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Deliberate self-harm as an addictive behaviour: A systematic analysis

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ABSTRACT

FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES
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DELIBERATE SELF-HARM AS AN ADDICTIVE BEHAVIOUR: A SYSTEMATIC ANALYSIS

by Tessa Louise Bryant

Self-harming activities, such as deliberate cutting, burning, scratching or poisoning are not uncommon. Yearly there are an estimated 140,000 presentations to accident and emergency departments in England and Wales following deliberate self-harm (DSH). Yet, the behaviour remains poorly understood. The primary aim of this thesis is to extend theoretical understanding of the mechanisms of DSH through systematic analysis. Given the compulsive nature of DSH, the field of addiction appeared to prove a logical field to search for empirically testable theories that may explain the maintenance of the behaviour. Indeed, the first study, a retrospective interview study with participants who were currently self-harming, revealed a distinct difference in motivations for initial and recent episodes. Self-report of motivations for later episodes of self-harm were much more similar than those reported for initiating self-harming behaviour; supporting the addictive nature of the behaviour.

This thesis focuses on two prominent theories of addiction and the predictions that they make when applied to DSH. Results from the second study indicated that those who self-harm endorse many criteria of clinical dependence and behavioural addiction. The results also suggested that theories of addiction may go some way towards enhancing our understanding of the mechanisms that maintain DSH. Reported pain was significantly higher for early self-harming episodes compared to later episodes and accidental episodes of injury. Longer lasting tension effects were reported for later episodes. Episodes of DSH also regulated the intensity of happiness, anger and sadness. This supports predictions made by the Opponent Process theory (OPT) of addiction. However, OPT could not account for all of the results. Emotional regulation was not more pronounced in later episodes, neither were injuries more severe. Further testing of this theory was therefore necessary. The third study considered the valence of cues associated with self-harm, using implicit and explicit measures. The findings indicated that the valence of the cues was not aiding the maintenance of the behaviour, i.e. that motivation to maintain self-harming persisted regardless of the attribution of the cues, refuting predictions made by OPT. The final set of studies used an implicit task to test predictions made by another addiction theory (the Incentive Sensitisation Theory; Robinson & Berridge, 1993). An attentional bias toward words associated with self-harm and personalised self-harm picture stimuli was demonstrated by those currently self-harming but not by those who had never self-harmed, supporting predictions made by the theory; however abstainers also demonstrated a lack of attentional vigilance to self-harm cues, refuting predictions made by IST. The theoretical and clinical implications of these findings are discussed.

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This is thesis is dedicated
in remembrance of Damian

'ONE'

Whispering,
Silent voice,
Whisper up the storm.

Lying on bright, coloured coverlet,
And in sacred place
Of rest
Is bladed enemy-lover-mine.
Black-bound, strange comfort
In my hand.
Like a completeness of arm.

The compulsion is strong.
A second person,
Inside self,
Clouds mind in scarlet vapours.
Moves limbs, sluggish,
Daren't obey.

"Do!" It orders,
"I won't" weeps exiled soul,
From the littlest corner.

Ineffectual.

In the ecstasy of agony,
In wailing triumph,
Two in one bring brightness-
To cutting.

Red lines,
Blooded reminders.
First small, once.
Now larger-
Shouting, not 'stating', only
Just what that Pit
Can do.
To one once sensible,
Now confused.

And how it violates last place
Where rest was found.
When the Pit's inside,
There is no sacristy of heart
Or person.

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CHAPTER ONE

The nature of deliberate self-harm

Chapter Summary

Deliberate self-harm is by no means a new phenomenon, yet despite alarming increases in prevalence and incidence rates of the behaviour it remains a puzzling one. Much has been detailed about modern typology of self-harm (a synopsis of which is presented in this chapter) however it is evident from a review of current knowledge that there is a lack of testable theories that may explain its function and maintenance. Those who self-harm say that it is an 'addiction' because of its compulsive nature, but what does this mean? If self-harm is addictive we would expect the characteristics of the behaviour to parallel those of other addictions. A review of modern typology of addictions suggests that there are indeed many parallels with the typology of self-harm.

1.1 Introduction to self-harm

"Mary kept her razors in a special wooden box, wrapped in a piece of velvet cloth. The box was kept under her bed. When her mother found out about the cutting, she made Mary hand over the razors. Mary bought some more and hid the box under a loose floorboard in her bedroom. Even when Mary stopped cutting she felt it helped her to know that her secret supply was still safe. Before cutting herself Mary laid out her razors on the cloth, and would choose one for that occasion. She would sometimes play certain music while she made her choice. After the cutting Mary followed a routine with cleaning up the blood and tending to the cuts, before putting on plasters, covering up her arms again, and cleaning and hiding the razor back in its special place. She said that just opening the box made her feel calmer."

(Gardner, 2002, p. 29)

Deliberate self-harm, as described above, is often viewed as a puzzling and odd phenomenon. Yet, this type of behaviour is surprisingly common, and has been documented in humans and animals throughout history.

1.1.1 Historic references to self-harm

Historic references to self-harm confirm that self-harming behaviour has been part of literary performances, cultural rituals and religious practices for many centuries. For example, in Sophocles' play 'Oedipus', written in the 5th century BC in Ancient Greece, Oedipus blinds himself by sticking his mother's golden brooches through his eyes. Soordas enucleated both his eyes in order to preserve his vision of Lord Krishna in Hindu mythology, and in the Christian bible, *Matthew, 6:22-23* states:

"What I say to you is: anyone who looks lustfully at a woman has already committed adultery with her in his thoughts. If your right eye is your trouble, gouge it out and throw it away! Better to lose part of your body than to have it all cast into Gehenna."

Self flagellation, purging and scarring was practiced by Christian cults from the eleventh century (Bell 1985), and is performed today by some members of the Roman Catholic Opus Dei movement (Rupe, 2001).

Culturally sanctioned acts of self-harm (Favazza, 1996) including rituals, which reflect community traditions; and practices, associated with ornamentation or medical purposes, have been practiced for many centuries in indigenous tribes. For example, Favazza (1989) quotes observations of Ivory Coast tribes who knife themselves in the stomach during New Year festivities. The tribal members claim that the herbal poultice applied to the wounds is prescribed by the spirits, and results in social healing of the community. Also, Powers (1986) reports that bereaved Oglala North American Indian fathers cut off their little finger following an infant's death. Other well documented culturally sanctioned self-harming practices include Moroccan head slashing. Head moulding was also practiced amongst Native American Indians, and was fashionable in France and Holland until the mid nineteenth century (Gardner, 2002).

Self-harm in animals is also common, self-harming behaviour has been observed in several animal species, including monkeys, parrots, lions, leopards and rodents (e.g. Harlow, 1958; Johnson, 1996). For example, many parrot owners have reported that their parrots engage in a form of self-injury, known as Quaker Mutilation Syndrome (QMS), where parrots pluck out their own feathers and peck at themselves. Lewis et al. (1976) observed severe self-injury by rhesus monkeys in three scenarios; when monkeys were threatened by humans (which generally resulted in the monkey threatening the human then engaging in a bout of self-biting), when the monkeys were threatened by another monkey in an adjacent cage (resulting in self-clasping and biting, combined with threatening and vocalization, which appeared to resemble 'frustrated other directed aggression') and finally when the monkey was not stimulated by other monkeys or humans (observed in isolated or solitary monkeys).

1.1.2 The prevalence and incidence of self-harm

The prevalence and incidence of self-harm indicate that this type of behaviour is surprisingly common. Reports of self-harm first started to appear in medical literature in the early 19th century (Favazza, 1993). The first case report on self-mutilation was

published in 1846. It described a guilt-ridden widow who enucleated both of her eyes. In the last 30 years low lethality, highly repetitive self-harming behaviours, including cutting, burning, skin picking, and object insertion, have become of particular concern, due to a marked increase in the prevalence and incidence of the behaviour in Britain and other countries around the world (Bialas et al., 1996; National Health Service Centres for Reviews and Dissemination, 1998). Yearly, there are now an estimated 140,000 presentations to Accident and Emergency departments in England and Wales following deliberate self-harm (Hawton et al., 1998) or 400 cases per 100,000 people (Melville & House, 1999) making self-harm one of the top five causes of acute medical and surgical admission in the United Kingdom (Hawton & Fagg, 1992). Given that self-harming behaviour can be very private, however, many will not present for treatment so the true figure may be much higher.

The high incidence rates of repetitive self-harming behaviours have drastic implications for practitioners, carers and service users, in terms of resources and finances, social and emotional care. Consequently understanding self-harm and learning to deal with it appropriately has become a national priority for carers (Women's Mental Health Framework, Department of Health, 2003; National Institute for Clinical Excellence, Self-harm clinical practice guidelines, 2004), politicians (Younger-Ross, 2002), and researchers (Hawton et al., 2002).

In the United Kingdom, epidemiological studies suggest that certain groups are statistically at greater risk of harming themselves. Women are three times more likely to self-mutilate than men whilst men are at greater risk of suicide (Babiker & Arnold, 1997; Health of the Nation, 1994). The prevalence of self-harm is particularly high amongst female Asians (D'Alessio & Ghazi, 1993) and in lower socio-economic groups (Hawton et al., 1994). Research has also suggested that gay men, lesbians and bisexuals may have an increased rate of self-harm (King & Mckeown, 2003). Indeed, homosexual or transsexual tendencies have been found to be a risk factor for male genital self-mutilation, and this behaviour has been found to be more prevalent than indicated by early reports (See Martin & Gattaz (1991) for a review). Haines et al (1995) report the incidence of self-mutilation among prisoners is one of the highest subpopulations investigated. As many as 50% of prisoners self-harm, posing a substantial drain on prison

resources (Holle & Arboleda-Florez, 1988; McCarthy, 1992). Descriptions of self-harming behaviour of incarcerated individuals are nevertheless virtually identical to those of non-incarcerated individuals (Haines et al., 1995).

Therefore, deliberate self-harm is by no means a new phenomenon, yet despite alarming increases in prevalence and incidence rates it is currently a problematic and puzzling one. In order to clarify the focus of this thesis, a definition of current forms of self-harm which are particularly perplexing will now be presented. Then, a synopsis of direct and indirect observations of the behaviour will be discussed.

1.2 Defining DSH

1.2.1 Definitions of self-harm

Definitions of self-harm are often inconsistent. The expression 'self-harm' has historically been used in different ways to describe many different types of behaviour. Terms such as "deliberate self-harm" (DSH), "parasuicide", "self-injury" and "self-mutilation" are often used interchangeably, (e.g. Simeon et al., 1992; Winchel & Stanley, 1991) and these same terms have been applied to describe inherently different behaviours. For example, many researchers do not distinguish between self-harm and suicidal behaviours, despite evidence that self-harmers generally do not intend to die as a result of their acts (Herpentz et al., 1995; Van de Kolk, Perry & Herman, 1991).

Within the last decade self-harm has begun to receive more systematic attention from clinical researchers but there remains a lack of consensus as to how to define and measure the construct (Gratz, 2001). In a seminal paper in this area, Kahan and Pattison (1984) attempted to address classification of the phenomena by focusing upon three components of self-harming acts, intentionality (or 'directness'), lethality and repetition. They operationally defined DSH as a distinctive type of behaviour, characterised by direct, repetitive, low lethality behaviours. They also specified that direct self-destructive behaviour occurs within a short time frame, is accompanied by personal awareness of the effects of one's actions, and involves a conscious intent to harm oneself. Interestingly, definitions of self-harm have not incorporated specific motivations for doing so, instead they tend to focus on intent (e.g. to cause harm rather than death) and observable behaviour (e.g. direct damage to tissue). There may be a number of reasons for this

(which will be discussed in further detail later in this thesis). These include that motivations for self-harming behaviour may be diverse and may change over episode and self-harming history, self-reported motivations for the behaviour may be difficult to access or inaccurate, and research into motivations for self-harm has often not been systematic and scientific.

