using personalised guided imagery they were able to hold their hand in the bucket of ice cold water for significantly longer than when not recalling a stressful experience.

It is widely recognised that inhibitory pain control systems can be activated by increased levels of stress (Watkins & Mayer, 1982). An individual's perception of pain may be altered by any change to their level of distress or psychological state (Melzack, Wall, & Ty, 1982). Miller, Boureau and Albe-Fessard (1979) found that by evoking high levels of mental stress they were able to inhibit perceptions of pain.

It may be, that as an individual's levels of stress increases, their perception of pain may become weaker resulting in higher tolerances to pain during times of high stress.

Research has shown that level of attention to the painful stimuli can alter an individual's perception of the pain as well as alter nociceptive processing in the brain. More specifically, the more an individual attends to the painful stimuli the higher their perception of the pain, while the more distracted an individual is the lower their pain levels (Miron, Duncan, & Bushnell, 1989; Arntz & De Jong, 1993). It may be that during times of high stress the individual is more distracted and is attending less to the painful stimuli than during times of low stress. More specifically, individuals may have been paying less attention to the cold pressor test and the painful stimuli during the stress condition than the no stress condition accounting for the differences in pain tolerance and threshold.

A lack of pain sensations during the act of NSSI in females with BPD has been found to be related to a number of factors including depression, high anxiety, impulsivity, trauma history, suicide attempts and dissociation (Russ, Shearin, Clarkin, Harrison, & Hull, 1993). Additionally, a lack of pain sensations during the act of NSSI for individuals with BPD or a dissociative disorder have been found to be related to a history of trauma or the experience of inescapable trauma during childhood (Nijenhuis et al., 1998). Further research on individuals with BPD has been conducted, however, these individuals were not distinguished based on history of NSSI. It was found that individuals with BPD, personality disorders and controls did not differ on their level of pain tolerance during a cold pressor test. However, when they were administered an uncontrollable stressor, it was found that individuals with BPD had a significantly higher pain tolerance than other individuals (McCown,

Gallins, Johnson, DeSimone, & Posa, 1993). This is consistent with the results of the current study.

It may be that these individuals are experiencing dissociation during times of high stress resulting in a higher pain threshold and tolerance. Bohus et al. (2000) found that when individuals were experiencing high levels of negative emotions and distress they reported an inability to feel parts of their body as well as experiencing a perceived insensitivity to pain sensations. However, a lack of research has been conducted investigating the relationship between SIA, NSSI and dissociation in non clinical populations.

Interestingly, there were no significant differences between the groups for the measure of subjective pain. Additionally, the subjective pain ratings did not differ between the stress and the no stress condition. Research has found that subjective ratings of pain are influenced by distraction, where pain ratings were significantly lower during more complex tasks (Barber & Cooper, 1972). However, this is inconsistent with the current results where the subjective measure of pain did not differ between the stress and no stress condition. If the subjective pain ratings were influenced by distraction it would have been expected that the ratings of pain would have been significantly lower during the stress condition.

The assessment of pain is starting to move beyond simply using measures of threshold and tolerance and is attempting to measure individual's perceptions and psychological reactions to pain (Price, 2000; Rainville, Bao, & Chretien, 2005). The difficulty with this is that an individual's perception of pain is influenced by a number of factors including personality traits, gender, emotional factors, cognitive factors and socio-cultural factors (Rainville, 2002; Rhudy & Meagher, 2000). More recently, it was found that the personality characteristics of individuals play a key

role in affecting subjective ratings of pain. More specifically, the affective dimension of pain was significantly greater in individuals with an emotionally overwhelmed profile on the MMPI when compared with other profiles (Mongini et al., 2009). It may be that a number of these factors are influencing the ability for individuals who self-injure to accurately identify and rate their levels of pain.

It may be that individuals who experience stress-induced analgesia during NSSI have an increased propensity to experience dissociation during times of high stress resulting in painless NSSI. Individuals engaging in NSSI often have increased levels of anxiety and depression, and have a decreased ability to utilise adaptive coping skills and problem solving abilities (Nock, 2009; Walsh & Rosen, 1988). These greater levels of distress may increase their likelihood of experiencing a dissociative episode during times of high stress. Furthermore, it is likely that the individuals who experience SIA during NSSI already have an increased propensity to experience dissociation resulting in a stronger dissociative response and the individuals reporting lower levels of pain.

It is thought that it is not the presence of stress induced analgesia that results in an increased tolerance to painful sensations, but an increased predisposition to experience dissociation during times of high stress (which results in painless NSSI). This dissociative experience may be triggered by the analgesic effects due to the release of endogenous opiates. The release of endogenous opiates is thought to be due to the stress reaction preceding the self-injurious event (Darche, 1990).

Research has found a strong link between dissociation and NSSI in a number of inpatient populations (van der Kolk, Perry, & Herman, 1991), with NSSI being the strongest predictor of dissociative experiences (Brodsky, Cloitre, & Dulit, 1995). Brodsky et al. found that individuals who engage in NSSI report higher levels of

dissociative experiences than individuals with no history of NSSI. Dissociation is thought to exist on a continuum from normal experiences through to pathological dissociation. Although all individuals have normal dissociative experiences, it is proposed that individuals who experience stress-induced analgesia during NSSI experience more severe and more frequent dissociation. These individuals may already have a propensity to dissociate and during times of high stress experience dissociation causing them to feel unreal and withdrawn and to have decreased pain sensitivity.

Increased levels of stress or stressful events are a known precipitant for NSSI (Rutter, 1989). It is thought that NSSI may develop as a result of chronic stress for individuals who do not have other more adaptive ways of managing their distress (Ross & Heath, 2002). It has also been proposed that the occurrence of childhood stress alters the levels of endogenous opioids in the body and may play a role in the experience of pain during the act (Sher & Stanley, 2009).

Given this, it was expected that individuals who experience no pain during NSSI would report more stressful life events and daily hassles than individuals who report pain during the act. Additionally, it was expected that the severity and frequency of daily hassles would be greater in individuals who do not feel pain during NSSI than individuals who feel pain during the act. However, it was found that there were no significant differences between individuals who engage in painless NSSI and those who experience pain during NSSI in relation to the number of reported stressful life events or daily hassles. Additionally, there were no differences between the groups in the severity or the frequency of daily hassles reported. It is not the number of reported stressful life events or daily hassles which is allowing an individual to engage in painless NSSI.

The underlying mechanism for NSSI is the same for both groups, with both individuals who do and do not feel pain during the act experiencing a similar tension reduction response. However, there are a number of factors prior to the act which may result in an individual experiencing stress-induced analgesia. These are shown in Figure 5.
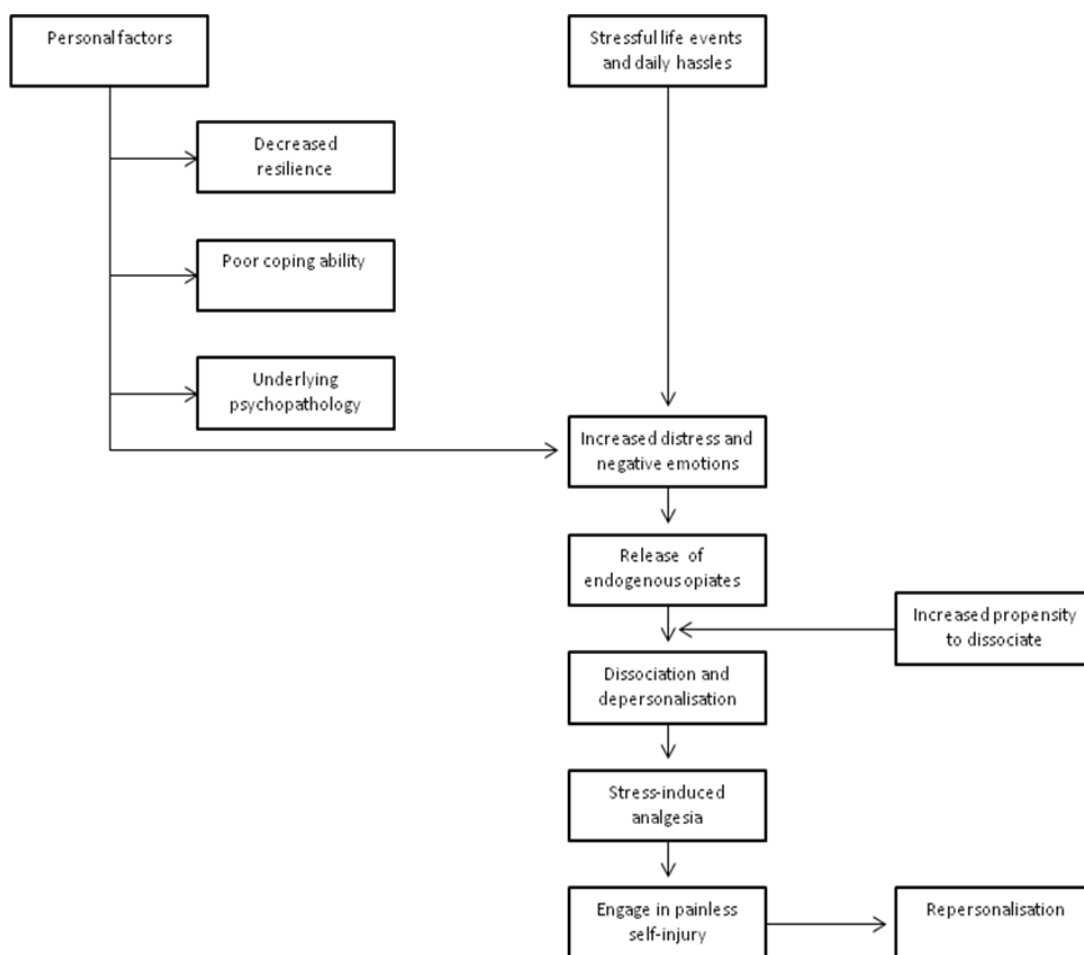
Figure 5. The factors which contribute to the experience of stress-induced analgesia during NSSI

Figure 5 shows the proposed path to develop stress-induced analgesia, thereby allowing an individual to engage in painless NSSI. It may be that although an individual who engages in painless NSSI experiences the same number of stressful life events and daily hassles as individuals who experience pain during the act, they have a number of personal factors which increase their levels of psychological distress and negative emotions. This increased distress results in a release of endogenous opiates (Darche, 1990). It is proposed that these individuals also have an increased propensity to experience dissociation during times of high stress. The high levels of negative emotions causes a state of dissociation or depersonalisation causing stress-induced analgesia and allowing the individual to engage in NSSI with little or no pain.

As shown in Figure 5, there may be a number of explanations why the groups do not differ on their level of stressful life events and daily hassles reported. Firstly, it may be that it is not the number of stressful events and daily hassles that are experienced, but rather the individual's ability to cope with these adaptively which contributes to stress-induced analgesia. For example, there may be one person who experiences three stressful life events but has adaptive coping strategies and problem solving techniques and is able to manage these without high levels of distress. Alternatively, another person may need to experience only one stressful life event to experience high distress due to their poor coping ability. The levels of stress, distress or negative emotions experienced by both groups in this study may not be a function of the number of stressful life events and daily hassles but rather individual differences in their coping ability.

Secondly, it may be that although both groups of individuals have experienced similar levels of stressful life events and daily hassles, the individuals

who experience stress-induced analgesia have more occurrences of dissociative experiences or are more predisposed to experience dissociation or depersonalisation during times of high stress. The individuals who feel pain during the act may have fewer dissociative experiences or a lower predisposition to experience dissociation or require a higher level of stress to facilitate this than individuals who do not feel pain during the act.

Thirdly, there are a number of other factors which may impact on an individual's ability to cope and manage distress as a result of daily hassles or stressful life event. An individual's level of resilience, access to social and professional support, underlying psychopathology, personality traits and genetic factors may all impact on an individuals' ability to manage life stress and daily hassles adaptively. It may be that it is not the number of these events but rather these factors which impact on an individual's psychological functioning causing them to experience increased distress, dissociation and stress-induced analgesia.

As for study one, a limitation of this study is the smaller sample size which causes the generalisability of the results to be slightly more limited. A further limitation of this study is that the stress induction script may not have elicited a strong enough stress response to cause SIA. Individuals' subjective rating of stress were not measured following the administration of the script, so it is unknown if individuals were reaching the necessary level of stress to elicit the desired reaction.

In summary, it can be concluded that it is not an individual's threshold or tolerance to pain during times of high stress which is allowing them to engage in painless NSSI. The third study will investigate the relationship between dissociative experiences and the presence or lack of pain sensations during the act of NSSI.

CHAPTER 6

STUDY 3: NSSI AND DISSOCIATIVE EXPERIENCES

Dissociation

It has been proposed that some individuals are able to engage in painless NSSI due to stress induced analgesia because of the increased occurrence of dissociative experiences. Dissociation may be defined as an inability to integrate feelings, thoughts, and memories into a clear, unified sense of consciousness (Demitrack, Putnam, Brewerton, Brandt, & Gold, 1990). Similarly, dissociation can be defined as a separation of these processes (Spiegel & Cardena, 1991). It has been proposed that dissociation is a process which exists on a continuum from normal and common dissociative experiences to severe forms consistent with those seen in dissociative disorders (Ross, 1997). An example of normal, everyday dissociative experiences is what is commonly referred to as 'highway hypnosis'. This refers to the experience whereby drivers become focused on their own thoughts or daydreams while the mental processes responsible for the task of driving become dissociated from consciousness. Even so, the task of driving is still completed successfully (Ross, Joshi, & Currie, 1990).

It is important to separate pathological dissociation from dissociative experiences which are common and occur for most individuals on a daily basis. Given that dissociative experiences lie on a continuum, dissociation is not characterised by one distinct set of symptoms. Instead, normal and abnormal behaviour is separated by the frequency, extent and/or intensity of the dissociative symptoms (Kihlstrom, Glisky, & Angiulo, 1994). During a serious threat to one's life, dissociation may act as a protective mechanism for an individual against feelings of intolerable distress (Noyes & Kletti, 1977). It is proposed that, in some

individuals, this protective defence mechanism becomes a habitual coping strategy which may lead to the development of a dissociative disorder (Spiegel, 1993).

The concept of dissociation was first introduced by Pierre Janet in the 19th century. However, today this phenomenon still lacks a clear conceptualisation. The difficulty in finding one single clear conceptualisation is reflective of the differences in both the definition and classification of dissociative disorders in the ICD-10 and DSM-IV-TR. Recent research has concentrated on trying to separate and differentiate pathological versus non-pathological dissociation (Levin & Spei, 2004). Childhood trauma has been shown to be a positive predictor for pathological dissociation, although this is not true for normal dissociative experiences (Irwin, 1999).

Janet first proposed that dissociation was a discontinuous phenomenon which was only observed in individuals with psychiatric disorders, particularly hysteria. He proposed that dissociation was absent in the general healthy population (Putnam, 1989). In contrast, more recent researchers have proposed that dissociation is a dimensional process and occurs on a continuum from normal and common dissociative experiences (e.g., daydreaming) through to severe and clinically significant experiences (e.g., dissociative identity disorder) (James, 1983; Prince; 1978; Putnam, 1993).

Janet (1907) believed that dissociation was a result of increased levels of stress. He proposed that during times of increased stress an individual's perceptions and behaviour (psychological automatisms) would be altered. These psychological automatisms split off but continue to influence the individual's thoughts and actions in what he labelled as a hysterical accident. Janet (1907) named this condition dissociation, which is characterised by a narrowing of consciousness. Furthermore, he proposed that particular individuals are proposed to develop dissociative disorders

due to genetic factors. He argued that the experience of trauma can cause dissociation in people already predisposed because they have a reduced capacity to bind their psychological automatisms into a single stream of consciousness.

In contrast to Janet's (1907) views, it is now understood that particular types of dissociation are common in the general population, with approximately 50% of individuals reporting the experience of depersonalisation at some point in their lives (Aderibigbe, Bloch, & Walker, 2001). Depersonalisation is a well known form of dissociation in which an individual will feel disconnected from themselves. They may report they feel as if they are watching themselves from outside their body. Another form of dissociation is derealisation, where an individual will feel disconnected from reality. They may feel as if they are in a dream with things around them moving at a different speed than expected (Lynn, Lilienfeld, Merckelbach, Giesbrecht, & van der Kloet, 2012). When these experiences are mild and infrequent they are not of clinical concern.

An individual's propensity to experience dissociation has been linked to a range of factors including hypnotisability, fantasy proneness and absorption (Kihlstrom, Glisky, & Angiulo, 1994). Furthermore, these factors are thought to originate because of events in childhood including abuse, trauma and neglect (Kihlstrom et al., 1994). In some cases, individuals who experience high levels of hypnotisability and/or fantasy proneness also indicate high levels of physical punishment during childhood (Lynn & Rhue, 1988; Nash & Lynn, 1986). However, these findings have been met with debate with many individuals with high hypnotisability experiencing only mild punishment during childhood (Hilgard, 1979).

Recent research has acted to further divide the concept of dissociation into two types, compartmentalisation and detachment (Holmes et al., 2005). The concept of compartmentalisation may be defined as "a partial or even complete failure to deliberately control processes and take actions that can normally be influenced by an act of volition" (Spitzer, Barnow, Freyberger, & Grabe, 2006, p. 83). It is believed that the compartmentalised processes continue to operate as expected although they are not able to be accessed volitionally. This results in the compartmentalised processes continuing to impact an individual's emotions, thoughts and behaviour. The process of compartmentalisation can be observed in dissociative amnesia as well as conversion symptomatology (Nijenhuis, 1999).

In contrast, detachment may be defined by "the subjective experience of an altered state of consciousness characterised by 'alienation' of oneself from the outside world" (Spitzer, Barnow, Freyberger, & Grabe, 2006, pg 84). Detachment is characterised by dulling or absence of emotional experiences and is observed in derealisation and depersonalisation. Holmes et al. (2005) proposed that the concept of detachment is similar to peritraumatic dissociation and emotional numbing. Further research has provided evidence for the presence of these two types of dissociation (Brown, Schrag, & Trimble, 2005; Stockdale, Gridley, Balogh, & Holtgraves, 2002).

Dissociation and psychopathology

There are a number of important distinctions in the definitions and classifications of dissociation in the ICD-10 and the DSM-V (APA, 2013). However, it is important to note that the majority of research to date has used the DSM-IV-TR

(APA, 2000) definitions and classifications. The ICD-10 maintains that dissociation may involve motor or sensory systems resulting in symptoms being included which would otherwise be included under the definition of conversion disorders. This is distinctly different to the DSM-IV-TR which states that dissociation involves psychic functions and systems. This results in conversion disorders being labelled as one of the somatoform disorders in the DSM-IV-TR. In comparison, the ICD-10 asserts that conversion and dissociative disorders represent one distinct category separate from somatoform disorders (Spitzer, Barnow, Freyberger, & Grabe, 2006).

Dissociative phenomena are seen across both Axis 1 and Axis 2 disorders in the DSM-IV-TR (APA, 2000) and the DSM-V (APA, 2013). There are a number of disorders in the DSM-IV-TR which explicitly refer to dissociative symptoms; dissociative amnesia, dissociative fugue and dissociative identity disorder (DID). The DSM-V does not include a diagnosis of dissociative fugue, but instead includes it as a coding option during a diagnosis of dissociative amnesia. In the DSM-IV-TR and the DSM-V, dissociative experiences are included in the diagnostic criteria for BPD, posttraumatic stress disorder (PTSD) and acute stress disorder (ASD). Dissociative experiences are observed in a range of psychiatric disorders including schizophrenia, mood disorders, somatoform disorders and obsessive compulsive disorder (OCD) (Brown, Schrag, & Trimble, 2005; Grabe et al., 1999; Spitzer, Haug, & Freyberger, 1997). The presence of dissociation also has been linked to poorer treatment outcomes and higher relapse rates in individuals with panic disorder and OCD (Michelson, June, Vives, Testa, & Marchione 1998; Rufer et al., 2005).

For some disorders the research has shown a relationship between the experience of dissociation or dissociative symptoms and other phenomena. For example, the literature widely points to peritraumatic dissociation being a predictor

for PTSD, although this is not explicitly mentioned in the DSM-IV-TR (Briere, Scott, & Weathers, 2005). Research has also shown a link between trichotillomania and childhood trauma, in that the act is often undertaken during a state of dissociation (Lochner et al., 2004).

Individuals with dissociative disorder diagnoses are observed to have sudden changes in behaviour, knowledge, affect, sensations and perceptions. Putnam (1988) proposed that changes such as these indicate that the individual has developed distinct states of consciousness which are organised around a predominant sense of self and affect. More so, it is suggested that this prevailing state has a limited range of behaviours and a set of state dependent memories. Putnam (1998) separated these states of consciousness from normal human experiences where individuals experience discontinuous, self-organising and self-stabilising states of consciousness as well as behaviour and physiology. Any changes to a state of consciousness are generally evident by changes to variables such as attention, memory cognition, regulatory physiology and an individual's sense of self. During development, most individuals learn to modulate their state of consciousness and recover from any disruptions to their state. Furthermore, during the course of maturation the states of consciousness, state-dependent experiences and memories will become associated and joined with one another. It is believed that the experience of trauma may interfere with the integrative processes, consistent with the high rates of sexual, physical and psychological abuse in individuals with dissociative disorders (van der Kolk & van der Hart, 1989). Additionally, evidence has suggested that the experience of dissociation of states of consciousness and behaviour is linked to the severity, frequency, duration, and age of onset of the trauma (Boon & Draijer, 1993; Putnam 1992).

It has been proposed that a disorganised attachment as a child (developing as a consequence of frightening and/or abusive behaviour from parents or care-givers) is a vulnerability factor for the occurrence of dissociative phenomena and psychopathology in adulthood (Vermetten, Dorahy, & Spiegel, 2007). The literature has extensively investigated the relationship between PTSD and dissociation. It is seen that the 'shut down' amnesic symptoms associated with dissociation are in stark contrast to the increased noradrenergic tone and hyperamnesia which is a known characteristic of PTSD. Much of the research suggests that although both PTSD and dissociation can follow the experience of a traumatic event, they nonetheless should be thought of as distinctly different entities (Vermetten et al., 2007).

Categorical vs. dimensional nature of dissociation

This debate over the categorical versus dimensional nature of dissociation has been reignited following the taxometric analysis of the Dissociative Experiences Scale (DES). This is a widely used self-report measure of dissociation and dissociative experiences (Carlson & Putnam, 1993). A study found a clear distinction between a non-pathological dimensional type of dissociation and a discontinuous pathological type (Waller, Putnam, & Carlson, 1996). This pathological dissociation was found to be identified by eight particular items on the DES. These eight items mostly assess depersonalisation and derealisation. Waller et al. (1996) suggested this underlying factor is class-like rather than trait-like and is a categorical rather than dimensional construct.

Waller, Putnam, and Carlson (1996) proposed that nonpathological dissociation lies on a continuum, whereas pathological dissociation can be thought of

as dimensional in nature. They found that pathological dissociative experiences, such as dissociative fugue, amnesia or depersonalisation, are taxonic (categorical), in that individuals can be classified into these distinct groups by the presence of a number of different symptoms.

Individuals with dissociative disorders, such as dissociative identity disorder or dissociative disorder not otherwise specified, have a particular set of symptoms which they display. These disorders are characterised by sudden alterations in their behaviour, affect, sensation, perception and knowledge (Ross et al., 1992). Putnam (1998) described individuals with these disorders as having developed a discrete sense of self, including body image, and a particular set of state dependent memories. It is hypothesised that during maturation, various self stabilising states, state dependent experiences and memories associate and integrate with one another to form one distinct state. These combine to form a unified state of consciousness, memory and identity which characterises an individual's personality. It is thought that experiencing significant trauma interferes with the process which integrates these states (van der Kolk & van der Hart, 1989). The experience of dissociation has been shown to be a predictor for poor response to treatment and high rates of relapse, especially in individuals with panic disorder and obsessive compulsive disorder (Michaelson, June, Vives, Testa, & Marchione, 1998; Rufer et al., 2006).

Prevalence of dissociation

The Dissociative Experiences Scale (DES) was devised by Bernstein and Putnam (1986) and is a 28 item self-report measure which assesses percentage of time an individual reports dissociative experiences. Using this measure, it was found

that adults in the general population report experiencing dissociative phenomena 10% of the time or less (Ross, Joshi, & Currie, 1990). Research has suggested that a DES score of approximately 15 to 20 can be used to discriminate between the general population and individuals with a psychiatric disorder (Ross, Joshi, & Currie, 1991; Ross, Ryan, Voigt, & Eide, 1991). However, it was then reported that a discriminant factor analysis indicated that a score of 30 is a more accurate figure to discriminate individuals on the DES (Carlson et al., 1993).

Studies investigating the prevalence of pathological dissociation found that in the North American general population the rates were between 2 and 3.3% (Seedat, Stein, & Forde, 2003; Waller & Ross, 1997). The European prevalence rates were reported to be 0.3% for a non clinical population and 1.8 to 2.9% for a student sample. In a psychiatric inpatient population the prevalence of pathological dissociation was seen to be between 5.4 and 12.7% (Modestin & Erni, 2004; Spitzer et al., 2006).

The rates of pathological dissociation were found to be higher in specific diagnostic groups. For example, females with eating disorders had a prevalence rate between 4.8 and 48.6%. This rate was dependent on the type of eating disorder diagnosed, with binge-purge anorexia having the highest prevalence rate, and binge eating the lowest (Spitzer et al., 2006; Waller, Ohanian, Meyer, Everill, & Rouse, 2001).

Reported demographic information relating to pathological dissociation is inconsistent and inconclusive. For example, some research has found that pathological dissociation is more frequent in young individuals (Seedat, Stein, & Forde, 2003; Waller & Ross, 1997). However, this finding was not seen in other studies or in other groups of a similar age (e.g., individuals with depersonalisation

disorder) (Simeon, Knutelska, Nelson, Guralnik, & Schmeidler, 2003). Although Irwin (1994) suggested that dissociation is more common among young females, most studies have failed to identify any gender differences associated with pathological dissociation. Interestingly, Irwin (1999) found that an individual's age negatively predicted both pathological dissociation and psychological absorption. This supports a number of other studies that found a decrease in dissociative experiences with age (Ross, Joshi, & Currie, 1990; Torem, Hermanowski, & Curdue, 1992). Some research has suggested that individuals with pathological dissociation tend to be single and not in a romantic relationship (Seedat, Stein, & Forde, 2003; Spitzer et al., 2006).

Predictors of dissociation

Although a plethora of research has been undertaken examining the relationship between trauma and dissociation, significantly less information is known about other potential predictors. Research has shown that a propensity to experience dissociation is linked to a number of aggression features, namely, physical aggression, the affective component (anger) and the attitudinal component (hostility) (Irwin, 1998). Both depression and anxiety also have been found to be correlated with dissociation (Irwin, 1995; Norton, Ross, & Novotny, 1990). Interestingly, aspects of grief predict the experience of dissociation, with this effect size even stronger with the inclusion of gender and age as independent variables (Irwin, 1994). Both unresolved guilt and shame are also strong predictors for the occurrence of dissociation (Irwin, 1998). Further research has shown that other factors do not predict dissociative experiences. For example, an investigation into the attitudinal

factors contributing to dissociation found that feelings of powerlessness did not predict the experience of dissociation (Irwin, 1998).

Theories of dissociation

Theories of dissociation can be classified into two broader categories: traumagenic models and diathesis stress models of dissociation. Traumagenic models propose that dissociation occurs during extraordinary circumstances, such as a threat to an individual's life. It is thought that the experience of dissociation acts as a psychobiological defence against otherwise intolerable levels of stress (Noyes & Kletti, 1977). More specifically, traumagenic models propose that dissociation is used as a coping strategy following prolonged periods of childhood abuse (Putnam, 1995). In clinical populations, it has been reported that the experience of dissociation is positively correlated with a self-reported history of childhood incest, sexual abuse, physical abuse, emotional abuse, and neglect (Chu & Dill, 1990; Coons, Bowman, Pellow, & Schneider, 1989). A similar relationship between childhood trauma and abuse and dissociation has been observed in nonclinical samples (Irwin, 1994; Sanders, McRoberts, & Tollefson, 1989)

Lending support to the traumagenic models of dissociation, Waller and Ross (1997) proposed that pathological dissociation does not have a heritable component and, instead, is predicted by a history of childhood trauma or abuse. In comparison, it has been suggested that nonpathological dissociation has a strong genetic component, with an estimated heritability of 50% (Tellegen et al., 1988). From this, it may be concluded that childhood abuse and trauma plays a key role in the development of

pathological dissociation with the same not being true for normal dissociative experiences.

Irwin (1999) found that childhood trauma was a predictor of pathological dissociation but not of nonpathological dissociation. Given the results, he speculated that the traumagenic models of dissociation should be revised to reflect the understanding that childhood trauma plays a key role in the development of pathological dissociation but not nonpathological dissociative experiences.

Researchers have proposed that high DES scores in individuals diagnosed with PTSD is indicative of dissociation being a defensive reaction to a traumatic event (Spiegel & Cardena, 1991). Additionally, a plethora of studies have suggested that a history of sexual and physical abuse can account for the high level of dissociative experiences in individuals with personality disorders (e.g., Chu & Dill, 1990; Herman, Perry, & van der Kolk, 1989; Perry & Herman, 1993). However, a number of studies have failed to find a relationship between sexual abuse and dissociative experiences in individuals with BPD (Zweig-Frank, Paris, & Guzder, 1994).

Carlson and Rosser-Hogan (1991) found a strong relationship between trauma experiences, the severity of traumatic strength symptoms and the strength of dissociation in refugees. They found a strong relationship between childhood abuse and trauma and dissociative phenomena experienced later in life. It was proposed that dissociation during childhood helps the individual to cope with traumatic experiences. Additionally, it was suggested that repeated episodes of trauma during childhood have a stronger relationship with dissociation in adulthood than single episodes of trauma.

A criticism of the general traumagenic models of dissociation is that the size of the relationship between childhood abuse and dissociative experiences has been found to be small (Irwin, 1994). It is proposed that a number of environmental factors may contribute to the development of pathological dissociation. It is also important to note that the level of support an individual with a history of childhood trauma has received has been shown to significantly affect the development of dissociative tendencies. More specifically, access to emotional support following childhood trauma has been shown to inhibit the development of dissociative phenomena (Irwin, 1996). A further criticism of the traumagenic models of dissociation is that there are individuals who have experienced severe childhood trauma who do not report experiencing dissociation in adulthood (Kendall-Tackett, Williams, & Finkelhor, 1993).

More recently, research has lent support to the posttraumatic model of dissociation. This model proposes that dissociation involves three widely accepted notions: 1) dissociation is a mechanism to help an individual cope with an intense stressor (especially true for childhood sexual and physical abuse); 2) dissociation is accompanied by cognitive deficits which impact on the individual's ability to process emotional information; and 3) the occurrence of dissociation is characterised by an avoidant information processing style which leads to an individual forgetting distressing memories (Lynn et al., 2012).

The posttraumatic model of dissociation has gained widespread support in the literature with a very high rate of childhood abuse being reported in clinical populations of individuals with dissociative identity disorder or other dissociative disorders (Gleaves, 1996; Simeon, Guralnik, Schmeidler, Sirof, & Knutelska, 2001). However, it has also received criticism from some researchers, who cite

methodological problems in the studies on which it is based. Firstly, many of the studies fail to obtain an objective corroboration of the reported abuse. Secondly, the majority of the studies involve cross-sectional designs which do not allow for causal inferences to be made. Thirdly, the researchers have failed to control for comorbid psychiatric conditions in their participants, with many individuals also having a diagnosis of eating disorders, anxiety and/or personality disorders. This increases the likelihood that the correlates of abuse are not specific to pathological dissociation or dissociative disorders.

In contrast, diathesis stress models of dissociation propose that some individuals have an increased propensity to experience dissociation when triggered by increased stress because of genetic or other factors, and this increased propensity exists whether or not the individual has experienced a traumatic event (Ray, 1996). A number of risk factors or diatheses for the development of pathological dissociation have been identified including hypnotisability, level of absorption and fantasy proneness (Monroe & Simons, 1991). The relationship between diatheses and stress is such that the more severe the diathesis or risk factor, the less stress is needed to cause a dissociative reaction (Kihlstrom et al., 1994).

Jang, Paris, Zweig-Frank and Livesley (1998) suggested there are common genetic factors underlying pathological and nonpathological dissociative capacity. Additive genetic influences were found to account for 48% and 55% of the variance on scales which measure pathological and non pathological dissociation respectively. The estimate of heritability was found not to differ by gender.

It is proposed that dissociation has a genetic component as the disorders where dissociative experiences are evident also have a heritability component, for example, schizophrenia and personality disorders (Jang et al., 1996; Moises et al.,

1995). Research has shown a high degree of common genetic components (45%) and a lower degree of environmental influences (34%) are associated with pathological and nonpathological dissociative capacity. The researchers postulated that this lends support to a dimensional view of the vulnerability to dissociate, with the environmental influences being what separates pathological from nonpathological dissociation. The occurrence of dissociation as an indication of trauma is thought to be a gross oversimplification. These findings are more consistent with the stress-diathesis model of dissociation. A more moderate predisposition will require greater levels of stress to be placed on the individual. When an individual lacks a diathesis, no amount of stress will result in symptomatology (Jang et al., 1998).

Kihlstrom et al. (1994) proposed a model of dissociation incorporating the diathesis-stress notion where dissociative capacity and personality disorder traits share the same common genetic basis. They suggested that investigating personality inventory scores may be useful in identifying individuals who have an increased propensity to experience dissociation.

The strong relationship between trauma and dissociation suggests that a diathesis stress model which links traumatic experiences with a predisposition to experience dissociation may account for a larger amount of the psychopathology associated with traumatic dissociation than one theory alone (Butler, Duran, Jasiukaitis, Koopman, & Spiegel, 1996). Research concentrating on military personnel has investigated the neurobiological correlates of dissociation in those that may have exposed to traumatic experiences. It was found that the propensity for an individual to dissociate during times of high stress was linked to a decreased capacity for neuropeptide Y release and a low ratio of DHEA-S: cortisol (Morgan et al., 2004). The understanding and assessment of dissociation and its neurobiological

correlates could be used to directly aid the recruitment of individuals for occupations involving traumatic duties (for e.g., police, paramedics or the armed forces).A diathesis stress model which incorporates the experience of trauma needs further investigation, and has not yet been applied to individuals who engage in NSSI.

Dissociation and NSSI

Research has found an association between dissociation and NSSI in a range of psychiatric populations (van der Kolk, Perry, & Herman, 1991), with NSSI found to be the strongest predictor of dissociative experiences (Brodsky, Cloitre, & Dulit, 1995). Individuals engaging in NSSI report stronger dissociative experiences than individuals who do not engage in NSSI independent of any history of abuse (Brodsky et al., 1995). Additionally, research using an inpatient population has found that individuals who have dissociative disorders engage in more frequent NSSI, have more methods of NSSI, and have an earlier age of onset of the behaviour than individuals with low levels of dissociative experiences. Individuals who have a dissociative disorder diagnosis report onset of NSSI during adolescence compared to an inpatient population with low dissociative experiences who report onset in early adulthood (Saxe, Chawla, & van der Kolk, 2002).

It is estimated that between 34% and 80% of individuals with a diagnoses of dissociative identity disorder also engage in NSSI (Anderson, Yasenik, & Ross, 1993; Coons & Milstein, 1990). More recently, a study found that 86% of individuals in an inpatient facility who had a diagnosed dissociative disorder also engage in NSSI, compared to 46% of an inpatient sample with no dissociative disorders (Saxe, Chawla, & van der Kolk, 2002).

Individuals with a dissociative disorder diagnosis often report amnesia following the act of NSSI (Coons & Milstein, 1990; Putnam, 1989). Often these individuals report finding evidence they have engaged in the act but report no knowledge of how or when this occurred. These individuals frequently report that the thoughts of NSSI as well as the behaviours originate from outside of themselves (Putnam, 1989). This has particular implications for the assessment of risk for these individuals as well as treatments. Risk factors that need to be identified and managed in this population include history of and recent impulsivity, recent dissociation, and level of stress.

It has been speculated that dissociation occurs as a result of the release of neurotransmitters which occurs during SIA. It has been found that opiate mediated SIA is experienced following exposure to an inescapable stressor which is associated with the experience of dissociation (Maier, 1986). That is, the release of these neurotransmitters is thought to be due to the stress reaction preceding the self-injurious event (Darche, 1990). Following the release of these neurotransmitters, individuals report stress-induced analgesia together with dissociative experiences (Darche, 1990). The individual will then engage in NSSI to ameliorate the feelings of unreality and distress (Haines et al., 1995). Therefore, it is thought that dissociation reflects the process of SIA. It may be concluded that more severe NSSI can occur because the greater level of distress is triggering a stronger depersonalisation response associated with the experience of stress-induced analgesia. However, there is a lack of research investigating SIA in non clinical samples of individuals who engage in NSSI.

The aim of the third study was to investigate the relationship between dissociation and pain in individuals who engage in NSSI. Additionally, this study

built on studies one and two. It is unclear why some individuals can engage in painless NSSI whereas others experience pain while engaging in the behaviour. It has been proposed that SIA during NSSI may be linked to the occurrence of dissociative episodes. However, it is unclear what the relationship is between the experience of painful sensations and dissociation during times of high stress. More specifically, it is unknown if increased levels of dissociative experiences or the presence of trauma is related to tolerance of and threshold to painful stimuli during a stressful event.

It was hypothesised that individuals who do not feel pain during NSSI would report an increased severity of depersonalisation experiences than individuals who do feel pain during NSSI. Additionally, it was predicted that individuals who do not feel pain during NSSI would report higher scores on the dissociative experiences scale than individuals who do feel pain during NSSI. It was hypothesised that individuals who do not feel pain during NSSI would obtain more diagnoses according to the Dissociative Disorders Interview Schedule (DDIS) than individuals who feel pain during NSSI. Also, it was expected that individuals who reported a higher number of dissociative experiences would have a higher pain threshold during a cold pressor test compared with individuals who reported a low number of dissociative experiences during a stress induction condition, but not a no stress condition. It was hypothesised that individuals who reported a high number of dissociative experiences would have a higher pain tolerance during a cold pressor test compared with individuals who reported a low number of dissociative experiences during a stress induction conditions but not a no stress condition. Finally, it was hypothesised that individuals who reported a high number of dissociative experiences would engage in more frequent and more injurious NSSI compared with individuals who reported a low number of dissociative experiences.

Method

Overview of study

This study used 30 participants who were recruited from advertisements within the University of Tasmania and in local newspapers. The data consisted of information from the NSSI behaviour checklist as well as scores from the Dissociative Experiences Scale, the Steinberg Depersonalisation Questionnaire and the Dissociative Disorder Interview Schedule. Additionally, cold pressor test measures of threshold and tolerance and subjective ratings of pain were also recorded. Questionnaires were analysed using t-tests and the NSSI checklist was analysed using t-tests and chi square analyses. To analyse the data obtained from the cold pressor tests, Analyses of Variances (ANOVAs) were conducted and a Huynh-Feldt correction was applied using an alpha level of 0.05.

Study 3: NSSI and dissociation

Participants

Thirty male and female participants were recruited from the University of Tasmania undergraduate population and the general population. The relatively small sample size is a reflection of the difficulty in obtaining participants who meet the necessary criteria. The sample size of the current study is consistent with published research in the area (Hilgard, Morgan, & Macdonald, 1975; Geisser, Robinson, & Pickren, 1992). The first part of the study consisted of two groups of participants, those who reported experiencing no pain during NSSI (n = 18) and those who reported experiencing pain during NSSI (n = 12). In the second part of the study the participants were divided into two groups, those who reported high dissociative experiences (n = 15) and those who reported low dissociative experiences (n = 15).

Individuals were placed in these groups based on their scores on the Dissociative

Experiences Scale with scores above 30 indicating a high level of dissociative

experiences and scores below 30 indicating low dissociative experiences.

The study had approval from the Tasmanian Social Sciences Human

Research Ethics Committee. The information sheet and consent form are presented in

Appendix G.

The mean age of the individuals who experienced no pain when engaging in

NSSI was 20.6 years ($SD = 5.6$) and that of the individuals who experience pain

during NSSI was 24.7 years ($SD = 8.8$). The mean age of the individuals who

reported low dissociative experiences was 23.1 years ($SD = 6.7$) and that of the

individuals who reported high dissociative experiences was 21.6 years ($SD = 7.4$).

There were no significant differences between the groups in relation to their age.

Design

The study involved three designs. The first was a Group [pain, no pain]

between subjects questionnaire study with the dependent variables being the

Dissociative Experiences Scale score, the Steinberg Depersonalisation Questionnaire

and the number of diagnoses on the DDIS. The second was a Group [low, high

dissociation] between subjects questionnaire study with the dependent variable being

frequency and severity of NSSI. The third was a Group [low, high dissociation] x

Condition (no stress induction, recall of stressful experience) mixed factorial design.

The dependent variables were time to pain sensation (threshold), the length of time in

the water (tolerance), and ratings of pain severity.

Materials and apparatus

A checklist was used during the preliminary interview stage to assess the

nature of the self-injurious behaviours. This checklist was described in Study one.

All participants were given the Dissociative Experiences Scale (DES) (Bernstein & Putnam, 1986), the Dissociative Disorders Interview Schedule (DDIS) (Ross et al., 1989) and the Steinberg Depersonalisation Questionnaire (SDQ) (Steinberg & Schnall, 2000). The DES is a self-report measure consisting of 28 items investigating awareness, memory and identity, derealisation and depersonalisation. Individuals are required to mark on a visual analogue scale the percent of time they experience each of the symptoms listed. The DES has been shown to have good test-retest and split-half reliability. Item-scale score correlations have all been shown to be significant, which indicates the test has good internal consistency and construct validity. This scale is presented in Appendix H1.

The DDIS is a structured interview which was developed to assist in the diagnosis of dissociative disorders, somatoform disorders, major depressive disorder, and borderline personality disorder. Additional items on the interview schedule gain information about an individual's substance use, childhood physical and sexual abuse, and secondary features of dissociative identify disorder. The DDIS has and overall inter-rater reliability of .68. This interview schedule is presented in Appendix H2.

The SDQ is a 15 item scale which asks individuals to rate the occurrence of common depersonalisation experiences on a 6 point scale: never, once or twice, sometimes, many times, almost all the time, only with drugs or alcohol. A score of 14 or less indicates no depersonalisation, 15-25 indicates mild depersonalisation, 26-44 indicates the presence of moderate depersonalisation, and 45-70 indicates the presence of severe depersonalisation. This questionnaire is presented in Appendix H3.

Participants were interviewed in order to construct a personalised stress induction guided imagery script. The same script construction was used as described in Study two.

A cold pressor test (Efran, Chorney, Ascher, & Lukens, 1989) was used in order to measure pain tolerance and threshold. The same cold pressor test method as described in study two was used.

Procedure

Participants attended an initial session where they were given the checklist to assess the nature of their self-injurious behaviours. Additionally, the Dissociative Disorders Interview Schedule was administered and all participants were given the DES and the Steinberg Depersonalisation Questionnaire to complete. Interviews were conducted to gain information in order to construct the stress script read during the cold pressor test.

Participants then attended a second session where the cold pressor test was administered. Initially, participants were administered three trials of the cold pressor test without thinking about any stressful experiences. Participants were asked to place their non-dominant hand in the warm water up to the wrist for approximately one minute. It was then placed immediately in the ice water. Participants were asked to say 'now' when they first experience a painful sensation (measure of threshold). They were instructed to leave their hand in the water for as long as possible, for a maximum of five minutes (measure of tolerance). Participants rated their discomfort after each trial. Participants were then read a script of a stressful experience and asked to complete three trials of the cold pressor test using the same method. Participants then completed VAS ratings relating to the stress induction trials.

Results

Description of sample and questionnaire data

Descriptive statistics for participants are presented in Table 10. The participants were allocated to the two groups based on their level of dissociative experiences.

Table 10

Descriptive statistics for individuals who experience low or high dissociative experiences.

Variable	Group	Statistic	
Total number of acts of NSSI	DissExLow	M	139.8
		s	225.8
	DissExHigh	M	782.1
		s	1472.2
Last act of NSSI (days ago)	DissExLow	M	443.2
		S	528.6
	DissExHigh	M	254.5
		S	375.6
Length of time engaging in NSSI	DissExLow	M	1366.3
		s	932.8
	DissExHigh	M	2250.8
		s	1803.6
Frequency of NSSI (times/year)	DissExLow	M	73.0
		s	91.0
	DissExHigh	M	120.7
		s	155.5

A number of self-injurious behaviours were engaged in including cutting, burning, biting, skin picking, hair pulling, banging and scratching. A range of

instruments where used in NSSI. These included knives, razors, glass, lighters, hot water, scissors, and teeth. The self-injurious behaviour involved body regions including arms, legs, stomach, feet, hands, wrists, and head. Descriptive statistics for the total sample are presented in Table 11.

Table 11

Descriptive statistics of self-injurious behaviour for the total sample of participants.

Variable	Level	% of sample
Method of NSSI	Cutting	70.0
	Skin picking	26.7
	Banging/hitting body	23.3
	Burning	13.3
	Trichotillomania	13.3
	Scratching	10.0
	Biting	10.0
Body regions	Arms	66.7
	Legs	66.7
	Hands/Wrists	36.7
	Stomach	33.3
	Head	26.7
	Face	10.0
Instrument	Razor	56.7
	Knife	53.3
	Hands/fingernails	30.0
	Scissors	26.7
	Wall/other hard object	20.0
	Glass	10.0
	Teeth	6.7
	Lighter	6.7
	Hot water	3.3

The NSSI checklist data were analysed using t-tests and chi square analysis. There were no significant differences between the pain and no pain groups in relation to the age of individuals, the last time they engaged in NSSI, the frequency of the behaviours, or the duration they have engaged in the behaviours.

t-tests were then utilised to examine the differences between the pain and no pain groups in relation to their dissociation and depersonalisation experiences. There were no significant differences between the pain and no pain groups in relation to the scores on the Dissociative Experiences Scale, $t(28) = .15$, $p > .05$, the Steinberg Depersonalisation Questionnaire, $t(28) = .68$, $p > .05$, and the DDIS, $t(28) = 1.54$, $p > .05$. The questionnaire data was then further analysed by allocating all participants to one of two groups, low or high dissociative experiences. There was a significant difference between these group on the Dissociative Experiences Scale, $t(28) = 10.6$, $p < .001$, with the low dissociative experiences group having a significantly lower score than the high dissociative experiences group. There was a significant difference between the groups on the Steinberg Depersonalisation Questionnaire, $t(28) = 5.4$, $p < .001$, with the low dissociative experiences group having a significantly lower score than the high dissociative experiences group. The mean scores on the DES and the SDQ for both groups are presented in Figure 6. The means and standard deviations are presented in Table 19 (Appendix I).
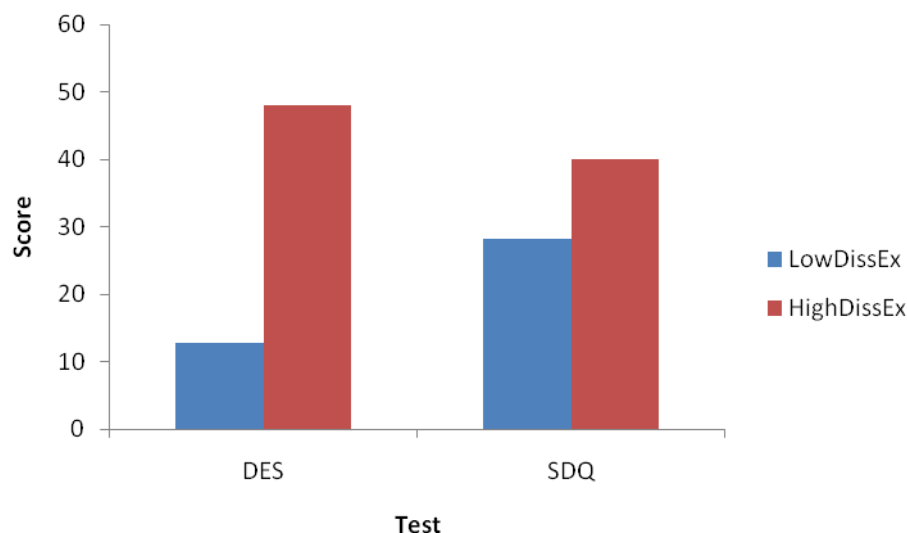
Figure 6. The mean score on the dissociative experiences scale and the Steinberg depersonalisation questionnaire for the low and high dissociative experiences groups

There was a significant difference between the groups the total number of DDIS diagnoses, t(28) = 4.7, p < .001, with individuals in the high dissociative experiences group having higher number of diagnoses on the DDIS. There was a significant difference between the groups for the total number of trances, sleepwalking episodes and/or childhood companions, t(28) = 2.3, *p* < .05, with individuals in the high dissociative experiences group having a higher number of reported trances and sleepwalking episodes. The mean number of total diagnoses and trance and sleepwalking episodes for the two groups as reported on the DDIS are presented in Figure 7. The means and standard deviations are presented in Table 20 (Appendix I).
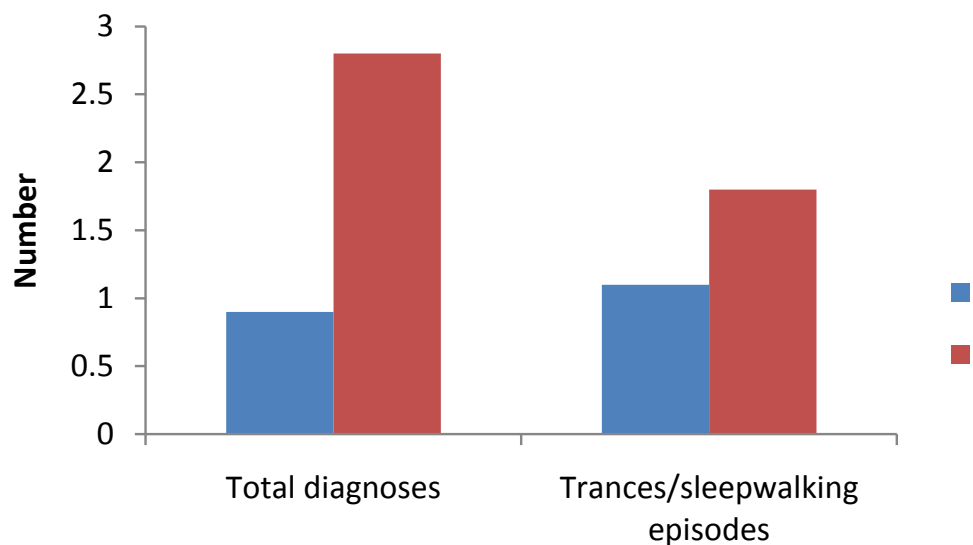
Figure 7. The mean number of total diagnoses and trance and sleepwalking episodes reported on the DDIS for the low and high dissociative experiences groups

Cold Pressor Test Data

Analyses of variance (ANOVAs) were conducted and a Huynh-Feldt correction applied for the cold pressor test data. Post-hocs were then performed using Fishers LSD. There was a significant condition by group interaction for the subjective rating of pain, $F(1,28) = 10.0$, MSE $= 6.0$, $p < .005$. Figure 8 presents the mean subjective pain rating for each condition for the two groups. The means and standard deviations are presented in Table 21 (Appendix I).
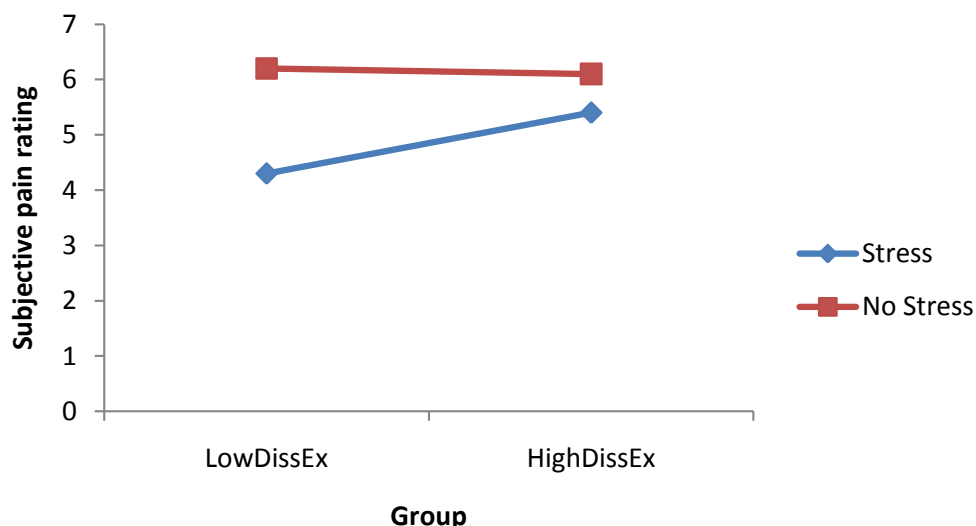
Figure 8. The mean subjective pain rating for the stress and no stress condition for the low and high dissociative experiences group

Group differences for each condition were then compared using t-tests. A significant difference was found between the groups for the stress condition, t(28) = 2.3, *p* < .05. The low dissociative experiences group was found to have significantly lower subjective pain ratings during the stress condition. There were no significant differences between the groups during the no stress condition for the subjective pain rating.

There was a significant effect for condition for the measure of threshold, F(1,28) = 1.6, MSE = 3198.9, *p* < .005, with individuals recording a higher pain threshold during the stressful condition compared with the non-stress condition. There was a significant effect for condition for the measure of tolerance, *F*(1,28) = 14.2, MSE = 37375.1, *p* < .001, with individuals recording a higher pain tolerance during the stressful condition compared with the non-stress condition. The mean cold pressor test measurements for the total sample are presented in Figure 9. The means and standard deviations are presented in Table 22 (Appendix I).
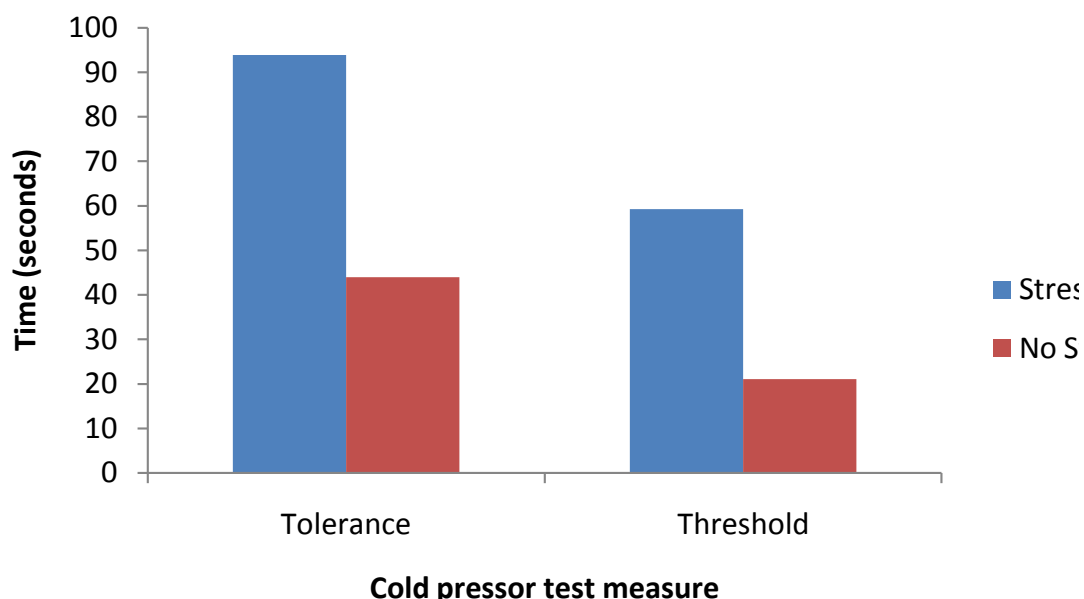
Figure 9. The mean threshold and tolerance measurements for the stress and no stress condition for the total sample of participants

ANOVAs were then conducted in order to investigate differences between individuals with high and low dissociative experiences on measures during the cold pressor test. It was found that there were no significant differences in tolerance, $F(1,28) = .39$, MSE $= 1027.6$, $p > .05$, or threshold to pain, $F(1,28) = 1.59$, MSE $= 3198.9$, $p > .05$ between individuals with low and high dissociative experiences.

Discussion

The aim of this study was to investigate the relationship between dissociation and pain in individuals who engage in NSSI. It was found that individuals who experience pain during NSSI and those who report stress-induced analgesia during the act do not differ in their threshold, tolerance or subjective ratings of pain. It was proposed some individuals have an increased occurrence of dissociative experiences

or a propensity to dissociate during times of high stress allowing them to engage in painless NSSI.

It was expected that individuals who do not feel pain during NSSI would report more severe depersonalisation experiences than individuals who feel pain during the act. Additionally, it was expected that individuals who experience SIA during NSSI would report more dissociative experiences and would obtain more diagnoses on the Dissociative Disorders Interview Schedule (DDIS) than individuals who feel pain during the act. However, no significant differences were found between the pain and the no pain groups on any of these measures. There were no significant differences between the groups on the frequency or severity of the dissociative experiences reported. Additionally, there were no significant differences between the groups in relation to the number of dissociative disorders obtained.

It is important to note that the Dissociative Experiences Scale and the Steinberg Depersonalisation Questionnaire are subjective measures of dissociative experiences. These require the individual to have insight into their dissociative experiences and be able to accurately report the frequency of their occurrence. Additionally, these measures do not specifically investigate dissociative experiences that occur as a result of elevated stress or the propensity to dissociate during times of high stress. Instead, they measure the frequency and severity of dissociative experiences and depersonalisation. It may be that individuals who report a lack of pain during NSSI have a comparable frequency and severity of everyday dissociative experiences as individuals who feel pain during the act. Their level of dissociative experiences may be distinctly different only at times of high stress.

When participants were allocated to the low and high dissociative experiences groups they were found to differ significantly on both their scores on the DES and

the SDQ. The high dissociative experiences group had significantly higher scores on both measures confirming that participants were correctly allocated to the groups. As expected, the high dissociative experiences group also obtained significantly more total diagnoses on the DDIS. The total number of diagnoses does not just refer to dissociative disorders but also includes disorders such as depression, anxiety and alcohol and drug abuse. The high dissociative experiences group also obtained more diagnosis of trances and sleep walking episodes than the low dissociative experiences group. This is consistent with the belief that dissociative disorders are often characterised by trance states (Ludwig, 1983) and that sleepwalking is a dissociative state between the body and mind during sleep (Basseti, Vella, Donati, Wielapp, & Weder, 2000).

The literature has suggested that dissociation occurs as a protective response to trauma and results in impaired functioning and a greater susceptibility to develop psychopathology (Armstrong, Putnam, Carlson, Libero, & Smith, 1997; Putnam, 1993). Furthermore, dissociation is thought to play a mediating role between trauma (sexual abuse) and mental health outcomes (Kiesel & Lyons, 2001). This belief is somewhat inconsistent with more recent research which has suggested that dissociation is significantly related to trauma and psychological symptomatology, but does not mediate the relationship (Banyard, Williams, & Siegel, 2010). Although it is unknown what level of trauma the current study's sample have experienced, the literature supports the finding that individuals with higher levels of dissociative experiences have greater levels of psychopathology.

Responses to painful stimuli for individuals in the high and low dissociative experiences groups were investigated using the cold pressor test. It was expected that individuals who reported a higher number of dissociative experiences would have a

higher pain threshold and tolerance on the cold pressor test during a stress induction condition, but not a no stress condition. However, there were no significant differences in threshold or tolerance to pain between individuals with low and high dissociative experiences.

According to the diathesis stress model of dissociation, some individuals have a propensity to experience dissociation during times of high stress because of genetic or other factors (Ray, 1996). Many individuals have a propensity to experience dissociation but require high levels of intense distress for this to occur. It could be that the stress induction script did not trigger a sufficient level of intense distress to facilitate dissociation in individuals who have a propensity to dissociate, resulting in no differences between the groups. Participants' levels of dissociative experiences were not measured at the time of the cold pressor test, and it is only when dissociation is present that any real effect on pain threshold and tolerance would be observed. It may be that the stressful event triggered a similar emotional reaction in both groups, with the differences in groups only observed following intense distress and a strong dissociative response.

Conversely, it may be that the results lend more support to the traumagenic model of dissociation. That is, individuals who experience stress-induced analgesia during NSSI do not necessarily have an increased propensity to dissociate but rather it develops as a coping strategy following prolonged periods of sexual abuse (Putnam, 1995). The traumagenic model of dissociation proposes that dissociation occurs during extraordinary circumstances such as a threat to one's life or traumatic experiences (Noyes & Kletti, 1977). It may be that the factor which separates individuals who do and do not feel pain during self-injurious behaviour is the presence or absence of trauma. More specifically, the presence of trauma or abuse

causes increased levels of dissociation allowing for NSSI to be engaged in with little or no pain sensations.

The literature clearly demonstrates a close relationship between dissociation and trauma. It is commonly seen that individuals experience a dissociative response at the time of the traumatic event (Marmer, Metzler, & Otte, 2004). Individuals report experiences consistent with dissociation including feeling unreal, withdrawn, having an altered sense of time, depersonalisation, confusion, disorientation and altered pain perceptions (Marmer et al., 2004). The experience of dissociation as a response to trauma has been referred to as peritraumatic dissociation (Marmer et al., 1994; Marmer, Weiss, & Metzler, 1998). Although, initially, peritraumatic dissociation acts as a protective factor for individuals during times of high distress and threat, it has been shown to be a risk factor for the development of PTSD in adulthood (Marmer, Metzler, & Otte, 2004). It has been hypothesised that adults who experience dissociation during trauma have also experienced childhood trauma or abuse which has acted to lower their threshold for dissociation (Marmer, Metzler, & Otte, 2004). Furthermore, it has been suggested that there is a genetic component to both the threshold for peritraumatic dissociation and a vulnerability to general dissociative experiences which is influenced by childhood trauma experiences (Spiegel, Hunt, & Dondershine, 1988).

As discussed above, it has been suggested that individuals who have experienced childhood trauma and abuse have a lower threshold for dissociation in adulthood. Additionally, these individuals may have a genetic predisposition to experience peritraumatic dissociation during childhood trauma as well as general dissociative experiences in adulthood. It is proposed that individuals who experience SIA during NSSI have experienced higher levels of trauma and abuse resulting in

peritraumatic dissociation. This acts to increase the likelihood that they will experience further episodes of dissociation during times of emotional distress. When an individual becomes highly distressed they have a lower threshold before experiencing dissociation. This results in an alteration in pain perceptions and the ability for them to engage in NSSI with little or no pain.

Although there were no differences between the groups there was a significant effect for condition with individuals recording a higher threshold and tolerance to painful stimuli during the stressful condition when compared with the no stress condition. This is consistent with previous research that has suggested that increased levels of distress and negative emotions can result in a perceived insensitivity to pain sensations (Bohus et al., 2000) and can alter the perception of pain (Melzack et al., 1982).

Interestingly, although there were no differences in threshold and tolerance, there was a significant difference between the groups for subjective ratings of pain during the stress condition. It was found that the low dissociative experiences group had significantly lower subjective pain ratings during the stress condition than the high dissociative experiences group. More specifically, individuals who had low dissociative experiences rated their pain experience during the cold pressor test as significantly lower than the high dissociation group. This is an unexpected result as it would be expected that higher dissociative experiences would result in individuals having lower subjective pain ratings during a stress condition. As expected, there were no significant differences between the groups during the no stress condition.

This result may be indicative of the fact the individuals with high levels of dissociative experiences have an inability to accurately perceive their level of pain. These individuals may be rating emotional pain and distress as a component of this

measure rather than purely the physical pain felt as a result of the painful stimuli. A number of factors influence the perception and response to pain including genetic, familial, developmental, psychological, social and cultural variables. The strength of the pain perceived is particularly affected by psychological factors including the situational and emotional factors which exist at the time of the pain experience (McGrath, 1994).

At times, pain complaints are met with benefits such as increased attention, decreased responsibilities or positive emotional responses from others (McGrath, 1994). It would be expected that a number of individuals would exaggerate their response to pain in receive these benefits or avoid situations which would be distressing or stressful. Individuals with high levels of dissociative experiences may be more likely to exaggerate their pain response to obtain these benefits because of underlying psychopathology (e.g., BPD), more unstable affect and poorer coping skills than individuals with low levels of dissociation. This results in individuals with high levels of dissociation rating their subjective pain as higher than individuals who have low levels of dissociative experiences.

It was expected that individuals who reported a high number of dissociative experiences would engage in more frequent and more severe NSSI compared with individuals who reported a low number of dissociative experiences. However, there were no significant differences between the groups in relation to the age of individuals, the last time they engaged in NSSI, the frequency of the behaviour, or the duration they engaged in the behaviour. The level of dissociative experiences does not appear to affect the severity or the frequency of NSSI. This may be because the level of dissociation experienced does not significantly influence threshold or tolerance to pain allowing for more severe NSSI with the absence of pain.

Furthermore, more frequent or severe NSSI may not serve any functional purpose for individuals with high levels of dissociation. The underlying mechanism of NSSI was consistent between the two groups with each producing a similar tension reduction response. The high levels of emotional distress and negative emotions have already reduced meaning more severe acts of NSSI are unnecessary.

As for study one and two, a limitation of this study is the smaller sample size which causes the generalisability of the results to be slightly more limited. A further limitation of this study is that the questionnaires administered relied on individual's self-report about their dissociative experiences. It may be that some individuals did not have accurate insight into their dissociative experiences or did not accurately report the frequency of dissociation.

It is unclear what role the experience of trauma plays in the experience of painless NSSI. It is proposed that the experience of trauma during childhood predisposes some individuals to experience further dissociation in adulthood. The experience of trauma and increased dissociation results in changes to the perception of pain allowing some individuals to engage in NSSI with little or no pain sensations. This will be further investigated in study four.

CHAPTER 7

STUDY 4: NSSI AND TRAUMA

Trauma

The concept of trauma is discussed somewhat inconsistently in research and literature. Although some individuals use the term trauma to refer to a negative event which causes significant psychological distress, others use the term to refer to the distress itself. However, technically the term trauma should only be used when referring to the event not the reaction. Furthermore, the term should only be used when referring to an event which is psychologically overwhelming for an individual. The Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revised (DSM-IV-TR) specifically defines trauma as a direct personal experience of an event which involves actual or threatened death or serious injury, or other threat to an individual's physical integrity; or witnessing an event that involves death, injury, or a threat the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close acquaintance. The individual's response to this event must involve intense fear, helplessness, or horror (p. 463). Although the DSM-IV-TR definition of trauma is useful, it has also been met with criticism in the literature. Many have criticised the requirement that trauma be limited to serious injury or threatened death or other threat to one's personal integrity. It is suggested that many events are potentially traumatic even when a threat to one's life or injury is not a factor (Briere, 2004). The DSM-IV-TR definition does not allow for experiences such as severe emotional abuse, major loss or separation to be included in the definition of trauma. The DSM-IV-TR is thought to underestimate the effects of such factors and the extent of actual trauma in the general population. More recent research and literature has suggested that an event may be labelled as traumatic if it

is extremely upsetting and overwhelms the individual and their ability to cope (Weathers & Keane, 2007).

The DSM-V (APA, 2013) includes the category of trauma and stressor-related disorders. There have been some changes to the diagnosis of PTSD, with the explanation of what represents a traumatic event now much clearer. Furthermore, sexual assault and exposure to an aversive details of a traumatic event are now specifically included as examples in the diagnostic criteria. The diagnostic criteria now include four major symptom clusters for a diagnosis of PTSD rather than three as seen in the DSM-IV-TR (APA, 2000): re-experiencing the event, heightened arousal, avoidance, and negative thoughts and mood or feelings. Additionally, the DSM-V now includes a PTSD dissociative subtype to indicate when individuals meet criteria for PTSD as well as experiencing persistent or recurrent symptoms of either depersonalisation or derealisation.

More recently, research has been shifting from primarily focusing on PTSD to focusing on the wide range of outcomes following the experience of trauma. These include positive outcomes such as posttraumatic growth as well as challenges such as mental health difficulties and traumatic grief, increased behavioural problems and increased substance use and abuse. Previous research involving natural disasters and cumulative trauma experiences often focuses on the diagnoses of PTSD as an emotional sequelae of trauma. However, research has shown that a large proportion of children who experience a range of natural disasters do not develop severe or very severe PTSD symptoms (McDermott, Berry, & Cobham, 2012; McDermott & Palmer, 1999). Although PTSD is regarded as the primary outcome following trauma, there is an increased acceptance that depression and anxiety are also important posttraumatic outcomes. The main symptoms of PTSD include re-

experiencing of the event (e.g., flashbacks), avoidance of trauma-related stimuli, becoming, negative alterations in cognitions and mood (including feeling numb and detached), and nervous system arousal (e.g., increase startle response, increased pulse or respiration rate).

The term trauma encompasses a wide range of potentially traumatic events. These include sexual and physical assault, robbery, kidnap, rape, hostage situations, terrorist attacks, torture, natural disasters, severe motor vehicle accidents, home or domestic fires, war, life threatening illnesses, witnessing death or serious injury of others and accidents (Briere & Scott, 2006). It is important to note that often such traumas do not occur independently of one another. Therefore, the issue of combined or cumulative trauma also needs to be taken into consideration Individuals who experience noninterpersonal traumas, such as, natural disasters or house fires, do not necessarily have an increased likelihood of experiencing another traumatic event. However, when looking specifically at interpersonal trauma, such as sexual or physical abuse, victims have been shown to be at a higher risk of experiencing additional interpersonal trauma in the future (Classen et al., 2002; Tjaden & Thoennes, 2000). It is estimated that approximately 4 million individuals will experience a traumatic event in the Unites States over a one year period (Perry, 1994a).