Kahan and Pattison's (1984) work has been used in studies within the last decade (e.g. Gratz, 2002) to formulate this definition of DSH as "the deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage (e.g. scarring) to occur". This definition of deliberate repetitive self-harm will be used in this thesis.

In order to orient the reader to current knowledge of self-harming acts, a synopsis of literature regarding modern typology of self-harm, predispositions to self-harm, factors associated with its initiation, and observations of how it changes over time will now be presented.

1.2.2 The modern typology of deliberate self-harm

The modern typology of deliberate self-harm describes a spectrum of behaviours which have distinctive patterns and characteristics. Studies which have collected reports from those who self-harm suggest multiple topographies of self-harm are often used by the same individuals (Favazza & Conterio, 1989a), but the most common type of self-mutilation is cutting (Feldman, 1988; Hawton et al., 2002; Horrocks et al., 2003). Seventy percent of those who repetitively self-harm report cutting themselves, whilst 35% burn themselves deliberately (Conterio & Favazza, 1986). A wide spectrum of self-harming behaviours have been documented, ranging from nail biting and hair pulling to more extreme forms such as self-enucleation, drowning, and self-castration (Sansone et al., 1996).

Research suggests that virtually all who self-harm tend to do so when alone. Some say that this is because they believe that what they do separates them "from the rest of humankind and (they) let no one or almost no one know about an act that they regard as shameful" (Burstow, 1992). Additionally, many of those who self-harm try to conceal evidence of their behaviour, for example, by concealing their injuries or the tools used to

harm themselves, or by explaining DSH related wounds as accidental rather than intentional (Briere & Gil, 1998) therefore self-reports of behaviour may not always be accurate representations of all incidents. Consistent with this, self-harmers are most likely to injure themselves in accessible but concealable areas, such as the arms and legs (Nixon et al., 2002).

There are however, exceptions to the more common features of self-harm, particularly the secrecy and shame associated with the behaviour. For example, a number of high profile self-harmers have openly discussed their self-harming behaviour in the media and even performed acts of self-harm in public. Sid Vicious, the legendary member of the Sex Pistols was known for his self-injury – including slashing his chest live on stage. Richey Edwards, a musician with the band 'The Manic Street Preachers' carved "4 Real" on his forearm with a razor blade during an interview with an NME Live Reviews Editor in 1991. Also, at an April 1994 concert in Bangkok, Thailand, he appeared with his chest slashed open by knives a fan had sent him. Despite being uncharacteristically open about his self-harm, Edwards discussed how he used it to deal with his emotions (specifically to reduce his anger) in a manner described by many others who engage in similar behaviour. In a 1995 BBC television interview Diana Princess of Wales, revealed that she was a self-injurer. She said that she had cut her arms and legs, explaining, "You have so much pain inside yourself that you try and hurt yourself on the outside because you want help."

According to Favazza (1996), self-harm may be compulsive (engaged in to avoid something bad occurring, similar to other obsessive compulsive behaviours) or impulsive (a reflex response to any sort of stress). In accordance with this, Simpson and Porter (1981) report that acts of self-harm may be planned hours or days in advance and that the severity of the wound may be precisely calculated, yet repetitive self-harm may also become a spontaneous response to any sort of stress. Favaro and Santonastaso (1998), suggest that vomiting, severe nail biting, and hair pulling (trichotillomania) were characteristically compulsive (engaged in to avoid something bad), whereas skin cutting and burning were generally impulsive (repetitively engaged in as a response to stress).

1.3 Predispositions to DSH

What predisposes people to self-harm? Clinical studies have suggested that factors in the environment or early experiences of individuals (for example, childhood sexual abuse or attachment problems) or an individual's physiology may predispose them to self-harm. Some researchers have suggested that predispositions to self-harm result from transactions between an individual's environment and their physiology. The following sections will consider the evidence base for these propositions.

1.3.1 The impact of environmental factors or early experiences

The impact of environmental factors or early experiences in life has been a focus of clinical attention since early psychological studies (e.g. Freud, 1901; Jung, 1913) and this interest is echoed in studies of self-harm.

1.3.1.1 *Sexual abuse in childhood and subsequent self-harm*

A direct relationship between sexual abuse in childhood and subsequent self-harm is often suggested in clinical literature (e.g. Strong, 1999). In support of this, Van der Kolk, Perry and Herman (1991) monitored 74 patients with a personality or bipolar disorder over a 4 year period. They found that self-reported exposure to sexual abuse during childhood predicted the frequency and severity of cutting by patients in their sample; and was more strongly related to self-harm than other forms of childhood trauma (i.e., physical abuse and witnessing domestic violence). However, this study was restricted by its small, inpatient based sample and therefore may be misrepresentative of the general population of those who self-harm. De Young (1982) interviewed forty five sexually abused women; 58% reported that they repetitively injured themselves. Some said that they were doing so to seek help, others to punish themselves as they felt responsible for the abuse or that they wished to make themselves ill or unattractive to avoid further assaults.

Despite frequent references within clinical literature of links between sexual abuse and subsequent self-harm, research in this area (which is significantly less plentiful) suggests that, although there may be links, one does not necessarily lead to the other. For example, single case reports by clinicians and interview studies by researchers (e.g. Brodsky et al;

1995) have cited cases of deliberate self-harm in the absence of reported histories of childhood abuse. Consequently, although a history of abuse and neglect appears to predict self-harming behaviours, there is no evidence that it is a necessary precursor.

1.3.1.2 *Attachment problems in early childhood*

Attachment problems in early childhood may also predict likelihood of self-harm. Case studies suggest a relationship between prolonged separation from a caregiver or loss of a parent and later self-harm behaviour (Levenkron, 1998), and there is some empirical support for this as well (Carroll et al., 1980; Gratz et al., 2002;Walsh & Rosen, 1988). For example, Simpson and Porter (1981) described twenty young people – sixteen girls and four boys – who were harming themselves. All of the young people described how one or both parents had left the home during their childhood, and that the replacement carers were often inadequate. The authors noted the desperate sense of isolation and the feeling that they were unlovable, which was expressed by nearly all participants. Although they searched for relationships, many refused to form meaningful relationships. Similarly, Gratz (2002) found that childhood separation was the most significant predictor of self-harm among male college students, accounting for 12% of the variance in this behaviour.

There is also empirical evidence that individual differences in the quality of the emotional bond formed between parent and child (i.e., the affective quality and security of the attachment relationship), independent of childhood abuse, neglect or separation, may have important implications for later adult adjustment and risk for psychopathology (e.g., Ogawa, Sroufe, Wein.eld, Carlson, & Egeland, 1997; Styron & Jano.-Bulman, 1997). For example, Gratz (2002) asked female college students to retrospectively rate their attachment security during childhood. She found that when the impact of neglect and abuse was controlled, insecure paternal (rather than maternal) attachment accounted for a significant amount of unique variance in self-harm behaviour. However, the cross-sectional, retrospective, correlational nature of the data from these studies makes it impossible to determine with certainty the precise nature of the relationships between self-harm and its hypothesized childhood risk factors.

1.3.2 Physiological susceptibilities to self-harm

Research into the physiological susceptibilities to self-harm has implicated the serotonin system. Drugs that are serotonin precursors or that block the reuptake of serotonin (making more available to the brain) seem to have some effect on self-harming behaviour. Novak (2003) discovered that monkey's displaying self-injurious behaviours had a blunted cortisol response to mild stressors, and that self-biting rapidly lowered a monkeys escalating heart rate. However, the use of animal models as approximations for human behaviour has limitations given the inherent biological, physiological and social differences between species. Although such studies may provide useful starting points for investigations with humans, they generate little insight into human self-harming behaviour, unless the hypotheses they generate are satisfactorily scientifically tested with humans.

Coccaro et al (1997) found that pharmacological enhancement of serotonin activity (using the selective serotonin uptake inhibitor fluoxetine hydrochloride) had an anti-aggressive effect in a double-blind placebo-controlled trial with 40 impulsive aggressive individuals with personality disorder. Clinical measures of aggression, depression and anxiety suggested that the placebo groups were more likely to exhibit aggression increases and responses to irritation which escalate into self-injury, suicide and attacks on others, however whether low levels of serotonin cause, or are an effect of self-harming behaviour continues to be debated.

1.3.3 Environmental factors or early experiences and physiological susceptibilities to self-harm

A transactional relationship between both environmental factors or early experiences and the physiological susceptibilities to self-harm, where these factors reciprocally adapt to and influence each other rather than directly interacting with each other, may account for the fact that only 60% of those who self-harm say that they have traumatic backgrounds (Herman, Perry & van der Kolk, 1989). A transactional relationship accounts for instances where genetic influences overwhelm positive environments since they do not assume equal power of influence by both factors. Similarly, they allow for the potential of powerful situations (for example repeated exposure to violent sexual or

physical abuse) to influence the behaviour of any person, "no matter how hardy" (Linehan, 1993, p.40).

Self-harm is associated with multiple problems. It appears to cut across a wide range of diagnostic categories (for example, axis one disorders, such as substance abuse, mood, anxiety, dissociative, eating and impulse control disorders; and axis two disorders, such as antisocial, histrionic and borderline personality disorders) although the focus has been on borderline personality disorders as repetitive attempts to deliberately harm oneself is one of the criteria for a clinical diagnosis of borderline personality disorder (BPD) (DSMIV-R, 1994). Marsha Linehan (1990) suggests based on clinical observations that environmental circumstances more subtle than abuse transact with biological susceptibilities to render patients susceptible to engaging in self-harming behaviours.

Linehan (1993) proposes that the borderline disorder (which incorporates self-harming behaviour) is a consequence of an emotionally vulnerable individual growing up within an invalidating environment. An 'emotionally vulnerable' person in this sense is someone whose autonomic nervous system reacts excessively to relatively low levels of stress and takes longer than normal to return to baseline once the stress is removed (Kiehn & Swales, 2000). This biologically based emotional vulnerability could result from a variety of influences (including, but not limited to, genetic influences, aversive intrauterine events, or early childhood experiences) that impact the development of the brain and central nervous system, thus not requiring the complicated determination of the specific cause (genetic versus environmental) of emotional reactivity and intensity. An invalidating environment is one in which individual's interpretations of his/her behaviour, including the intention and motivations of the behaviour, are dismissed, leading to self-invalidation and self-distrust (Linehan, 1993). This invalidating environment may take one of several forms, including (1) childhood sexual abuse, (2) families in which little time or attention is given to children, and (3) families in which negative emotional displays by children are punished. Linehan (1993) suggests that those who are emotionally vulnerable are more likely to react to their emotions and environment in ways that lead them to experience a disturbed sense of their own identity, have problems in responding functionally in interpersonal situations, encounter thought

disturbances and engage in dysfunctional behavioural responses e.g. drinking, drug taking and/or self-harm.

1.4 The emergence and development of DSH

Potential causes of deliberate self-harm have been widely debated and investigated, yet less systematic attention has been focused upon the way the behaviour emerges and develops. Information about the emergence and development of self-harm may be important to gather in order to test theories of self-harm, since theoretical explanations of behaviour generally focus on its development and maintenance. The next section focuses on what is known about these characteristics of self-harm.