There is a strong link between trauma and attachment, with individuals who report a history of childhood trauma also experiencing insecure attachment styles during adulthood (Stalker & Davies, 1995; Styron & Janoff-Bulman, 1997). Furthermore, it has been suggested that trauma and insecure attachments are strong predictors for adult somatisation. Trauma and an insecure attachment impact are thought to influence an individual's ability to develop and maintain appropriate

interpersonal relationships during times of need (Waldinger, Schultz, Barsky, & Ahern, 2006).

Singular and cumulative trauma

It is necessary to distinguish between a singular isolated traumatic event, and trauma which is repetitive and cumulative in nature. Exposure to repeated or sustained trauma, especially during childhood, results in a complex presentation and posttraumatic stress symptomatology. Research has shown that individuals who have experienced cumulative trauma often experience symptoms relating to disturbances in affective, interpersonal and self-regulatory abilities. These disturbances result in anger management difficulties, dissociative symptomatology, difficulty regulating emotions and arousal levels and aggressive or socially avoidant behaviour (Kessler, 2003).

There is a lack of research specifically examining the treatment and intervention options for single-event trauma experiences, with most research concentrating on cumulative trauma. This is especially true for children, where there is a lack of knowledge of how single-event trauma effects school performance and achievement.

The effects of trauma

When investigating the effects of trauma it is important to take into consideration individual, social and trauma-specific variables as these factors are related to the development of posttraumatic stress symptoms and clinical intervention

outcomes. These factors are important as there may be two individuals who have experienced the same event, with one experiencing mild short term symptoms, whereas the other individual may develop a stress disorder and experience significant psychological distress and impairment. The extent and type of an individual's symptomatology can be linked to a number of risk factors. Often psychological interventions are aimed at reducing these risk factors in order to reduce the posttraumatic stress response and lessen the risk of developing further symptomatology in the future (Briere & Scott, 2006).

Research has shown that the level of distress and symptomatology following a traumatic event is linked to three specific factors: variables specific to the victim; characteristics of the stressor; and how the victim's social network and support respond to the victim (Briere & Scott, 2006). Research has identified a number of risk factors specifically relating to the victim which were present prior to the incident of trauma. These risk factors increase the likelihood that victims will develop posttraumatic stress following exposure to trauma. The major victim specific risk factors include being female (Leskin & Sheikh, 2002); age at time of incident, with younger or older individuals having elevated risk (Koenen, Moffitt, Poulton, Martin, & Caspi, 2007); race, with African Americans and Hispanic individuals having elevated risk (Kulka et al., 1990); low socioeconomic status (Rosenman, 2002); high distress at the time of incident and immediately following (Brewin, Andrews, & Rose, 2000); previous trauma history (Ozer, Best, Lipsey, & Weiss, 2003); history of psychological dysfunction or disorders (Brady, Kileen, Brewerton, & Lucerini, 2000); lack of adaptive coping strategies (Fauerbach, Richter, & Lawrence, 2002); family dysfunction and/or family history of psychopathology (Bassuk, Dawson, Perloff, &Weinreb, 2001); and a genetic predisposition (Segman et al., 2001).

When investigating further the victim specific risk factors, it appears clear that less adaptive coping strategies, history of psychopathology or past exposure to trauma would increase an individual's risk of developing posttraumatic stress symptoms following exposure to a traumatic event. However, there are a number of risk factors including gender and race which are less obvious as to why they are associated with a higher likelihood of posttraumatic stress symptoms. Further research has shown that being female or a non-Caucasian in the US are risk factors for posttraumatic stress as these groups are more often exposed to events that would cause posttraumatic disturbance (Briere, 2004). More specifically, the elevated risk relates to the social factors to which the person is exposed, including racial and sexual inequality, with these groups of individuals having an increased risk of experiencing trauma.

One of the most widely researched risk factors is the level of distress of the victim during and/or after the incident, more specifically referred to as peritraumatic distress. This factor is a major predictor of risk for PTSD. A traumatic event often causes individuals to experience other peritraumatic responses such as guilt, shame and anger. These responses also act to increase the risk of posttraumatic stress reactions (Leskela, Dieperink, & Thuras, 2002). More recently, it has been proposed that peritraumatic distress is both a victim variable and an index of trauma severity (Briere & Scott, 2006).

The second domain which is linked to the amount of posttraumatic stress symptomatology relates to characteristics of the stressor (Briere & Scott, 2006). Research has found a number of trauma characteristics that affect the posttraumatic functioning of individuals. These include: sexual (as opposed to nonsexual) victimisation (Breslau, Davis, Andreski, & Peterson, 1991); intentional acts of

violence (as opposed to noninterpersonal acts) (Briere & Elliott, 2000); threat to

one's life (Holbrook, Hoyt, Stein, & Sieber, 2001); unpredictability and

uncontrollability (Carlson & Dalenberg, 2000); physical injury (Briere & Elliott,

2000); the extent of combat exposure during war (Kulka et al., 1990); witnessing

death (Epstein, Fullerton, & Ursano, 1998); and the loss of a loved one or friend due

to a traumatic event (Green et al., 1990). It has been shown that irrespective of victim

variables, certain trauma characteristics, such as sexual acts (e.g., rape), are linked to

a much higher incidence of PTSD than traumatic events such as natural disasters

(Briere & Scott, 2006).

The third domain which is linked to the amount of posttraumatic stress

symptomatology is how individuals around the victim respond to them following the

incident. An adequate level of psychological support from family and friends has

been shown to decrease the severity of posttraumatic stress symptomatology

(Berthold, 2000). Given the shame and guilt that is felt by some victims, the level of

social support often varies considerably between the types of trauma. Additionally,

some trauma experiences are thought to be more socially acceptable than others, and

are met with higher levels of social support, resources and understanding (Briere &

Scott, 2006).

The effects of trauma are widespread and can result in a broad range of

symptoms and disorders. In some cases, the experience of trauma does not result in

psychopathology but instead individuals can experience increased feelings of

emptiness, loss of hope and trust, and a lack of care for themselves or others (Briere

& Scott, 2006). The most common symptomatology and disorders linked to the

experience of trauma include: depression (Kessler, Sonnega, Bromet, Hughes, &

Nelson, 1995); complicated or traumatic grief (Prigerson et al., 1999); anxiety and

panic (Falsetti & Resnick, 1997; Mayou, Bryant, & Ehlers, 2001); PTSD and ASD (Briere & Scott, 2006); dissociation (Chu, Frey, Ganzel, & Matthews, 1999); somatisation and conversion disorders (Ursano, Fullerton, Kao, & Bhartiya, 1995; Sar, Akyuz, Kundakci, Kiziltan, & Dogan, 2004); drug and alcohol abuse (Ouimette & Brown, 2003); and borderline personality disorder (Herman, Perry, & van der Kolk, 1989).

Neurobiology of trauma

Childhood trauma has a significant effect on the social, physical, emotional, behavioural and cognitive functioning of children (Perry, Pollard, Blakley, Baker, & Vigilante, 1995). It has been widely recognised that trauma during childhood negatively impacts on neurodevelopment by affecting both the development and function of the brain, as well as changes to stress-responsive neurobiological systems. Research has shown that cumulative trauma during childhood results in impairment to multiple brain structures. Furthermore, childhood trauma and/or adversity has been shown to affect adult mental health outcomes, with the risk increasing with the amount of trauma experienced (Anda et al., 2005). It is interesting that although the profound effects of childhood trauma are well recognised, there has been a lack of research investigating the short and long term effects as well as treatment options for traumatised infants and children. Instead, much of the research has concentrated on adults with a history of childhood or life trauma (e.g., combat or natural disasters).

The development of neuropsychiatric symptoms following trauma is dependent on the severity, frequency, pattern and nature of the event. It is estimated

that at least 50% of children who experience trauma will develop such

symptomatology (Schwartz & Perry, 1994). Additionally, trauma during childhood

increases the risk of developing neuropsychiatric symptomology during adolescence

and adulthood (Davidson & Smith, 1990; Teicher, Glod, Surrey, & Swett, 1993).

      One of the most severe neuropsychiatric responses to trauma is PTSD.

Neuroimaging studies have found that a diagnosis of PTSD is associated with

decreased brain white and grey matter and smaller hippocampal volume (Villareal &

King, 2004). Although a vast array of research has been undertaken on PTSD in

adulthood, far less attention has been payed to PTSD in children. Fennema-

Notestine, Stein, Kennedy, Archibald, and Jernigan (2002) found that a smaller

hippocampal volume is associated with the experience of childhood abuse, with the

volume loss correlating with the severity of the abuse as well as the severity of the

PTSD symptomatology experienced. McFarlane (1987) found that childhood PTSD

can be commonly observed in individuals with a history of abuse or neglect.

Children with a diagnosis of PTSD present with a range of symptoms including

anxiety, depressed mood, behaviour disorders and phobias (Schwartz & Perry, 1994).

      When an individual is under threat they will experience a range of responses

which are designed to have an adaptive function. These responses include

physiological reactions, such as increased heart rate and respiration rate, altered

mental states, and altered patterns of thinking (Perry, Pollard, Blakley, Baker, &

Vigilante, 1995). Perry et al. (1995) proposed that reactions to threat lie on a

continuum from calm to arousal to alarm, fear and then terror. It is thought that

different areas of the brain control and organise mental and physical functions

depending on where an individual's reaction is on this continuum. The more

threatened or the further along the continuum an individual is, the more primitive

their reaction to the trauma. When a child is further along the continuum (i.e., in a state of alarm or fear) due to the experience or memory of trauma, they will experience difficulty attending and concentrating, they will become anxious and hypervigilant, and will attend more to nonverbal cues such as body language, facial expressions and tone of voice (Perry et al., 1995). If an individual is often functioning at a baseline of low levels of alarm or fear then it stands to reason their presentation and symptomatology will have a significant impact on their ability to attend and concentrate, learn, process and react to situations appropriately.

Hyperarousal and dissociation are often observed in children and adults with a history of trauma as a response to a relatively minor stressor. These responses are a result of sensitisation of the neural response patterns (Perry, Pollard, Blakley, Baker, & Vigilante, 1995). When a particular pattern of neural activation or experience occurs frequently, a sensitised neural response is generated. Sensitisation occurs when an altered or more sensitive system arises as a result of this repeated pattern of neural activation. It is believed that the experience of trauma can cause sensitisation by modifying the pattern and amount of neurotransmitter release in a number of systems which play a role in sensations, perception and processing of particular experiences (Kalivas & Kuffy, 1989; Kleven, Perry, Woolverton, & Seidon, 1990; Perry et al., 1995). Neurotransmitter receptor/effector activation, through a number of alterations to messengers, results in changes to the micro-environment of the nucleus of cells. Furthermore, these changes result in modifications in the process of gene transcription as well as the expression of proteins which play a key role in neuronal structure and function. These alterations result in sensitisation of neurotransmitter receptor/effectors to similar stimulation of neurotransmitters in the

future as a result of further traumatic experiences (LeDoux, Cicchetti, & Xagoraris, & Romanski, 1990; Perry et al., 1995).

During brain development in infancy and childhood, different areas develop and become functional at different times. Given this, there are particular times during development where the brain requires (critical periods) or is sensitive to (sensitive periods) particular experiences or cues. Any disruption during these periods leads to significant problems in neurodevelopment. Some of these deficits have been found to be irreversible. Both trauma and a lack of sensory experiences result in a disruption to the necessary cues resulting in problems in neurodevelopment (Perry et al., 1995). Sensory deprivation during the critical period of neurodevelopment has been shown to significantly affect the organisation and development of particular brain functions in animals (Cummins & Livesey, 1979; Ebinger, 1974). Perry et al. (1995) believed that the experience of trauma and sensory deprivation during the critical and sensitive periods of neurodevelopment result in disruptions to brain functions responsible for humour, affect regulation, attachment and empathy.

A large amount of research has investigated adults' reactions to threat and the fight and flight response is well understood in adults (Cannon, 1914; Goldstein, 1995; Selye, 1936). This response is not commonly observed in infants or children, with the two most common neuronal response patterns being the hyperarousal continuum and the dissociation continuum (Perry et al., 1995).

Following a threat, activity in the sympathetic nervous system increases. This results in physiological responses including an increase in heart rate, blood pressure and respiration rate, increased muscle tone, a release of stored sugars, hypervigilance, and ignoring of noncritical information. These reactions all prepare the body to fight or escape from a threat (Perry et al., 1995). A hyperarousal response

to threat causes an increase in activity of the locus coeruleus (the mediator of the flight or fight response) and the ventral tegmental nucleus (regulates sympathetic nuclei in the pons and medulla) (Perry et al., 1995). The hyperarousal response to threat involves a number of brain regions which are also important for functions such as regulating arousal, affect, vigilance, sleep, the response to sleep, behavioural irritability, locomotion, attention, and the startle response (Andrade & Aghajanian, 1984; Bhaskaran & Freed, 1988). Following the acute fear response, these neural systems are able to be reactivated if the child is exposed to a specific reminder of the previous trauma, thinks about the traumatic event, or even dreams about the event. As time passes, the specific reminders become more generalised, causing the brain to be activated repeatedly (Perry et al., 1995). The continued activation of these systems results in sensitisation of the brain stem and midbrain neurotransmitter systems, leading to functional changes in the brain (Vantini, Perry, Gucchait, U'Prichard, & Stolk, 1984). It is commonly seen that children who have experienced trauma experience motor hyperactivity, behavioural impulsivity, sleep problems, anxiety, tachycardia, hypertension, and neuroendocrine abnormalities (De Bellis, Lefter, Trickett, & Putnam, 1994; Perry & Pate, 1994)

NSSI and trauma

It is widely accepted that there is a strong relationship between NSSI and trauma. A number of studies have investigated the links between childhood trauma and NSSI, however, these focus primarily on clinical or inpatient populations. A number of studies have investigated the adoption of self-injurious behaviour in children who have experienced abuse or trauma. Rosenthal and Rosenthal (1984)

found that suicidal behaviour, NSSI and decreased pain sensitivity were present in 16 of their sample of 32 preschool children who were between the ages of two and a half and five. Green (1978) found that 41% of individuals who reported a history of physical and/or sexual abuse engaged in self-injurious behaviours such as biting, cutting, burning and head banging. Furthermore, it was found that 79% of individuals who reported a history of significant childhood trauma engaged in NSSI, and 89% of individuals who reported a major disruption in parental care engaged in NSSI. Interestingly, a disruption to parental attachment was only found to be associated with cutting whereas prolonged separation from a parent or caregiver was related to cutting as well as other types of NSSI (van der Kolk, Perry, & Herman, 1991). The understanding of the relationship between trauma and NSSI has been further strengthened by studies which have found the adoption of NSSI occurs in adults following the experience of war or traumas such as rape (Greenspan & Samuel, 1989; Pitman, 1990).

The age trauma is experienced has a large impact on the adoption and severity of the self-injurious behaviour. The earlier the trauma is experienced the more frequent the NSSI. Trauma and abuse were found to be significantly correlated with self-injurious behaviour, whereas trauma during adolescence was correlated only with a diagnosis of anorexia and the experience of suicide attempts (van der Kolk, Perry, & Herman, 1991).

Zanarini, Laudate, Frankenburg, Reich, and Fitzmaurice (2011) found that factors relating to the experience of trauma throughout an individual's life are significant risk factors for the occurrence of NSSI over time. More specifically, they found the incidence of NSSI was 2.67 times higher for individuals who reported a childhood history of sexual abuse when compared to those who had no history of

childhood abuse. The odds of engaging in NSSI over time increased by approximately two in individuals who had been raped as an adult. Furthermore, a more severe history of separation, neglect or sexual abuse is related to individuals engaging in self-injurious behaviour for a longer period of time (van der Kolk, Perry, & Herman, 1991). van der Kolk et al. (1991) concluded that the experience of trauma during childhood contributes to the adoption of NSSI, whereas less secure attachments act to maintain the behaviour.

Recently, Zanarini, Laudate, Frankenburg, Reich, and Fitzmaurice (2011) found that cognitive symptoms, such as overvalued ideas, the occurrence of dissociation and major depressive episodes significantly increased the risk of individuals engaging in NSSI over a ten year period. They found six variables that significantly predicted the occurrence of NSSI: female gender, severity of dysphoric cognitions (e.g., overvalued ideas), severity of dissociative experiences, major depression, history of childhood abuse, and sexual assaults in adulthood. Additionally, the report of a history of having a physically violent partner or spouse was associated with individuals continuing to engage in NSSI.

The relationship between dissociation, trauma and analgesia

It is widely recognised that childhood trauma (both physical and sexual abuse) is linked to the development of dissociative symptoms. It is thought that childhood abuse could be a variable which accounts for the comorbidity of dissociative symptoms and NSSI. Individuals with a history of childhood sexual and/or physical abuse have been found to experience higher levels of dissociation compared with individuals who have no history of abuse (Brodsky et al., 1995).

However, it has also been proposed that NSSI is a direct response to dissociative symptoms and may occur regardless of the presence or absence of childhood abuse (Favazza, 1989; Shapiro, 1987). At present, there is a paucity of research investigating the links between NSSI and a history of trauma in non-personality disordered populations.

Investigations have not found any evidence to suggest that pain tolerance differed depending on the presence or absence of painful sensations during NSSI. However, pain tolerance was significantly greater when individuals were imaging a stressful event compared with a non-stress condition (Dykes & Haines, in preparation). It may be hypothesised that individuals engaging in NSSI do not have the necessary coping strategies or problem solving abilities to adequately cope with stressful events and the associated negative emotions. When the feelings of stress and other negative emotions reach a level with which the individual is no longer able to cope, feelings of unreality develop, and NSSI subsequently occurs. It is hypothesised that it may not be the presence of stress-induced analgesia triggered by situational factors that results in an increased tolerance to painful sensations, but a generally increased predisposition to experience dissociation during times of high stress resulting in painless NSSI (Dykes & Haines) with a dissociative experience being triggered by the analgesic effects of the release of endogenous opiates.

Research investigating the association between NSSI and dissociation is contradictory. Some researchers have proposed that individuals will engage in NSSI because of the occurrence of a dissociative episode regardless of the experience of any abuse (Favazza, 1989; Shapiro, 1987). More recently, research has found that dissociation was not correlated with NSSI when history of abuse was controlled for (Zweig-Frank, Paris, & Guzder, 1994). In contrast, it has been suggested that NSSI

and dissociation may co-occur as a way of coping with intolerable negative self/object internalisations and a distorted body image due to traumatic and distressing life experiences relating to childhood abuse (Brodsky et al., 1995).

Animal models of SIA include an element of stress controllability which is thought to be important in the understanding of behaviour of individuals with BPD. It has been proposed that individuals who have been repeatedly exposed to trauma would increase the antinociceptive response to uncontrollable stressors in the future. Additionally, is has been suggested that an individual with BPD will have a greater propensity to experience SIA following an uncontrollable stressor than control individuals as they have been 'primed' to experience SIA during times of uncontrollable stress, therefore having a faster habituation to any subsequent pain (Maier, 1986). However, there is a lack of research investigating SIA in community based samples of individuals who engage in NSSI.

Evidence has suggested that there are similarities between the animal response to major threat (e.g., freezing, analgesia and anaesthesia) and the way in which humans respond following the experience of severe trauma (Nijenhuis, Vanderlinden, & Spinhoven, 1998). Nijenhuis et al. (1998) proposed that animal models of reactions to trauma provide us with a model for human dissociative responses and may be able to explain some characteristics of dissociative states observed in dissociative disorders. Extensive research has found that animals do not respond to a threat or aversive stimuli with a single response, but display different behavioural and physiological states giving them the highest chance of survival (Fanselow & Lester, 1988). It was seen that when an attack on an animal is imminent, freezing is combined with a state of analgesia. This is a functional response as any perception of pain during this state would act to take the animal's

attention away from the fight, decreasing their chance of survival (Bolles & Fanselow, 1980). This response was found to be mediated by endogenous opiates as well as non-opioid mechanisms (Siegfried, Frischknecht, & Nunez de Souza, 1990). There is evidence to suggest that endogenous opiates are also important in other stress-induced states of catalepsy and immobility (Campbell Teskey, Kavaliers, & Hirst, 1984), reduction of fear and panic (van der Kolk, 1994) and the suppression and delay of panic escape behaviours and cries for help (Kalin, 1993).

Following the reduction in the imminence of a threat, pain perception is seen to return and recuperation behaviours are seen (Bolles & Fanselow, 1980). It is hypothesised that the stimulus which predicts an aversive event or threat will elicit analgesia, while the presentation of a safety signal will generate a change in pain sensitivity resulting in the cessation of conditioned analgesia (Wiertelak, Watkins, & Maier, 1992).

A plethora of animal studies have shown that experimental traumatisation, such as an inescapable electric shock to an animal, produces a defensive reaction (Fanselow & Lester, 1988). The higher the traumatisation (i.e. the shock) the stronger the defence (Fanselow & Lester, 1988). It was also noted that trauma in the way of an inescapable shock was seen to induce deficits in learning and memory (Garber & Seligman, 1980). Associations between extreme aversive stimuli and other stimuli were shown to be extremely resistant to any change (Bouton & Bolles, 1980). Following the formation of these associations, the animals tended to react in exaggerated ways to stressors which they tolerated previously. From this, it may be inferred that a sensitisation effect occurs, that is, the animals increase their response to a stimulus without further exposure to threat. It is also proposed that continued

traumatisation will result in defensive behaviour as well as a tolerance of analgesia (Siegfried et al., 1990).

For the past 100 years, researchers have found similarities between animal defensive responses and trauma induced psychopathology in humans (Krystal, 1988). These similarities have led researchers to hypothesise that the animal model of response to inescapable shock may also serve as a biological model for posttraumatic stress disorder in humans (van der Kolk, Greenberg, Boyd, & Krystal, 1985). It is believed that this biological model is also of relevance to better understanding of trauma-induced dissociation.

It may be hypothesised that individuals engaging in NSSI do not have the necessary coping strategies or problem solving abilities to adequately cope with stressful events and the associated negative emotions. When the feelings of stress and other negative emotions reach a level with which the individual is no longer able to cope, feelings of unreality develop, and NSSI subsequently occurs. It may be hypothesised that individuals engaging in NSSI do not have the necessary coping strategies or problem solving abilities to adequately cope with stressful events and the associated negative emotions. When the feelings of stress and other negative emotions reach a level with which the individual is no longer able to cope, feelings of unreality develop, and NSSI subsequently occurs. It is hypothesised that it may not be the presence of stress-induced analgesia triggered by situational factors that results in an increased tolerance to painful sensations but a generally increased predisposition to experience dissociation during times of high stress resulting in painless NSSI (Dykes & Haines, in preparation) with a dissociative experience being triggered by the analgesic effects of the release of endogenous opiates. However, this needs further investigation. It is necessary for future research to investigate the

relationship between pain sensations and SIA during NSSI and the tension reducing properties of this behaviour.

The aim of this study was to investigate the relationship between trauma history and NSSI. It has been proposed that there is a strong relationship between increased levels of distress and a history of trauma in individuals who engage in NSSI, however, this needs further investigation. It was hypothesised that individuals who engage in NSSI would report higher levels of childhood abuse and trauma than individuals who do not engage in NSSI. Additionally, it was expected that individuals who engage in NSSI would have experienced a higher frequency of life trauma than individuals who do not engage in NSSI. It was hypothesised that individuals who engage in NSSI and report experiencing higher levels of dissociative experiences will report having experienced more severe and more frequent trauma experiences than individuals reporting low levels of dissociative experiences.

Method

Overview of study

This study used 52 participants in total who were recruited from the University of Tasmania from advertisements within the University of Tasmania and in local newspapers. The data consisted of scores from the Trauma Questionnaire, and the Childhood and Abuse Scale, the Dissociative Experiences Scale and the Steinberg Depersonalisation Questionnaire. Data was analysed using T-tests with a significance level of .05.

Study 4: NSSI and trauma

Participants

Fifty-two male and female participants were recruited from the University of Tasmania undergraduate population and the general population. The first part of the study consisted of two groups of participants, those who reported a history of engaging in NSSI (n = 30) and those who reported no history of NSSI (n = 22). The second part concentrated on only individuals with a history of NSSI and consisted of two groups of participants, those who reported high dissociative experiences (n = 15) and those who reported low dissociative experiences (n = 15). Individuals were placed in these groups based on their scores on the Dissociative Experiences Scale. The mean age of the individuals who had no history of engaging in NSSI was 24.4 years (*SD* = 6.4) and that of the individuals who engaged in NSSI was 22.4 years (*SD* = 7.0). The mean age of the individuals who reported low dissociative experiences was 23.1 years (*SD* = 6.7) and that of the individuals who reported high dissociative experiences was 21.6 years (*SD* = 7.4).

The study had approval from the Tasmanian Social Sciences Human Research Ethics Committee. The information sheets and consent forms are presented in Appendix J.

Design

This study involved two designs. The first was a Group [NSSI, no NSSI] between subjects questionnaire study with the dependent variables being frequency of child abuse and trauma experiences and frequency of life trauma experienced. The second design was a Group [low, high dissociation] between subjects questionnaire study with the dependent variables being severity and frequency of child and adult traumatic experiences.

Materials

All participants were given the Dissociative Experiences Scale (DES) (Bernstein & Putnam, 1986) and the Steinberg Depersonalisation Questionnaire (Steinberg & Schnall, 2000). The Trauma Questionnaire (TQ) (Escalona, Tupler, Saur, Krishnan, & Davidson, 1997) and the Childhood Abuse and Trauma Scale (CAT) (Sanders & Becker-Lausen, 1995) was used to provide a measure of traumatic events experienced.

The TQ is a self-report measure used to identify the occurrence of, frequency of, and age of occurrence of a number of traumatic experiences. These experiences include accidents, combat, sexual abuse, physical abuse, natural disasters, torture, loss of property, and bereavement.

The CAT is a self-report measure used to identify the frequency and severity of a number of negative childhood and adolescent experiences. The CAT scores reflect the respondents own subjective evaluation of the severity of stress and/or maltreatment in the home environment as a child. It is a 38 item measure rated on a 5 point scale ranging from never through to always. The questions relate to the individual's childhood experiences of physical maltreatment, sexual maltreatment, punishment, psychological maltreatment, psychical and/or emotional neglect, and negative home environment. The CAT yields a total score as well as three subscale scores. These are neglect/negative home atmosphere subscale, the sexual abuse subscale, and the punishment subscale. This scale has been shown to have strong internal consistency, test-retest reliability and validity. It has been shown to correlate significantly with factors such as depression, dissociation, problematic interpersonal relationships, and victimisation (Sanders & Becker-Lausen, 1995). This scale is presented in Appendix K1.

Procedure

Participants attended a session where they were administered the CAT, The Trauma Questionnaire, the DES and the Steinberg Depersonalisation Questionnaire.

Results

A significant difference was found between the NSSI and no NSSI groups on the measure of childhood abuse and trauma, $t(50) = 4.4$, *p < .001*. The NSSI group was found to have a significantly higher total CAT score than the no NSSI group. A significant difference was found between the two groups for the measure of neglect/negative home atmosphere during childhood on the CAT, $t(50) = 3.7$, $p<.001$. The NSSI group was found to have a significantly higher CATNeg score than the no NSSI group. A significant difference was found between the two groups for the measure of punishment on the CAT, $t(50) = 3.0$, $p < .005$. The NSSI group was found to have a significantly higher CATPun score than the no NSSI group. No significant differences were found between the groups for the CAT subscale of sexual abuse. The mean scores for the significant measures of the CAT are presented in Figure 10. The means and standard deviations are presented in Table 23 (Appendix L).
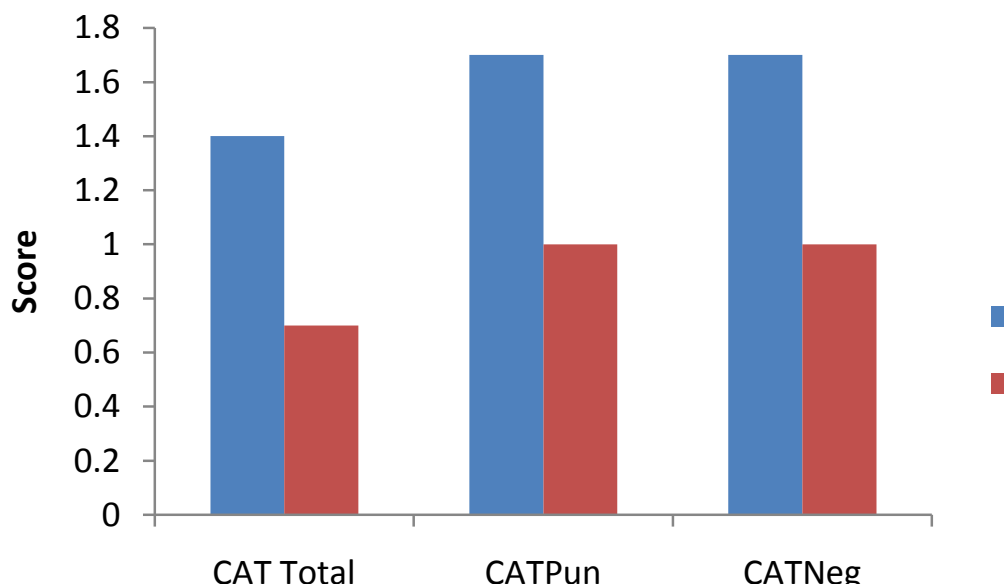
Figure 10. The mean childhood abuse and trauma scale total score, punishment subscale score, and neglect/negative home atmosphere subscale score for the NSSI and no NSSI groups

No significant results were found between the groups for the total score on the Trauma Questionnaire, t(50) = 1.1, *p* > .05. However, when the scores were further broken down into interpersonal and non-interpersonal trauma, a significant difference was found between the two groups, t(50) = 2.0, *p < .05.* The NSSI group was found to have significantly higher interpersonal life trauma than the no NSSI group. The mean scores for the frequency of interpersonal life trauma reported on the TQ are presented in Figure 11. The means and standard deviations are presented in Table 24 (Appendix L).
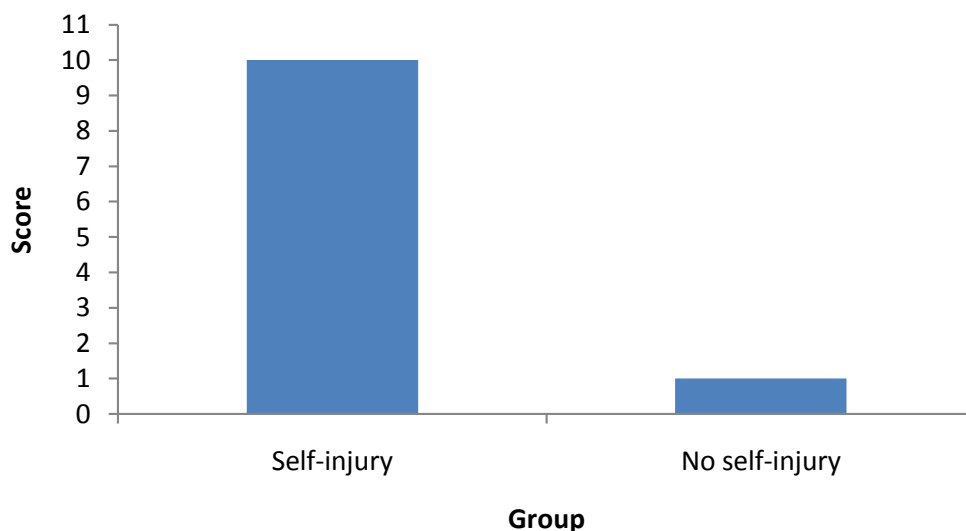
Figure 11. The mean number of reported interpersonal trauma experiences on the trauma questionnaire for the NSSI and no NSSI groups

Group differences relating to childhood and adult trauma were analysed using t-tests. It was found that there were no significant differences on any measure of the CAT or the TQ for the high and low dissociative experiences groups. The NSSI participants were then assigned to the pain and no pain groups as in study three for further analysis. A significant difference was found between the groups for the total score on the CAT, $t(28) = 2.7$, $p < .02$. The no pain group was found to have a significantly higher total score on the CAT than the pain group. A significant difference was found between the groups for the measure of neglect/negative home atmosphere subscale on the CAT, $t(28) = 3.6$, $p < .001$. The no pain group was found to have a significantly higher CATNeg score than the pain group. There were no significant differences between the groups for the measures of punishment or sexual abuse on the CAT. The mean scores for the CAT Total and CATNeg measures are presented in Figure 12. The means and standard deviations are presented in Table 25 (Appendix L).
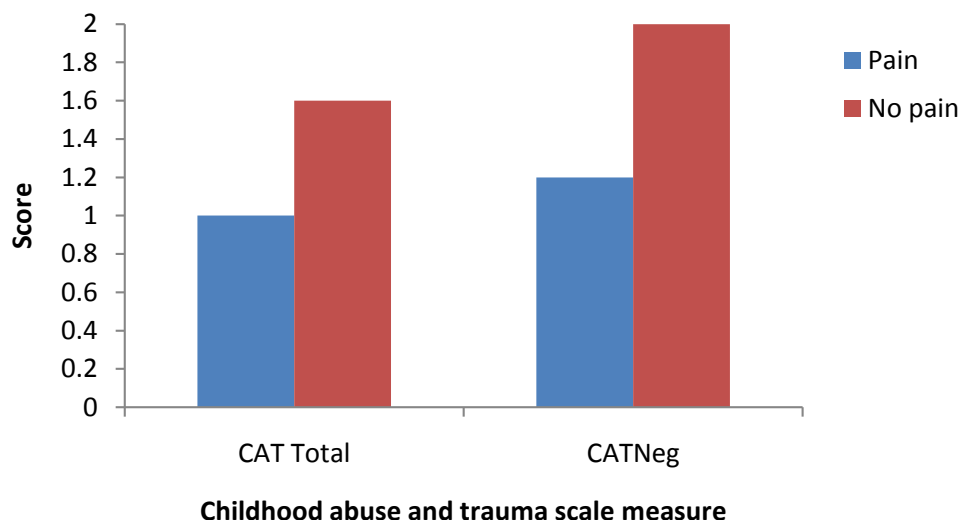
Figure 12. The mean total score and neglect/negative home atmosphere score on the childhood abuse and trauma scale for the pain and no pain groups

A significant difference was found between the pain and no pain groups for the total score on the TQ, $t(28) = 2.8$, $p < .01$. The pain group had a significantly higher total score on the TQ than the no pain group. A significant difference was found between the groups for the number of reported interpersonal life traumas on the TQ, $t(28) = 2.6$, $p < .02$. The pain group had a significantly higher reported number of interpersonal life traumas than the no pain group. There were no significant differences between the groups for the measure of non-interpersonal traumas. The mean scores for the frequency of total life traumas and interpersonal traumas are presented in Figure 13. The means and standard deviations are presented in Table 26 (Appendix L).
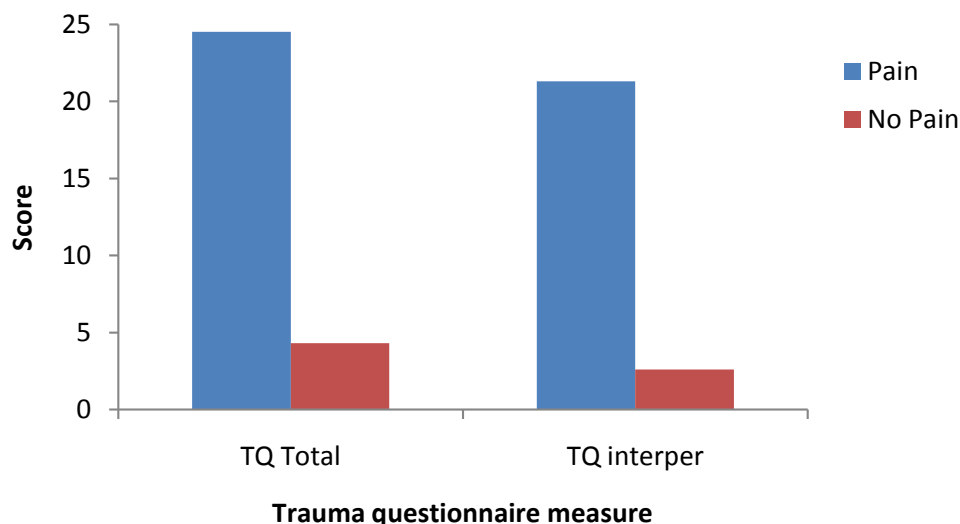
Figure 13. The mean total score and interpersonal trauma score on the trauma questionnaire for the pain and no pain groups

Discussion

This study aimed to investigate the relationship between the experience of trauma and pain during NSSI. Although there is a wide body of research investigating the relationship between NSSI and trauma, there is a lack of research into the relationship between trauma and stress-induced analgesia during the act.

It was hypothesised that individuals who engage in NSSI would report higher levels of childhood abuse and trauma than individuals with no history of NSSI. Additionally, it was expected that individuals who engage in self-injurious behaviours would report a higher frequency of life trauma than individuals with no history of NSSI. As expected, significant differences were found between the two groups on a number of measures of the CAT. The NSSI group was found to have significantly higher scores on the total CAT score, the neglect/negative home

atmosphere score, and the punishment score. Interestingly, there were no differences between the groups on the sexual abuse subscale.

It has been widely documented that individuals who engage in NSSI have more extensive histories of childhood abuse and trauma and more disrupted parental care, with a strong relationship between the experience of childhood trauma and the adoption of the behaviour (van der Kolk, Perry, & Herman, 1991). This is consistent with the current results. NSSI has been observed in children as young as two and a half who have a history of abuse and neglect (Rosenthal & Rosenthal, 1984). van der Kolk et al. (1991) found that a history of neglect was the most powerful predictor of cutting behaviour. They concluded that a history of trauma affects the adoption of NSSI, however, an insecure attachment is the factor which maintains the behaviour. The experience of trauma and neglect is thought to negatively affect the ability to regulate affect and maintain appropriate interpersonal relationships (van der Kolk et al., 1991). NSSI is an effective mechanism for regulating emotions and reducing distress in individuals who have poor coping or affect regulation skills as a result of trauma or neglect. Furthermore, it has been hypothesised that individuals adopt NSSI rather than other maladaptive coping strategies, such as alcohol or drug use, as it is a self-injurious behaviour which they learnt through modelling of earlier childhood abuse (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007).

Glassman et al. hypothesised that individuals who experienced a negative home environment consisting of insults, excessive criticism or physical abuse form a similar view of themselves through the process of modelling. They believed this can lead to a self-critical view of self which causes the individual to engage in NSSI as a form of self-punishment or self-abuse.

Interestingly, the scores on the sexual abuse subscale were not significantly different between the groups. A large body of research has found a strong association between sexual abuse and NSSI, whereas other traumas, such as physical abuse, have been shown to be a more inconsistent contributor (Nock & Kessler, 2006; Yates, 2004). This is inconsistent with the current results where there were no significant differences in the level of sexual abuse reported between the two groups. More recently, Klonsky and Moyer (2008) found that the relationship between NSSI and childhood sexual abuse was relatively small. They concluded that although sexual abuse and NSSI are related, a causal relationship is absent. Instead, they proposed that the two are related only because they are associated with similar psychiatric risk factors.

In the current study no significant differences were found between the NSSI and no NSSI groups for the total score on the TQ. When child abuse and trauma is considered in isolation there was a significant relationship with self-injurious behaviour. However, when all life experiences of trauma are grouped together there was no significant relationship between overall level of life trauma (child and adult) and NSSI. It may be that the effects of child abuse and trauma are more profound and have longer lasting effects on an individual's coping ability, interpersonal relationships, sense of self and psychopathology than trauma which occurs later in life. For most individuals, if trauma was to occur in adulthood they have already developed the necessary strategies to manage high levels of distress, therefore rendering the adoption of NSSI in adulthood largely unnecessary.

The results suggest that the age the trauma is experienced is a crucial factor in not only the development of psychopathology and dissociation, but also the adoption of NSSI. More recently, it has been found that cumulative trauma during childhood

predicted the complexity of symptoms in adulthood. Interestingly, the same is not said for adult trauma which does not have predictive qualities for symptom complexity in adulthood. As expected, cumulative trauma in childhood also increased the symptom complexity in samples of children (Cloitre et al., 2009).

The experience of childhood trauma and abuse has been shown to result in impairments in children's development relating to emotional regulation and interpersonal behaviour skills (Shipman, Edwards, Brown, Swisher, & Jennings, 2005; Shipman, Zeman, Penza, & Champion, 2000). The disturbances in emotional and self-regulatory behaviours have particular applications to the study of NSSI as this behaviour is thought to act as a maladaptive coping strategy used to ameliorate increased levels of negative emotions. These disturbances in self-regulation are said to account for both the increase and avoidance of particular emotions and interpersonal behaviours. This is observed in individuals who experience dysphoria and anger as well as dissociation, and who are aggressive as well as distant (Cloitre et al., 2009).

It is widely accepted that extreme levels of stress in childhood, caused by events such as trauma and neglect, lead to alterations in the biological stress systems in the body (De Bellis et al., 1999). The hypothalamic-pituitary- adrenal axis and the catecholamine system (locus coeruleus-noradrenaline/sympathetic nervous system) are vulnerable to high levels of stress which, in turn, negatively affects brain development (De Bellis et al., 1999). Research has suggested that alterations to these systems, as a result of childhood trauma, are permanent (De Bellis & Putnam, 1994; Perry, 1994).

Studies have shown that children and adolescents with a history of trauma or maltreatment have significantly smaller intracranial and cerebral volumes than

individuals with no trauma history. The presence of PTSD symptomatology, such as intrusive thoughts, hyperarousal, avoidance and dissociation, was found to be positively correlated with ventricular volume (De Bellis et al., 1999). It has been proposed that dissociation is caused by early neuronal loss in the temporal and cortical areas of the brain as a result of the experience of childhood trauma (De Bellis et al., 1999). The prefrontal cortex is linked to executive functions, such as decision making, personality, planning and working memory. De Bellis et al. (1999) proposed that childhood trauma results in neuronal loss in the prefrontal cortex, providing an explanation for the presence of psychopathology as well as psychosocial, cognitive and behaviour problems in these individuals. It may be inferred that the occurrence of significant childhood trauma results in alterations to brain structures, systems and development resulting in symptomatology which some individuals manage or ameliorate by the adoption of NSSI.

The experience of trauma impairs the ability to self-regulate affective states or use appropriate interpersonal relationships for affective regulation (van der Kolk, 1987). This inability to appropriately regulate affect and distress may lead to the adoption and maintenance of self-injurious behaviour. However, this proposal does not account for the large number of individuals who experience childhood trauma and abuse and do not engage in NSSI or the individuals who engage in NSSI without a history of childhood trauma and abuse. It may be that individuals who go on to engage in NSSI were more vulnerable to increased distress or difficulty coping prior to experiencing trauma. Additionally, an individual's internal schemas and attitudes about attachment and the role of parental figures may provide an explanation why some individuals engage in NSSI following trauma whereas others do not. It is proposed that negative relationships during childhood lead to the development of

insecure attachments in adulthood. This may have a negative impact on an individuals' ability to form and maintain appropriate interpersonal relationships and manage their affect and distress adaptively. Recent research is beginning to acknowledge the significant impact childhood trauma has on development and outcomes into adulthood. van der Kolk (2005) has proposed that a new diagnostic criterion of Developmental Trauma Disorder be formed to account for the distinct and complex presentation of traumatised children.

The scores of the TQ were further analysed by dividing them into interpersonal and non-interpersonal trauma. It was found that the NSSI group had experienced significantly higher levels of interpersonal trauma than the no NSSI group. This is consistent with research which has suggested that experiences related to interpersonal safety lead to dissociation and self-injurious behaviour (van der Kolk et al., 1991) as well as significantly greater trauma symptomatology (Green et al., 2000). Furthermore, it has been found that trauma symptomatology does not differ between individuals with a history of non-interpersonal trauma and those without a trauma history (Green et al., 2000).

Interpersonal trauma results in a higher risk of developing complex PTSD or stress disorders than non-interpersonal traumas such as natural disasters or accidents (Roth, Pelcovitz, van der Kolk, & Mandel, 1997). Lifetime rates of PTSD in individuals with a history of interpersonal trauma range from 31% to 39%, compared with 9% for individuals who have a history of non-interpersonal trauma (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Interpersonal trauma is generally viewed as more distressing than non-interpersonal trauma, and is often more difficult for the victim to comprehend and rationalise (Resnick et al., 1993). The presence of psychopathology, high levels of distress and dissociation in individuals who have

experienced interpersonal trauma may lead to an individual being more vulnerable to adopting NSSI as a maladaptive coping strategy.

Given the results that individuals with a history of NSSI had significantly higher levels of childhood abuse and trauma, it was hypothesised that those experiencing higher levels of dissociative experiences would report having experienced more severe and more frequent trauma experiences than individuals who report low levels of dissociative experiences. However, no significant differences were found between the groups on any measure of the CAT or the TQ. This result is unexpected and is inconsistent with results of previous studies where there has been a relationship between dissociation, trauma and NSSI (Brodsky et al., 1995; Chu & Dill, 1990). In this case the level of trauma experienced had no impact on the strength of the dissociative experiences.

It is proposed that individuals with higher levels of abuse and trauma have more dissociative experiences only at the time of the trauma, consistent with a peritraumatic dissociation model. The measures used to obtain the level of dissociative experiences in this sample looked at general dissociative experiences and do not categorise these into peritraumatic dissociative experiences. It is proposed that dissociative experiences do not occur because of an increased propensity to dissociate but rather as a direct response to a threat or traumatic event. This theory may account for results from previous studies which found a relationship between childhood sexual abuse and NSSI but not between dissociation and childhood sexual abuse (Brodsky et al; Zweig-Frank, Paris, & Guzder, 1994).

The experience of childhood abuse and trauma leads to a number of consequences with dissociation only being one of these. A number of studies have found that dissociation is not the only outcome of childhood abuse and trauma, with

low self-esteem being the factor linking childhood trauma with NSSI (Brodsky et al., 1995; Finkelhor, 1988). Additionally, as discussed above, childhood abuse and trauma has been demonstrated to have significant effects on brain development and functions which can explain the adoption of NSSI. It can be concluded that the occurrence of childhood and life trauma does not alter an individual's level of general dissociative experiences.

Given the results, it was decided to divide the sample into those who feel pain during the act of NSSI and those who report no pain during the act. The aim was to investigate whether the experience of trauma would differ between the groups after removing the factor of dissociation. The results found that the no pain group had a significantly higher total score on the CAT and the neglect/negative home atmosphere subscale score than the pain group. There were no significant differences between the groups for the measures of punishment or sexual abuse on the CAT. Interestingly, when looking at the TQ measure, the pain group was found to have a significantly higher total score and interpersonal traumas than the no pain group.

From these results it can be inferred that the presence of childhood trauma and neglect is a significant factor in the development of SIA during NSSI. Previous research has shown that some individuals who report childhood sexual abuse also experience analgesia and kinaesthetic analgesia (insensitivity to touch) (Albach, 1993). Although there were significant results for the measure of total life trauma (i.e. childhood and adult trauma), this does not appear to affect the presence or absence of pain sensations during NSSI. It is proposed that the presence of significant childhood trauma and neglect has serious and permanent effects on brain structure, function and development. These alterations may affect emotional regulation, interpersonal relationships and lead to psychopathology in adulthood. The

experience of childhood trauma has a strong relationship with the development of depression, substance abuse and suicidality in adulthood (Brodsky, Malone, Ellis, Dulit, & Mann, 1997; Putnam, 2003). These factors all increase the likelihood that individuals will utilise maladaptive coping strategies such as NSSI during times of significant distress. Furthermore, it is proposed that the changes to the brain following trauma may affect the way in which these individuals are perceiving pain, especially at times of high stress, resulting in the presence of stress-induced analgesia.

A plethora of research has shown the significant effects early trauma experiences have on the hypothalamic-pituitary-adrenal (HPA) axis which plays an important role in responses to stress (Smith, Kim, van Oers, & Levine, 1997). Childhood trauma has been found to affect the hippocampus, thereby disrupting neurogenesis and memory function. Additionally, trauma and neglect can result in increases in glucocorticoid response to stress (Ladd, Owens, & Nemeroff, 1996), decreased genetic expression of cortisol receptors in the hippocampus and increased expression of corticotrophin-releasing factor in the hypothalamus). This is known to cause disruptions to the hypothalamic-pituitary-adrenocorticol (HPA) system (Liu et al., 1997). Furthermore, early experiences of significant distress can result in difficulties with affect regulation and social attachment due to alterations in serotonergic (Bennett et al., 2002) and GABAergic receptors (Caldji, Francis, Sharma, Plotsky, & Meaney, 2000).

The alterations and disruptions to brain development, functions and systems clearly explain the factors which contribute to individuals becoming more vulnerable to using NSSI as a coping strategy during times of high stress. However, there must be a further underlying alteration to the brain as a result of childhood trauma which

can explain the differences in pain perceptions and experiences during the act. It is proposed that the experience of peritraumatic dissociation is the factor which links childhood trauma to stress-induced analgesia. More specifically, when an individual experiences a significant episode of childhood trauma or neglect they experience sensitisation of the neural response patterns leading to a dissociative response (Perry et al., 1995). This response involves the dopaminergic systems (mesocortical and mesolimbic systems) which play an important role as they are co-localised with endogenous opiates which mediate the processing of pain (Abercrombie, Keefe, DiFrischia, & Zigmond, 1989; Perry et al., 1995). More specifically, these opioid systems play a key role in altering the perception of painful stimuli (Perry et al., 1995).

Therefore, it is hypothesised that individuals who experience childhood trauma have significant and permanent alterations to their brain development and structure. These alterations result in changes to affect regulation, difficulty with interpersonal relationships and the presence of psychopathology with increases the need for additional coping resources. These alterations cause the individual to be more vulnerable to stress and increase the likelihood that they will engage in maladaptive coping strategies, such as NSSI, in order to ameliorate increased levels of negative emotions. Furthermore, childhood trauma is known to trigger states of hyperarousal as well as dissociation affecting the dopaminergic systems thereby altering the perception of pain. The presence of peritraumatic dissociation may lower the threshold to experience dissociation in the future and increase the likelihood that an individual will again experience dissociation during times of extreme distress. This experience of dissociation and alterations to the dopaminergic system allows for individuals to engage in NSSI with little or no pain.

CHAPTER 8

SUMMARY AND CONCLUSIONS

Overview of results

The present study investigated potential explanations for individual differences in the experience of pain during NSSI. Of particular interest was the relationship between NSSI, dissociation and trauma, and the impact of these factors on pain during self-injurious behaviour. A personalised, staged guided imagery methodology was employed to assess the psychological and psychophysiological reactions during NSSI for individuals who do and do not report feeling pain during the act. Additionally, the cold pressor test was used to measure individual's responses and reactions to painful stimuli.

Contrary to the formulated hypothesis, it was found that both individuals who do and do not feel pain during the act experienced a tension reduction response following the self-injurious behaviour. This finding was consistent with previous literature where individuals who engage in NSSI had comparable reactions to guided imagery (Brain et al., 1998, Haines et al., 1995, Jeffrey & Warm, 2002). Interestingly, there were no significant differences in the strength of the tension reduction response in those who do and do not feel pain during the act. This result suggests that the underlying mechanism of NSSI is the same for both groups of individuals, with the absence or presence of pain not having any influence on the subjective psychological distress felt prior to the act.

Unexpectedly, the lack of pain sensations did not result in these individuals reporting more severe or frequent NSSI. More specifically, the absence of pain during NSSI is not resulting in individuals engaging in more frequent or severe self-injurious behaviour. It appears that individuals are obtaining relief and benefit from engaging in NSSI regardless of their experience of pain during the act. It may be that

the individuals do not need to engage in more frequent or severe NSSI as the strength of tension reduction response necessary is already being reached.

Given that no significant differences were found between the groups in relation to their psychological and psychophysiological reactions to NSSI, it was hypothesised that differences in threshold, tolerance or the perception of pain during times of high stress may account for the differences in the experience of pain during the act. However, there was no evidence found to suggest that pain tolerance or threshold differed depending on the presence or absence of pain sensations during times of high stress. From these results, it may be concluded that it is not an individual's threshold or tolerance to pain which is allowing them to engage in painless NSSI.

It was expected that individuals who feel pain during the act would also have a higher subjective pain rating, however this result was not found. Furthermore, the subjective rating did not differ between a stress and no stress condition. Research has highlighted a number of factors which influence an individual's perception of pain including emotional factors and personality traits (Rainville, 2002; Rhudy & Meagher, 2000). It may be that these factors are affecting the ability of individuals who engage in NSSI to accurately identify and rate their levels of pain.

It was expected that individuals who do not experience pain during NSSI would experience higher levels of daily hassles and stressful life events than those individuals who feel pain during the act. This is because inhibitory pain control systems are known to be activated by increased levels of stress (Watkins & Mayer, 1982). Furthermore, the perception of pain can be altered by any change to an individual's psychological state or level of distress (Melzack, Wall, & Ty, 1982). However, the current results did not support this hypothesis, with there being no

significant differences in the frequency or severity of daily hassles or stressful life events for those who do and do not feel pain during the act.

Given the results of studies one and two have shown that the underlying mechanism for NSSI is comparable and there were no differences in pain perception, threshold or tolerance between the groups, it was proposed that the experience of dissociation may account for the differences in the experience of pain. More specifically, it was thought that individuals who do not feel pain during the act may have an increased propensity to experience dissociation during times of high stress resulting in the ability to engage in painless NSSI. This was investigated in study three.

Individual's dissociative experiences and clinical diagnoses were investigated using a number of measures. Contrary to the hypothesis, it was found that there were no differences between the pain and no pain groups in relation to the severity or frequency of their dissociative experiences or the number of diagnoses they obtained on the Dissociative Disorders Interview Schedule. It may be that individuals who do not feel pain during NSSI have similar everyday experiences of dissociation as those that feel pain during the act, with the differences in dissociative experiences only being seen at times of high stress.

The diathesis stress model of dissociation suggests that because of genetic or other factors, some individuals have an increased propensity to experience dissociation during times of high stress (Ray, 1996). The current results did not support this notion. One explanation for this is that the stress induction script did not elicit high enough levels of distress to facilitate dissociation in those with an increased propensity to dissociate. Conversely, the current results could lend more support to the traumagenic model of NSSI, where dissociation develops as a coping

strategy from prolonged periods of abuse (Putnam, 1995). The literature clearly shows a close relationship between dissociation and trauma, with it commonly observed that individuals experience a dissociative response at the time of a traumatic event (Marmer, Metzler, & Otte, 2004). It was thought that the experience of trauma during childhood may predispose some individuals to experience further dissociation during adulthood. This was further investigated in study four.

The results supported the hypothesis that individuals who engage in NSSI have experienced higher levels of childhood abuse and neglect than individuals who do not engage in NSSI. Furthermore, individuals who engaged in NSSI reported higher levels of neglect, a more negative home atmosphere and higher levels of punishment than individuals who do not engage in self-injurious behaviours. This is consistent with research which has shown that individuals who engage in NSSI have more extensive histories of childhood trauma and abuse and more disrupted care (van der Kolk, Perry, & Herman, 1991).

When incorporating the factor of dissociation, it was expected that individuals who have high levels of dissociative experiences would report more severe and frequent trauma experiences than individuals with low levels of dissociative experiences. However, contrary to this hypothesis, it was found that there were no differences in the experience of life trauma or childhood abuse and trauma, with the level of trauma having no impact on the strength of the dissociative experience. It may be that individuals who have experienced high levels of abuse and trauma are experiencing peritraumatic dissociation, whereby they are experiencing higher levels of dissociation only at the time of the trauma.

Given these results, it was decided to investigate the differences in the experience of trauma for those that do and do not feel pain during NSSI while

removing the factor of dissociation. It was found that the no pain group had higher levels of reported childhood abuse and trauma than the pain group. Furthermore, the no pain group reported more neglect and a more negative home atmosphere than the pain group. These results suggest that it is the presence of childhood abuse, trauma and neglect which is a significant factor in the development of stress-induced analgesia during NSSI, allowing for these individuals to engage in the act with no pain. Although all individuals who engaged in NSSI reported significantly higher levels of life trauma than those that do not engage in the act, it appears that it is the experience of significant childhood trauma and neglect which affects the presence or absence of pain sensations during NSSI.

Conclusions

The results show that the experience of childhood abuse, trauma and neglect affects not only the adoption of NSSI as a maladaptive coping strategy, but also allows for individuals to engage in the act without the experience of pain. It is well known that the experience of childhood abuse and trauma negatively affect emotional regulation, interpersonal relationships and can lead to the development of psychopathology in adulthood (Brodsky et al., 1997; Putnam, 2003). Furthermore, it may be that the experience of trauma and abuse during childhood affects the way in which some individuals perceive pain during times of high stress. This may result in the presence of SIA, thereby allowing an individual to engage in painless NSSI.

Although there is some knowledge that trauma and abuse cause alterations and disruptions to brain development and function (Perry et al., 1995), little is still known as to how these disruptions are related to the brain areas responsible for the

perception and experience of pain during times of high stress or NSSI. It may be that the experience of childhood trauma is triggering a state of hyperarousal and dissociation, affecting the dopaminergic systems, and altering the perception of pain. The alterations in brain development and structure which occur following the experience of childhood abuse and trauma may also cause the individual to become more vulnerable to stress, and increase the need for them to utilise additional coping strategies. Furthermore, poor affect regulation, the presence of psychopathology, and poor interpersonal relationships increase the likelihood that the individual will engage in more maladaptive coping strategies such as NSSI to lower their levels of distress and tension.

Limitations

Given the specific sample required for this study and the consequential difficulties in obtaining participants, the sample size in the current study is reasonably small. Therefore, the generalisability of the results is somewhat limited. However, the intensive nature of the investigation provides results which are both interpretable and directive for future research.

The retrospective nature of the study is a potential problem and may be affected by memory recall difficulties. Additionally, given that some of the data in the current study are self-report this may also be affected by biased recall. Although many trauma-related studies use similar methodologies and provide useful and accurate data, there may be a tendency to under-report experiences of trauma or maltreatment.

Directions for future research

This study opens many avenues for the future with further research investigating the relationship between childhood abuse and trauma, NSSI and pain being necessary. It would be interesting to conduct a study using functional magnetic resonance imagery (fMRI) and other techniques such as EEGs to investigate the changes in brain activity and physiology in individuals with and without a history of child abuse and trauma who do and do not feel pain during NSSI. This would allow for further knowledge to be gained as to how the experience of childhood abuse and trauma affects the experience and perception of pain.

Furthermore, research concentrating on the experience of peritraumatic dissociation rather than general dissociative experiences would be of interest. More specifically, further investigation into the experience of peritraumatic dissociation and its relationship to childhood abuse and trauma and pain in NSSI would be of great benefit.

Finally, further investigation into the type of childhood abuse and trauma, and its relationship with the experience and perception of pain during NSSI would be of interest. Future research may concentrate on the subtypes of childhood abuse and trauma and whether specific factors such as childhood sexual abuse, childhood parental separation and/or neglect, or a chaotic home environment affect not only the development of NSSI but also the perception or experience of pain during times of high stress as well as during self-injurious behaviour.

References

Abercrombie, E. D., Keefe, K. A., DiFrischia, D. S., & Zigmond, M. J. (1989). Differential effects of stress on in vivo dopamine release in striatum, nucleus accumbens and medial frontal cortex. *Journal of Neurochemistry, 52,* 1655-1658. doi:10.1111/j.1471-4159.1989.tb09224.x

Aderibigbe, Y. A., Bloch, R. M., & Walker, W. R. (2001). Prevalence of depersonalisation and derealisation experiences in a rural population. *Social Psychiatry Psychiatric Epidemiology, 36,* 63-69.

al'Absi, M., & Petersen, K. L. (2003). Blood pressure but not cortisol mediates stress effects on subsequent pain perception in healthy men and women. *Pain, 106,* 286-295. doi:10.1016/S0304-3959(03)00300-2

al'Absi, M., & Rokke, P. D. (1991). Can anxiety help us tolerate pain? *Pain, 46,* 43-51.

Albach, F. (1993). *Freud's seduction theory: Incest, trauma, and hysteria.* Middelburg: Stichting Petra.

Allen, C. (1995). Helping with deliberate self-harm: Some practical guidelines. *Journal of Mental Health, 4,* 243-250. doi:10.1080/09638239550037523

American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders, Text Revision,* (4th Ed.). Washington DC: APA.

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders, Text Revised,* (5th Ed.). Washington DC: APA.

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. C., … & Giles, W. H. (2005). The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and

epidemiology. *European Archives of Psychiatry and Clinical Neuroscience, 256,* 174-186.

Anderson, G., Yasenik, L., & Ross, C. A. (1993). Dissociative experiences and disorders among women who identify themselves as sexual abuse survivors. *Child Abuse and Neglect, 17,* 677-686.

Andover, M. S., Pepper, C. M., & Gibb, B. E. (2007). Self-mutilation and coping strategies in a college sample. *Suicide and Life –Threatening Behaviours, 37,* 238-243. doi:10.1521/suli.2007.37.2.238

Andrade, R., & Aghajanian, G. K. (1989). Locus coeruleus activity in vitro: Intrinsic regulation by a calcium-dependent potassium conductance but not alpha-2 ad renoceptors. *Journal of Neuroscience, 4,* 161-170.

Armstrong, J., Putnam, F. W., Carlson, E. B., Libero, D. Z., & Smith, S. R. (1997) Development and validation of a measure of adolescent dissociation: The adolescent dissociative experiences scale (A-DES). *The Journal of Nervous and Mental Disease, 185,* 491-497.

Arntz, A., & De Jong, P. (1993). Anxiety, attention and pain. *Journal of Psychosomatic Research, 37,* 423-431. doi:10.1016/0022-3999(93)90145-6

Atkinson, J. H., Kremer, E. F., Risch, S. C., Morgan, C. D., Azad, R. F., Ehlers, C. L., & Bloom, F. E. (1983). Plasma measures of beta-endorphins/beta-lipotropin-like immunoreactivity in chronic pain syndrome and psychiatric subjects. *Psychiatry Research, 9*, 319-327.

Banyard, V. L., Williams, L., & Siegel, J. A. (2010). Understanding links among childhood trauma, dissociation, and women's mental health. *American Journal of orthopsychiatry,71,* 311-321.

Barber, T. X., & Cooper, B. J. (1972). Effects on pain of experimentally induced and spontaneous distraction. *Psychological Reports, 31,* 647-651.

Basseti, C., Vella, S. W., Donati, F., Wielapp, P., & Weder, B. (2000). SPECT during sleepwalking. *The Lancet, 356,* 484-485.

Bassuk, E. L., Dawson, R., Perloff, J., &Weinreb, L. (2001). Post-traumatic stress disorder in extremely poor women: Implications for health care clinicians. *Journal of the American Medical Women's Association, 56,* 79-85.

Bennett, A. J., Lesch, K. P., Heils, A., Long, J. C., Lorenz, J.G., Shoaf, S. E., … & Higley, J. D. (2002). Early experience and serotonin transporter gene variation interact to influence primate CNS function. *Molecular Psychiatry, 7,* 118-122.

Bennum, I. (1984). Psychological models of self-mutilation. *Suicide and Life Threatening Behaviour, 14,* 166-186. doi:10.1111/j.1943-278X.1984.tb00447.x

Berkson, G. (1968). Development of abnormal stereotyped behaviours. *Developmental Psychobiology, 1,* 118-132. doi:10.1002/dev.420010210

Bernstein, E.M., & Putnam, F.W. (1986). Development, reliability and validity of a dissociation scale. *Journal of Nervous and Mental Disease, 174, 727-735.*

Berthold, S. M. (2000). War traumas and community violence. Psychological, behavioural, and academic outcomes among Khmer refugee adolescents. *Journal of Multicultural Social Work, 8,* 15-46. doi:10.1300/J285v08n01_02

Bhaskaran, D., & Freed, C. R. (1988). Changes in neurotransmitter turnover in locus coeruleus by changes in arterial blood pressure. *Brain Research Bulletin, 21,* 191-199.

Bliss, E. L. (1986). *Multiple personality, allied disorders and hypnosis.* New York: Oxford University Press.

Bohus, M., Haaf, B., Simms, T., Limberger, M., Schmahl, C., Unckel, C., ... & Linehan, M. M. (2004). Effectiveness of inpatient dialectical behaviour therapy for borderline personality disorder: a controlled trial. *Behaviour Research and Therapy, 42,* 487-499. doi:10.1016/S0005-7967(03)00174-8

Bohus, M., Limberger, M., Ebner, U., Glocker, F. X., Schwarz, B., Wernz, M., & Lieb, K. (2000). Pain perception during self-reported distress and calmness in patients with borderline personality disorder and self-mutilating behaviour. *Psychiatry Research, 95,* 251-260.

Bolles, R. C., & Fanselow, M. S. (1980). A perceptual-defensive recuperative model of fear and pain. *Behavioural and Brain Sciences, 3,* 302-302.

Boon, S., & Draijer, N. (1993). The differentiation of patients with MPD or DDNOS from patients with a cluster B personality disorder. *Dissociation, 6,* 1260135.

Bouton, M. E., & Bolles, R. C. (1980). Conditioned fear associated by freezing and by the suppression of three difference baselines. *Animal Learning and Behaviour, 8,* 429-434. doi:10.3758/BF03199629

Brady, T. K., Killeen, T. K., Brewerton, T., & Lucerini, S. (2000). Comorbidity of psychiatric disorders and posttraumatic stress disorder. *Journal of Clinical Psychiatry, 61,* 22-32.

Brain, K. L., Haines, J., & Williams, C. L. (1998). The psychophysiology of self-mutilation: Evidence of tension reduction. *Archives of Suicide Research, 4,* 227-242. doi:10.1080/13811119808258298

Brain, K. L., Haines, J., & Williams, C. L. (2002). The psychophysiology of repetitive self-mutilation. *Archives of Suicide Research, 6,* 199-210.

Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry, 48,* 216-222. doi:10.1001/archpsyc.1991.01810270028003

Brewin, C. R., Andrews, B., & Rose, S. (2000). Fear, hopelessness, and horror in posttraumatic stress disorder: Investigating DSM-IV criterion A2 in victims of violent crimes. *Journal of Traumatic Stress, 13,* 499-509.

Briere, J. (2004). *Assessment of traumatic events.* American Psychological Association.

Briere, J., & Elliott, D. (2000). Prevalence, characteristics, and long term sequelae of natural disaster exposure in the general population. *Journal of Traumatic Stress, 13,* 661-679. doi:10.1023/A:1007814301369

Briere, J., & Gill, E. (1998). Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry, 68,* 609-620.

Briere, J. N., & Scott, C. (2006). *Principles of trauma theory: A guide to symptoms, evaluation, and treatment.* Thousand Oaks, California: Sage.

Briere, J., Scott, C., & Weathers, F. (2005). Peritraumatic and persistent dissociation in the presumed etiology of PTSD. *American Journal of Psychiatry, 162,* 2995-2301. doi:10.1176/appi.ajp.162.12.2295

Brittlebank, A. D., Cole, A., Hassanyeh, F., Kenny, M., Simpson, D., & Scott, J. (1990). Hostility, hopelessness and deliberate self-harm: A prospective follow-up study. *Acta Psychiatrica Scandinavica, 81,* 280-283.

Brodsky, B., Cloitre, M., & Dulit, R. (1995). Relationship of dissociation to self-mutilation and childhood abuse in borderline personality disorder. *American Journal of Psychiatry, 152,* 1788-1792.

Brodsky, C., Malone, K. M., Ellis, S. P., Dulit, R., & Mann, J. J. (1997). Characteristics of borderline personality disorder associated with suicidal behaviour. *American Journal of Psychiatry, 154,* 1715-1719.

Brown, G. K., Beck, A. T., Steer, R. A., & Grisham, J. R. (2000). Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. *Journal of Consulting and Clinical Psychology, 68,* 371. doi:10.1037/0022-006X.68.3.371

Brown, J. R., Schrag, A., & Trimble, M. R. (2005). Dissociation, childhood interpersonal trauma, and family functioning in patients with somatization disorder. *American Journal of Psychiatry, 162,* 899-905.

Butler, L. D., Duran, R. E., Jasiukaitis, P., Koopman, C., & Spiegel, D. (1996). Hypnotizability and traumatic experiences: A diathesis stress model of dissociative symptomatology. *American Journal of Psychiatry, 153,* 42-63.

Cahill, L., Prins, B., Weber, M., & McGaugh, J. L. (1994). β-Adrenergic activation and memory for emotional events. *Nature, 371,* 702-704. doi:10.1038/371702a0

Caldji, C., Francis, D., Sharma, S., Plotsky, P. M., Meaney, M .J. (2000). The effects of early rearing environment on the development of GABA and central benzodiazepine receptor levels and novelty-induced fearfulness in the rat. *Neuropsychopharmacology, 22,* 219-229.

Caldwell, C. B., & Gottesman, I. I. (1992). Schizophrenia-A high risk factor for

suicide: Clues to risk reduction. *Suicide and Life Threatening Behaviour, 22,*

479-493. doi:10.1111/j.1943-278X.1992.tb01040.x

Campbell Teskey, G., Kavaliers, M., & Hirst, M. (1984). Social conflict activates

opioid analgesic and ingestive behaviours in male mice. *Life Sciences, 35,*

303-315.