1.4.1 Initiation of self-harm

Initiation of self-harm, like cigarette smoking and alcohol consumption, is common in adolescents in the UK (Hawton et al., 1996; Meltzer, 2002). Hawton et al (2002) found that 13% of secondary school students had self-harmed (based on an anonymous questionnaire survey of 6020 pupils). The most typical age of onset is between 16 to 25 years (Pattison & Kahan, 1983) but children as young as five years old have also been reported engaging in acts of self-mutilation (Simpson & Porter, 1981).

Social context, or specifically knowing someone else who harms themselves, seems to be strongly associated with initiation of self-harm behaviour. Those adolescents who are aware of others who self-harm are more likely to do so themselves. Hawton et al. (2002) distributed anonymous self report questionnaires to 41 schools in England, resulting in data from 6020 pupils aged 15 and 16. Three hundred and ninety eight (6.9%) participants reported an act of deliberate self harm in the previous year (although the criterion of a non-fatal outcome rather than a non-fatal intention was used). For both sexes, awareness of peers who had self harmed was the strongest binary factor in the final multivariate logistic regression model. There was a strong association between having self harmed and being aware of self harm in peers ($r=0.80$, $P<0.0001$), but only in females ($r=0.67$, $P<0.0001$; males: $r=0.20$, $P=0.28$). In females the factors included in a multivariate logistic regression for deliberate self harm were recent self harm by friends, self-harm by family members, drug misuse, depression, anxiety, impulsivity, and low

self-esteem. In males the factors were suicidal behaviour in friends and family members, drug use, and low self esteem. Given the importance of social context in the initiation of self-harm, social learning theory principles (such as social modelling) may help explain initiation of the behaviour (as discussed later in this chapter).

Self-harm is also associated with engagement in other risky behaviours (such as drug or alcohol abuse). For example, about 20% of repetitive self-mutilators have a history of episodic drug or alcohol abuse (Favazza & Conterio, 1989; Haw et al., 2001). Half of people who attend A&E following self-harm will have consumed alcohol immediately before or during the self harming episode (Merrill et al., 1992) and alcohol dependence is diagnosed in approximately 10% of self-harm cases in general hospitals (Suokas & Lonnqvist, 1995; Wylie et al., 1996).

1.4.2 Changes over time

Changes over time occur as deliberate self-harming behaviour continues. Research indicates that self-harming episodes become more severe, more frequent and more time consuming. Sansone et al. (2002) studied the self-harming behaviours of 83 psychiatric inpatients across their lifespan in a self-report questionnaire study. Participants were asked to indicate, from a list, which self-harm behaviours they had engaged in and at what ages they had engaged in each behaviour. The researchers found that, for those patients diagnosed with Borderline Personality Disorder (BPD), self-harm behaviour increased and more lethal forms of self-harming behaviour were engaged in, until the age period of 18 to 24 years and then remained relatively sustained through to the 50s. For those not diagnosed with BPD, an increase in self-harming behaviour occurred after age 30.

Those who self-harm report that they experience increasing urges to self-harm, especially when faced with a situation that they believe is intolerable or uncontrollable; and that it becomes increasingly difficult for them to control the behaviour, hence they struggle to quit the behaviour, even when they express a desire to do so. Also, they describe periods of self-harming interspersed with periods of self-enforced abstinence (Schwartz et al., 1989).

In the long-term, regular incidents of DSH produce dramatic, socially mediated and/or detrimental effects including stigma, physical trauma, loss of income and social support (Harris, 2000; Hawton et al., 1994,1996). Regardless of a person's intent, cutting oneself deliberately can result in permanent damage to tendons and nerves, long term scarring or disfigurement and in extreme cases permanent disability, hospitalisation and/or death (National Institute for Clinical Excellence, 2004). For example, the rate of suicide in self-harmers who have previously attended Accident and Emergency departments following episodes of self-harm is between 50 and 100 times greater than the rate of suicide in the general population (Hawton et al., 2003; Owens et al., 2002).

DSH also interferes with therapy and interpersonal relationships (Favazza, 1989), can arouse negative feelings, strong reactions, and prejudice in both clinicians and the general public (Barstow, 1995; Conterio & Lader, 1998; Feldman, 1988; Linehan, 1993; Tantam & Whittaker, 1992; Walsh & Rosen, 1988) and may unintentionally result in death (Kernberg, 1987). Moreover, the shame, guilt, and regret that often follow an act of self-harm may exacerbate the negative emotional arousal of the individual, as well as increase the likelihood of further isolation (Leibenluft et al., 1987; Schwartz, Cohen, Hoffmann, & Meeks, 1989). The negative physical consequences of self-harm (e.g., scars) may also result in shame, necessitate greater isolation from others, or both (Favazza, 1989a).

Studies which have focused on those who have been repetitively self-harming suggest that although it may be initiated due to interpersonal factors (such as social modelling) it often leads to intrapersonal functions. For example, in an interview study of 21 college students with a self-identified history of self-harm behaviour, (Gratz, 2000) found that the most frequently described function of self-harm was to relieve unwanted feelings. Seventy-six percent of participants reported that self-harm relieved feelings of stress, anger, frustration, sadness, emotional upset, tension, anxiety, grief, emotional pain, and being overwhelmed.

This review of the literature has highlighted certain ideas. In particular, it appears that self-harming behaviours have qualities and features which are also found in addictions. For example, they are initiated in adolescence, associated with other risky behaviours and influenced by social contexts. They also become more severe, more frequent and more

time consuming over time, and are often continued despite escalating negative consequences. Like other addictions, those who self-harm report that they experience increasing urges to self-harm, and that it becomes increasingly difficult for them to control the behaviour, hence they struggle to quit the behaviour, even when they express a desire to do so. Also, the review suggests that although onset of self-harm is influenced by interpersonal functions (e.g. social modelling), as it continues self-harming appears to have intrapersonal (e.g. emotional regulation) functions.

1.5 Theories of self-harm

The previous section presented some knowledge of the way the behaviour emerges and develops, however, there is little agreement of why and how self-harming behaviour is initiated and maintained. The most frequently speculated theories come from three theoretical perspectives; psychodynamic, social learning and emotional regulation accounts.

1.5.1 Psychodynamic accounts

Psychodynamic accounts emphasize the importance of developmental experiences in shaping the person and their responses to their environment. Early psychodynamic accounts have been criticised for their overriding focus on the influence of unconscious instinctive drives and forces (Chodoff, 1966). More modern psychodynamic theory places greater emphasis on conscious experience and its interaction with the unconscious, and the role that social factors play in human development.

Clinicians working from psychodynamic perspectives (e.g. Doctors, 1981; Kernberg, 1987) have speculated upon the interaction of conscious and unconscious meanings of attacks on the body. Podvoll (1969, cited in Gardner, 2002) emphasizes three dynamics of self-harm, which encompass a number of psycho-analytic perspectives of the behaviour; the dynamics of unconscious and conscious issues of dependence / independence and attachment, the dynamics of unconscious and conscious anger towards self (self-hate), and the dynamics of unconscious and conscious issues of anger towards others turned inwards.

1.5.1.1 *Dependence / independence and attachment*

The dynamics of unconscious and conscious issues of dependence / independence and attachment focus on the 'flight from deeply dependent, even symbiotic wishes towards a more primitive love object to a reliance on the auto-erotic use of one's own body' – that is, a move from dependency to separation and independence. For example, Laugers (1984) views the body as the channel for the expression of all adolescent's feelings and fantasies. Adolescents who have difficulties forming relationships are deadlocked between adulthood independence from parents and family and childhood dependence, so the body becomes the site to represent this battle.

Haim (1974) suggests that in the belief that one can kill themselves there exists recognition that they are alive and free, and therefore no longer a dependent child consequently 'the manipulation of the idea of death is not devoid of pleasure' (Haim, 1974, p. 208). Similarly, Joseph (1982) discusses the libidinal satisfaction linked to self-destruction. It acts as 'a constant pull towards despair and near-death so that the patient is fascinated and subconsciously excited by the whole process (Joseph, 1982, p. 456).

1.5.1.2 *Unconscious and conscious anger towards self*

The dynamics of unconscious and conscious anger towards self was emphasized by Podvoll (1969) as 'a capacity to treat one's own flesh with scorn and contempt necessary to allay more narcissistic urges' – that is, hatred of the body. Pao (1969) focused his research on hospitalized young females who cut themselves. He described incidents of self-harm as a function of 'a regressed ego state with surrendering of autonomous ego functioning to a drive dominated act which was simultaneously sadistic and masochistic' (Pao, 1989, p. 198). Many reports by self-harmers do suggest that their behaviours may form an aggressive attack on their own bodies (Smith et al., 1998). However, there is an assumption that these regressed states also operate outside of conscious awareness, highlighted by the observation that incidents of self-harm may be accompanied by dissociative states where the individual who is self-harming emotionally 'cuts off' from one or more aspects of their current experience (Orbach, 1994).

1.5.1.3 *Anger towards others turned inwards*

The dynamics of unconscious and conscious issues of anger towards others turned inwards describes self-harm as a process unconsciously used to divert aggression onto the self 'a fixed and seemingly indestructible object, in this way the patient manages to preserve intact her split off and idealized object'. That is, Podvoll (1969) assumes that those who self-harm do so because aggression towards the self is 'safer' than seemingly uncontrollable aggression towards others. Simpson and Porter (1981) suggested that the self-harming acts of the twenty young people they studied acted as a focus for aggressive feelings and contained an element of self-punishment, often for sexual feelings and behaviour. Fonagy (1995, cited in Gardner, 2002) states that the underlying motive is "a wish to attack thoughts, in oneself or in another" (p.582).

Ettinger (1992) suggests that DSH may be initiated as a form of self-expression, for example, to express dysfunction of a dysfunctional family or environment or an intolerable emotional pain that cannot be expressed more directly and so is turned inward on the self. As this hypothesis is based on difficulties expressing oneself, it is, by its own definition, difficult to test and almost impossible to disprove. Evidence for this account is therefore based on retrospective accounts by those who self-harm.

All of these accounts are based on subjective interpretations of observations or accounts of the behaviour. The theories are derived from interpretations of the accounts and substantiated by these interpretations. Therefore although they may have face validity they form a circular argument which has been difficult to either prove or disprove.

1.5.2 Social learning theory

Social learning theory (Bandura, 1973) provides an account of how social and emotional stressors may influence the initiation of initial self-harming episodes. As discussed earlier in this chapter, social context, or specifically knowing someone else who harms themselves, seems to be strongly associated with initiation of self-harm behaviour. Those adolescents who are aware of others who self-harm are more likely to do so themselves (Hawton et al., 2002). Social learning theory encompasses the concept of vicarious learning; where through observation, actions are learnt and imitated, which may explain this association.

In an extension of this theory, Simpson and Porter (1981) suggest that those who DSH learn through models that injury and care are associated, and attempt to elicit care or self-care, though self-injury; although they provide only anecdotal evidence for this claim. Similarly, clinicians have speculated that if a person learns that direct requests which immediately follow self-harming episodes will be listened to and addressed, DSH may be positively reinforced; thus self-harm will become an operant behaviour, as an individual learns that it can be used as a means to get requests listened to and addressed. This is the function that historically has been attributed to most self-harm behaviour, contributing to the common belief that individuals who engage in this behaviour are manipulative and attention seeking (Feldman, 1988; Tantam & Whittaker, 1992). However, researchers have begun to address the fact that this negative belief about the function of self-harm is most likely a misconception.