Cannon, W. B. (1914). The emergency function of the adrenal medulla in pain and

the major emotions. *American Journal of Physiology-Legacy Content, 33,*

356-372.

Carlson, E., & Dalenberg, C. J. (2000). A conceptual framework for the impact of

traumatic experiences. *Trauma, Violence, and Abuse, 1,* 4-28.

doi:10.1177/1524838000001001002

Carlson, E., & Putnam, F. W. (1993). An update on the dissociative experiences

scale. *Dissociation, 6,* 16-27.

Carlson, E. B., Putnam, F. W., Ross, C. A., Torem, M., Coons, P., Dill, D., . . .

Braun, B. G. (1993). Validity of the dissociative experiences scale in

screening for multiple personality disorder: A multicenter study. *American

Journal of Psychiatry, 150,* 1030-1036.

Castille, K., Prout, M., Marczyk, G., Shmidheiser, M., Yoder, S., & Howlett, B.

(2007). The early maladaptive schemas of self-mutilators: Implications for

therapy. *Journal of Cognitive Psychotherapy: An International Quarterly, 21*,

58-71.

Chapman, A. L., & Dixon-Gordon, K. L. (2007). Emotional antecedents and

consequences of deliberate self-harm and suicide attempts. *Suicide and Life-

Threatening Behaviour, 37,* 543-552. doi:10.1521/suli.2007.37.5.543

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy, 44,* 371-394.

Chowanec, G. D., Josephson, A. M., Coleman, C., & Davis, H. (1991). Self-harming behaviour in incarcerated male delinquent adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 30,* 202-207. doi:10.1097/00004583-199103000-00007

Chu, J. A., & Dill, D. L. (1990). Dissociative symptoms in relation to childhood physical and sexual abuse. *American Journal of Psychiatry, 147,* 887-892.

Chu, J. A., Frey, L. M., Ganzel, B. L., & Matthews, J. A. (1999). Memories of childhood abuse: Dissociation, amnesia, and corroboration. *American Journal of Psychiatry, 156,* 749-755.

Cicchetti, D., & Toth, S. L. (1991). A developmental perspective on internalizing and externalizing disorders. *Internalizing and Externalizing Expressions of Dysfunction, 2,* 1-19.

Classen, C., Nevo, R., Koopman, C., Nevill-Manning, K., Gore-Felton, C., Rose, D.L., & Spiegel, D. (2002). Recent stressful life events, sexual revictimization, and their relationship with traumatic stress symptoms among women sexually abused in childhood. *Journal of Interpersonal Violence, 17,* 1274-1290.

Cloitre, M., Stolbach, B. C., Herman, J. L., van der Kolk, B., Pynoos, R., Wang, J., & Petkova, E. (2009). A developmental approach to complex PTSD: Childhood and adult cumulative trauma as predictors of symptom complexity. *Journal of Traumatic Stress, 22,* 399-408. doi:10.1002/jts.20444

Clore, G. C. (1994). Why emotions are felt. In P. Ekman & R. G. Davidson (Eds.). *The nature of emotion: Fundamental questions* (pp. 103-111). Oxford, UK: Oxford University Press.

Coccaro, E. F., Berman, M. E., & Kavousii, R. J. (1997). Assessment of life history of aggression: Development and psychometric characteristics. *Psychiatry Research, 73,* 147-157.

Cohen, S., Lavell, J., Rich, C. L., & Bromet, E. (1994). Rates and correlates of suicide attempts in first-admission psychotic patients. *Acta Psychiatrica Scandinavica, 90,* 167-171. doi:10.1111/j.1600-0447.1994.tb01573.x

Coid, J., Allolio, B., & Rees, L. H. (1983). Raised plasma metenkephalin in patients who habitually mutilate themselves. *The Lancet, 322,* 545-546.

Compas, B. E., Grant, K. E., & Ey, S. (1994). Psychosocial stress and child and adolescent depression. In W. M. Reynolds & H. F. Johnston (Eds.), *Handbook of depression in children and adolescents: Issues in clinical child psychology* (pp. 509-503). New York, NY: Plenum Press.

Compas, B. E., Malcarne, V. L., & Fondacaro, K. M. (1988). Coping with stressful events in older children and young adolescents. *Journal of Consulting and Clinical Psychology, 56,* 405. doi:10.1037/0022-006X.56.3.405

Connors, R. (1996). NSSI in trauma survivors: Functions and meanings. *American Journal of Orthopsychiatry, 66,* 197-206.

Coons, P. M., & Milstein, V. (1990). Self-mutilation associated with dissociative disorders. *Dissociation: Progress in the Dissociative Disorders, 3,* 81-87.

Coons, P. M., Bowman, E. S., Pellow, T. A., & Schneider, P. (1989). Post-traumatic aspects of the treatment of victims of sexual abuse and incest. *Psychiatric Clinics of North America, 12,* 325-335.

Cummins, R. A., & Livesey, P. J. (1979). Enrichment-isolation, cortex length and the rank order effect. *Brain Research, 178,* 89-98. doi:10.1016/0006-8993(79)90089-1

Darche, M. A. (1990). Psychological factors differentiating self-mutilating and non-self-mutilating adolescent inpatient females. *Psychiatric Hospital, 21,* 31-35.

Davidson, J., & Smith, R. (1990). Traumatic experiences in psychiatric outpatients. *Journal of Traumatic Stress, 3,* 459-475. doi:10.1002/jts.2490030314

De Bellis, M., Keshavan, M. S., Clark, D. B., Casey, B. J., Giedd, J. N., Boring, A. M., Frustaci, K., & Ryan, N. D. (1999). Development traumatology part II: Brain development. *Society of Biological Psychiatry, 45,* 1271-1284.

De Bellis, M. D., Lefter, L., Trickett, P. K., Putnam, F. W. (1994). Urinary catecholamine excretion in sexually-abused girls. *Journal of the American Academy of Child and Adolescent Psychiatry, 33,* 320-327.

De Bellis, M., & Putnam, F. W. (1994). The psychobiology of childhood maltreatment. *Child and Adolescent Psychiatric Clinics of Australia, 3,* 663-677.

DeLongis, A., Folkman, S., &. Lazarus, R.S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal of Personality and Social Psychology, 54,* 486-495. doi:10.1037/0022-3514.54.3.486

Demitrack, M. A., Putnam, F. W., Brewerton, T. D., Brandt, H. A., & Gold, P. W. (1990). Relation of clinical variables to dissociative phenomena in eating disorders. *American Journal of Psychiatry, 147,* 1184-1188.

Deutsch, S. I. (1986). Rationale for the administration of opiate antagonists in treating infantile autism. *American Journal of Mental Deficiency, 90,* 631-635.

DiClemente, R. J., Ponton, L. E., & Hartly, D. (1991). Prevalence and correlates of cutting behaviour: Risk for HIV transmission. *Journal of the American Academy of Child and Adolescent Psychiatry, 30,* 735-739. doi:10.1016/S0890-8567(10)80007-3

Doctors, S. (1981). The symptom of delicate self-cutting in adolescent females: A developmental view. In S. C. Feinstein, J. G. Looney, A. Z. Schwaartzberg, & A. D. Sorosky (eds.), *Adolescent psychiatry* (pp. 443-460). Chicago: University of Chicago Press.

Donaldson, C., & Lam, D. (1994). Rumination, mood, and social-problem solving in major depression. *Psychological Medicine, 34,* 1309-1318.

Dykes, K., & Haines, J, In preparation.

Ebinger, P. (1974). A cytoarchitectonic volumetric comparison of brains in wild and domestic sheep. *Z Anat Entwickl-Gesch, 144,* 267-302. doi:10.1007/BF00522811

Efran, J. S., Chorney, R. L., Ascher, L. M., & Lukens, M. D. (1989). Coping styles, paradox, and the cold pressor task. *Journal of Behavioural Medicine, 12,* 91-103.

Epstein, R. S., Fullerton, C. S., & Ursano, R. J. (1998). Posttraumatic stress disorder following an air disaster: A prospective study. *American Journal of Psychiatry, 155,* 934-938.

Escalona, R., Tupler, L. A., Saur, C. D., Krishnan, K. R., & Davidson, J. R. (1997). Screening for trauma history on an inpatient affective-disorder unit: A pilot study. *Journal of Traumatic Stress, 10,* 299-305.

Falsetti, S. A., & Resnick, H. S. (1997). Frequency and severity of panic attach symptoms in a treatment seeking sample of trauma victims. *Journal of Traumatic Stress, 10,* 683-689. doi:10.1023/A:1024810206381

Fanselow, M. S., & Lester, L.S. (1988). A functional behaviouristic approach to aversively motivated behaviour: Predatory imminence as a determinant of topography of defensive behaviour. In R. C. Bolles & M. D Beecher (eds.), *Evolution and learning* (pp. 185-212). Hilsdale, England: Lawrence Erlbaum Associates.

Fauerbach, J. A., Richter, L., & Lawrence, J. W. (2002). Regulating acute posttrauma distress. *Journal of Burn Care and Research, 23,* 249-257.

Favazza, A. R. (1989). Normal and deviant self-mutilation: An essay-review. *Transcultural Psychiatric Research Review, 26,* 113-127. doi:10.1177/136346158902600202

Favazza, A. R. (1996). *Bodies under siege: Self-mutilation and body modification in culture and psychiatry*. Baltimore: John Hopkins University Press.

Favazza, A. R. (1998). The coming of age of self-mutilation. *Journal of Nervous and Mental Disease, 186,* 259-268.

Favazza, A. R. (1999). Self-mutilation. In D. G. Jacobs (ed.), *The Harvard Medical School guide to suicide assessment and intervention* (pp. 125-145). San Francisco: Jossey-Bass.

Favazza, A. R., & Conterio, K. (1988). The plight of chronic self-mutilators. *Community Mental Health, 24,* 22-30. doi:10.1007/BF00755050

Favazza, A. R., & Conterio, K. (1989). Female habitual self-mutilators. *Acta Psychiatrica Scandinavica, 79,* 283-289.

Favazza, A. R., & Favazza, B. (1987). *Bodies under siege: Self-mutilation in culture and psychiatry.* Baltimore: John Hopkins University Press.

Feldman, M. D. (1988). The challenge of self-mutilation: A review. *Comprehensive Psychiatry, 29,* 252-269. doi:10.1016/0010-440X(88)90048-X

Fennema-Notestine, C., Stein, M. B., Kennedy, C. M., Archibald, S. L., Jernigan, T. L. (2002). Brain morphometry in female victims of intimate partner violence with and without posttraumatic stress disorder. *Biological Psychiatry, 51,* 1089-1101.

Forman, S. G., & Kalafat, J. (1998). Substance abuse and suicide: Promoting resilience against self-destructive behaviour in youth. *School Psychology Review, 27,* 398-406.

Foster, L. (1998). Nervous habits and stereotyped behaviors in preschool children. *Journal of the Academy of Child and Adolescent Psychiatry, 37,* 711-717. doi:10.1097/00004583-199807000-00010

Fridlund, A. (1994). *Human facial expression.* San Diego, CA: Academic Press.

Gaffney, A. (1993). Cognitive developmental aspects of pain in school-age children. In N. L. Schechter, C. Berde & M. Yaster (eds.). *Pain in infants, children and adolescents* (pp. 75-85). Baltimore: Williams and Wilkins.

Garber, J., & Seligman, M. E. (1980). *Human helplessness: Theory and applications.* New York: Academic Press.

Geisser, M. E., Robinson, M. E., & Pickren, W. (1992). Coping styles among pain sensitive and pain tolerant individuals on the cold-pressor test. *Behavior Therapy , 23*, 31-41.

Glassman, L. H., Weierich, M. R., Hooley, J. M., Deliberto, T. L., & Nock, M. K. (2007). Child maltreatment, non suicidal NSSI, and the mediating role of self-criticism. *Behaviour Research and Therapy, 45,* 2483-2490. doi:10.1016/j.brat.2007.04.002

Gleaves, D. H. (1996). The sociocognitive model of dissociative identity disorder: A re-examination of the evidence. *Psychological Bulletin, 120,* 42-59.

Goldstein, D. S. (1995). *Stress, catecholamines and cardiovascular disease.* New York: Oxford University Press.

Goodyer, I. M., & Altham, P. M. E. (1991). Lifetime exit events and recent social and family adversities in anxious and depressed school-age children and adolescents. *Journal of Affective Disorders, 21,* 219-228. doi:10.1016/0165-0327(91)90001-9

Grabe, H. J., Goldschmidt, F., Lehmkuhl, L., Gansicke, M., Spitzer, C., & Freyberger, H. J. (1999). Dissociative symptoms in obsessive-compulsive dimensions. *Psychopathology, 32,* 319-324.

Gratz, K. K., Conrad, S. D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry, 72,* 128-140.

Green, A.H. (1978). Self-destructive behaviour in batter children. *American Journal of Psychiatry, 135,* 579-582.

Green, B. L., Lindy, J. D., Grace, M. C., Gleser, G. C., Leonard, A. C., Korol, M., & Winget, C. (1990). Buffalo Creek survivors in the second decade: Stability of stress symptoms. *American Journal of Orthopsychiatry, 60,* 43-54. doi:10.1037/h0079168

Green, B. L., Goodman, L. A., Krupnick, J. L., Corcoran, C. B., Petty, R. M., Stockton, P., & Stern, N. M. (2000). Outcomes of single versus multiple trauma exposure in a screening sample. *Journal of Traumatic Stress, 13,* 271-286.

Greenspan, G. S., & Samuel, S. E. (1989). Self-cutting after rape. *American Journal of Psychiatry, 146,* 789-790.

Groholt, B., Ekeberg, O., Wichstrom, L., & Haldorsen, T. (2000). Young suicide attempters: A comparison between a clinical and an epidemiological sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 868-875. doi:10.1097/00004583-200007000-00015

Gross, J. J. (1998). The emerging field of emotional regulation: An integrative review. *Review of General Psychology, 2,* 271-299

Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition and Emotion, 13,* 551-573

Guertin, T., Lloyd-Richardson, E., Spirito, A., Donaldson, D., & Boergers, J. (2001). Self-mutilative behavior in adolescents who attempt suicide by overdose. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 1062-1069. doi:10.1097/00004583-200109000-00015

Gunnell, D., & Frankel, S. (1994). Prevention of suicide: aspirations and evidence. *BMJ: British Medical Journal, 308,* 1227

Haines, J., & George, N, In preparation

Haines, J., & Williams, C. L. (2003). Coping and problem solving of self-mutilators. *Journal of Clinical Psychology, 59,* 1097-1106.

Haines, J., Williams, C. L., Brain, K. L., & Wilson, G. V. (1995). The psychophysiology of self-mutilation. *Journal of Abnormal Psychology, 104,* 471-489. doi:10.1037/0021-843X.104.3.471

Harbeck, C., & Peterson, L. (1992). Elephants dancing in my head: A developmental approach to children's concepts of specific pains. *Child Development, 63,* 138-149.

Hawton, K., Fagg, J., Simkin, S., Bale, E., & Bond, A. (2000). Deliberate self-harm in adolescents in Oxford, 1985-1995. *Journal of Adolescence, 23,* 47-55. doi:10.1006/jado.1999.0290

Hawton, K., Fagg, J., Simkin, S., Bale, E., & Bond, A. (1997). Trends in deliberate self-harm in Oxford, 1985-1955. Implications for clinical services and the prevention of suicide. *The British Journal of Psychiatry, 171,* 556-560.

Hawton, K., Harriss, L., Simkin, S., Bale, E., & Bond, A. (2004). Self-cutting: Patient characteristics compared with self-poisoners. *Suicide and Life-Threatening Behaviour, 34,* 199-208. doi:10.1521/suli.34.3.199.42776

Hayes, R. L., Dubner, R., & Hoffman, D. S. (1981). Neuronal activity in medullary dorsal horn of awake monkeys trained in a thermal discrimination task. II. Behavioural modulation of responses to thermal and mechanical stimuli. *Journal of Neurophysiology, 46,* 428-443.

Helmstetter, F. J., & Fanselow, M. S. (1987). Effects of naltrexone on learning and performance of conditional fear-induced freezing and opioid analgesia. *Physiology and Behaviour, 39,* 501-505.

Herpertz, S. (1995). Self-injurious behaviour psychopathological and nosological characteristics in subtypes of self-injurers. *Acta Psychiatrica Scandinavica, 91,* 57-68. doi:10.1111/j.1600-0447.1995.tb09743.x

Herpertz, S., Sass, H., & Favazza, A. (1997). Impulsivity in self-mutilative behaviour: Psychometric and biological findings. *Journal of Psychiatric Research, 31,* 451-465.

Herman, J. L., Perry, J. C., & van der Kolk, B. A. (1989). Childhood trauma in borderline personality disorder. *American Journal of Psychiatry, 146,* 490-495.

Hilgard, E. R. (1979). Consciousness in contemporary psychology. *Annual Review of Psychology, 31,* 1-28. doi:10.1146/annurev.ps.31.020180.000245

Hilgard, E. R., Morgan, A. H., & Macdonald, H. (1975). Pain and dissociation in the cold pressor test: a study of hypnotic analgesia with "hidden reports" through automatic key pressing and automatic talking. *Journal of Abnormal Psychology, 84,* 280-289.

Hirschfeld, R. (1996). Panic disorder: Diagnosis, epidemiology, and clinical course. *Journal of Clinical Psychiatry, 57,* 3-8.

Holbrook, T. L., Hoyt, D. B., Stein, M. B., & Sieber, W. J. (2001). Perceived threat to life predicts posttraumatic stress disorder after major trauma: risk factors and functional outcomes. *Journal of Trauma and Acute Care Surgery, 51,* 287-293.

Holmes, T. H. (1976). *Schedule of recent experiences*. Seattle, Washington: Department of Psychiatry and Behavioural Sciences. University of Washington, School of Medicine.

Holmes, E. A., Brown, R. J., Mansell, W., Fearon, R., Hunter, E., Frasquilho, F., & Oakley, D. A. (2005). Are there two quantitatively distinct forms of dissociation? A review and some clinical implications. *Clinical Psychology Review, 25,* 1-23.

Holmes, G. E., Williams, C. L., & Haines, J. (1998). Motor vehicle accident trauma

    exposure: Personality profiles associated with posttraumatic diagnoses.

    Anxiety, Stress and Coping, 14, 301-313. doi:10.1080/10615800108248359

Hurry, J. (2000). Deliberate self-harm in children and adolescents. *International*

    Review of Psychiatry, 12, 31-36.

Hurry, J., & Storey, P. (2000). Assessing young people who deliberately harm

    themselves. *The British Journal of Psychiatry, 176,* 126-131.

    doi:10.1192/bjp.176.2.126

Irwin, H. J. (1994). Affective predictors of dissociation, I: The case of unresolved

    grief. *Dissociation, 7,* 86-91.

Irwin, H. J. (1996). Traumatic childhood events, perceived availability of emotional

    support, and the development of dissociative tendencies. *Child Abuse and*

    Neglect, 20, 701-707.

Irwin, H. J. (1998). Attitudinal predictors of dissociation: Hostility and

    powerlessness. *The Journal of Psychology, 132,* 389-400.

    doi:10/1080/00223989809599273

Irwin, H. J. (1999). Pathological and nonpathological dissociation: The relevance of

    childhood trauma. *The Journal of Psychology, 133,* 157-164.

James, W. (1983). *The principles of psychology*. Cambridge: Harvard University

    Press.

Janal, M., Colt, W., Clark, W., & Glusman, M. (1984). Pain sensitivity, mood and

    plasma endocrine levels in man following long-distance running: Effects of

    naloxone. *Pain, 19,* 13-25.

Jang, K. L., Paris, J., Zweig-Frank, H., & Livesley, W. J. (1998). Twin study of dissociative experience. *The Journal of Nervous and Mental Disease, 186,* 345-351.

Jeffery, D., & Warm, A. (2002). A study of service providers' understanding of self-harm. *Journal of Mental Health, 11,* 295-304. doi:10.1080/09638230020023679

Kalin, N.H. (1993). The neurobiology of fear. *Scientific American, 268,* 94-101.

Kalivas, P.W., & Kuffy, P. (1989). Similar effects of daily cocaine and stress on mesocorticolimbic dopamine neurotransmission in the rat. *Biological Psychiatry, 25,* 939-950.

Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two models of stress management: Daily hassles and uplifts versus major life events. *Journal of Behavioural Medicine, 4,* 1-39. doi:10.1007/BF00844845

Kemperman, I., Russ, M. J., Clark, W. C., Kakuma, T., Zanine, E., & Harrison, K. (1997). Pain assessment in self-injurious patients with borderline personality disorder using signal detection theory. *Psychiatry Research, 70,* 175-183.

Kendall-Tackett, K. A., Williams, L. M., & Finkelhor, D. (1993). Impacts of sexual abuse on children: A review and synthesis of recent empirical studies. *Psychological Bulletin, 113,* 164-180.

Kessler, R. C. (2003). Epidemiology of women and depression. *Journal of Affective Disorders, 74,* 5-13. doi:10.1016/S0165-0327(02)00426-3

Kessler, R. C., Price, R. H., & Wortman, C. B. (1985). Social factors in psychopathology: Stress, social support, and coping processes. *Annual Review of Psychology, 36,* 531-572.

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995).

Posttraumatic stress disorder in the national comorbidity survey. *Archives of General Psychiatry, 52,* 1048-1060.

Kihlstrom, J. F., Glisky, M. L., & Angiulo, M. J. (1994). Dissociative tendencies and dissociative disorders. *Journal of Abnormal Psychology, 103,* 117-124. doi:10.1037/0021-843X.103.1.117

Kiesel, C.L., & Lyons, J.S. (2001). Dissociation as a mediator for psychopathology among sexually abused children and adolescents. *The American Journal of Psychiatry, 158,* 1034-139. doi:10.1176/appi.ajp.158.7.1034

Kleven, M. S., Perry, B.D., Woolverton, W. L., & Seidon, L. S. (1990). Effects of repeated injections of cocaine on D1 and D2 dopamine receptors in the brain. *Brain Research, 532,* 265-270.

Klonsky, E. D. (2007). The functions of deliberate NSSI: A review of the evidence. *Clinical Psychology Review, 27,* 226-239.

Klonsky, E .D., & Moyer, A. (2008). Childhood sexual abuse and non-suicidal NSSI: meta analysis. *British Journal of Psychiatry, 192,* 177-170. doi:10.1192/bjp.bp.106.030650

Klonsky, E. D., Oltmanns, T. F., & Turkheimer, E. (2003). Deliberate self-harm in a nonclinical population: Prevalence and psychological correlates. *The American Journal of Psychiatry, 160,* 1501-1508.

Klossika, I., Flor, H., Kamping, S., Bleichhardt, G., Trautmann, N., Treede, R. D., ...&Schmahl, C. (2006). Emotional modulation of pain: a clinical perspective. *Pain, 124,* 264-268.

Koenen, K. C., Moffitt, T. E., Poulton, R., Martin, J., & Caspi, A. (2007). Early childhood factors associated with the development of post-traumatic stress

disorder: results from a longitudinal birth cohort. *Psychological Medicine, 37,* 181-192.

Kolb, L. (1987). A neuropsychological hypothesis explaining posttraumatic stress disorder. *American Journal of Psychiatry, 144,* 989-996.

Krystal, H. (1988). *Integration and self-healing: Affect, trauma, alexithymia.* Hillsdale: Lawrence Erlbaum.

Krystal, J. H., Kosten, T. R., Southwick, S., Mason, J. W., Perry, B. D., & Giller, E. L. (1989). Neurobiological aspects of PTSD: Review of clinical and preclinical studies. *Behaviour Therapy, 20,* 177-198. doi:10.1016/S0005-7894(89)80068-1

Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R., & Weiss, D. S. (1990). *Trauma and the Vietnam war generation: Report of findings from the National Vietnam Veterans Readjustment Study.* New York: Brunner/Mazel.

Kumar, G., Pepe, D., & Steer, R. A. (2004). Adolescent psychiatric inpatients' self-reported reasons for cutting themselves. *The Journal of Nervous and Mental Disease, 192,* 830-836.

Ladd, C. O., Owens, M. J., & Nemeroff, C. B. (1996). Persistent changes in corticotropin-releasing factor neuronal systems induced by maternal separation. *Endocrinology, 137,* 1212-1218.

Lang, P. J. (1979). A bio-informational theory of emotional imagery. *Psychophysiology, 16,* 495-511. doi:10.1111/j.1469-8986.1979.tb01511.x

Langbehn, D. R., & Pfohl, B. (1993). Clinical correlates of self-mutilation among psychiatric inpatients. *Annals of Clinical Psychiatry, 5,* 45-51.

Lazarus, R. S., and Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer Publishing Company.

LeDoux, J. E., Cicchetti, P., & Xagoraris, A., & Romanski, L. M. (1990). The lateral amygdaloid nucleus: Sensory interface of the amygdala in fear conditioning. *Journal of Neuroscience, 10,* 1062-1069.

Leskela, J., Dieperink, M., & Thuras, P. (2002). Shame and posttraumatic stress disorder. *Journal of Traumatic Stress, 15,* 223-226. doi:10.1023/A:1015255311837

Leskin, G. A., & Sheikh, J. I. (2002). Lifetime trauma history and panic disorder: Findings from the National Comorbidity Survey. *Journal of Anxiety Disorders, 16,* 599-603.

Levin, R., & Spei, E. (2004). Relationship of purported measures of pathological and nonpathological dissociation to self-reported psychological distress and fantasy immersion. *Assessment, 11,* 160-168. doi:0.1177/1073191103256377

Liu, D., Diorio, J., Tannenbaum, B., Caldji, C., Francis, D., Freedman, A., … & Meaney, M. J. (1997). Maternal care, hippocampal glucocorticoid receptors, and hypothalamic-pituitary-adrenal responses to stress. *Science, 277,* 1659-1662.

Lochner, C., Seedat, S., Hemmings, S. M., Kinnear, C. J., Corfield, V. A., Niehaus, D. J., … & Stein, D. J. (2004). Dissociative experiences in obsessive-compulsive disorder and trichotillomania: Clinical and general findings. *Comprehensive Psychiatry, 45,* 384-391.

Ludwig, A. M. (1983). The psychobiological functions of dissociation. *American Journal of Clinical Hypnosis, 26,* 93-99. doi:10/1080/00029157.1983.10404149

Lynn, S. J., Lilienfeld, S. O., Merckelbach, H., Giesbrecht, T., & van der Kloet, D. (2012). Dissociation and dissociative disorders challenging conventional wisdom. *Current Directions in Psychological Science, 21,* 48-53.

Lynn, S. J., & Rhue, J. W. (1988). Fantasy proneness: Hypnosis, developmental antecedents, and psychopathology. *American Psychologist, 43,* 35-44.

Maier, S. (1986). Stressor controllability and stress-induced analgesia. In D. Kelley (ed.), *Stress-induced analgesia. Annals of the New York Academy of Sciences* (Vol. 467, pp. 55-72). New York: New York Academy of Sciences.

Marmer, C. R., Metzler, T. J., & Otte, C. (2004). The peritraumatic dissociative experiences questionnaire. *Assessing Psychological Trauma and PTSD, 2,* 144-167.

Marmer, C. R., Weiss, D. S. & Metzler, T. J. (1998). Peritraumatic dissociation and posttraumatic stress disorder. In J. D. Bremner & C. J. Marmer (eds.), *Trauma, memory and dissociation* (pp. 229-252). Washington, DC: American Psychiatric Association.

Marmer, C. R., Weiss, D. S., Schlenger, W. E., Fairbank, J. A., Jordan, B. K., Kulka, R. A., & Hough, R. L. (1994). Peritraumatic dissociation and posttraumatic stress in male Vietnam theatre veterans. *American Journal of Psychiatry, 151,* 902-907.

Martenson, M. E., Cetas, J. S., & Heinrichter, M. M. (2009). A possible neural basis for stress-induced hyperalgesia. *Pain, 142,* 236-244.

Mayou, R. A., Bryant, B., & Ehlers, A. (2001). Prediction of psychological outcomes one year after a motor vehicle accident. *American Journal of Psychiatry, 158,* 1231-1238. doi:10.1176/appi.ajp.158.8.1231

McCormack, H. M., Horne, D. J., & Sheather, S. (1988). Clinical applications of visual analogue scales: a critical review. *Psychological Medicine, 18,* 1007-1019.

McCown, W., Gallins, H., Johnson, J., DeSimone, P. A., & Posa, J. (1993). Borderline personality disorder and laboratory-induced cold pressor pain: evidence of stress-induced analgesia. *Journal of Psychopathology and Behavioural Assessment, 15,* 87-95.

McDermott, B. M., Berry, B., & Cobham, V. E. (2012). Social connectedness: a potential aetiological factor in the development of child post-traumatic stress disorder. *Australian and New Zealand Journal of Psychiatry, 46*, 109-117. doi:10.1177/0004867411433950

McDermott, B. M., & Palmer, L. J. (1999). Wilderness area and wildfire disasters: assessment and treatment insights from a child and adolescent screen program. In A. M. La Greca, W. K. Silverman, E. M. Vernberg & M. C. Roberts (eds.), *Helping children cope with disasters: integrating research and practice.* (pp. 139-156). Washington, DC: American Psychological Association. 2001.

McFarlane, A. C. (1987). Posttraumatic phenomena in a longitudinal study of children following a natural disaster. *American Academy of Child and Adolescent Psychiatry, 26,* 764-769.

McGrath, P. A. (1990). *Pain in children: Nature, assessment, and treatment.* New York: Guilford Publications.

McGrath, P. A. (1993). Psychological aspects of pain perception. In N. L. Schechter, C. B. Berde & M. Yaster (eds.), *Pain in infants, children and adolescents.* Baltimore, MD: Williams and Wilkins.

McGrath, P. A. (1994). Psychological aspects of pain perception. *Archives of Oral Biology, 39,* 55s-62s. doi:10.1016/0003-9969(94)90189-9

McLaughlin, J., Miller, P., & Warwick, H. (1996). Deliberate self-harm in adolescents: Hopelessness, depression, problems and problem solving. *Journal of Adolescence, 19,* 523-532.

Melzack, R., Wall, P. D., & Ty, T. C. (1982). Acute pain in an emergency clinic: latency of onset and descriptor patterns related to different injuries. *Pain, 14,* 33-43.

Menninger, K. A. (1935). A psychoanalytic study of the significance of self-mutilators. *The Psychoanalytic Quarterly, 4,* 408-466.

Michaelson, L., June, K., Vives, A., Testa, S., & Marchione, N. (1998). The role of trauma and dissociation in cognitive-behavioural psychotherapy outcomes and maintenance for panic disorder with agoraphobia. *Behaviour Research and Therapy, 36,* 1011-1050.

Millan, M. J. (2002). Descending control of pain. *Progress in Neurobiology, 66,* 355-474. doi:10.1016/S0301-0082(02)00009-6

Miller, J. C., Boureau, F., & Albe-Fessard, D. (1979). Supraspinal influences on nociceptive flexion reflex and pain sensations in man. *Brain Research, 179,* 61-68.

Milnes, D., Owens, D., & Blenkiron, P. (2002). Problems reported by self-harm patients: perception, hopelessness, and suicidal intent. *Journal of Psychosomatic Research, 53,* 819-822.

Miron, D., Duncan, G. H., & Bushnell, M. C. (1989). Effects of attention on the intensity and unpleasantness of thermal pain. *Pain, 39,* 345-352. doi:10.1016/0304-3959(89)90048-1

Modestin, J., & Erni, T. (2004). Testing the dissociative taxon. *Psychiatry Research, 126,* 77-82.

Mongini, F., Rota, E., Evangelista, A., Ciccone, G., Milani, C., Ugolini, A., … & Rosato, R. (2009). Personality profiles and subjective perception of pain in head pain patients. *Pain, 144,* 125-129. doi:10.1016/j.pain.2009.03.026

Moises, H. W., Yang, L., Kristbjarnarson, H., Wiese, C., Byerley, W., Macciardi, F., … & Helgason, T. (1995). An international two-stage genome-wide search for schizophrenia susceptibility genes. *Nature Genetics, 11,* 321-324.

Monroe, S. M., & Simons, A. D. (1991). Diathesis-stress theories in the context of life stress research: implications for the depressive disorders. *Psychological Bulletin, 110,* 406-425.

Morgan, C. A., Hazlett, G. A., Rasmusson, A., Zimolo, Z., Southwick, S. M., & Charney, D. S. (2004). Relationships among plasma dehyroepiandrosterone sulfate and cortisol levels, symptoms of dissociation and objective performance in humans exposed to acute stress. *Archives of General Psychiatry, 61,* 819-825.

Nash, M. R., & Lynn, S. J. (1986). Child abuse and hypnotic ability. *Imagination, Cognition, and Personality, 5,* 211-218.

Nijenhuis, E. R. S. (1999). Somatoform dissociation: Major symptoms of dissociative disorders. *Journal of Trauma and Dissociation, 1,* 7-32. doi:10.1300/J229v01n04_02

Nijenhuis, E. R. S., Vanderlinden, J., & Spinhoven, P. (1998). Animal defensive reactions as a model for trauma-induced dissociative reactions. *Journal of Traumatic Stress, 11,* 243-260. doi:10.1023/A:1024447003022

Nixon, M. K., Cloutier, P. F., & Aggarwal, S. (2002). Affect regulation and addictive aspects of repetitive NSSI in hospitalized adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 41,* 1333-1341.

Nock, M. K., & Cha, C. B. (2009). Psychological models of nonsuicidal NSSI. In M. K. Nock (Ed.). *Understanding nonsuicidal NSSI: Origins, assessment, and treatment* (pp. 99-116). Washington, DC: American Psychological Association.

Nock, M. K., & Favazza, A. R. (2009). Nonsuicidal NSSI: Definition and classification. In M. K. Nock (Ed.). *Understanding nonsuicidal NSSI: Origins, assessment, and treatment* (pp. 9-18). Washington, DC: American Psychological Association.

Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: analysis of the comorbidity survey. *Journal of Abnormal Psychiatry, 115,* 616-623.

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behaviour. *Journal of Consulting and Clinical Psychology, 72,* 885-890. doi:10.1037/0022-006X.72.5.885

Nock, M. K., & Prinstein, M. J. (2005). Clinical features and behavioural functions of adolescent self-mutilation. *Journal of Abnormal Psychology, 114,* 140-146.

Norton, G. R., Ross, C. A., & Novotny, M. F. (1990). Factors that predict scores on the Dissociative Experiences Scale. *Journal of Clinical Psychology, 46,* 273-277.

Noyes, R., & Kletti, R., (1977). Depersonalization in response to life-threatening danger. *Comprehensive Psychiatry, 18,* 375-384.

Oatley, K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion, 1,* 29-50. doi:10.1080/0269993870840362

Orbach, I., Mikulincer, M., King, R., Cohen, D., & Stein, D. (1997). Thresholds and tolerance of physical pain in suicidal and nonsuicidal adolescents. *Journal of Consulting and Clinical Psychology, 65,* 646-652.

Ouimette, P., & Brown, P. J., (2003). *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders.* Washington, DC: American Psychological Association.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin, 129,* 52-73. doi:10.1037/1942-9681.S.1.3

Pattison, E. M., & Kahan, J. (1983). The deliberate self-harm syndrome. *American Journal of Psychiatry, 140,* 867-872.

Perry, B. D. (1994). Neurobiological sequelae of childhood trauma: Post-traumatic stress disorders in children. In M. Murberg (ed.), *Catecholamines in post-traumatic stress disorder emerging concepts* (pp. 253-276). Washington, DC: American Psychiatric Press.

Perry, J. C., & Herman, J. L. (1993). Trauma and defense in the etiology of borderline personality disorder. In J Paris (ed.), *Borderline Personality Disorder: Etiology and Treatment* (pp. 123-129). Washington, DC: American Psychiatric Publishing, Inc.

Perry, B. D., & Pate, J. E. (1994). Neurodevelopment and the psychobiological roots of post-traumatic stress disorders. In L. F. Koziol & C. E. Stout (Eds.), *The neuropsychology of mental illness: A practical guide* (pp. 129-147). Springfield, IL; Charles C. Thomas.

Perry, B. D., Pollard, R. A., Blakley, T. L., Baker, W. L., & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaption, and use dependent development of the brain: How states become traits. *Infant Mental Health Journal, 16,* 271-291.

Pitman, R. (1990). Self-mutilation in combat-related PTSD. *American Journal of Psychiatry, 147,* 123-124.

Price, D. D. (1988). *Psychological and neural mechanisms of pain.* Raven Press: New York.

Price, D. D. (2000). Psychological and neural mechanisms of the affective dimensions of pain. *Science, 288,* 1769-1772. doi:10.1126/science.288.5472.1769

Price, D. D., Barrell, J. J., & Gracely, R.H. (1980). A psychophysical analysis of experimental factors that selectively influence the affective dimensions of pain. *Pain, 8,* 137-149.

Prigerson, H. G., Shear, M. K., Jacobs, S. C., Reynolds, C. F., Maciejewski, P. , Davidson, J. R. T., ... & Zisook, S. (1999). Consensus criteria for traumatic grief: A preliminary empirical test. *British Journal of Psychiatry, 174,* 67-73.

Prince, M. (1978). *The dissociation of personality*. New York: Oxford University Press.

Putnam, F. W. (1988). The switch process in multiple personality disorder. *Dissociation, 1,* 24-33.

Putnam, F. W. (1989). Pierre Janet and modern views of dissociation. *Journal of Trauma Stress, 4,* 413-429. doi:10.1002/jts.2490020406

Putnam, F. W. (1992). Discussion: Are alter personalities fragments or figments? *Psychoanalytic quarterly, 12,* 95-112.

Putnam, F. W. (1993). Dissociative phenomena. In D Spiegel (ed.), *Dissociative disorders. A clinical review* (pp.1-16). Lutherville: Sidran.

Putnam, F. W. (1995). Development of dissociative disorders. In D Spiegel & D. J. Cohen (eds.), *Developmental psychopathology. Vol 2. Risk, disorder, and adaption* (pp. 581-608). New York: Wiley.

Putnam, F. W. (1998). Developmental pathways in sexually abused girls. Presented at psychological trauma: Maturational processes and psychotherapeutic interventions. Harvard Medical School, Boston. March 20.

Putnam, F. W. (2003). Ten year research update review; child sexual abuse. *Journal of the American Academy of Child and Adolescent Psychiatry, 4,* 269-278. doi:10.1097/00004583-200303000-00006

Raine, W. J. B. (1982). Self-mutilation. *Journal of Adolescence, 5,* 1-13.

Rainville, P. (2002). Brain mechanisms of pain affect and pain modulation. *Current Opinion in Neurobiology, 12,* 195-204.

Rainville, P., Bao, Q. V. H., & Chretien, P. (2005). Pain-related emotions modulate experimental pain perceptions and autonomic responses. *Pain, 118,* 306-318.

Ray, W. J. (1996). Dissociation in normal populations. In L. K. Michelson & W. J. Ray (eds.), *Handbook of dissociation: Theoretical, empirical, and clinical perspectives* (pp.51-66). New York: Springer.

Resnick, H. S., Kilpatrick, D. G., Dansky, B. S., Saunders, B. E., & Best, C. L. (1993). Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology, 61,* 984-991. doi:10.1037/0022-006X.61.6.984

Rhudy, J . L., & Meagher, M. W. (2000). Fear and anxiety: divergent effects on human pain thresholds. *Pain, 84,* 65-75.

Rodham, K., & Hawton, K. (2009). Epidemiology and phenomenology of nonsuicidal NSSI. In M. K. Nock (Ed.). *Understanding nonsuicidal NSSI: Origins, assessment, and treatment* (pp. 99-116). Washington, DC: American Psychological Association.

Rosen, P. M., Walsh, B. W., & Rode, S. A. (1990). Interpersonal loss and self-mutilation. *Suicide and Life-Threatening Behaviour, 20,* 177-184.

Rosenman, S. (2002). Trauma and posttraumatic stress disorder in Australia: findings in the population sample of the Australian National Survey of Mental Health and Wellbeing. *Australian and New Zealand Journal of Psychiatry, 36,* 515-520. doi:10.1046/j.1440-1614.2002.01039.x

Rosenthal, P. A., & Rosenthal, S. (1984). Suicidal behaviour by preschool children. *American Journal of Psychiatry, 141,* 520-525.

Rosenthal, R. J., Rinzler, C., Walsh, R., & Klausner, E. (1972). Wrist-cutting syndrome: the meaning of the gesture. *American Journal of Psychiatry, 128,* 1363-1368.

Ross, C. A. (1997). *Dissociative identity disorder: Diagnosis, clinical features, and treatment of multiple personality.* New Jersey: John Wiley & Sons.

Ross, C. A., Heber, S., Norton, G. R., Anderson, D., Anderson, G., & Barchet, P. (1989). The dissociative disorders interview schedule: A structured interview. *Dissociation, 2,* 169-189.

Ross, C. A., Anderson, G., Fraser, G. A., Reagor, P., Bjornson, L., & Miller, S. D. (1992). Differentiating multiple personality disorder and dissociative disorder not otherwise specified. *Dissociation, 5,* 87-91.

Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31,* 67-78. doi:10.1023/A:1014089117419

Ross, S., & Heath, N. (2003). Two models of adolescent self-mutilation. *Suicide and Life-Threatening Behaviour, 33,* 277-287.

Ross, C. A., Joshi, S., & Currie, R. (1990). Dissociative experiences in the general population. *American Journal of Psychiatry, 147,* 1547-1552.

Ross, C. A., Joshi, S., & Currie, R. (1991). Dissociative experiences in the general population: A factor analysis. *Hospital and Community Psychiatry, 42,* 297-301.

Ross, D. M., & Ross, S. A. (1988). *Childhood pain: Current issues, research, and management.* Baltimore: Urban & Schwarzenberg.

Ross, C. A., Ryan, L., Voigt, H., & Eide, L. (1991). High and low dissociators in a college student population. *Dissociation: Progress in the Dissociative Disorders, 4,* 147-151.

Roth, A. S., Ostroff, R. B., & Hoffman, R. E. (1996). Naltrexone as a treatment for repetitive self-injurious behaviour: An open-label trial. *Journal of Clinical Psychiatry, 57,* 233-237.

Roth, S., Pelcovitz, D., Van der Kolk, B. A., & Mandel, F. (1997). Complex PTSD in victims exposed to sexual and physical abuse: Results from the DSM-IV field trials for posttraumatic stress disorder. *Journal of Traumatic Stress, 10,* 539-555.

Rufer, M., Held, D., Cremer, J., Fricke, S., Moritz, S., Peter, H., & Hand, I. (2005). Dissociation as a predictor of cognitive behaviour therapy outcome in patients

with obsessive-compulsive disorder. *Psychotherapy and Psychosomatics, 75,* 40-46. doi:10.1159/000089225

Russ, M. (1992). Self-injurious behaviour in patients with borderline personality disorder: Biological perspectives. *Journal of Personality Disorders, 6*, 64-81.

Russ, M. J., Roth, S. D., Lerman, A., Kakuma, T., Harrison, K., Shindledecker... & Mattis, S. (1992). Pain perception in self-injurious patients with borderline personality disorder. *Biological Perspectives, 32,* 501-511.

Russ, M. J., Shearin, E. N., Clarkin, J. F., Harrison, K., & Hull, J. W. (1993). Subtypes of self-injurious patients with borderline personality disorder. *American Journal of Psychiatry, 150,* 1869-1871.

Rutter, M. (1989). Pathways from childhood to adult life. *Journal of Child Psychiatry and Psychology, 30,* 23-51. doi:10.1111/j.1469-7610.1989.tb00768.x

Sampson, E., Mukherjee, S., Ukoumunne, O. C., Mullan, N., & Bullock, T. (2004). History of deliberate self-harm and its association with mood fluctuation. *Journal of Affective Disorders, 79,* 223-227.

Sanders, B., & Becker-Lausen, E. (1995). The measurement of psychological maltreatment: Early data on the child abuse and trauma scale. *Child Abuse and Neglect, 19,* 315-323.

Sanders, B., McRoberts, G., & Tollefson, C. (1989). Childhood stress and dissociation in a college population. *Dissociation: Progress in the Dissociative Disorders, 2,* 17-23.

Sar, V., Akyuz, G., Kundakci, T., Kiziltan, E., & Dogan, O. (2004). Childhood trauma, dissociation, and psychiatric comorbidity in patients with conversion

disorder. *American Journal of Psychiatry, 161,* 2271-2276.

doi:10.1176/appi.ajp.161.12.2271

Saxe, G.N., et al. (1993). Dissociative disorders in psychiatric inpatients. *Am J Psychiatry, 150*, 1037-1042.

Saxe, G. N., Chawla N., & van der Kolk, B. (2002). Self-destructive behaviour in patients with dissociative disorders. *Suicide and Life Threatening Behaviour, 32,* 313-320. doi:10.1521/suli.32.3.313.22174

Schaffer, C. B., Carroll, J., & Abramowitz, S. (1982). Self-mutilation and the borderline personality. *Journal of Nervous and Mental Disease, 170,* 468-473.

Schwartz, E. D., & Perry, B. D. (1994). The post-traumatic response in children and adolescents. *Psychiatric Clinics of North America, 17,* 311-326.

Seedat, S., Stein, M. B., & Forde, D. R. (2003). Prevalence of dissociative experiences in a community sample: relationships to gender, ethnicity, and substance use. *Journal of Nervous and Mental Disease, 191,* 115-120.

Segman, R. H., Cooper-Kazaz, R., Macciardi, F., Golster, T., Halfon, Y., Dobroborski, T., & Shalev, A. Y. (2001). Association between the dopamine transporter gene and posttraumatic stress disorder. *Molecular Psychiatry, 7,* 903-907.

Selby, E. A., Anestis, M. D., & Joiner, T. E. (2008). Understanding the relationship between emotional and behavioural dysregulation: Emotional cascades. *Behaviour Research and Therapy, 46,* 593-611. doi:10.1016/j.brat.2008.02.002

Selye, H. (1936). A syndrome produced by diverse noxious agents. *Nature, 138,* 32. doi:10.1038/138032a0

Shapiro, S. (1987). Self-mutilation and self-blame in incest victims. *American Journal of Psychotherapy, 41,* 46-54.

Sher, L., & Stanley, B. (2009). Biological models of nonsuicidal NSSI. In M. K. Nock (Ed.). *Understanding nonsuicidal NSSI: Origins, assessment, and treatment* (pp.99-116). Washington, DC: American Psychological Association.

Shipman, K., Edwards, A., Brown, A., Swisher, L., & Jennings, E. (2005). Managing emotion in a maltreating context: A pilot study examining child neglect. *Child Abuse and Neglect, 29,* 1015-1029. doi:10.1016/j.chiabu.2005.01.006

Shipman, K., Zeman, J., Penza, S., & Champion, K. (2000). Emotion management skills in sexually maltreated and nonmaltreated girls: A developmental psychopathology perspective. *Development and Psychopathology, 12,* 47-62.

Siegfried, B., Frischknecht, H. R., & Nunes de Souza, R. L. (1990). An ethological model for the study of activation and interaction of pain, memory and defensive systems in the attacked mouse. Role of endogenous opioids. *Neuroscience and Biobehavioural Reviews, 14,* 481-490.

Simeon, D., Knutelska, M., Nelson, D., Guralnik, O., & Schmeidler, J. (1992). Examination of the pathological dissociation taxon in depersonalization disorder. *Journal of Nervous and Mental disorders, 191,* 738-744.

Simeon, D., Guralnik, O., Schmeidler, J., Sirof, B., & Knutelska, M. (2001). The role of childhood interpersonal trauma in depersonalization disorder. *American Journal of Psychiatry, 158,* 1027-1033. doi:10.1176/appi.ajp.158.7.1027

Simeon, D., Knutelska, M., Nelson, D., Guralnik, O., & Schmeidler, J. (2003). Examination of the pathological dissociation taxon in depersonalization disorder. *Journal of Nervous and Mental Disease, 191,* 738-744.

Simpson, M. A. (1976). Self-mutilation. *British Journal of Hospital Medicine, 16,* 430-438.

Simpson, C. A., & Porter, G. L. (1981). Self-mutilation in children and adolescents. *Bulletin of the Menninger Clinic, 45,* 428-438.

Smith, M. A., Kim, S. Y., van Oers, H. J., & Levine, S. (1997). Maternal deprivation and stress induce immediate early genes in the infant rat brain. *Endocrinology, 138,* 4622-4628. doi:10.1210/en.138.11.4622

Spiegel, D. (1993). *Dissociative disorders: A clinical review.* Lutherville, MD: Sidran Press.

Spiegel, D., & Cardena, E. (1991). Disintegrated experiences: The dissociative disorders revisited. *Journal of Abnormal Psychology, 100,* 366-378.

Spiegel, D., Hunt, T., & Dondershine, H.vE. (1988). Dissociation and hypnotisability in posttraumatic stress disorder. *American Journal of Psychiatry, 145,* 301-305.

Spitzer, C., Barnow, S., Grabe, H. J., Klauer, T., Stieglitz, R. D., Schneider, W., & Freyberger, H. J. (2006). Frequency, clinical and demographic correlates of pathological dissociation in Europe. *Journal of Trauma and Dissociation, 7,* 51-62. doi:10.1300/J229v07n01_05

Spitzer, C., Barnow, S., Freyberger, H. J., & Grabe, H. J. (2006). Recent developments in the theory of dissociation. *World Psychiatry, 5,* 82-86.

Spitzer, C., Haug, H. J., & Freyberger, H. J. (1997). Dissociative symptoms in schizophrenic patients with positive and negative symptoms. *Psychopathology, 30,* 67-75.

Stalker, C. A., & Davies, F. (1995). Attachment organisation and adaption in sexually-abused women. *Canadian Journal of Psychiatry. Revue canadienne de psychiatrie, 40,* 234-240.

Starr, D. L. (2004). Understanding those who self-mutilate. *Journal of Psychosocial Nursing and Mental Health Services, 42,* 32-41.

Staud, R., Vierck, C. J., Cannon, R. L., Mauderli, A. P., & Price, D. D. (2001). Abnormal sensitization and temporal summation of second pain (wind-up) in patients with fibromyalgia syndrome. *Pain, 91,* 165-175. doi:10.1016/S0304-3959(00)00432-2

Steinberg, M., & Schnall, M. (2000). *The stranger in the mirror – Dissociation: The hidden epidemic.* New York: HarperCollins

Stockdale, G. D., Gridley, B.E., Balogh, D. W., & Holtgraves, T. (2002). Confirmatory factor analysis of single and multiple-factor competing models of the dissociative experiences scale in a nonclinical sample. *Assessment, 9,* 94-106.

Styron, T., & Janoff-Bulman, R. (1997). Childhood attachment and abuse: Long-term effects on adult attachment, depression, and conflict resolution. *Child Abuse and Neglect, 21,* 1015-1023.

Suyemoto, K. L., & MacDonald, M. L. (1995). Self-cutting in female adolescents. *Psychotherapy: Theory, Research, Practice, Training, 32,* 162-171. doi:10.1037/0033-3204.32.1.162

Teicher, M. H., Glod, C. A., Surrey, J., & Swett, C. (1993). Early childhood abuse and limbic system ratings in adult psychiatric outpatients. *Journal of Neuropsychiatry and Clinical Neurosciences, 5,* 301-306.

Tellegen, A., Lykken, D. T., Bouchard, T. J., Wilcox, K. J., Segal, N. L., & Rich, S. (1988). Personality similarity in twins reared apart and together. *Journal of Personality and Social Psychology, 54,* 1031-1039.

Thompson, R. A. (1994). Emotion regulation. A theme in search of definition. In N. Fox (Ed.). *The development of emotion regulation: Biological and behavioural considerations.* Monographs of the Society for Research in Child Development, Vol. 59 (pp. 225-252).

Tjaden, P., & Thoennes, N. (2000). Prevalence and consequences of male-to-female and female-to-male intimate partner violence as measured by the National Violence Against Women Survey. *Violence Against Women, 6,* 142-161. doi:10.1177/10778010022181769

Torem, M. S., Hermanowski, R. W., & Curdue, K. J. (1992). Dissociation phenomena and age. *Stress Medicine, 8,* 23-25. doi:10.1002/smi.2460080104

Ursano, R. J., Fullerton, C. S., Kao, T. C., & Bhartiya, V. R. (1995). Longitudinal assessment of posttraumatic stress disorder and depression after exposure to traumatic death. *Journal of Nervous and Mental Disease, 183,* 36-42.

Vantini, G., Perry, B. D., Gucchait, R. B., U'Prichard, D. C., & Stolk, 3, M. (1984), Brain epinephrine systems: Detailed comparison of adrenergic and noradrenergic metabolism, receptor number and 'in vivo' regulation in two inbred rat strains. *Brain Research, 296,* 49-.65.

van der Kolk, B. (1987). *Psychological trauma.* Washington, DC: American Psychiatry Press

van der Kolk, B. A. (1994). The body that keeps the score: Memory and the evolving psychobiology of posttraumatic stress. *Harvard Review of Psychiatry, 1,* 253-265.

van der Kolk, K. (2005). Development trauma disorder: Toward a rational diagnosis for children with complex trauma histories. *Psychiatric Annals, 35,* 401-408.

van der Kolk, B., Greenberg, M., Boyd, H., & Krystal, J. (1985). Inescapable shock, neurotransmitters, and addiction to trauma: towards a psychobiology of post traumatic stress. *Biological Psychiatry, 20,* 314-325. doi:10.1016/0006-3223(85)90061-7

van der Kolk, B. A., Perry, J. C., & Herman, J. L. (1991). Childhood origins of destructive behaviour. *American Journal of Psychiatry, 148,* 1665-1672.

van der Kolk, B. A., & Van der Hart, O. (1989). Pierre Janet and the breakdown of adaption in psychological trauma. *American Journal of Psychiatry, 146,* 1530-1540.

van Moffaert, M. (1989). Management of self-mutilation. *Psychotherapy and Psychosomatics, 51,* 180-186. doi:10.1159/000288154

Vermetten, E., Dorahy, M. J., & Spiegel, D. (2007). *Traumatic dissociation: Neurobiology and treatment.* Arlington, VA: American Psychiatric Publishing.

Villarreal, G., & King, C. Y. (2004). Neuroimaging studies reveal brain changes in posttraumatic stress disorder. *Psychiatric Annals, 34,* 845-856.

Wagner, B. M., Compas, B. E., & Howell, D. C. (1988). Daily and major life events: A test of an integrative model of psychosocial stress. *American Journal of Community Psychology, 16,* 189-205. doi:10.1007/BF00912522

Waldinger, R. J., Schultz, M. S., Barsky, A. J., & Ahern, D. K. (2006). Mapping the road from childhood trauma to adult somatization: the role of attachment. *Psychosomatic Medicine, 68,* 129-135.

Wall, P. D. & Melzack, R. D. (1994). (Eds.) *Textbook of pain,* 3rd ed. Edinburgh, UK: Churchill Livingstone.

Waller, G., Ohanian, V., Meyer, C., Everill, J., & Rouse, H, (2001). The utility of the dimensional and categorical approaches to understanding dissociation in the eating disorders. *British Journal of Clinical Psychology, 40,* 387-397. doi:10.1348/014466501163878

Waller, N., Putnam, F. W., & Carlson, E. B. (1996). Types of dissociation and dissociative types: A taxometric analysis of dissociative experiences. *Psychological Methods, 1,* 300-321.

Waller, N. G., & Ross, C. A. (1997). The prevalence and biometric structure of pathological dissociation in the general population: Taxometric and behaviour genetic findings. *Journal of Abnormal Psychology, 106,* 499-510.

Walsh, B. W., & Rosen, P. M. (1988). *Self-mutilation: Theory, research and treatment.* New York: Guilford Press.

Watkins, L. R., & Mayer, D. J. (1982). Organization of endogenous opiate and nonopiate pain control systems. *Science, 216,* 1185-1192. doi:10.1126/science.6281891

Watson, D. (1988). Intraindividual and interindividual analyses of positive and negative affect: their relation to health complaints, perceived stress, and daily activities. *Journal of Personality and Social Psychology, 54,* 1020-1030.

Weather, F. W., & Keane, T. M. (2007). The criterion a problem revisited: controversies and challenges in defining and measuring psychological trauma. *Journal of Traumatic Stress, 20,* 107-121. doi:10.1002/jts.20210

Weierich, M. R., & Nock, M. K. (2008). Posttraumatic stress symptoms mediate the relation between childhood sexual abuse and nonsuicidal NSSI. *Journal of*

Consulting and Clinical Psychology, 76, 39-44. doi:10.1037/0022-006X.76.1.39

Wells, J. H., Haines, J., Williams, C. L., & Brain, K. L. (1998). The self-mutilative nature of severe onychophagia: A comparison with self-cutting. *Canadian Journal of Psychiatry, 44,* 40-47.

Werry, J., Carlielle, J., & Fitzpatrick, J. (1983). Rhythmic motor activities (sterotypies) in children under five: etiology and prevalence. *Journal of the American Academy of Child and Adolescent Psychiatry, 22,* 329-336. doi:10.1016/S0002-7138(09)60667-1

Wiertelak, L. P., Watkins, L. R. & Maier, S. F. (1992). Conditioned inhibition of analgesia. *Animal Learning and Behaviour, 20,* 339-349.

Wilkins, J., & Coid, J. (1991). Self-mutilation in female remanded prisoners: I. An indicator of severe psychopathology. *Criminal Behaviour and Mental Health, 1,* 247-267

Williams, K., & McGillicuddy-De Lisi, A. (2000). Coping strategies in adolescents. *Journal of Applied Developmental Psychology, 20,* 537-549. doi:10.1016/S0193-3973(99)00025-8

Winchel, R.M., & Stanley, M. (1991). Self-injurious behaviour: A review of the behaviour and biology of self-mutilation. *The American Journal of Psychiatry, 148,* 306-317.

Windle, M. (1992). Temperament and social support in adolescence: Interrelations with depressive symptoms and delinquent behaviours. *Journal of Youth and Adolescence, 21,* 1-21.

Yarcheski, A., & Mahon, N. E. (1999). The moderator-mediator role of social support in early adolescents. *Western Journal of Nursing Research, 21,* 685-698. doi:10.1177/01939459922044126

Yates, T. M. (2004). The developmental psychopathology of self-injurious behaviour: Compensatory regulation in posttraumatic adaption. *Clinical Psychology Review, 24,* 35-74.

Zanarini, M. C., Gunderson, J. G., Frankenberg, F. R., & Chauncey, D. L. (1990). Discriminating borderline personality disorder from other axis II disorders. *American Journal of Psychiatry, 147,* 161-167.

Zanarini, M. C., Laudate, C. S., Frankenburg, F. R., Reich, D. B., & Fitzmaurice, G. (2011). Predictors of self-mutilation in patients with borderline personality disorder: A 10 year follow up study. *Journal of Psychiatric Research, 45,* 823-828. doi:10.1016/j.jpsychires.2010.10.015

Zettle, R. D., Hocker, T. R., Mick, K. A., Scofield, B. E., Peterson, C. L., Song, H., ... & Sudarijanto, R. P. (2010). Differential strategies in coping with pain as a function of level of experiential avoidance. *The Psychological Record, 55,* 511-524.

Zlotnick, C., Donaldson, D., Spirito, A., & Pearlstein, T. (1997). Affect regulation and suicide attempts in adolescent inpatients. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 793-798. doi:10.1097/00004583-199706000-00016

Zlotnick, C., Mattia, J. I., & Zimmermann, M. (1999). Clinical correlates of self-mutilation in a sample of general psychiatric patients. *Journal of Nervous and Mental Disease, 187,* 296-301.

Zweig-Frank, H., Paris, J., & Guzder, J. (1994). Psychological risk factors for

    dissociation and self-mutilation in female patients with borderline personality

    disorder. *Canadian Journal of Psychiatry, 39,* 259-263.

APPENDIX A

Descriptive statistics for the clarity of imagery and accuracy of script content for the pain and no pain group for the NSSI, accidental injury and neutral scripts

Table 12. The mean ratings and standard deviations for the pain and no pain group for the measures of clarity and closeness for each stage of the NSSI, accidental injury and neutral scripts.

Variable	Group	Stage	NSSI		AI		N	
			M	SD	M	SD	M	SD
Closeness	Pain	Scene	83.4	17.6	86.0	10.3	84.5	13.9
		App.	83.8	16.7	83.7	15.8	87.0	16.3
		Inc.	85.9	13.1	84.5	16.8	86.9	15.1
		Cons.	82.0	15.5	82.9	15.8	86.1	16.5
	No pain	Scene	78.4	27.9	82.1	13.7	80.8	15.0
		App.	86.6	13.6	89.2	11.3	81.4	15.8
		Inc.	85.1	13.7	87.0	13.0	85.2	12.8
		Cons.	84.1	15.4	83.9	15.2	83.0	17.2
Clarity	Pain	Scene	77.6	29.7	85.5	12.7	92.3	6.4
		App.	89.9	5.9	89.9	9.8	93.6	4.1
		Inc.	86.6	10.0	89.5	11.6	93.5	3.7
		Cons.	85.0	17.8	85.7	14.7	93.1	4.0
	No pain	Scene	91.1	6.4	91.5	7.9	89.6	11.6
		App.	84.7	14.7	90.2	6.0	85.7	12.6
		Inc.	91.5	6.9	90.0	7.0	87.4	8.6
		Cons.	88.1	10.1	90.0	9.8	85.8	10.4

APPENDIX B

Materials described in study 1

B1: INFORMATION SHEET

UNIVERSITY
OF TASMANIA

INFORMATION SHEET
An Investigation into Stress-Induced Analgesia and Pain during Self-Mutilation

The current study is being conducted by Dr Janet Haines and Miss Katie Dykes of the School of Psychology at the University of Tasmania. The purpose of the study is investigate the relationship between pain sensations and stress-induced analgesia during self-mutilation and the tension reducing properties of this behaviour. This project is being undertaken by Katie Dykes as a component of the Clinical Masters course in Psychology.

We are asking people to participate in this study if they engage in self-mutilation. The information gained from this study will increase the knowledge about why individuals engage in these types of behaviours, its links to pain and their psychological and physiological states at the time of the act. This may assist in the management and treatment of these behaviours.

The information gained from this study will increase the knowledge about why individuals engage in these types of behaviours and their psychological and physiological states at the time of the act. This may assist in the management and treatment of these behaviours.

Participation in this study is completely voluntary. Three hours course credit will be available to Psychology students if required. If you agree to participate, you may withdraw from the study at any time without prejudice. If you wish to withdraw, you may also request that all data related to you be withdrawn from the study. Withdrawal from the study at any time will in no way impact on amount of course credit given.

If you agree to participate, your first session will involve being interviewed on audiotape to obtain information regarding certain events. The first is a self-mutilative event. The second event involves discussing a time when an accidental injury occurred and the third event involves discussing an emotionally neutral event such as making a cup of coffee. The information gathered from the session will be used to form three separate imagery scripts. Imagery scripts are a structured form of the story you told in the preliminary interview stage. Participants will also be interviewed in order to gain information to construct a script about a stressful situation.

Participants will then be asked to attend a second session where a cold pressor test will be administered in order to study pain responses. Participants will be asked to place their hand in a tub of warm water and then in a tub of ice cold water. The test will be administered twice, once following the stressful event script being read and

once without the stressful script being presented. There will be three trials in each of the two conditions, that is, you will be asked to put your hand in the tub of ice water three times without the stressful event you provided being read to you and three times following the stressful event being read to you.

You will then be asked to return for a third session which will involve you being asked to imagine aspects of the events being read to you while measurements of heart rate and respiration rate. This involves electrodes being placed on the participant's ribs and left mastoid process to measure heart rate and a band being placed around the participant's torso to measure respiration rate. The measurement tools used in the study do not cause discomfort although you should be aware that during the placement of the electrode stickers there is a slight risk of a skin rash. After each script has been presented you will be asked to complete visual analogue scales to determine your psychological responses associated with unreality, anxiety, fear, tension and anger. Each of the three stages is estimated to take one hour each.

Some individuals may find that it is distressing or that they become anxious discussing self-mutilative events. If this applies to you, we recommend that you do not participate in this study because we require that individuals discuss their reactions to these events. If you agree to participate but find that you are experiencing feelings of anxiety, distress or discomfort please let us know. We will assist you in any way possible and provide you with an option to withdraw from participating in the study. We do not wish for the study to cause any distress or discomfort for you.

We will regard all data gathered with the strictest of confidence. All written information, computer files and audiotapes will be stored using participation number codes. The data will be stored in a locked cabinet and computer files only accessed by password. Individuals will not be able to be identified from results of the study or in any published works.

If you are interested in participating in the study or wish to discuss this study at any time during the process please contact;

Katie Dykes   Dr Janet Haines
kdykes@utas.edu.au   J.Haines@utas.edu.au

If you wish to discuss any act of self-mutilation with an individual not associated with the study, we suggest that you contact Student Counselling (telephone: 62262697), the University Psychology Clinic (telephone: 62262805) or your general practitioner. The services provided by both Student Counselling and the University Psychology Clinic are free of charge. If you require immediate assistance please tell us as we will be happy to offer support. If you are receiving counselling or psychological support, you may wish to discuss your participation in this study with your counsellor or psychologist before commencing.

We will be happy to discuss your individual results with you. Overall results of the study will be available in hard copy or in electronic form accessed using the School of Psychology website at the conclusion of the study (www.scieng.utas.edu.au/psychol/). If at any time you wish to withdraw from the

study we would be happy to discuss any concerns you may have. All data collected from the study will be kept at the School of Psychology for at least five years. Following this, paper documents will be destroyed using a paper shredder and audiotapes will be destroyed using a bulk eraser.

Please retain this information sheet to refer to if necessary. If you agree to participate in this study you will be provided with a statement of informed consent which you will be asked to read and sign.

Ethics approval has been received by the Human Research Ethics Committee to proceed with the study (ethics reference number H9770). Should you have any concerns, questions or complaints with regard to the ethical conduct of this research, please contact the Executive Officer of the Human Research Ethics (Tasmania) Network, on 6226 7479 or human.ethics@utas.edu.au.

Thank you.

Dr Janet Haines   Katie Dykes

B2: CONSENT FORM

STATEMENT OF INFORMED CONSENT
An Investigation into Stress-Induced Analgesia and Pain during Self-Mutilation

I……………………………………………have read and understood the information sheet regarding this study. The nature and possible effects of this study have been explained to me.

I understand that the study involves;
- Discussing a self-mutilative event, an accidental injury
  event, a stressful event and an emotionally neutral event;
- Recording the discussions of these events on an audiotape to aid the
  preparation of imagery scripts;
- Attending a laboratory session where the cold pressor test will be
  administered and a script of a previously discussed stressful event being
  read. This involves the participant placing their non-dominant hand in a
  tub of warm water and a tub of ice-cold water;
- Rating my psychological responses to the cold pressor test using the
  visual analogue scales;
- Completing a number of questionnaires about various life events;
- Attending a recording session which includes having electrodes and other
  measurement instruments fitted so that measurements of my heart rate
  and
  respiration rate can be made while I am being asked to imagine features
  of the
  previously discussed events;
- Rating my psychological responses to each of the three events using the
  visual analogue scales;
- A time commitment of approximately one hour for the interview and two
  hours
  for the laboratory sessions.

I understand that the data collected from this study will be stored at the School of Psychology for at least 5 years with paper documents being destroyed by paper shredder and audiotapes destroyed by bulk eraser.

I understand that all data collected from this study will be regarded as confidential and that my name will not be attached to the data. Any questions that I have asked have been answered by the researchers to my satisfaction. I agree to participate in this study with the knowledge that I am free to withdraw at any time without prejudice. If I wish to withdraw, I understand that I am able to request all data relating to me be withdrawn from the study. I agree that the research data gathered

may be published, however I understand that if so I will not be able to be identified in published material.

Name of
participant…………………………………………………………………………

Signature………………………………..
Date………………………………..

<div align="center">Investigator's statement</div>

I have explained the study to this participant and I believe that consent is informed and that s/he understands the implications of participation.

Name of
Investigator…………………………………………………………………………...

Signature………………………….........
Date………………………………..