Self-harm is often a private and secretive act, with many individuals choosing to conceal this behaviour from others (Conterio & Lader, 1998; Favazza, 1992). Moreover, within the empirical research on the functions of self-harm, the elicitation of a caring response from others is not the most frequently cited function of self-harm among self-harming individuals themselves. For example, Briere and Gil (1998) found that although 40% of their sample reported engaging in self-harm to get attention or help from others, the majority of self-harming individuals (more than 70%) endorsed the intrapersonal functions of self-punishment, enhancement of self-control, and relief from painful feelings, stress, tension, and anger. According to Linehan (1993), the fact that the self-harm behaviour of an individual may influence others does not mean that this was the intent of the behaviour, as "function does not prove intention" (p. 17), thus eliciting a caring response or influencing others may not the be the primary intent or primary goal of the behaviour but may end up reinforcing the behaviour nonetheless.

Notwithstanding this critique, the review of the literature describing self-harm early in this chapter, suggested that although onset of self-harm is influenced by interpersonal functions (e.g. modelling by peers) as it continues self-harming appears to have intrapersonal (e.g. emotional regulation) functions. For example, Gratz (2001) found reports that self-harm relieved feelings of stress, anger, frustration, sadness, emotional upset, tension, anxiety, grief, emotional pain, and being overwhelmed. Therefore

inconsistencies in the application of social learning principle may be due to the changing function of self-harm over time. It is possible that, although social learning factors may influence the onset of the behaviour, other factors affect its maintenance. Theories of the behaviour need to be able to adapt to take account of this.

1.5.3 Emotional regulation theories

Emotional regulation theories which suggest that self-harm acts as a 'tension reduction behaviour', developed from reports by those who self-harm that the act of self-mutilation relieves increasing feelings of increasing anxiety, tension, agitation and anger (as described above). Tension reduction behaviours include activities that distract, soothe, or otherwise draw attention away from emotional distress, reducing the impact and duration of the negative affect (Briere & Gil, 1998). In support of this Kemperman et al. (1997) asked 38 female inpatient self-mutilators with BPD to rate changes in mood and dissociation before, during and after a typical incident of DSH. They found that DSH reportedly increased positive affect, decreased negative affect and reduced dissociative ('numbing') symptoms but that these feelings may be followed by intense disappointment, guilt or fear of the consequences of the action (Feldman, 1988). Clinical and empirical self-report data also suggest that self-harm may operate as a form of emotional avoidance, functioning to escape, avoid, or alter unwanted emotions (Gratz, 2002). For example, some people who self-harm report that it helps them to reconnect with the body after a dissociative episode (Favazza, 1989; Feldman, 1988).

Linehan (1993) suggests that if people are not taught effective strategies to regulate and tolerate their own emotions (such as distraction or self soothing), then they are more likely to use self-harm to escape, avoid or alter unwanted emotions, particularly, if they are 'emotionally vulnerable', i.e. their autonomic nervous system reacts excessively to relatively low levels of stress and takes longer than normal to return to baseline once the stress is removed (Kiehn & Swales, 2000). This supposition forms the basis of an extensively applied form of therapy (Dialectical Behavioural Therapy (DBT) where clients are taught (alongside interpersonal and meditation skills) to recognise and identify emotional states and identify alternative means of coping with emotional dysregulation; Linehan, 1993). Early evaluations of the therapy, based on this model, suggest it has

some utility in reducing the frequency of self-harming behaviours. For example, Linehan et al. (1991) found a significantly lower rate of repetition of self-harm during follow up in patients who received dialectical behaviour therapy versus standard aftercare. This comparison, however, was restricted to a subgroup of randomly assigned patients which was smaller than that which entered the original trial. There is also some neuro-physiological evidence of differences between borderline personality patients and other patients which may translate to emotional vulnerability. For example, Cowdry et al (1985) found that patients with borderline personality disorder have significantly more electro-encephalographic (EEG) dysrhythmias than their depressed control patients, suggesting that some borderline individuals may have a low threshold for activation of limbic structures, the brain structures associated with emotional regulation. However, it is difficult to conclude whether these patterns are a cause or consequence of the individuals' behaviour patterns.

It is likely that some individuals do not have full awareness of the function of their behaviour or their emotional states before and after engaging in self-harm, thereby limiting the extent to which they can accurately report on these aspects. In order to address this anomaly, Haines, Williams, Brain and Wilson (1995) have shown that amongst self-harming male prisoners, tension relief indexed by marked reductions in psychophysiological responding, accompanies the imaginal presentation of self-harming incidents. They asked self-harming prisoners to imagine a chain of events leading up to and following an act of self-harm while monitoring physiological changes in finger blood volume, heart rate, respiration and skin conductance. They showed that tension relief, indexed by a decline in these measures, corresponded to imagining the act itself. However, participants reported continued negative feelings despite reduced psycho-physiological arousal. Thus, while this finding is reliable, it does little to explain why tension is reduced.

Haines et al. (1995) report:

"Self-mutilators often are unable to provide explanations for their own self-mutilative behavior. . . . Participants reported continued negative feelings despite reduced psycho-

physiological arousal. This result suggests that it is the alteration of psycho-physiological arousal that may operate to reinforce and maintain the behavior, not the psychological response." (1995, p. 481)

In summary, despite various theories, there is little consensus of why and how self-harming behaviour is initiated and maintained, since none are both adequate and testable. Clinical and empirical self-report data suggest that self-harm may operate as a form of emotional avoidance, functioning to escape, avoid, or alter unwanted emotions. Yet, this provides little information on why the tension relief occurs or how the behaviour is maintained. All of the theories proposed are macro theories which have attempted to describe how the behaviour is maintained in broad terms. No researchers have as yet undertaken a 'micro', moment by moment, empirically based analysis of the behaviour and its functions to support their theories. This review of the literature suggests that the functions of the behaviour are initially primarily interpersonal (e.g. influenced by social context and environmental influences) but change to being primarily intrapersonal (e.g. regulating emotions) as the behaviour continues to be performed. This pattern of functional change is similar to that seen in addictions. The literature review also suggests that there are many other features of self-harm which are similar to addictions. In order to progress understanding of the function of self-harm it may of utility to consider knowledge of the functions of those behaviours with similar characteristics.

1.6 Similarities between DSH and Addiction

"I really would like to stop self-harming but feel I can't because I am addicted to it. I couldn't live without the release it gives me. The buzz you get from it. If I could find a way of coping without harming myself, it would be fantastic."

(Harris, 2000, p.160)

As illustrated by the previous quote, those who self-harm often say that it is an 'addiction' because of its compulsive nature, but what does this mean? If self-harm is addictive we would expect the characteristics of the behaviour to parallel those of other

addictions. The following review of modern typology of addictions suggests many parallels with the typology of self-harm.

1.6.1 Predispositions

Like self-harm, clinical studies have suggested that factors in the environment or early experiences of individuals (for example, childhood sexual abuse or attachment problems) or an individual's physiology may predispose them to abuse drugs and alcohol (Galizio & Maisto, 1985) or engage in behavioural addictions such as gambling or sexual addictions (Black & Mayer, 1998). This is supported by evidence that despite widespread drug use, drug addiction is relatively infrequent. For example, about 8% of regular drinkers of alcohol are addicts (U.S. Department of Health, Education and Welfare, 1971). Therefore it is highly unlikely that drug sampling is a major cause of subsequent addiction (Solomon, 1977). Some researchers have also suggested that predispositions to addictions result from transactions between an individual's environment and their physiology.

1.6.1.1 *The impact of environmental factors or early experiences*

The impact of environmental factors or early experiences in life is echoed in studies of drugs, alcohol and behavioural addictions.

Sexual abuse in childhood and subsequent substance abuse

A direct relationship between sexual abuse in childhood and subsequent substance abuse has been reported, although like self-harm, child abuse is not a necessary precursor. For example, Best and Schnurr (2000) found that in a national household survey of 4023 adolescents, physical or sexual abuse increased the risk of current substance abuse. Patterns of behavioural addictions are less clear, Black and Mayer (1998) suggest that a history of sexual abuse may be related to compulsive sexual behaviour but not to pathological gambling, however, they based this conclusion on data from a small sample of gamblers. As part of a national survey, Wilsnack, Vogeltanz, Klassen and Harris (1997) questioned 1099 women about drinking. Women with histories of Childhood sexual abuse (CSA) were significantly more likely than women without CSA histories to

report recent alcohol use, intoxication, drinking related problems and alcohol dependence symptoms; and lifetime use of prescribed psychoactive drugs and illicit drugs.

Attachment problems in early childhood

Attachment problems in early childhood may also predict likelihood of addictive behaviours. Like self-harm, there is empirical evidence that individual differences in the quality of the emotional bond formed between parent and child may influence the development of maladaptive psychosocial behavioural like heroin addiction. For example, Andersson and Eisemann (2003) studied 81 healthy participants and 81 heroin addicts. They found that parental rearing behaviour perceived as both rejecting and overprotected was associated with subsequent heroin addiction. In accordance with this, Bell et al. (2000) have reported that strong parental bonding mitigates the use or abuse of substances.

1.6.1.2 *Physiological susceptibilities to addictions*

Research into the physiological susceptibilities to addictions, has implicated the serotonin system. As mentioned earlier in this chapter, low levels of serotonin have been associated with self-harming behaviours (Coccaro et al.,1997). Research into the physiological basis of addiction has also implicated the serotonin system. It has been found that decreased serotonin levels are associated with heavy alcohol consumption (Branchy, Shaw & Leiber, 1981), whereas higher levels increase the likely effectiveness of alcohol treatment programmes (Naranjo, Sellers & Lawrin, 1986). McGurrin (1992) has argued that this substance may also play a role in the development of problem gambling. The question that remains, however, is whether decreased serotonin levels are the result, or cause, of addictions.

1.6.1.3 *Environmental factors or early experiences and physiological susceptibilities*

A transactional relationship between both environmental factors or early experiences and the physiological susceptibilities to self-harm, where these factors reciprocally adapt to and influence each other rather than directly interacting with each other, was proposed earlier in this chapter to account for the fact that only 60% of those who self-harm say

that they have traumatic backgrounds (Herman, Perry & van der Kolk, 1989). Similarly, they allow for the potential of powerful situations (for example repeated exposure to violent sexual or physical abuse) to influence the behaviour of any person, "no matter how hardy" (Linehan, 1993, p.40).

Similar to self-harm, substantial psychiatric comorbidity has been identified in individuals with substance and behavioural addictions. For example, Helzer and Pryzbeck (1998) found strong associations between antisocial personality disorder, mania and substance abuse in a household sample of 20,000 respondents. Epidemiological data also suggests that antisocial personality disorder is highly prevalent in inmates who inject heroin (compared to inmates who are not abusing drugs) (Kaye & Finlay Jones, 1998). Additionally, studies have suggested a relatively high incidence of personality disorder (especially obsessive-compulsive and avoidant personality disorder) in participants reporting pathological gambling (Black & Mayer, 1998).

However, although like self-harm there is some evidence that those who are psychiatrically vulnerable may be more likely to engage in addictions, like self-harm, not all of those who develop addictions report traumatic backgrounds (Clark, Lesnick & Hegedus,1997). Therefore, the transaction relationship may also be a plausible account to account for predispositions for addictions.

1.6.2 The emergence and development of addictions

The next section focuses on what is known about characteristics of emergence and development of addictions and how these appear to parallel those associated with self-harm

1.6.2.1 *Initiation of addictive behaviours*

Initiation of addictive behaviours (such as cigarette smoking and alcohol consumption), are common in adolescents in the UK (Hawton et al., 1996; Meltzer, 2002). Like self-harm, the most typical age to experiment with drugs is during adolescence. Also like self-harm, social context, or specifically knowing someone else who engages in drug taking, seems to be strongly associated with initiation of drug-taking behaviour. Those teenagers who are aware of others who take drugs are more likely to do so themselves. Prinstein,

Boergers, and Spirito (2001) asked 527 adolescents to report on their substance use (cigarette and marijuana use, heavy episodic drinking) and the health-risk behaviour of their friends. Adolescents' substance use was related to their friends' substance use. Family dysfunction, social acceptance, and depression altered the magnitude of association between peers' and adolescents' risk behaviour.

Like self-harm, the necessary or sufficient conditions that cause a person to try a drug have yet to be convincingly established, but drug availability, (Jaffee, 1965), personality predispositions (Shaffer, 2000), negative emotions such as anger, frustration, loneliness and unhappiness (Solomon, 1977), and social influences such as peer group pressure (Dupre et al., 1995) have been suggested to influence drug sampling. Larkin & Griffiths (2004) conducted interviews with eleven individuals in their 20's who engaged in 'risky but rewarding' behaviours (namely bungee jumping and use of the recreational drug Ecstasy) to try to illuminate something of what it means to take risks for pleasure in our culture. The participants they interviewed also described a "positive, appetitive and wilful orientation" towards risk seeing it as a "source of pleasure and reward, cultural identity and social participation ...(and)... as a means of expressing resistance to conventional constraints" (ll. 28-31, p.230, Larkin & Griffiths, 2004). They found a distinction between those who accepted that there may be long term risk (rationalising their engagement with the activity as a treat and minimising the risks) and those who try not to think about the risks.

Drug taking, like self-harm, is associated with engagement in other risky behaviours (such as drug or alcohol abuse). Similarly, many adolescents who engage in gambling activities are also involved in other problem behaviours, such as substance abuse, violence, delinquency, teenage pregnancy and school dropout (Hawkins & Catalano, 1992).

1.6.2.2 *Changes over time*

Changes over time occur as substance abuse continues. Like the patterns seen with self-harm, over time substance abuse tends to become more frequent and stronger or larger doses are taken. There are many reports of addicts increasing their drug consumption over time (Falk et al., 1983). Increased dosage with experience has been attributed to an

overall reduction in affective response (Solomon, 1980) or tolerance to aversive effects (Robinson & Berridge, 1993). Those who abuse drugs report that they experience increasing urges to do so and that it becomes increasingly difficult for them to control the behaviour. Clinical observations suggest that a loss of control is common to gambling addictions (Blaszczynski & McConaghy, 1989; Carlton & Manowitz, 1987; McCormick, 1994). For example, Carlton et al. (1988) administered a modified attention deficit disorder scale to a sample of 16 problem gamblers and found that they scored significantly higher on Attentional Deficit Disorder (ADD) items than a control group.

Long term drug-use can also arouse negative feelings, strong reactions and prejudice in clinicians and the general public, in a similar manner to self-harming behaviours, exacerbating feelings of shame, guilt and regret and increasing the likelihood of social isolation. Regular long term drug use frequently results in negative physical, social and psychological consequences; including stigma, loss of social support and relationship problems; concentration difficulties and depression, and negative withdrawal symptoms, such as cramps, sweating, nausea and convulsions (Wise & Bozarth, 1987).

Most, if not all, researchers agree that a person's use of drugs progresses through stages. Prochaska and DiClemente (1983) describe five stages of change in addictive behaviours: precontemplation and contemplation (prior to quitting), action (the act of quitting), maintenance and relapse. Individuals may cycle through these stages for many years before quitting their addiction. For example, many studies reveal a very high rate of return to drug use after treatment (Bradley, Phillips, Green & Gossop, 1989). The typical addict is unsuccessful in abstaining for long periods of time, despite negative social, economic and personal consequences of relapse. Hunt and Matarazzo (1973) report that about 80% of abstaining alcoholics relapse during the year after their treatment. Researchers have disagreed on the relative importance of specific risks to relapse, but there is overall agreement that unpleasant mood states, external events, beliefs about the drug and its effects, and social pressure increase the likelihood of relapse (Litman et al., 1983). Those who self-harm, like those who abuse drugs, cycle several times through these stages before achieving long-term maintenance (Prochaska, DiClemente & Norcross, 1992). They describe periods of self-harming interspersed with periods of self-enforced abstinence (Schwartz et al., 1989).

1.7 Summary

The psychological processes involved in the development and maintenance of deliberate self-harm remain a puzzling phenomenon. Much has been detailed about modern typology of self-harm however it is evident from a review of current knowledge that there is a lack of testable theories that may explain its function and maintenance. Those who self-harm say that it is an 'addiction' because of its compulsive nature, but what does this mean? If self-harm is addictive we would expect the characteristics of the behaviour to parallel those of other addictions. A review of modern typology of addictions suggests that there are many parallels with the typology of self-harm. However, if self-harm really is addictive, we should expect it to satisfy diagnostic criteria of other addictions. In which case, in the absence of satisfactory theories of self-harm, it would be of heuristic value to consider whether current theories of addiction might apply to the behaviour. This is the focus of the next chapter.

CHAPTER TWO

Knowledge of addictions and deliberate self-harm

Chapter Summary

On a prima facie basis, deliberate self-harm appears to meet clinical criteria for dependency and/or behavioural addiction. There is one exception –rather than the pleasurable high experienced from drugs or gambling, the initial effect of self-harm is likely to be pain. How can this be explained? One theory of addiction, the Opponent Process Theory (OPT, Solomon, 1977) links the experiences of aversive and positive stimulation. According to OPT, behaviours resulting in initial positive affect are inevitably followed by a compensatory negative response, whereas behaviours that initially produce negative affect are followed by positive compensatory responses. Some theoretical accounts suggest that amongst regular drug users, the operant behaviour of dosing is negatively reinforced, i.e. it occurs to avoid the negative consequences of drug withdrawal – the opponent process that follows a drug high. Similarly, operant behaviours that produce immediate aversive consequences may be positively reinforced by a delayed positive opponent process. If the immediate aversive consequence is discounted OPT may be able to explain how an addiction to aversive operant behaviours, like self-harm, develops and is maintained. Discounting may occur through social reinforcement, classical conditioning, or dissociation.

Those who self-harm often describe their behaviour as "private" and "shameful" suggesting a dislike for it – yet they find themselves compelled to engage in it, particularly when stressed. Another theory of addiction, the Incentive Sensitization Theory (IST: Robinson & Berridge, 1993) may provide an alternative perspective that can help explain how compulsions to engage in reinforcing but socially unacceptable activities (like self-harm) are triggered and maintained. IST suggests that addiction related stimuli trigger hypersensitized reward systems in the brain, causing "wanting" (i.e. behavioural engagement that leads to operant behaviours such as seeking and using the object of the addiction) independent of "liking" (i.e. the subjective experience of pleasure in relation to the consequences of these behaviours). Empirically testable predictions can be formulated from these theories in order to establish their application to the phenomenon of self-harm.

2.1 How do we define addictions?

In the first chapter of the thesis a review of modern typology of addictions suggested that there are many parallels with the typology of self-harm. If self-harm really is addictive, however, we should expect it to satisfy diagnostic criteria for addiction. It is therefore important to consider how the concept of addiction has been defined and operationalised.

Addiction is a controversial concept often defined by prevailing social, cultural, political and economic factors. There has been considerable debate regarding its appropriate definition and a number of criticisms have been raised regarding the use of the term. For example, definitions of addiction are often vague, inexplicit (Goodman, 1990), or inaccurately applied by professionals and lay people (Shaffer, 1999). Conceptions of addiction may be biological (e.g. Betz et al., 2000) social (e.g. Acker, 1993) psychological (e.g. Verheul et al., 1998) or contain elements of these perspectives (e.g. Bio-psychosocial perspective; Orford, 1985), however there is some consensus within definitions of addiction that addictive behaviour, like self-harm, is perceived as 'a loss of control' over a behaviour and has harmful consequences both psychologically and physically (Cottler, 1993; DSM IV, 1994; Robinson & Berridge, 2000; Rousaville et al., 1993). Note that 'perceived loss of control' is more widely accepted than 'compulsion' – supported by Tiffany's (1990) theory of habit formation which purports that individuals may repetitively engage in potentially harmful behaviours due to non-intentional habit sequences which may be initiated in the absence of pleasure.

Practitioners and health organizations tend to focus on operational definitions of the concept. For example, The World Health Organisation (1974) defined drug addiction as "a syndrome in which the use of a drug is given a much higher priority than other behaviours that once had a higher value... In its extreme form (addiction) is associated with compulsive drug using behaviour and it exhibits the characteristics of a chronic relapsing disorder." (pp.15). However, theorists often define addiction in terms of the mechanisms they propose to underlie the concept (e.g. Solomon, 1980). Consequently, it is important to consider the context within which any definition of addiction is proposed.

For many people the concept of addiction involves taking of drugs. Therefore it is perhaps unsurprising that most official definitions concentrate on drug ingestion (Griffiths, 2005). These are the definitions that with be focused on in this thesis as the

theories discussed in the following chapters have been most extensively applied to drugs. Also more stringent definitions, currently applied in medical settings were focused upon to give these findings greater credibility and applicability in clinical practice.

2.1.1 Formal Clinical Diagnosis.

The most utilised operationalised definition of addiction relates to the application of clinical criteria necessary for a formal clinical diagnosis. One of the most widely used diagnostic guidelines for addiction are presented in the Diagnostic and Statistical Manual of Mental Disorders IV, where the term 'addiction;' has been replaced by the term 'dependence'. According to the World Health Association (2001) the concept of dependence incorporates a compulsion to take the drug on a periodic or continuous basis and represents a variation in that it implies an impaired control over the behaviour.

Features of dependence are manifested in seven categories of symptoms, three or more of which need to be experienced within the same 12 month period, in order to make a diagnosis of dependence. The criteria focus on tolerance, withdrawal, impaired control, unsuccessful quit attempts, time spent procuring, neglect of other activities, and use despite negative physical consequences, as described below.

Tolerance, in this instance, refers to either a need for markedly increased amounts of a drug to achieve intoxication, or markedly diminished effect with continued use of the same amount of the drug. *Withdrawal* describes the process whereby the drug is taken to relieve specific, drug related, withdrawal symptoms. *Impaired control* occurs when the drug is taken in larger amounts or over longer periods than was intended. *Unsuccessful quit attempts* describe a persistent desire for the drug or unsuccessful efforts to cut down or control drug use. *The time spent procuring the drug* refers not only to time spent in obtaining and using the drug, but also to the period recovering from its aversive consequences. *Neglect of other activities* involves giving up or reducing important social, occupational, or recreational activities because of drug use. Finally *use despite negative consequences* refers to continued drug use despite knowledge of a persistent or recurrent physical or psychological problem that is likely to have been worsened by use of the drug.

A number of criticisms have been levelled at these criteria. For example, many of the terms are open to interpretation; consequently reliability of diagnoses based solely

on these categories may be limited. Also, clinical applications of 'dependency' have often been restricted to drug and interpersonal contexts, despite evidence that similar symptoms have been noted in relation to other behaviours (for example, pathological gambling (Griffiths, 1990; Mobilia, 1993; Walters, 1996), eating disorders (Lacey, 1993; Lesieur & Blume, 1993), sexual addictions (Goodman, 1993), generic technological addictions (Griffiths, 1995), and pinball addiction (Griffiths, 1992). For example, Griffiths (1995) has argued that certain behaviours (for example, gambling, computer gaming), can be addictive, and have formulated six criteria for behavioural addiction. These include, salience, conflict, tolerance, euphoria, withdrawal symptoms, relapse.