APPENDIX C

Materials referred to in study 1

C1: Self-injurious behaviour checklist

INTERVIEW SCHEDULE

NSSI HISTORY

Age _____

Sex _____

When was the last time you deliberately injured yourself? _____

How many times have you deliberately injured yourself? _____

How long have you been deliberately injuring yourself for? _____

On average, how often do you deliberately injure yourself? _____
(For example: once a day, twice a week, once a month)

How have you deliberately injured yourself?   _____

_____

_____

_____

What parts of your body have you deliberately injured? _____

_____

_____

_____

What instruments did you use to deliberately injure yourself? _____

_____

_____

_____

C2: Visual Analogue Scale
Visual Analogue Scales

Script type:

Stage:

How did you feel: Normal   Unreal
|_____|

How did you feel: Relaxed   Anxious
|_____|

How did you feel: Unafraid   Afraid
|_____|

How did you feel: Relaxed   Tense
|_____|

How did you feel: No pain   Extreme Pain
|_____|

How did you feel: Calm   Angry
|_____|

How well were you able

to clearly picture   Clear   Unclear
the scene described: |_____|

How close to real   Not close   Very close
life was that scene: |_____|

C3: Example of personalised imagery scripts

NEUTRAL SCRIPT

Close your eyes. We'll start the 60 second baseline…
Right. It is morning and you decide to make yourself some breakfast. You are at home in your kitchen. Notice that your brother is also there. Notice the marble benches and white floors of the kitchen with the chrome appliances. You are watching sunrise on TV at the moment. They are doing a segment on the wiggles. Notice that you are feeling pretty normal and awake. **Concentrate on that feeling right now (pause).** Your mind drifts a bit and you think about your essay that you have to do. You can hear the TV in the background and notice them talking about the wiggles. You decide to make yourself some toast with vegemite for breakfast. You are feeling pretty normal and awake. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. You are standing in your kitchen and have decided to make some toast and vegemite for breakfast. You walk over and grab the bread and the margarine from the fridge. You walk over and put the bread in the toaster first which is next to the fridge. Then you walk to the pantry and grab the vegemite. You are feeling pretty awake and normal. **Concentrate on that feeling right now (pause).** On the way back you get a knife as well. You grab the knife from down under the bench. You hear the toast pop up and spread on the margarine and vegemite. You are putting away the butter and vegemite as you use them. You spread your toast on the chopping board. As you go to walk out of the kitchen you grab a plate. You are felling pretty normal. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. You walk around to the bench and sit down on the bar stool. Notice that the paper is open in front of you. You can hear the television on and are watching that a bit too. Notice that sunrise is on. You pick up you toast and begin to eat it. You take a bite, chew the toast and swallow it. You are feeling pretty awake and normal. **Concentrate on that feeling right now (pause).** You continue to eat your toast. You flip over the paper and read about the football on the back page. You start talking to your brother about buying some stuff. You take a bite of toast. Notice that you have nearly finished your toast now. You can taste the vegemite on the toast. You are feeling pretty awake and normal. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. Notice that you have finished your toast. You can still hear the TV playing. You think to yourself that you should go have a shower. You get up from your barstool and walk around to the kitchen. In your hand you have your plate. You walk to the dishwasher which is right at the other end of the kitchen. You are feeling awake and normal. **Concentrate on that feeling right now (pause).** You open up the dishwasher and put in your plate. Now shut the dishwasher door. You can still hear the TV in the background. Think to yourself that you need to go and have your

shower. You start walking downstairs to have your shower. You are feeling awake and pretty normal. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

ACCIDENTAL INJURY SCRIPT

Close your eyes. We'll start the 60 second baseline…
Right. It is in the evening and you are making yourself some pasta for dinner. You are at home in your kitchen. Notice that you can see your brother doing some uni work. Notice the marble benches and white floors of the kitchen with the chrome appliances. You are watching the bill on TV at the moment. Notice that you are ok. **Concentrate on that feeling right now (pause).** Your mind drifts a bit and you think about your essay that you have to do. You are thinking about uni and about travelling. You can hear the TV in the background. Notice the smells coming from the kitchen as you cook dinner. You are feeling ok. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. Notice the pot of boiling water and pasta sitting on the stove. Notice the pot of chilli pasta sauce sitting next to it. That isn't turned on yet. Notice the warmth from the gas stove as you stir the pasta. You can hear the sound of the bill coming from the TV. You are feeling pretty ok. **Concentrate on that feeling right now (pause).** You notice that the pasta has started to stick to the bottom of the pot. You pick up the spoon and begin to stir the pasta. You stir the pasta round and round. You are thinking to yourself about travelling. You continue to stir the pasta and a bit falls out. You are feeling pretty ok. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. You think to yourself that you don't want the pasta to burn on the gas stove. So, with your right hand you reach out to pick up the piece of paper. You feel your index finger touch the piece of metal around the hot plate as you pick up the paper. You pull your finger back really quickly and swear. You feel a sharp pain. **Concentrate on that feeling right now (pause).** Notice the red mark on the knuckle of your index finger. You can feel a sharp pain. You walk over to the sink and turn on the cold tap. Now, hold your finger under the cold water. You hold it under for eight seconds. Notice you can still feel the pain from the burn. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. You take your finger out from under the water. Notice that you can still feel your finger hurting. You shake your finger to get the water off. Now take out a hand towel from underneath the sink. You take the hand towel and dry your finger with it. Notice that you can still feel your finger hurting. **Concentrate on that feeling right now (pause).** You take the hand towel and put it on the handle on the oven. You notice the pasta is still cooking. Now, you walk over and stir the pasta. You don't want it to stick again. Notice that you can still feel your index finger hurting a bit. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

NSSI SCRIPT

Close your eyes. We'll start the 60 second baseline…
Right. You are in your bedroom. You have not been getting along with your brother. He is giving you a really hard time at the moment. He has been being a real smart arse. You are in your bedroom and you are crying hysterically. Your brother is giving you a really hard time and saying stuff to your mum about you. You feeling stressed and fed up. **Concentrate on that feeling right now (pause).** You feel like you have had enough. Notice how dark it is outside the window. Notice all the posters on your bedroom window. You feel like you have had enough. You are sick of your brother giving you a really hard time and being a smart arse. You are feeling fed up. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. You walk to your closet and open a draw. Inside the draw notice a pack of razors. Now, take out one of the razors. Notice how sharp the razor looks. You are feeling really fed up. You are sick of your brother giving you a hard time and being a smart arse. You are upset and are crying hysterically. You have had enough. **Concentrate on that feeling right now (pause).** Notice the razor in your hand. You feel like the stress has just built up. You have been having a really hard time at school as well where all the girls are just being bitches. You are feeling pretty angry. You feel like you have had enough. You are feeling upset and are crying hysterically. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. You are feeling angry and upset. You just want everyone to realise how you are feeling. Now, you take the razor and standing there you begin to cut your wrist. Using your left hand you take the razor and cut the skin on your right wrist. Notice the blood come from the cut. You are concentrating on cutting. You are feeling angry. **Concentrate on that feeling right now (pause).** Holding the razor in your left hand, you continue to cut your right wrist. Notice the blood coming from the cuts. Again, you put the razor to the skin and cut. You are concentrating on cutting your wrist. You are feeling angry. **Concentrate on that feeling right now (pause).**

Close your eyes.
Right. You notice how much blood is coming from your wrist. You grab a towel and hold it against your wrist. Now, you open your bedroom door and walk down to the bathroom. You shut the door behind you after you walk in there. You turn on the tap and put your wrist underneath the water. **Concentrate on that action right now (pause).** You are not crying as much anymore. You start crying again, but notice that you don't feel as distressed as what you did before. You can feel your wrist stinging as you hold it underneath the water. Notice, that you don't feel as distressed anymore. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

APPENDIX D

Descriptive statistics for the psychophysiological and psychological data for
Study 1

Table 13. The mean VAS pain rating and standard deviations for the pain and no pain group for each stage of the NSSI, accidental injury and neutral scripts.

Variable	Group	Stage	NSI		AI		N	
			M	SD	M	SD	M	SD
Pain	Pain	Scene	22.6	26.8	7.3	13.1	5.4	5.1
		App.	33.1	22.5	5.2	4.3	8.4	12.2
		Inc.	44.3	28.8	42.8	31.0	5.1	4.7
		Cons.	38.7	28.9	58.1	34.7	7.1	6.2
	No pain	Scene	15.2	15.0	5.4	4.8	3.9	4.5
		App.	21.2	22.3	6.8	8.5	6.0	9.2
		Inc.	15.0	18.9	70.7	25.8	4.7	4.9
		Cons.	24.2	25.0	74.2	27.3	5.5	6.4

Table 14. The means and standard deviations for the physiological measures for the pain and no pain group for each stage of the NSSI, accidental injury and neutral scripts.

Variable	Group	Stage	NSI		AI		N	
			M	SD	M	SD	M	SD
Heart rate	Pain	Scene	75.4	11.6	72.6	9.2	73.6	12.1
		App.	74.6	11.7	70.0	9.8	73.0	11.8
		Inc.	74.6	11.9	70.4	10.1	74.0	10.9
		Cons.	79.9	10.9	70.2	9.0	73.7	12.0
	No pain	Scene	69.2	16.7	67.9	12.2	64.1	15.6
		App.	64.7	22.0	72.6	14.0	65.3	18.1
		Inc.	70.2	16.8	69.9	12.4	65.9	17.3
		Cons.	66.7	16.6	70.5	12.7	66.4	16.8
Resp. rate	Pain	Scene	17.9	2.5	15.5	1.9	16.8	2.0
		App.	19.6	2.8	16.2	2.2	16.8	1.9
		Inc.	17.8	3.6	18.0	2.4	15.9	1.6
		Cons.	16.2	2.4	17.4	2.0	16.4	1.6
	No pain	Scene	17.8	2.3	15.1	2.5	15.0	2.0
		App.	18.4	3.3	15.7	2.4	14.8	2.6
		Inc.	17.2	3.8	17.1	2.8	14.7	2.9
		Cons.	14.7	2.8	16.3	2.4	14.8	2.9

Table 15. The means and standard deviations for the psychological measures for the pain and no pain group for each stage of the NSSI, accidental injury and neutral scripts.

Variable	Group	Stage	NSI		AI		N	
			M	SD	M	SD	M	SD
Unreality	Pain	Scene	41.9	31.7	9.6	9.3	7.3	9.7
		App.	56.8	28.8	17.2	17.4	8.1	8.5
		Inc.	58.3	27.6	32.5	16.7	5.6	5.5
		Cons.	25.6	14.2	36.7	28.7	4.2	3.9
	No pain	Scene	59.6	16.7	10.4	15.1	6.2	3.4
		App.	72.3	24.7	11.8	19.4	3.8	3.5
		Inc.	62.4	27.0	30.1	23.9	5.4	5.6
		Cons.	27.0	27.4	40.8	32.0	6.0	4.7
Anxiety	Pain	Scene	60.3	33.5	11.1	11.6	12.4	18.6
		App.	74.2	23.6	14.7	16.5	12.4	18.6
		Inc.	57.1	18.3	54.0	20.4	12.9	17.3
		Cons.	35.3	20.1	59.5	25.3	15.2	22.4
	No pain	Scene	75.4	12.4	15.2	25.5	7.9	6.5
		App.	77.6	15.6	12.0	17.9	4.6	5.2
		Inc.	55.7	20.7	53.9	22.4	2.9	2.4
		Cons.	30.0	23.5	69.1	24.0	9.0	10.5
Fear	Pain	Scene	43.3	33.7	7.8	11.0	4.7	5.1
		App.	49.6	28.7	6.6	5.8	7.4	6.3
		Inc.	35.6	30.0	42.5	30.9	10.1	15.2
		Cons.	34.0	21.5	44.9	27.2	8.5	14.5
	No pain	Scene	52.8	26.6	4.2	5.5	5.4	6.0
		App.	49.8	31.4	4.7	3.7	5.2	8.7
		Inc.	39.9	30.7	50.6	21.7	4.1	4.4
		Cons.	32.0	30.0	52.0	28.6	7.7	10.8
Tension	Pain	Scene	57.7	34.1	17.6	14.1	17.8	20.8
		App.	82.4	15.5	16.8	15.3	8.0	11.1
		Inc.	56.0	23.6	59.3	29.3	12.9	10.1
		Cons.	35.7	26.6	61.8	25.4	17.8	23.7

Table 15. cont.

Variable	Group	Stage	NSI		AI		N	
			M	SD	M	SD	M	SD
	No pain	Scene	79.8	13.6	8.2	5.5	4.9	4.8
		App.	75.9	14.6	9.0	6.8	7.7	9.6
		Inc.	57.4	20.4	64.2	21.3	5.8	7.5
		Cons.	30.9	26.7	71.5	27.4	12.5	11.8
Anger	Pain	Scene	54.0	42.9	10.3	11.3	13.1	17.0
		App.	79.3	29.2	10.8	10.5	7.8	6.3
		Inc.	41.8	34.2	51.5	38.7	6.2	4.8
		Cons.	29.8	25.2	60.3	35.3	11.3	14.4
	No pain	Scene	75.7	17.7	8.0	8.4	15.4	20.5
		App.	73.8	23.3	10.6	11.9	13.4	24.1
		Inc.	57.6	27.3	69.4	28.8	15.2	25.3
		Cons.	29.8	23.5	69.3	29.1	16.3	26.0

Table 16. The mean respiration rate and standard deviations for each stage of the NSSI, accidental injury and neutral scripts.

Stage	NSI		AI		N	
	M	SD	M	SD	M	SD
Scene	17.9	2.3	15.3	2.2	15.9	2.2
Approach	19.0	3.0	16.0	2.3	15.8	2.4
Incident	17.5	3.6	17.6	2.6	15.3	2.4
Consequence	15.5	2.6	16.9	2.2	15.6	2.5

Table 17. The mean VAS ratings and standard deviations for each stage of the NSSI, accidental injury and neutral scripts.

VAS	Stage	NSI		AI		N	
		M	SD	M	SD	M	SD
Unreality	Scene	50.8	26.3	10.0	12.2	6.8	7.1
	App.	64.6	27.3	14.5	18.1	6.0	6.7
	Inc.	60.4	26.7	31.3	20.1	5.5	5.4
	Cons.	26.3	21.2	38.8	29.7	5.1	4.3
Anxiety	Scene	67.9	25.8	13.2	19.4	10.2	13.8
	App.	75.9	19.6	13.4	16.8	8.5	13.9
	Inc.	56.4	19.0	54.0	20.8	7.9	13.1
	Cons.	32.4	21.5	64.3	24.5	12.1	17.4
Fear	Scene	48.1	29.9	6.0	8.7	5.1	5.5
	App.	49.7	29.3	5.7	4.8	6.3	7.5
	Inc.	37.8	29.6	46.6	26.3	7.1	11.3
	Cons.	33.0	25.4	48.5	27.4	8.1	12.4
Tension	Scene	68.8	27.7	12.9	11.5	11.4	16.1
	App.	79.2	15.0	12.9	12.2	7.9	10.1
	Inc.	56.7	21.5	61.8	25.1	9.4	9.4
	Cons.	33.3	26.1	66.7	26.2	15.2	18.5
Anger	Scene	64.9	33.8	9.2	9.8	14.3	18.3
	App.	76.6	25.9	10.7	10.9	10.6	17.4
	Inc.	49.7	31.2	60.5	34.5	10.7	18.3
	Cons.	29.8	23.7	64.8	31.8	13.8	20.6

APPENDIX E

Materials referred to in study 2

E1: SCHEDULE OF RECENT EXPERIENCES

Schedule of Recent Experiences
Part A

Instructions: Think back on each possible life event listed below, and decide if it happened to you within the last year. If the event did happen, check the box next to it.

	Check here if event happened to you	**Mean Value**
1. A lot more or a lot less trouble with the boss.	_____	_____
2. A major change in sleeping habits (sleeping a lot more or a lot less, or change in part of day when asleep).	_____	_____
3. A Major change in eating habits (a lot more or a lot less food intake, or very different meal hours or surroundings).	_____	_____
4. A revision of personal habits (dress, manners, associations, etc.).	_____	_____
5. A major change in your usual type and/or amount of recreation.	_____	_____
6. A major change in your social activities (clubs, dancing, movies, visiting, etc.).	_____	_____
7. A major change in church activities (a lot more or a lot less than usual).	_____	_____
8. A major change in number of family get-togethers (a lot more or a lot less than usual).	_____	_____
9. A major change in financial state (a lot worse off or a lot better off than usual).	_____	_____
10. In-law troubles.	_____	_____
11. A major change in the number of arguments with spouse (a lot more or a lot less than usual regarding child-rearing, personal habits, etc.).	_____	_____

12. Sexual difficulties.   _____   _____

Schedule of Recent Experience
Part B

Instructions: In the space provided, indicate the **number of times** that each applicable event happened to you within the last two years.

	No of Times	Mean value	Your score
13. Major personal injury or illness.	_____	_____	_____
14. Death of a close family member (other than spouse).	_____	_____	_____
15. Death of a spouse.	_____	_____	_____
16. Death of a close friend.	_____	_____	_____
17. Gaining a new family member (through birth, adoption, oldster moving in, etc.).	_____	_____	_____
18. Major change in the health or behaviour of a family member.	_____	_____	_____
19. Change in residence.	_____	_____	_____
20. Detention in jail or other institution.	_____	_____	_____
21. Minor violations of the law (traffic tickets, jaywalking, disturbing the peace, etc.).	_____	_____	_____
22. Major business readjustment (merger, reorganization, bankruptcy, etc.).	_____	_____	_____
23. Marriage.	_____	_____	_____
24. Divorce.	_____	_____	_____
25. Marital separation from spouse.	_____	_____	_____

26. Outstanding personal achievement.   _____ _____ _____

27. Son or daughter leaving home (marriage, attending college, etc.).   _____ _____ _____

28. Retirement from work.   _____ _____ _____

29. Major change in working hours or conditions.   _____ _____ _____

30. Major change in responsibilities at work (promotion, demotion, lateral transfer).   _____ _____ _____

31. Being fired from work.   _____ _____ _____

32. Major change in living conditions (Building a new home, remodeling, deterioration of home or neighborhood   _____ _____ _____

33. Wife beginning or ceasing work outside the home.   _____ _____ _____

34. Taking on a mortgage greater than $10, 000 (purchasing a home, business, etc.).   _____ _____ _____

35. Taking on a mortgage or loan or less than $10, 000 (purchasing a car, TV, freezer, etc.).   _____ _____ _____

36. Foreclosure on a mortgage or loan.   _____ _____ _____

37. Vacation.   _____ _____ _____

38. Changing to a new school.   _____ _____ _____

39. Changing to a different line of work.   _____ _____ _____

40. beginning or ceasing formal schooling.   _____ _____ _____

41. Marital reconciliation with mate.   _____ _____ _____

42. Pregnancy.   _____ _____ _____

E2: DAILY HASSLES SCALE

DIRECTIONS: Hassles are irritants that can range from minor annoyances to fairly major pressured, problems, or difficulties. They can occur few or many times. Listed below are a number of ways in which a person can feel hassled. First, circle the hassles that you have experienced in the past month. Then, look at the numbers on the right of the hassles you have identified, then indicate how severe each of the circled hassles has been for you over the past month by circling the appropriate number (1 = somewhat severe; 2 = moderately severe; 3 = extremely severe). Indicate also how often you have experienced those hassles in the past month, again by circling the appropriate number (1 = rarely; 2 = sometimes; 3 = often).

Hassles		*Severity*			*Frequency*		
1.	Misplacing or losing things.	1	2	3	1	2	3
2.	Having to wait.	1	2	3	1	2	3
3.	Not enough sleep.	1	2	3	1	2	3
4.	Family/relationship friction.	1	2	3	1	2	3
5.	Not enough money.	1	2	3	1	2	3
6.	Driving/parking/traffic.	1	2	3	1	2	3
7.	Not enough time to do things.	1	2	3	1	2	3
8.	Domestic chores.	1	2	3	1	2	3
9.	Too many demands/responsibilities.	1	2	3	1	2	3
10.	Minor illness.	1	2	3	1	2	3
11.	Noise.	1	2	3	1	2	3
12.	Machines/technology/computers.	1	2	3	1	2	3
13.	Bureaucracy.	1	2	3	1	2	3
14.	Physical appearance/weight.	1	2	3	1	2	3
15.	Unexpected changes in routine.	1	2	3	1	2	3
16.	Future prospects.	1	2	3	1	2	3
17.	Maintaining proper eating habits.	1	2	3	1	2	3
18.	Running late.	1	2	3	1	2	3
19.	Dealing with difficult/rude/unreliable people.	1	2	3	1	2	3
20.	Dealing with authority figures.	1	2	3	1	2	3

E3: EXAMPLE OF A STRESS INDUCTION SCRIPT

Close your eyes.
Right. You are in your brother's shop. Notice that you are standing behind the counter. Your mum is next to you, but you're not talking. Notice customers walking around the shop. You can see them in the mirrors. At the moment you are stocking the cigarettes. You are feeling pretty ok. **Concentrate on that feeling right now (pause).** You serve a few people who come up to the counter in between stocking the cigarettes. You keep an eye out for anyone trying to steal stock. You have mirrors that you can see down the aisles in while you are at the counter. You are feeling ok. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. You notice a difficult customer has just walked in. She has been rude and difficult in the past and you don't really like serving her. Notice her walking around filling her trolley. You hope that she doesn't give you a hard time this time. Normally you just take it when she is rude. You are feeling ok. **Concentrate on that feeling right now (pause).** This lady has been rude before to you and has asked you what your problem is with her. You hope that she isn't going to be difficult today. You decide to try and be calm if she is going to be a smart arse. **Concentrate on this thought right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. The customer comes up and starts putting all her groceries down really hard on the counter. You give her a look and she starts being rude to you asking you what your problem is. You are starting to get really annoyed and stressed. She is being really rude to you. You are feeling stressed. **Concentrate on that feeling right now (pause).** She finishes putting all her food up and throws her money and cards at you. You think to yourself how rude she is. You can feel your whole face going red. The customer is giving you a really hard time. You are feeling annoyed and stressed. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

Close your eyes.
Right. The lady walks out and as she does she makes a comment to your mum about the service you gave her. You are feeling really angry and stressed. You can feel your whole face going red. Your mum says to you that you should be nice to the customers. You are feeling really angry and stressed. **Concentrate on that feeling right now (pause).** You leave the counter and walk through the aisles. You hit the door as you walk past. You are feeling really angry and stressed about how rude that customer was to you. You don't think you deserve to be treated like that. You are feeling annoyed and stressed. **Concentrate on that feeling right now (pause). Open your eyes and switch that scene off.**

APPENDIX F

Descriptive statistics for the cold pressor data for study 2

Table 18. The mean threshold and tolerance and the standard deviations for the stress and no stress induction conditions.

Condition	Tolerance		Threshold	
	M	SD	M	SD
Stress	117.1	21.1	58.1	14.0
No Stress	76.8	11.3	36.6	7.5

APPENDIX G

Materials described in study 3

G1: INFORMATION SHEET

UNIVERSITY OF TASMANIA

INFORMATION SHEET
An Investigation into Stress-Induced Analgesia and Pain during Self-Injury

Information sheet for participants

Invitation

The current study is being conducted by Dr Janet Haines, Professor Douglas Paton and Ms Katie Dykes of the School of Psychology at the University of Tasmania. The purpose of the study is to investigate the relationship between pain sensations and stress-induced analgesia during self-injury and the tension reducing properties of this behaviour. This project is being undertaken by Katie Dykes as a component of the PhD (Clin).

What is the purpose of this study?

The study aims to investigate the relationship between dissociation and pain in individuals who engage in self-injury. Additionally, the study aims to investigate the links between a trauma history and self-injury. The information gained from this study will increase the knowledge about why individuals engage in these types of behaviours, its links to pain and individuals' psychological and physiological states at the time of the act. This may assist in the management and treatment of these behaviours.

Why have I been invited to participate?

We are investigating two groups of individuals, those who have a history of engaging in self-injury, and those that have no history of engaging in self-injury. Self injury is defined as an individual causing harm to one's own body with enough severity to cause tissue damage but without suicidal intent. Examples of self-injurious behavior include cutting, burning, skin scratching and/or picking, biting one's self and wound excoriation.

Participation in this study is completely voluntary. Two hours course credit will be available to Psychology students if required. If you agree to participate, you may withdraw from the study at any time without prejudice. If you wish to withdraw, you may also request that all data related to you be withdrawn from the study. Withdrawal from the study at any time will in no way impact on amount of course credit given.

This research will take place in the School of Psychology, University of Tasmania, Sandy Bay Campus. Participation in this research will require approximately two hours of your time.

What will I be asked to do?

If you agree to participate, your first session will involve being interviewed to obtain information regarding a stressful event in order to construct a guided imagery script. Imagery scripts are a structured form of the story you told in the preliminary interview stage. Additionally, during the first session you will be asked to complete a number of questionnaires about life events and experiences.

Participants will then be asked to attend a second session where a cold pressor test will be administered in order to study pain responses. Participants will be asked to place their hand in a tub of warm water and then in a tub of ice cold water. The test will be administered twice, once following the stressful event script being read and once without the stressful script being presented. There will be three trials in each of the two conditions, that is, you will be asked to put your hand in the tub of ice water three times without the stressful event you provided being read to you and three times following the stressful event being read to you.

Are there any possible benefits from participation in this study?

This research gives us information about the links between pain, trauma and self-injurious behaviours. Some individuals find it beneficial to talk about their behaviours, and feel that they are helping others by participating. Participants will also be given information about how they can access free counselling services if they are interested in doing so. The results of this study may allow researchers to develop strategies for early identification, intervention and treatment of particular populations.

Are there any possible risks from participation in this study?

Some individuals may find that it is distressing or that they become anxious discussing self-injurious events. If you agree to participate but find that you are experiencing feelings of anxiety, distress or discomfort please let us know. We will assist you in any way possible and provide you with an option to withdraw from participating in the study. We do not wish for the study to cause any distress or discomfort for you.

If you wish to discuss any act of self-injury with an individual not associated with the study, we suggest that you contact Student Counselling (telephone: 62262697), the University Psychology Clinic (telephone: 62262805) or your general practitioner. The services provided by both Student Counselling and the University Psychology Clinic are free of charge. If you require immediate assistance please tell us as we will be happy to offer support. If you are receiving counselling or psychological support, you may wish to discuss your participation in this study with your counsellor or psychologist before commencing.

What if I change my mind during or after the study?

If you agree to participate, you may withdraw from the study at any time without prejudice. You may request that your data be withdrawn from the study if you choose to not participate in the study. Withdrawal from the study at any time will in no way impact on amount of course credit given or your course grades. Participants are able to withdraw their data from the research up to December 2013.

What will happen to the information when this study is over?
We will regard all data gathered with the strictest of confidence. All written information and computer files will be stored using participation number codes. The data will be stored in a locked cabinet and computer files only accessed by password. Individuals will not be able to be identified from results of the study or in any published works. The data will be kept for five years from the date of first publication and then will be shredded and computer files deleted.

How will the results of the study be published?
Overall results of the study will be available in hard copy or in electronic form accessed using the School of Psychology website at the conclusion of the study (www.scieng.utas.edu.au/psychol/). Results should be available July 2014.

What if I have questions about this study?
If you are interested in participating in the study or wish to discuss this study at any time during the process please contact Katie Dykes. kdykes@utas.edu.au
This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. Please quote ethics reference number H0012442

Please retain this information sheet to refer to if necessary. If you agree to participate in this study you will be provided with a statement of informed consent which you will be asked to read and sign.

Thank you.

Dr Janet Haines   Katie Dykes

G2: CONSENT FORM

UNIVERSITY OF TASMANIA

STATEMENT OF INFORMED CONSENT

An Investigation into Stress-Induced Analgesia and Pain during Self-Injury

1. I agree to take part in the research study named above.

2. I have read and understood the Information Sheet for this study.

3. The nature and possible effects of the study have been explained to me.

4. I understand that the study involves:

   - Attending an interview session where the participant will complete a number of questionnaires and discuss a stressful event;
   - Attending a laboratory session where the cold pressor test will be administered and a script of a previously discussed stressful event will be read. This involves the participant placing their non-dominant hand in a tub of warm water and a tub of ice-cold water;
   - Rating my psychological responses to the cold pressor test using the visual analogue scales;
   - Completing a number of questionnaires about various life events;
   - A time commitment of approximately one hour for the interview and one hour for the laboratory sessions.

5. I understand that participation involves the risk that the information discussed may be potentially distressing. I understand that I am free to withdraw from the study at any time without prejudice.

6. I understand that all research data will be securely stored on the School of Psychology, University of Tasmania premises for five years from the publication of the study results, and will then be destroyed.

7. Any questions that I have asked have been answered to my satisfaction.

8. I understand that the researcher(s) will maintain confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research.

9. I understand that the results of the study will be published so that I cannot be identified as a participant.

10. I understand that my participation is voluntary and that I may withdraw at any time without any effect.

11. I understand that if I choose to withdraw from the study, I can ask for my data to be withdrawn. Participants can withdraw their data from the research up until December 2013.

Participant's name:

_____

Participant's signature:

_____

Date: _____

Statement by Investigator

☐ I have explained the project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so participants have had the opportunity to contact me prior to consenting to participate in this project.

Investigator's name:

_____

Investigator's signature:

_____

Date: _____

APPENDIX H

Materials referred to in study 3

H1: DISSOCIATIVE EXPERIENCES SCALE

Name _____ **Date** _____ **Age** _____ **Sex** _____

Directions: This questionnaire consists of twenty-eight questions about experiences that you may have in your daily life. We are interested in how often you have these experiences. It is important, however, that your answers show how often these experiences happen to you when you **are not** under the influence of alcohol or drugs. To answer the questions, please determine to what degree the experience described in the question applies to you and circle the number to show what percentage of the time you have the experience.

Example:

0%	10	20	30	40	50	60	70	80	90	100%
(never)										(always)

1. Some people have the experience of driving a car and suddenly realizing that they don't remember what has happened during all or part of the trip. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

2. Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear all or part of what was said. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

3. Some people have the experience of finding themselves in a place and having no idea how they got there. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

5. Some people have the experience of finding new things among their belongings that they do not remember buying. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

6. Some people sometimes find that they are approached by people that they do not know who call them by another name or insist that they have met them before. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something as if they were looking at another person. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

8. Some people are told that they sometimes do not recognize friends or family members. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

10. Some people have the experience of being accused of lying when they do not think that they have lied. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

11. Some people have the experience of looking in a mirror and not recognizing themselves. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

12. Some people sometimes have the experience of feeling that other people, objects, and the world around them are not real. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

13. Some people sometimes have the experience of feeling that their body does not belong to them. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

18. Some people sometimes find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

19. Some people find that they are sometimes able to ignore pain. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

21. Some people sometimes find that when they are alone they talk out loud to themselves. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were different people. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.). Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing that thing (for example, not knowing whether they have just mailed a letter or have just thought about mailing it). Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

25. Some people find evidence that they have done things that they do not remember doing. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing. Circle a number to show what percentage of the time this happens to you.

0%   10   20   30   40   50   60   70   80   90   100%

27. Some people find that they sometimes hear voices inside their head that tell them to do things or comment on things that they are doing. Circle a number to show what percentage of the time this happens to you.

| 0% | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100% |

28. Some people sometimes feels as if they are looking at the world through a fog so that people or objects appear far away or unclear. Circle a number to show what percentage of the time this happens to you.

| 0% | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100% |

H2: DISSOCIATIVE DISORDERS INTERVIEW SCHEDULE

**DEMOGRAPHIC DATA FOR DISSOCIATIVE DISORDERS
INTERVIEW SCHEDULE**

Age: [   ] [   ]

Sex: Male = 1 Female = 2 [   ]

Marital status: Single = 1 Married(including common-law) = 2

Separated/Divorced = 3 Widowed = 4 [   ]

Number of children: (If no children, score 0) [   ]

Occupational status: Employed = 1 Unemployed = 2 [   ]

Have you been in jail in the past?

Yes = 1 No = 2 Unsure = 3 [   ]

Physical diagnoses currently active

[   ]

[   ]

[   ]

Current and past diagnoses must consist of written diagnoses provided by the referring physician or available in the patient's chart (give DSM-III codes if possible, if not write DSM-Ill diagnoses to the right of the brackets).

Psychiatric diagnoses currently active

[   ]

[   ]

[   ]

Psychiatric diagnoses currently in remission

[   ]

[   ]

[   ]

Questions in the Dissociative Disorders Interview Schedule must be asked in the order they occur in the Schedule. All the items in the Schedule, including all the items in the DSM-III diagnostic criteria for dissociative disorders and borderline personality disorder must be enquired about. The wording of the questions should be used exactly as written in order to standardize the information gathered by different interviewers. The interviewer should not read the section headings aloud. The interviewer should open the interview by thanking the subject for his/her participation and then should say:

"Most of the questions I will ask can be answered Yes, No or Unsure. A few of the questions have different answers and I will explain those as we go along."

1 . Somatic Complaints

1 . Do you suffer from headaches?
Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 1, go to question 3:

2. Have you been told by a doctor that you have migraine headaches?
Yes = 1   No=2   Unsure = 3   [   ]

Interviewer should read the following to the subject:

"I am going to ask you about a series of physical symptoms now . To count a symptom as present and to answer yes in these questions, the following must be met:

a) no physical disorder has been found to account for the symptom.
b) the symptom does not occur only during a panic attack.
c) it caused you to take medicine (other than aspirin), see a doctor, or alter your life style .'

Interviewer should now ask the subject, "Have you ever had the following physical symptoms for which doctors could find no physical explanation?"

The interviewer should review criteria a-c for the subject immediately following the first positive response to ensure that the subject has understood.

3. Abdominal pain (other than when menstruating)
Yes = 1   No=2   Unsure = 3   [   ]

4. Nausea (other than motion sickness)
Yes = 1   No=2   Unsure = 3   [   ]

5. Vomiting (other than motion sickness)
Yes = 1   No=2   Unsure = 3   [   ]

6. Bloating (gassy)
Yes = 1   No=2   Unsure = 3   [   ]

7. Diarrhoea
Yes = 1   No=2   Unsure = 3   [   ]

8. Intolerance of (gets sick on) several different foods
Yes = 1   No=2   Unsure = 3   [   ]

9. Back pain
Yes = 1   No=2   Unsure = 3   [   ]

10. Joint pain
    Yes = 1   No=2   Unsure = 3   [ ]

11. Pain in extremities (the hands and feet)
    Yes = 1   No=2   Unsure = 3   [ ]

12. Pain in genitals other than during intercourse
    Yes = 1   No=2   Unsure = 3   [ ]

13. Pain during urination
    Yes = 1   No=2   Unsure = 3   [ ]

14. Other pain (other than headaches)
    Yes = 1   No=2   Unsure = 3   [ ]

15. Shortness of breath when not exerting oneself
    Yes = 1   No=2   Unsure = 3   [ ]

16. Palpitations (a feeling that your heart is beating very strongly)
    Yes = 1   No=2   Unsure = 3   [ ]

17 . Chest pain
    Yes = 1   No=2   Unsure = 3   [ ]

18. Dizziness
    Yes = 1   No=2   Unsure = 3   [ ]

19. Difficulty swallowing
    Yes = 1   No=2   Unsure = 3   [ ]

20 . Loss of voice
    Yes = 1   No=2   Unsure = 3   [ ]

21. Deafness
    Yes = 1   No=2   Unsure = 3   [ ]

22. Double vision
    Yes = 1   No=2   Unsure = 3   [ ]

23 . Blurred vision
    Yes = 1   No=2   Unsure = 3   [ ]

24. Blindness
    Yes = 1   No=2   Unsure = 3   [ ]

25. Fainting or loss of consciousness
    Yes = 1   No=2   Unsure = 3   [ ]

26. Amnesia
    Yes = 1   No=2   Unsure = 3   [ ]

27. Seizure or convulsion
    Yes = 1   No=2   Unsure = 3   [ ]

28. Trouble walking
    Yes = 1   No=2   Unsure = 3   [ ]

29. Paralysis or muscle weakness
      Yes = 1   No=2   Unsure = 3   [   ]

30. Urinary retention or difficulty urinating
      Yes = 1   No=2   Unsure = 3   [   ]

31. Long periods with no sexual desire
      Yes = 1   No=2   Unsure = 3   [   ]

32. Pain during intercourse
      Yes = 1   No=2   Unsure = 3   [   ]

Note: If subject is male ask question 33 and then go to question 38 . If female, go to question 34.