In the context of a behavioural addiction, *Salience* describes the importance of the behaviour in the person's life, specifically the extent to which the person's behaviours, thinking and feelings revolve around the addiction. *Conflict* may be intra-personal (focusing on internal disputes about preoccupation with the behaviour) and inter-personal (referring to effects on relationships with others). *Tolerance* describes an increased engagement in the behaviour to experience the same effect initially experienced. *Withdrawal* effects are unpleasant reactions to the cessation of the addictive behaviour and *relapse* is reinstatement to a former state of the addiction, even after periods of abstinence (Brown, 1989) [1].

On a prima facie basis, deliberate self-harm appears to meet clinical criteria for dependency and/or behavioural addiction. For example, as described in the previous chapter, those who self-harm describe urges or compulsions to harm themselves that are associated with a lack of control over the behaviour (Schwartz et al., 1989); they neglect other activities as the behaviour becomes more salient in their thoughts (Leibenluft et al., 1987; Schwartz, Cohen, Hoffmann, & Meeks, 1989); they continue to harm themselves despite negative consequences (Favazza, 1989a) and they find it difficult to quit the behaviour (Schwartz et al., 1989). There is one exception; initial doses of opiates (e.g. morphine, heroin) and psychomotor stimulants (e.g.

[1] In 2005, Mark Griffiths updated the components of behavioural addiction reclassifying 'euphoria' as 'mood modification' (Griffiths, 2005). Mood modification refers to the subjective experience that people report as a consequence of engaging in a particular activity – therefore it encompasses the earlier criterion of a euphoric 'buzz' or 'high' but also allows for the inclusion of a tranquillizing and/or distressing feel of 'escape' or 'numbing'. At the time of coding and analysing the data in the subsequent chapters of this thesis this updated classification was yet to be published. This expansion of the definition to incorporate paradoxical numbing or escape from negative sensations has important implications for the notion of self-harm as addictive, and is discussed further in later chapters.

amphetamine, cocaine) taken intravenously, and initial experiences of gambling, may trigger a sense of well-being and/or euphoria (Hindmarch, 1980; Griffiths, 1990) yet, self-harm - unlike most drug taking or gambling - has an initial negatively valenced effect i.e. rather than the pleasurable high experienced from many drugs or gambling, the initial effect of self-harm (that is, the first effect during the first few episodes in which the behaviour is ever engaged in) is likely to be unpleasant. How can this be explained?

2.2 The Opponent Process Theory

2.2.1 The Opponent Process Model

One theory of addiction, the Opponent Process Theory (OPT, Solomon, 1977) links the experiences of aversive and positive stimulation in an account that describes "the costs of pleasure and the benefits of pain" (Solomon, 1980, pp.691). According to Solomon it is of commonplace that behaviours which result in initial positive affect are inevitably followed by a compensatory negative response, whereas behaviours that initially produce negatively affect are followed by positive compensatory responses.

The theory evolved from Solomon's observation of ducklings. He noticed that when ducklings were presented with a moving mother duck, they became excited, "stumbling in the direction of the mother and moving their head quickly so that the mother is kept in sight" (Solomon, 1980, p.692). However, when the mother was removed, the duckling emitted a high-pitched, repetitive sound, (known as distress calling) which persisted for several minutes before ceasing. He observed that before affect returned to baseline level it became more extreme in the direction opposite to the stimulus that triggered the initial disruption i.e. the ducklings' distress calls were more extreme than the excitement they displayed at seeing the mother duck.

Solomon became aware that similar affective or hedonic contrasts occurred in a variety of settings, for example, in feeding babies (who cry for several minutes when milk is removed) parachutists (who experience anxiety pre-jump and elation post jump) and drug taking (where initial positive effects of drugs are followed by negative 'withdrawal' symptoms). Solomon theorised that the nervous systems of mammals are evolved to detect and react to 'biologically relevant stimuli' and that these stimuli educe strong hedonic states. When the stimuli are removed, a contrasting or opposing hedonic state ensues, that finally ceases after several minutes of stimulus absence.

Solomon observed the following initial pattern of affective response to a variety of biologically relevant stimuli, as shown in Fig 2.1. This complex sequence of events is called the 'standard pattern of affective dynamics'; it has 5 distinct features: (i) the peak of the initial state (which may be a positive affective response (in the case of drugs or babies milk) or a negative affective response (like fear pre-parachute jump) which occurs when the stimulus is presented (ii) the adaptation phase of the initial state, where the intensity of the response state declines (iii) the steady level of the initial response state; (iv) the peak of the opposite (or 'opponent') response state, which occurs when the stimulus is removed and may be a negative affective response (like withdrawal in drugs or crying when milk is removed from babies) or a positive affective response (like elation post-parachute jump) but crucially is of opposite valence to the initial response state; and finally, (v) the decay of the opposite response back to original baseline state.

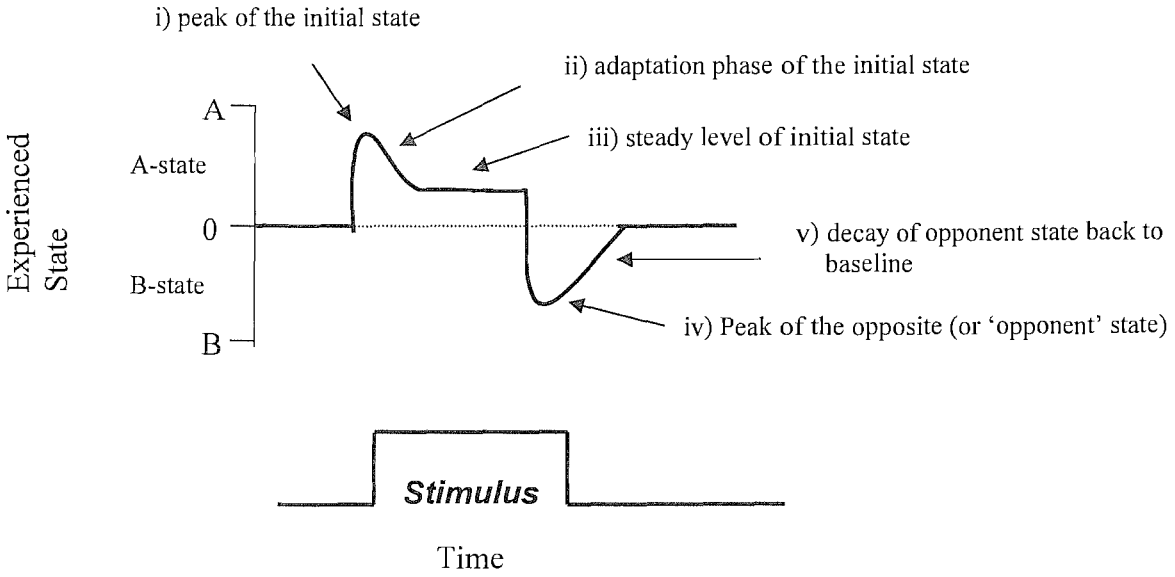

Figure 2.1 Initial pattern of affective response to biologically relevant stimuli (adapted from Robinson & Berridge, 2003).

This pattern of response may be similar to that described by those who self-harm. Although self-harming may first occur as a result of social learning factors (e.g. observational learning, attention seeking - Taiminen et al; 1998); many of those who continue to harm themselves report that they do so in order to relieve emotional tension. The act of self-harm produces an immediate, stable, unconditional affective

response: pain. However, this is followed by a period of contrasting, oppositely toned hedonic state: tension relief; identifiable by increases in endorphins and psycho-physiological changes (Haines et al., 1995). Consistent with this, Haines, Williams, Brain and Wilson (1995) have shown that amongst self-harming male prisoners, tension relief – indexed by marked reductions in psychophysiological responding – accompanies the imaginal presentation of self-harming incidents. However, while this finding is reliable, it requires a theoretical account to explain why tension is reduced. This pattern of response is also similar to common responses to drugs where the initial manifest affective response to the substance (which is usually pleasurable) is followed by the negative consequences of drug withdrawal.

In an attempt to model the underlying theoretical mechanism for these observed responses, Solomon described theoretically derived a- and b- processes which are indexed by measurable opposing A and B states. He argued that an initial a-process is activated by an external stimulus and this in turn activates a slave opponent b-process. The b-process functions to oppose the initial a-process, whether the a-process is positive or negative. The b-process is of 'sluggish latency', slow to build to its asymptote and slow to decay after the stimulus and a-process have terminated

Solomon suggests that the resulting measurable affective or hedonic condition of the organism is a result of the sum of the intensity of the a- and b-processes. This can be observed in Fig 2.2, where the amalgamation of the two theoretical opponent process curves (in the lower diagram) produces a function corresponding to the experienced state (in the upper diagram). Thus the outcome results in an A-state when the a-process is greater than the b-process and in a B-state when the b-process is greater than the a-process.

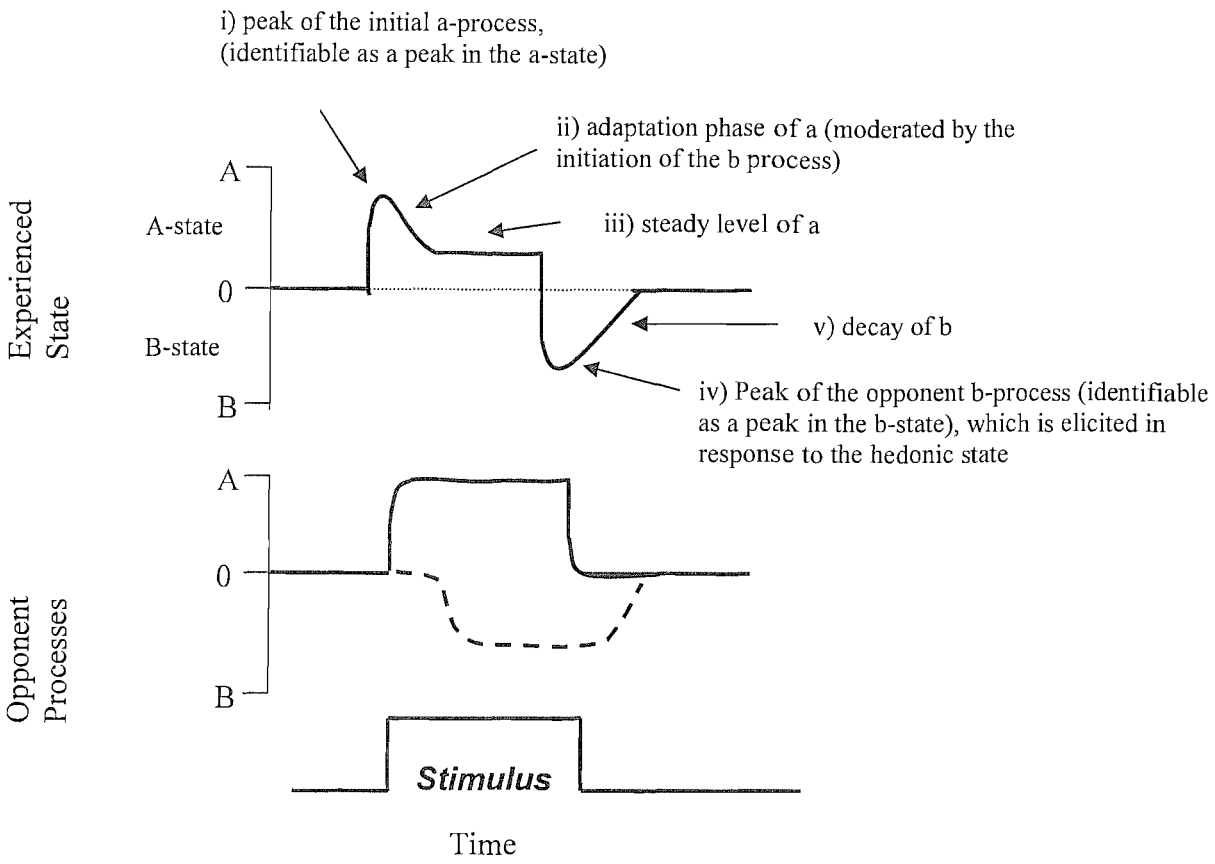

Figure 2.2 Opponent Process Model of Addiction: Initial drug effect (adapted from Robinson & Berridge, 2003).

Solomon and his colleagues observed that this pattern of response only occurred when the stimulus was novel; with repeated exposure, the pattern of affective responding changed. Specifically, the initial response to the stimulus was less intense. For example, Katcher et al.(1969) found that when a laboratory dog was administered a series of electric shock US over a period of many days, the increase in heart rate at shock onset reduced with time indicating habituation. Also the opposite, opponent B-state was more intense and lasted longer. For example, with repeated introduction and removal of milk from babies, the crying when the milk was removed increased in intensity and length.

The observed pattern of affective dynamics following repeated elicitation and withdrawal of the stimulus is represented in Fig 2.3. Although the overall pattern is similar to the initial affective response, the initial A-state peaks at a lower intensity whilst the opposing B-state peaks at a greater intensity and is longer lasting. Thus one consequence is that the overall arousal experienced in the presence of the US is reduced over repeated exposure.

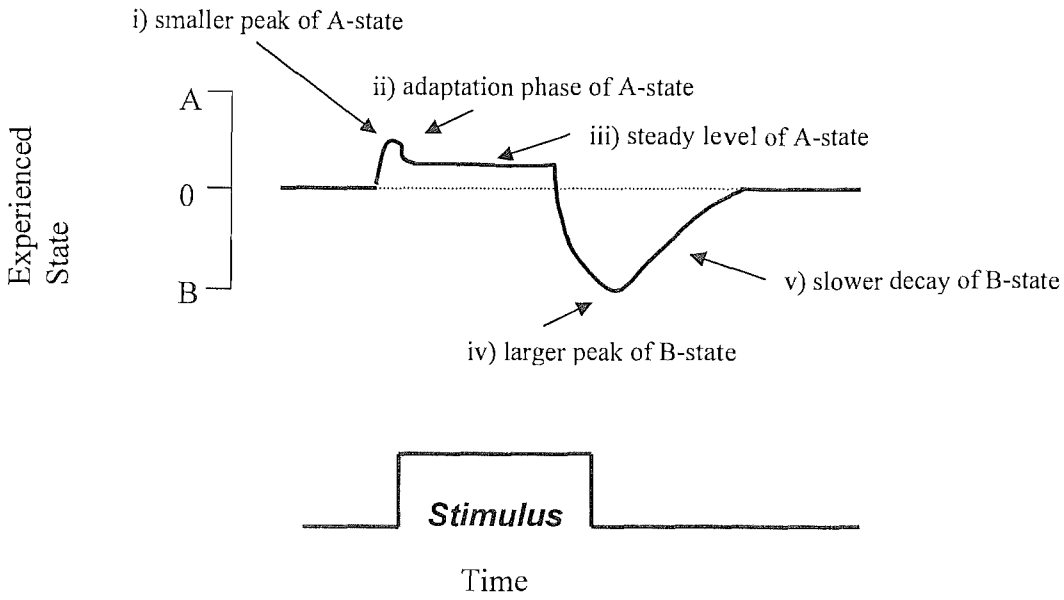

Figure 2.3 Opponent Process Model of Addiction: Pattern of affective response for repetitive exposure to biologically relevant stimuli (adapted from Robinson & Berridge, 2003).

This effect can be seen in a variety of contexts; in substance addiction for example, the initial manifest affective response to the substance (which is usually pleasurable) is after a time no longer so apparent or so sustained. Similarly, in non-drug aversive experiences (like jogging) the initial manifest affective response to the behaviour (which is usually aversive, e.g. breathlessness and fatigue) is no longer is so apparent or sustained. A similar effect has been reported anecdotally by those who self-harm, that is, that the initial aversive pain response to self-harm becomes less apparent and less sustained with repeated experience of the behaviour. For example, studies suggest that those who have been self-harming for a number of years on a regular basis, report that they now experience less intense pain and/or shorter durations of pain when they harm themselves compared with when they started to harm themselves, irrespective of the severity of the wound (Sutton, 2002).

Solomon attributes this change in dynamics to the strengthening of the b-process with repeated elicitation. The a-process initially elicited is non-habituating but does not outlast the unconditional stimulus which triggers it. In contrast, the opponent b-process becomes longer lasting and is strengthened by use. This is illustrated in the lower diagram of Fig 2.4. Since the resulting measurable affective or hedonic condition of the organism is a result of the sum of the intensity of the a- and b-

processes, there are two consequences of this. Firstly, the overall affect elicited in the presence of the unconditional stimulus is reduced with repeated exposure, so the initial A-state response to the stimulus is less intense. Secondly, the strengthened b-process outlasts the a-process, so the opposing B-state is of greater intensity and is longer lasting (as described above and in the upper diagram of Fig 2.4).

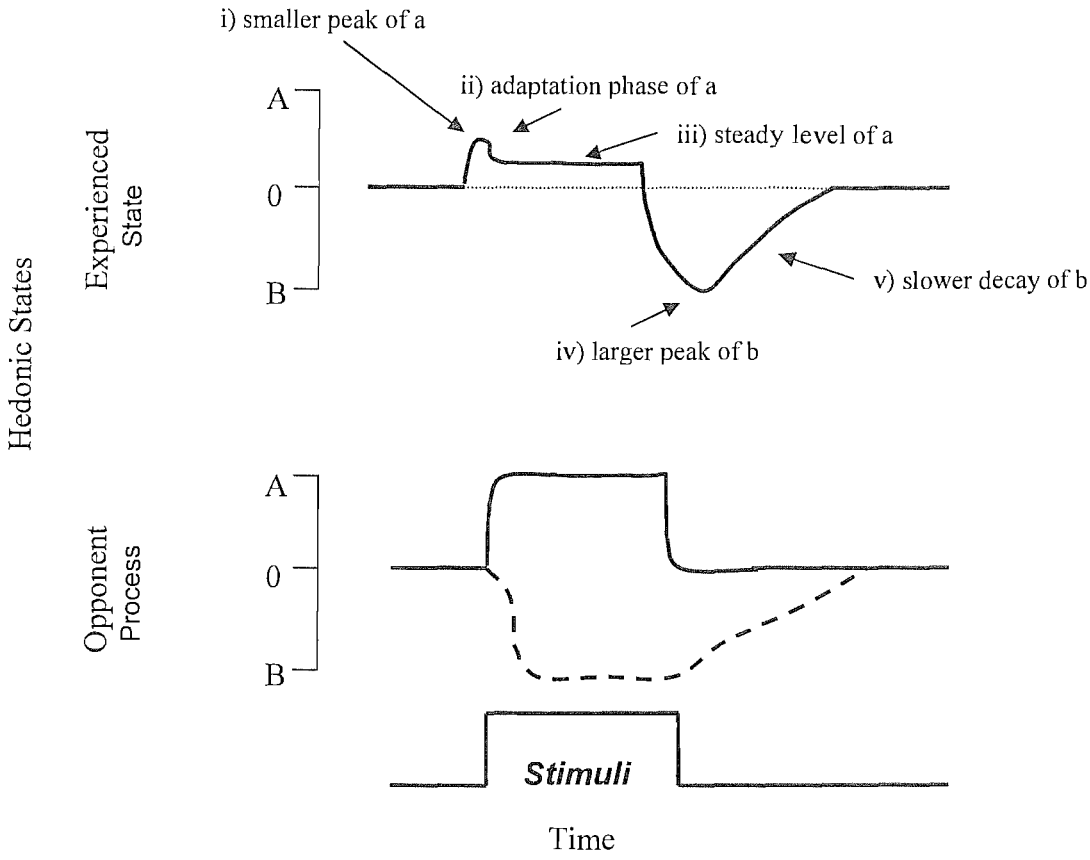

Figure 2.4 Opponent Process Model of Addiction: Effect of drug after addiction (adapted from Robinson & Berridge, 2003).

2.2.2 OPT and acquired motivation

The Opponent Process Theory is particularly attractive because it appears to apply to many instances of acquired motivation. For example, some theoretical accounts suggest that amongst regular drug users, the operant behaviour of dosing is negatively reinforced, i.e. it occurs to avoid the negative consequences of drug withdrawal – the opponent process that follows a drug high. In a similar way, operant behaviours that produce immediate aversive consequences (e.g. fear-producing activities such as bungee jumping, or exposure to irritating and painful stimuli like those produced in sauna bathing or jogging) may be positively reinforced by a delayed positive

opponent process (e.g., the elation that follows such a fear-inducing encounter or the reported 'high' from endorphins following jogging). If the immediate aversive consequence is, for some reason, discounted OPT may be able to explain how an addiction to aversive operant behaviours, like self-harm, develops and is maintained.

2.2.3 OPT and self-harm

As mentioned earlier, the act of self-harm produces an immediate, stable, unconditional affective response: pain. However, both self-report and psycho-physiological studies suggest that this response is followed by a period of contrasting, oppositely toned hedonic state: tension relief. Self-harming may therefore be viewed as producing an aversive unconditional stimulus, as the initial behaviour (self-harming) is reinforced by the positive opponent process (tension relief). If the immediate painful response to self-harm is discounted OPT may be able to explain how an addiction to self-harm, develops and is maintained.

Discounting of the initial aversive consequence may occur due to classical conditioning of the positive opponent process (tension relief). That is, the behaviour (self-harm) is reinforced by the positive opponent processes (tension relief) which increase the likelihood of the behaviour being engaged in again. The behaviour may also be reinforced by social factors, such as peer support, this fits with evidence cited in the first chapter which suggests that those adolescents who are aware of others who self-harm are more likely to do so themselves (Hawton et al., 2002).

The discounting of risks involved in engaging in behaviours such as self-harm may also be understood through studies of other risky behaviours. Larkin and Griffiths (2004) interviewed eleven individuals in their 20's who engaged in 'risky but rewarding' behaviours (namely bungee jumping and use of the recreational drug Ecstasy) to try to illuminate something of what it means to take risks for pleasure in our culture. The participants they interviewed described a "positive, appetitive and wilful orientation" towards risk seeing it as a "source of pleasure and reward, cultural identity and social participation ...(and)... as a means of expressing resistance to conventional constraints" (ll. 28-31, p.230, Larkin & Griffiths, 2004). They also found a distinction between those who accepted that there may be long term risk (rationalising their engagement with the activity as a treat and minimising the risks) and those who tried not to think about the risks.

Those who self-harm also often describe experiences during harming themselves when they feel 'detached from reality' (Orbach, 1994). This process, where individuals become detached from an aspect of their experience, has been termed 'dissociation'. Dissociation consists of a disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment, which may be sudden or gradual, transient or chronic (American Psychiatric Association, 1994). It is thought to be an unconscious mechanism that enables avoidance of threatening or distressing information (Bernstein & Putnam, 1986).

When individual's are overwhelmed by an external stressor, they resort to denial or disengagement (i.e. dissociate) as a way of coping. Although adaptive at the time, many traumatized individuals then continue to dissociate as a way of dealing with trauma-related memories and other stressful life experiences (Shalev, Peri, Canetti & Schreiber (1996). Many of those who self-harm describe using self-harm to initiate a dissociative state (essentially the experience of harm triggers detachment) or to escape a dissociative experience (whereby the experience of harm re-integrates the individuals experiences, grounding them back to current reality) so that self-harming behaviour then becomes a way of coping with dissociation (Favazza & Conterio, 1989).