33. Impotence
      Yes = 1   No=2   Unsure = 3   [   ]

34. Irregular menstrual periods
      Yes = 1   No=2   Unsure = 3   [   ]

35. Painful menstruation
      Yes = 1   No=2   Unsure = 3   [   ]

36. Excessive menstrual bleeding
      Yes = 1   No=2   Unsure = 3   [   ]

37. Vomiting throughout pregnancy
      Yes = 1   No=2   Unsure = 3   [   ]

38. Have you had many physical problems or a belief that you have been sick, for several years beginning before the age of 30?
      Yes = 1   No=2   Unsure = 3   [   ]

39. Have you ever had any other serious physical symptoms for which doctors could find no explanation?
      Yes = 1   No=2   Unsure = 3   [   ]

H. Substance Abuse
40. Have you ever had a drinking problem?
      Yes = 1   No=2   Unsure = 3   [   ]

41. Have you ever used street drugs extensively?
      Yes = 1   No=2   Unsure = 3   [   ]

42. Have you ever injected drugs intravenously?
      Yes = 1   No=2   Unsure = 3   [   ]

43. Have you ever had treatment for a drug or alcohol problem?
      Yes = 1   No=2   Unsure = 3   [   ]

III . Psychiatric History
44. Have you ever had treatment for an emotional problem or mental disorder?
      Yes = 1   No=2   Unsure = 3   [   ]

45. Do you know what psychiatric diagnoses, if any, you have been given in the past?
    Yes = 1   No=2   Unsure = 3   [   ]

46. Have you ever been diagnosed as having:
    a) depression   [   ]
    b) mania   [   ]
    c) schizophrenia   [   ]
    d) anxiety disorder   [   ]
    e) other psychiatric disorder (specify)   [   ]
    Yes = 1   No=2   Unsure = 3

If subject did not volunteer a diagnosis for 46 (e) go to question 48.

47. If the subject volunteered diagnoses for (e) did the subject volunteer any of the following:
    a) psychogenic amnesia   [   ]
    b) psychogenic fugue   [   ]
    c) multiple personality disorder   [   ]
    d) depersonalization disorder   [   ]
    e) atypical dissociative disorder   [   ]
    Yes = 1   No=2   Unsure = 3

48. Have you ever been prescribed psychiatric medication?
    Yes = 1   No=2   Unsure = 3   [   ]

49 . Have you ever been prescribed one of the following medications?
    a) antipsychotic
    b) antidepressant
    c) lithium
    d) anti-anxiety or sleeping medication
    e) other (specify)
    Yes = 1   No=2   Unsure = 3   [   ]

50. Have you ever received ECT, also known as electroshock treatment?
    Yes = 1   No=2   Unsure = 3   [   ]

51 . Have you ever had therapy for emotional, family, or psychological problems, for more than 5 sessions in one course of treatment?
    Yes = 1   No=2   Unsure = 3   [   ]

52. How many therapists, if any, have you seen for emotional problems or mental illness in your life?
    Unsure = 89   [   ] [   ]

If subject answered No to both questions 51 and 52, go to question 54.

53. Have you ever had a treatment for an emotional problem or mental illness which was ineffective?
    Yes = 1   No=2   Unsure = 3   [   ]

IV. Major Depressive Episodes

The purpose of this section is to determine whether the subject has ever had or currently has a major depressive episode.

54. Have you ever had a period of depressed mood lasting at least two weeks in which you lost interest or pleasure in all or almost all usual activities and past times and felt depressed, blue, hopeless, low, down in the dumps or irritable?
    Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 54, go to question 62.

If subject answered Yes or Unsure, interviewer should ask, "During this period did you experience the following symptoms nearly every day for at least two weeks?"

55 . Poor appetite or significant weight loss (when not dieting) or increased appetite or significant weight gain.
    Yes = 1   No=2   Unsure = 3   [   ]

56. Sleeping too little or too much.
    Yes = 1   No=2   Unsure = 3   [   ]

57. Being physically and mentally slowed down, or agitated to the point where it was noticeable to other people.
    Yes = 1   No=2   Unsure = 3   [   ]

58. Loss of interest or pleasure in usual activities, or decrease in sexual drive.
    Yes = 1   No=2   Unsure = 3   [   ]

59. Loss of energy ; fatigue.
    Yes = 1   No=2   Unsure = 3   [   ]

60. Feelings of worthlessness, self-reproach, or excessive or inappropriate guilt.
    Yes = 1   No=2   Unsure = 3   [   ]

61 . Difficulty concentrating or difficulty making decisions.
    Yes = 1   No=2   Unsure = 3   [   ]

62. Have you ever had recurrent thoughts of death, suicidal thoughts, wishes to be dead, or attempted suicide?
    Yes = 1   No=2   Unsure = 3   [   ]

If you have made a suicide attempt, did you:
a)   take an overdose   [   ]
b)   slash your wrists or other body areas   [   ]
c)   inflict cigarette burns or other self injuries   [   ]
d)   use a gun, knife, or other weapons   [   ]
e)   attempt hanging   [   ]
f)   use another method   [   ]
    Yes = 1   No=2   Unsure = 3   [   ]

63. If you have had an episode of depression as described above, is it: [   ]
currently active, first occurrence = 1
currently in remission = 2
currently active, recurrence = 3
uncertain = 4
due to a specific organic cause = 5

V. Schneiderian First Rank Symptoms

64 . Have you ever experienced the following:
   Yes = 1   No=2   Unsure = 3   [   ]

a) voices arguing in your head   [   ]
b) voices commenting on your actions   [   ]
c) having your feelings made or controlled by someone or something outside you   [   ]
d) having your thoughts made or controlled by someone or something outside you   [   ]
e) having your actions made or controlled by someone or something outside you   [   ]
f) influences from outside you playing on or affecting your body such as some external
        force or power   [   ]
g) having thoughts taken out of your mind   [   ]
h) thinking thoughts which seemed to be someone else's   [   ]
i) hearing your thoughts out loud   [   ]
j) other people being able to hear your thoughts as if they're out loud   [   ]
k) thoughts of a delusional nature that were very out of touch with reality   [   ]

If subject answered No to all Schneiderian symptoms, go to question 67, otherwise,
interviewer should ask:

"If you have experienced any of the above symptoms are they clearly limited to one of the
following :"

65. Occurred only under the influence of drugs, or alcohol.
   Yes = 1   No=2   Unsure = 3   [   ]

66. Occurred only during a major depressive episode.
   Yes = 1   No=2   Unsure = 3   [   ]

VI. Trances, Sleepwalking, Childhood Companions

67. Have you ever walked in your sleep?
   Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 67, go to question 69.

68. If you have walked in your sleep, how many times, roughly?
   1-10 = 1   11-50 = 2   >50 = 3   Unsure = 4   [   ]

69. Have you ever had a trance-like episode where you stare off into space, lose awareness of
what is going on around you and lose track of time?
   Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 69, go to question 71.

70. If you have had this experience, how many times, roughly?
   1-10 = 1   11-50 = 2   >50 = 3   Unsure = 4   [   ]

71 . Did you have imaginary playmates as a child?
   Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 71, go to question 73.

72. If you had imaginary playmates, how old were you when they stopped?
   Unsure= 0   [   ] [   ]

If subject still has imaginary companions score subject's current age.

VII. Childhood Abuse

73. Were you physically abused as a child or adolescent?
   Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 73, go to question 78.

74. Was the physical abuse independent of episodes of sexual abuse?
   Yes = 1   No=2   Unsure = 3   [   ]

75. If you were physically abused, was it by:
   a)   father   [   ]
   b)   mother   [   ]
   c)   stepmother   [   ]
   d)   stepfather   [   ]
   e)   sibling   [   ]
   f)   male relative   [   ]
   g)   female relative   [   ]
   h)   other male   [   ]
   i)   other female   [   ]
   Yes = 1   No=2   Unsure = 3

76. If you were physically abused, how old were you when it started?
   Unsure = 89.   If less than 1 year, score 0.   [   ] [   ]

77. If you were physically abused how old were you when it stopped?
   Unsure = 89 . If less than 1 year score 0.
   If ongoing score subject's current age.   [   ] [   ]

78. Were you sexually abused as a child or adolescent? Sexual abuse includes rape, or any type of unwanted sexual touching or fondling that you may have experienced.
   Yes = 1   No=2   Unsure = 3   [   ]

If the subject answered No to question 78, go to question 85 . If the subject answered Yes or Unsure to question 78, the interviewer should state the following before asking further questions on sexual abuse:

"The following questions concern detailed examples of the types of sexual abuse you may or may not have experienced. Because of the explicit nature of these questions, you have the option not to answer any or all of them. The reason I am asking these questions is to try to determine the severity of the abuse that you experienced. You may answer Yes, No, Unsure or not give an answer to each question."

79. If you were sexually abused was it by:
   a)   father   [   ]
   b)   mother   [   ]
   c)   stepfather   [   ]
   d)   stepmother   [   ]
   e)   sibling   [   ]
   f)   male relative   [   ]
   g)   female relative   [   ]
   h)   other male   [   ]
   i)   other female   [   ]
   Yes = 1   No=2   Unsure = 3   No Answer = 4

If subject is female skip question 80 . If male skip question 81.

80. If you are male and were sexually abused, did the abuse involve:

a) hand to genital touching   [   ]
b) other types of fondling   [   ]

c)   intercourse with a female   [   ]
d) anal intercourse with a male - you active   [   ]
e) you performing oral sex on a male   [   ]
f) you performing oral sex on a female   [   ]
g) oral sex done to you by a male   [   ]
h) oral sex done to you by a female   [   ]
i) anal intercourse - you passive   [   ]
j) enforced sex with animals   [   ]
k) pornographic photography   [   ]
l) other (specify)   [   ]
   Yes = 1   No=2   Unsure = 3   No Answer = 4

81 . If you are female and were sexually abused, did the abuse involve:
a) hand to genital touching   [   ]
b) other types of fondling   [   ]
c) intercourse with a male   [   ]
d) simulated intercourse with a female   [   ]
e) you performing oral sex on a male   [   ]
f) you performing oral sex on a female   [   ]
g) oral sex done to you by a male   [   ]
h) oral sex done to you by a female   [   ]
i) anal intercourse with a male   [   ]
j) enforced sex with animals   [   ]
k) pornographic photography   [   ]
l) other (specify)   [   ]
   Yes = 1   No=2   Unsure = 3   No Answer = 4

82. If you were sexually abused, how old were you when it started?
    Unsure = 89 . If less than 1 year, score 0.   [   ] [   ]

83. If you were sexually abused, how old were you when it stopped?
    Unsure = 89 . If less than 1 year score 0.
    If ongoing score subject's current age.   [   ] [   ]

84. How many separate incidents of sexual abuse were you subjected to up until the age of 18?
    1-5=1   6-10=2   11-50=3   >50=4   Unsure=5   [   ]

85 . How many separate incidents of sexual abuse were you subjected to after the age of 18?
    0=1   1-5=2   6-10=3   11 -50=4   >50=5   Unsure=6   [   ]

VIII. Features Associated with Multiple Personality Disorder

For questions 86-95, if subject answers Yes, ask subject to specify whether it is occasionally, fairly often or frequently, excluding question 93.

86. Have you ever noticed that things are missing from your personal possessions or where you live?
    Never = 1   Occasionally = 2   Fairly Often = 3
    Frequently = 4   Unsure = 5   [   ]

87. Have you ever noticed that there are things present where you live, and you don't know where they came from or how they got there? e .g . clothes, jewellery, books, furniture.
    Never = 1   Occasionally = 2   Fairly Often = 3
    Frequently = 4   Unsure = 5   [   ]

88. Have you ever noticed that your handwriting changes drastically or that there are things around in handwriting you don't recognize?

    Never = 1   Occasionally = 2   Fairly Often = 3

    Frequently = 4   Unsure = 5   [   ]

89. Do people ever come up and talk to you as if they know you but you don't know them, or only know them faintly?

    Never = 1   Occasionally = 2   Fairly Often = 3

    Frequently = 4   Unsure = 5   [   ]

90. Do people ever tell you about things you 've done or said, that you can ' t remember, not counting times you have been using drugs or alcohol?

    Never = 1   Occasionally = 2   Fairly Often = 3

    Frequently = 4   Unsure = 5   [   ]

91. Do you ever have blank spells or periods of missing time that you can ' t remember, not counting times you have been using drugs or alcohol?

    Never = 1   Occasionally = 2   Fairly Often = 3

    Frequently = 4   Unsure = 5   [   ]

92. Do you ever find yourself coming to in an unfamiliar place, wide awake, not sure how you got there, and not sure what has been happening for the past while, not counting times when you have been using drugs or alcohol?

    Never = 1   Occasionally = 2   Fairly Often = 3

    Frequently = 4   Unsure = 5   [   ]

93. Are there large parts of your childhood after age 5 which you can't remember?

    Yes = 1   No=2   Unsure = 3   [   ]

94. Do you ever have memories come back to you all of a sudden, in a flood or like flashbacks?

    Never = 1   Occasionally = 2   Fairly Often = 3

    Frequently = 4   Unsure = 5   [   ]

95. Do you ever have long periods when you feel unreal, as if in a dream, or as if you're not really there, not counting when you are using drugs or alcohol?

    Never = 1   Occasionally = 2   Fairly Often = 3

    Frequently = 4   Unsure = 5   [   ]

96. Do you hear voices talking to you sometimes or talking inside your head?

    Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 96, go to question 98.

97. If you hear voices, do they seem to come from inside you?

    Yes = 1   No=2   Unsure = 3   [   ]

98. Do you ever speak about yourself as "we" or " us " ?

    Yes = 1   No=2   Unsure = 3   [   ]

99. Do you ever feel that there is another person or persons inside you?

    Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 99, go to question 102.

100. Is there another person or persons inside you that has a name?

    Yes = 1   No=2   Unsure = 3   [   ]

101 . If there is another person inside you, does he or she ever come out and take control of your body?

        Yes = 1   No=2   Unsure = 3   [   ]

IX. Supernatural/Possession/ESP Experiences/Cults

102. Have you ever had any kind of supernatural experience?

        Yes = 1   No=2   Unsure = 3   [   ]

103. Have you ever had any extrasensory perception experiences such as:

    a) mental telepathy   [   ]
    b) seeing the future while awake   [   ]
    c) moving objects with your mind   [   ]
    d) seeing the future in dreams   [   ]
    e) deja vu (the feeling that what is happening to you has happened before   [   ]
    f) other (specify)   [   ]
    Yes = 1   No=2   Unsure = 3

104. Have you ever felt you were possessed by a:

    a) demon   [   ]
    b) dead person   [   ]
    c) living person   [   ]
    d) some other power or force   [   ]
    Yes = 1   No=2   Unsure = 3

105. Have you ever had any contact with:

    a) ghosts   [   ]
    b) poltergeists (cause noises or objects to move around)   [   ]
    c) spirits of any kind   [   ]
  Yes = 1   No=2   Unsure = 3

106. Have you ever felt you know something about past lives or incarnations of yours?

        Yes = 1   No=2   Unsure = 3   [   ]

107. Have you ever been involved in cult activities?

        Yes = 1   No=2   Unsure = 3   [   ]

X. Borderline Personality Disorder

Interviewer should state, "For the following eight questions, please answer Yes only if you have been this way much of the time for much of your life . Have you experienced :"

108. Impulsive or unpredictable behavior in at least two areas that are potentially self-damaging, e .g., spending, sex, gambling, substance use, shoplifting, overeating, physically self-damaging acts.

        Yes = 1   No=2   Unsure = 3   [   ]

109. A pattern in which many of your personal relationships tend to be intense, but unstable and short-lived.

        Yes = 1   No=2   Unsure = 3   [   ]

110. Intense anger or lack of control of anger, e .g., frequent displays of temper, constant anger.

        Yes = 1   No=2   Unsure = 3   [   ]

111. Feeling uncertain about your identity, which may include problems with self-image, self-awareness, sexual identity or career choice . e .g. because you feel uncertain about who you are, you may try to imitate different people in an attempt to discover which identity fits best for you.
    Yes = 1   No=2   Unsure = 3   [   ]

112. Frequent mood swings: noticeable shifts from normal mood to depression, irritability or anxiety.
    Yes = 1   No=2   Unsure = 3   [   ]

113. Feeling uncomfortable being alone, e .g . frantic efforts to avoid being alone, depressed when alone.
    Yes = 1   No=2   Unsure = 3   [   ]

114. Physically self-damaging acts, e.g., suicidal gestures, self-mutilation, recurrent accidents or physical fights.
    Yes = 1   No=2   Unsure = 3   [   ]

115. Chronic feelings of emptiness or boredom.
    Yes = 1   No=2   Unsure = 3   [   ]

XL Psychogenic Amnesia

116. Have you ever experienced sudden inability to recall important personal information or events that is to extensive to be explained by ordinary forgetfulness?
    Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No or Unsure to question 116, go to 118.

117. If you answered Yes to the previous question was the disturbance due to a known physical disorder (e .g., blackouts during alcohol intoxication, or stroke)?
    Yes = 1   No=2   Unsure = 3   [   ]

XII. Psychogenic Fugue

118. Have you ever experienced sudden unexpected travel away from your home or customary place of work, with inability to recall your past?
    Yes = 1   No=2   Unsure = 3   [   ]

119. Have you ever assumed a new identity (partial or complete)?
    Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to one or both of questions 118 and 119, go to 121.

120. If you answered Yes to both the previous two questions was the disturbance due to a known physical disorder? (e .g., blackouts during alcohol intoxication, or stroke)?
    Yes = 1   No=2   Unsure = 3   [   ]

XIII. Depersonalization Disorder

121. Interviewer should say, "I am now going to ask you a series of questions about depersonalization . Depersonalization means feeling unreal, feeling as if you're in a dream, seeing yourself from outside your body or similar experiences ."
    a) Have you had one or more episodes of depersonalization sufficient to cause problems in your work or social life?
    Yes = 1   No=2   Unsure = 3   [   ]

b) Have you ever had the feeling that your feet and hands or other parts of your body have changed in size?
Yes = 1   No=2   Unsure = 3   [   ]
c) Have you ever experienced seeing yourself from outside your body?
Yes = 1   No=2   Unsure = 3   [   ]
d) Have you ever had a strong feeling of unreality that lasted for a period of time, not counting when you are using drugs or alcohol?
Yes = 1   No=2   Unsure = 3   [   ]
If subject did not answer Yes to any of 121 a-d, go to question 123.

122 . If you answered Yes to any of the previous questions about depersonalization, was the disturbance due to another disorder, such as Schizophrenia, Affective Disorder, Organic Mental Disorder (mental disorder with a physical cause), Anxiety Disorder, or epilepsy?
Yes = 1   No=2   Unsure = 3   [   ]

XIV. Multiple Personality Disorder - NIMH Research Criteria, consisting of DSM-III (123-125) criteria plus two further criteria (126-127)

123. Have you ever felt like there are two or more very different personalities within yourself, each of which is dominant at a particular time?
Yes = 1   No=2   Unsure = 3   [   ]

If subject answered No to question 123, go to question 128.

Do any of the following apply to you?

124. The personality or part of you that is dominant at any particular time controls your behavior.
Yes = 1   No=2   Unsure = 3   [   ]

125. Each individual personality is complex and has behaviors and social relationships that are not shared by the other personalities.
Yes = 1   No=2   Unsure = 3   [   ]

126. Two or more different personalities, have been in control of your body on at least three separate occasions.
Yes = 1   No=2   Unsure = 3   [   ]

127. Some type of amnesia or combination of types of amnesia exists among the different personalities.
Yes = 1   No=2   Unsure = 3   [   ]

XV. Atypical Dissociative Disorder (Dissociative Disorder Not Otherwise Specified)

128. Subject appears to have a dissociative disorder but does not satisfy the criteria for a specific dissociative disorder . Examples include trance-like states, derealisation unaccompanied by depersonalization, and those more prolonged dissociated states that may occur in persons who have been subjected to periods of prolonged and intense coercive persuasion (brainwashing, thought reform, and indoctrination while the captive of terrorists or cultists).
Yes = 1   No=2   Unsure = 3   [   ]

XVI. Concluding Items

129. During the interview, did the subject display unusual, illogical, or idiosyncratic though processes?
     Yes = 1   No=2   Unsure = 3   [   ]

130. If the subject is assessed as having a multiple personality disorder, and answered Yes to question 1, the interviewer should ask, "In your opinion are the headaches I asked about earlier part of your problem with different personalities controlling you?"
     Yes = 1   No=2   Unsure = 3   [   ]

131. If the subject is assessed as having MPD, and has also received the diagnosis of depression (question 63), the interviewer should ask : "In your opinion is the depression I asked about earlier:"
Confined to one personality = 1   [   ]
Affects most or all personalities = 2   [   ]
Unsure = 3   [   ]

Interviewer should make a brief concluding statement telling subject that there are no more questions, and thanking the subject for his/her participation.

H3: STEINBERG DEPERSONALIZATION QUESTIONNAIRE

At times anyone may feel as if they are just going through the motions of life, or they may experience detachment from their feelings, but if these sensations are consistent and are making it hard to function and relate to others, these may be signs of dissociation. This screening test is designed to determine whether you have experienced signs of depersonalization and may be at risk for a dissociative disorder. Review the following statements and indicate how often you have had that experience.

	Never	Once or twice	Sometimes	Many times	Almost all the time	Only with drugs or alcohol
1. I have gone thru the motions of living while the real me was far away from what was happening to me.	○	○	○	○	○	○
2. I have felt that I was living in a dream	○	○	○	○	○	○
3. I have been able to see myself from a distance, as if I were outside of my body watching a movie of myself.	○	○	○	○	○	○
4. I feel that I can turn off or detach from my emotions.	○	○	○	○	○	○
5. My behavior has felt out of control.	○	○	○	○	○	○
6. I have purposely hurt or cut myself so that I could feel pain or that I am real.	○	○	○	○	○	○
7. I have gone through the motions of working while I felt that my mind was somewhere else.	○	○	○	○	○	○
8. I feel as if I am "spacey".	○	○	○	○	○	○
9. I have had the feeling that I was a stranger to myself or have not recognized myself in the mirror.	○	○	○	○	○	○
10. One part of me does things while an observing part talks to me about them.	○	○	○	○	○	○
11. I have felt as if parts of my body were disconnected from the rest of my body.	○	○	○	○	○	○
12. My whole body or parts of it have seemed unreal or foreign to me.	○	○	○	○	○	○
13. I have felt as if words flowed from my mouth but they were not in my control.	○	○	○	○	○	○
14. I have felt that my emotions are not in my control.	○	○	○	○	○	○
15. I have felt invisible.	○	○	○	○	○	○

IF YOU HAVE HAD ANY OF THE ABOVE EXPERIENCES, ANSWER THE FOLLOWING:

	NO	YES
Did the experience(s) interfere with your relationships with friends, family or coworkers?	○	○
Did it affect your ability to work?	○	○
Did it cause you discomfort or stress?	○	○

APPENDIX I

Descriptive statistics for the questionnaire data for study 3

Table 19. The mean SDQ and DES scores and the standard deviations for the low and high dissociation groups.

Group	SDQ		DES	
	M	SD	M	SD
Low dissociative experiences	28.3	6.7	12.7	8.2
High dissociative experiences	40.1	5.2	48.1	10.0

Table 20. The mean total DDIS diagnoses and number of trances/sleepwalking episodes and the standard deviations for the low and high dissociation groups.

Group	Total DDIS diagnoses		Trances/sleepwalking episodes	
	M	SD	M	SD
Low dissociative experiences	0.9	0.7	1.1	0.7
High dissociative experiences	2.8	1.4	1.8	0.9

Table 21. The mean subjective pain rating and the standard deviations for the low and high dissociation groups for the stress and no stress conditions.

Condition	Group	Pain rating	
		M	SD
Stress	Low dissociative experiences	4.3	1.5
	High dissociative experiences	5.4	1.2
No stress	Low dissociative experiences	6.2	0.7
	High dissociative experiences	6.1	1.7

Table 22. The mean threshold and tolerance measurements and the standard deviations for the stress and no stress condition for the total sample.

Condition	Threshold		Tolerance	
	M	SD	M	SD
Stress	59.3	15.8	93.9	18.0
No stress	21.1	4.3	44.0	7.6

APPENDIX J

Materials described in study 4

J1: INFORMATION SHEET

UNIVERSITY
OF TASMANIA

INFORMATION SHEET

An Investigation into Stress-Induced Analgesia and Pain during Self-Injury and the impact of trauma on these factors
Information sheet for participants

Invitation
The current study is being conducted by Dr Janet Haines, Professor Douglas Paton and Ms Katie Dykes of the School of Psychology at the University of Tasmania. The purpose of the study is to investigate the relationship between trauma history and self-injury. This project is being undertaken by Katie Dykes as a component of the PhD (Clin).

What is the purpose of this study?
The study aims to investigate the links between a trauma history and self-injury. The information gained from this study will increase the knowledge about why individuals engage in these types of behaviours and individuals' psychological and physiological states at the time of the act. This may assist in the management and treatment of these behaviours.

Why have I been invited to participate?
We are investigating two groups of individuals, those who have a history of engaging in self-injury, and those that have no history of engaging in self-injury. Self injury is defined as an individual causing harm to one's own body with enough severity to cause tissue damage but without suicidal intent. Examples of self-injurious behavior include cutting, burning, skin scratching and/or picking, biting one's self and wound excoriation.

Participation in this study is completely voluntary. One hour course credit will be available to Psychology students if required. If you agree to participate, you may withdraw from the study at any time without prejudice. If you wish to withdraw, you may also request that all data related to you be withdrawn from the study. Withdrawal from the study at any time will in no way impact on amount of course credit given.

This research will take place in the School of Psychology, University of Tasmania, Sandy Bay Campus. Participation in this research will require approximately one hour.

What will I be asked to do?
If you agree to participate, you will be asked to complete a number of questionnaires about life events and experiences.

Are there any possible benefits from participation in this study?
This research gives us information about the links between trauma and self-injurious behaviours. Some individuals find it beneficial to talk about their behaviours, and feel that they are helping others by participating. Participants will also be given information about how they can access free counselling services if they are interested in doing so. The results of this study may allow researchers to develop strategies for early identification, intervention and treatment of particular populations.

Are there any possible risks from participation in this study?
Some individuals may find that it is distressing or that they become anxious when thinking about self-injurious events or whilst answering the questionnaire questions. If you agree to participate but find that you are experiencing feelings of anxiety, distress or discomfort please let us know. We will assist you in any way possible and provide you with an option to withdraw from participating in the study. We do not wish for the study to cause any distress or discomfort for you.

If you wish to discuss any act of self-injury with an individual not associated with the study, we suggest that you contact Student Counselling (telephone: 62262697), the University Psychology Clinic (telephone: 62262805) or your general practitioner. The services provided by both Student Counselling and the University Psychology Clinic are free of charge. If you require immediate assistance please tell us as we will be happy to offer support. If you are receiving counselling or psychological support, you may wish to discuss your participation in this study with your counsellor or psychologist before commencing.

What if I change my mind during or after the study?
If you agree to participate, you may withdraw from the study at any time without prejudice. You may request that your data be withdrawn from the study if you choose to not participate in the study. Withdrawal from the study at any time will in no way impact on amount of course credit given or your course grades. Participants are able to withdraw their data from the research up to December 2013.

What will happen to the information when this study is over?
We will regard all data gathered with the strictest of confidence. All written information and computer files will be stored using participation number codes. The data will be stored in a locked cabinet and computer files only accessed by password. Individuals will not be able to be identified from results of the study or in any published works. The data will be kept for five years from the date of first publication and then will be shredded and computer files deleted.

How will the results of the study be published?
Overall results of the study will be available in hard copy or in electronic form accessed using the School of Psychology website at the conclusion of the study (www.scieng.utas.edu.au/psychol/). Results should be available July 2014.

What if I have questions about this study?
If you are interested in participating in the study or wish to discuss this study at any time during the process please contact Katie Dykes. kdykes@utas.edu.au

This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. Please quote ethics reference number H0012442

Please retain this information sheet to refer to if necessary. If you agree to participate in this study you will be provided with a statement of informed consent which you will be asked to read and sign.

Thank you.

Dr Janet Haines   Katie Dykes

J2: CONSENT FORM

UNIVERSITY
OF TASMANIA

STATEMENT OF INFORMED CONSENT
**An Investigation into Stress-Induced Analgesia and Pain during Self-Injury and
the impact of trauma on these factors**

1. I agree to take part in the research study named above.

2. I have read and understood the Information Sheet for this study.

3. The nature and possible effects of the study have been explained to me.

4. I understand that the study involves:

   - Completing a number of questionnaires about various life events;
   - A time commitment of approximately one hour

5. I understand that participation involves the risk that the information discussed may be potentially distressing. I understand that I am free to withdraw from the study at any time without prejudice.

6. I understand that all research data will be securely stored on the School of Psychology, University of Tasmania premises for five years from the publication of the study results, and will then be destroyed.

7. Any questions that I have asked have been answered to my satisfaction.

8. I understand that the researcher(s) will maintain confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research.

9. I understand that the results of the study will be published so that I cannot be identified as a participant.

10. I understand that my participation is voluntary and that I may withdraw at any time without any effect.

11. I understand that if I choose to withdraw from the study, I can ask for my data to be withdrawn. Participants can withdraw their data from the research up until December 2013.

Participant's name:
_____

Participant's signature:
_____

Date: _____

Statement by Investigator

☐   I have explained the project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐   The participant has received the Information Sheet where my details have been provided so participants have had the opportunity to contact me prior to consenting to participate in this project.

Investigator's name:
_____

Investigator's signature:
_____

Date: _____

APPENDIX K

Materials referred to in study 4

K1: CHILDHOOD ABUSE AND TRAUMA SCALE

MARGIN NOTES: SA = Sexual Abuse Subscale Item

PUN = Punishment Subscale Item

NEG = Neglect/Negative Home Atmosphere Subscale Item

R = Reverse-scored item

HOME ENVIRONMENT QUESTIONNAIRE

This questionnaire seeks to determine the general atmosphere of your home when you were a child or teenager and how you felt you were treated by your parents or principal caretaker. (If you were not raised by one or both of your biological parents, please respond to the questions below in terms of the person or persons who had the primary responsibility for your upbringing as a child.) Where a question inquires about the behavior of both of your parents and your parents differed in their behavior, please respond in terms of the parent whose behavior was the more severe or worse.

In responding to these questions, simply circle the appropriate number according to the following definitions:

0 = never

1 = rarely

2 = sometimes

3 = very often

4 = always

To illustrate, here is a hypothetical question:

Did your parents criticize you when you were young?

If you were rarely criticized, you should circle number 1.

Please answer all the questions.

	1. Did your parents ridicule you?	0 1 2 3 4
NEG	2. Did you ever seek outside help or guidance because of problems in your home?	0 1 2 3 4
NEG	3. Did your parents verbally abuse each other?	0 1 2 3 4
PUN	4. Were you expected to follow a strict code of behavior in your home?	0 1 2 3 4
R-PUN	5. When you were punished as a child or teenager, did you understand the reason you were punished?	0 1 2 3 4
PUN	6. When you didn't follow the rules of the house, how often were	0 1 2 3 4

you severely punished?

NEG	7. As a child did you feel unwanted or emotionally neglected?	0 1 2 3 4
	8. Did your parents insult you or call you names?	0 1 2 3 4
SA	9. Before you were 14, did you engage in any sexual activity with an adult?	0 1 2 3 4
NEG	10. Were your parents unhappy with each other?	0 1 2 3 4
NEG	11. Were your parents unwilling to attend any of your school-related activities?	0 1 2 3 4
	12. As a child were you punished in unusual ways (e.g., being locked in a closet for a long time or being tied up)?	0 1 2 3 4
SA	13. Were there traumatic or upsetting sexual experiences when you were a child or teenager that you couldn't speak to adults about?	0 1 2 3 4
NEG	14. Did you ever think you wanted to leave your family and live with another family?	0 1 2 3 4
SA	15. Did you ever witness the sexual mistreatment of another family member?	0 1 2 3 4
NEG	16. Did you ever think seriously about running away from home?	0 1 2 3 4
	17. Did you witness the physical mistreatment of another family member?	0 1 2 3 4
R-PUN	18. When you were punished as a child or teenager, did you feel the punishment was deserved?	0 1 2 3 4
NEG	19. As a child or teenager, did you feel disliked by either of your parents?	0 1 2 3 4
	20. How often did your parents get really angry with you?	0 1 2 3 4
	21. As a child did you feel that your home was charged with the possibility of unpredictable physical violence?	0 1 2 3 4
R	22. Did you feel comfortable bringing friends home to visit?	0 1 2 3 4
R	23. Did you feel safe living at home?	0 1 2 3 4
R-PUN	24. When you were punished as a child or teenager, did you feel "the punishment fit the crime" ?	0 1 2 3 4
	25. Did your parents ever verbally lash out at you when you did not expect it?	0 1 2 3 4
SA	26. Did you have traumatic sexual experiences as a child or teenager?	0 1 2 3 4
NEG	27. Were you lonely as a child?	0 1 2 3 4
	28. Did your parents yell at you?	0 1 2 3 4
SA	29. When either of your parents was intoxicated, were you ever afraid of being sexually mistreated?	0 1 2 3 4

NEG	30. Did you every wish for a friend to share your life?	0 1 2 3 4
NEG	31. How often were you left at home alone as a child?	0 1 2 3 4
	32. Did your parents blame you for things you didn't do?	0 1 2 3 4
NEG	33. To what extent did either of your parents drink heavily or abuse drugs?	0 1 2 3 4
PUN	34. Did your parents ever hit or beat you when you did not expect it?	0 1 2 3 4
SA	35. Did your relationship with your parents ever involve a sexual experience?	0 1 2 3 4
NEG	36. As a child, did you have to take care of yourself before you were old enough?	0 1 2 3 4
	37. Were you physically mistreated as a child or teenager?	0 1 2 3 4
NEG	38. Was your childhood stressful?	0 1 2 3 4

APPENDIX L

Descriptive statistics for the questionnaire data for study 4

Table 23. The mean CAT total, CAT punishment and CAT negative scores and the standard deviations for the NSSI and no NSSI groups.

Group	CAT Total		CATPun		CATNeg	
	M	SD	M	SD	M	SD
NSSI	1.4	0.6	1.7	0.9	1.7	0.8
No NSSI	0.7	0.4	1.0	0.5	1.0	0.6

Table 24. The mean number of reported interpersonal trauma experiences and the standard deviations for the NSSI and no NSSI groups.

Group	TQinterpersonal	
	M	SD
NSSI	10.1	20.9
No NSSI	0.9	1.7

Table 25. The mean CAT Total and CAT negative scores and the standard deviations for the pain and no pain groups.

Group	CAT Total		CATNeg	
	M	SD	M	SD
Pain	1.0	0.6	1.2	0.7
No pain	1.6	0.4	2.0	0.6

Table 26. The mean CAT Total and CAT negative scores and the standard deviations for the pain and no pain groups.

Group	TQ Total		TQ interpersonal	
	M	SD	M	SD
Pain	24.5	29.4	21.3	29.2
No pain	4.3	6.4	2.6	6.5