Dissociation has been shown to link the experience of childhood abuse with subsequent self-harming behaviour (Chu & Dill, 1990). It is clear, however, that childhood trauma may result in several different outcomes only one of which may be dissociation (Brodsky, Cloitre & Dulit, 1995). Little is known about the neurological basis of this experience, however, it is commonly described by those who self-harm and may also mediate the intensity of the aversive consequences (pain) experienced by those who self-harm.

If the behaviour is consistent with this hypothesis, then with repeated episodes of DSH, the b-process (tension relief) will strengthen, moderating the experience of the a-process (pain)- increasing the tolerance of the pain, and lengthening the period of tension reduction, mitigating against the chronically high levels of tension seen in this group (Bennun, 1984).

This explanation leads to a number of more specific predictions about changes in the motivation for self-harm, the experience of self-harm, and the function of the behaviour, over time. Although DSH may be initiated as a response to social and emotional pressures, the theory predicts that with repeated DSH episodes, these

functions will be replaced or supplemented by tension relief. Consequently it is possible that the self-harming behaviour may become independent of the processes that initiated it, achieving 'functional autonomy' (Allport, 1937).

These hypotheses closely match patterns seen in clinical practice. Adult self-harmers frequently show heightened emotional arousal. They report an absence of pain during acts of DSH (Walsh & Rosen, 1988), followed by a marked, immediate and prolonged reduction in tension (Lion & Conn, 1982), this state is eventually succeeded by a gradual re-emergence of tension (Clarke & Llewelyn, 2001; Favazza & Conterio, 1989). However, this theoretical interpretation of these reports has yet to be empirically substantiated.

2.3 The Incentive Sensitization Theory

2.3.1 The role of pleasure in maintenance of addictive behaviour

As discussed in the first chapter, those who self-harm are not proud of their behaviour. They often describe it as "private" and "shameful" suggesting a dislike for it – yet they find themselves compelled to engage in it, particularly when stressed (Schwartz et al., 1989). The Opponent Process Theory provides a testable explanation of the maintenance of self-harming behaviour with some face validity. Humans cannot tolerate being in a high state of emotional tension for any length of time (Smith et al., 1998) and therefore, engaging in an activity to reduce the high level of emotional arousal is credible in the absence of alternative coping strategies.

There is, however, anecdotal evidence of individuals engaging in self-harming behaviours in the absence of high levels of tension. For example, as discussed in chapter one, clinical reports of self-harming to end 'dissociation' (a feeling of being cut-off from reality), 'out of habit', or simply due to an inexplicable compulsion to mutilate (Schwartz et al., 1989; Smith et al., 1998). Moreover, prolonged self-harming, like prolonged drug addiction, has many negative consequences, such as stigma, scarring, loss of income and breakdown in relationships (Smith et al., 1988). Robinson and Berridge (1993) argue that such consequences often far outweigh the magnitude of (drug) pleasure or the memory of (drug) pleasure. The same argument can be applied to any account of addiction, since continued use despite negative consequences is a central component of the concept. Therefore, since acts of self-harm may occur in the absence of high levels of tension and lead to negative consequences which may in the long term increase tension, it is unlikely that

experiences of tension relief (like experiences of euphoria associated with drug taking) are solely responsible for maintaining the behaviour, and inducing relapse.

2.3.2 The Incentive Sensitization Model

Another theory of addiction, the Incentive Sensitization Theory (IST: Robinson & Berridge, 1993) may provide an alternative perspective to that of OPT that can help explain how compulsions to engage in reinforcing but socially unacceptable activities (like self-harm) are triggered and maintained. This theory is of particular utility in relation to this point since it is a non-affect based account, that is, it suggests that the behaviour is not overwhelmingly motivated by affect (liking).

This theory can be clearly distinguished from Solomon's because it does not rely on affect as an explanation for drug use. In IST, drug related cues potentiate the reinforcement value of a drug in the same way food deprivation establishes food as a reinforcer. This process is biological and not linked to verbal behaviour (e.g. subjective liking) or positive affect; therefore it is a useful tool to explain compulsive engagement in socially unacceptable activities (such as self-harm) since craving can occur without enjoyment in engaging in the behaviour and in spite of awareness of negative consequences.

The theory proposes that physiological consequences of addictions (e.g. physiological drug effects, or endorphins) alter dopamine related brain systems that are associated with reward, causing these systems to become excessively sensitive (or 'sensitized') to specific drug effects and stimuli associated with drugs. As a consequence drug-related stimuli grab the addict's attention, triggering excessive wanting (a subjective experience of needing or desiring something, sometimes described as 'craving') for the drug and drug seeking and drug taking behaviours. The theory suggests that addicts are unaware that the stimuli are grabbing their attention (this process 'can occur and influence behaviour without conscious awareness', Robinson & Berridge, 1993) they are only able to report increases in drug seeking and drug taking behaviours.

To describe this theory in context, it is useful to think how IST may explain the motivation of those who take drugs. Although drug taking may be initiated by social influences (such as peer group pressure) IST would suggest that the experience of drugs activates reward systems which are normally triggered by natural reinforcers such as food, water or sexual activity. These reward systems are associated with

wanting to seek out and engage in the behaviour again, rather than the subjective experience of liking. Once activated, these reward systems become excessively sensitive to cues associated with drugs in the future. Consequently sightings of cues associated with drugs (e.g. needles, bottles of alcohol) re-trigger these reward systems in the brain. This causes individuals who have previously taken drugs to "want" to take the drug again i.e. to seek and engage in drug taking opportunities, in the same way that one deprived of food or water may crave and seek out the same. In the same way that craving and seeking out water when water deprived may for most, be independent from subjective pleasure generally experienced from drinking water; the theory suggests that the 'craving' of individuals for drugs may be independent (but not necessarily mutually exclusive) from the pleasure experienced from them. Therefore, IST might suggest that although drug taking may initially be motivated by social factors, it is maintained by excessive wanting, created by re-activation of reward systems in the brain by cues associated with the behaviour, rather than the pleasure experienced from taking the drug.

This distinction between "wanting" (i.e. behavioural engagement that leads to operant behaviours such as seeking and using an object) and "liking" (i.e. the subjective experience of pleasure in relation to the consequences of these behaviours) provides an alternative perspective to help explain how compulsions to engage in socially unacceptable behaviours (like self-harm) are triggered and maintained. IST was developed to explain the process of dependence to addictive drugs however the authors suggest that it would be reasonable to apply it to behavioural addictions since studies of brain activation in addicts suggest that the brain reward pathways that mediate the reinforcing effects of drugs and thereby shape drug-seeking behaviours, (specifically the prefrontal cortex, via connections with the limbic system and the reinforcement pathways, Wise & Bozarth, 1987) fulfil a similar role in facilitating salient, out-of-control, and harmful non-drug behaviours (such as gambling) (Koob, 2003; Potenza, Leung & Blumberg, 2003). Additionally, the authors of the theory concur that repeated stimulation with endorphins (evidenced as consequences of behavioural addictions such as gambling, and also of self-harm; Sandman, 1990, 1991; Meyer et al., 2004) may result in similar brain processes to those initiated by physiological drug effects (Robinson, Personal communication, 2001).

IST suggests that the process of excessive wanting of potentially socially unacceptable activities occurs because stimuli associated with addictive behaviours

become the target of a powerful process which is separate from that associated with pleasure – salience attribution. Salience is attributed to perceptions and mental representations of the associated stimuli by a neural system separate from that associated with pleasure. The neural system associated with salience is made up of brain circuits associated with reward, including particularly, the mesotelencephalic dopamine system (Robinson & Berridge, 1993). Whereas normal levels of incentive salience result in normal 'wanting', hyperactivation of this system (due to sensitisation of its neural substrate by the physiological effects of addictions) results in excessive incentive salience attribution, which is experienced as craving and causes cues to function as reinforcers, potentiating consumption. Owing to this, stimuli associated with addictive behaviours (such as needles, or fruit machines) attract attention, motivating compulsive seeking and goal directed behaviour. This can lead to a preoccupation with the addictive behaviour, which persists regardless of the consequent hedonic value of the addiction, and impairs an addict's ability to focus on non-addiction related activities (Townshend & Duka, 2001). Therefore, such an attentional bias may lead directly to relapse and addictive behaviour, independent of subjective liking.

Classical conditioning of drug cues *may* occur since the initial unconditional effect of many drugs is euphoria; hence, drugs may act as artificial incentives, activating neural systems associated with subjective pleasure or 'liking'. However the theory purports that 'liking' is not the basis for drug use. It is excessive wanting directed towards particular stimuli (also called *incentive motivation*, since it occurs without conscious awareness and potentates goal directed behaviour), rather than subjective pleasure, is proposed to drive compulsive seeking and engagement in addictions. This may help to explain persistent urges or cravings to indulge in behaviours which may not be described as pleasurable or socially acceptable (such as self-harm). The model proposes that the psychological process (and neural substrate) for pleasure (liking) is separate from the psychological process (and neural substrate) responsible for excessive wanting triggered by increased attention outside of conscious awareness (termed 'incentive salience') towards stimuli associated with the addiction (Berridge, 2003).

None of the psychological processes as described above and in the IST model (below) are apparent to conscious awareness, apart from their products, i.e. 'wanting' (or 'craving') or subjective pleasure ('liking'). As illustrated in the IST model, the

conditioned stimuli and unconditioned stimuli can produce pleasure directly via the pleasure integrator system, which results in an experience of subjective pleasure. However, the incentive salience attributor (which is associated with wanting and craving) can only be activated by repeated engagement in the addictive behaviour (e.g. drug administration, repeated gambling behaviours).

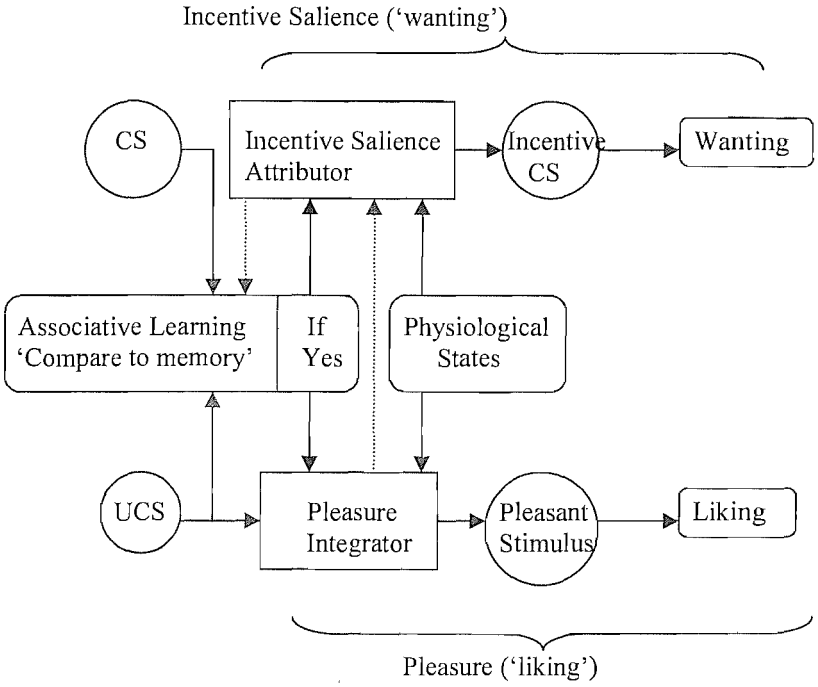

Figure 2.5: A schematic representation of the Incentive Salience Model of Motivation (Robinson & Berridge, 1993)

The activation of the incentive salience attributor by an unconditional stimulus associated with the addiction (the physiological addiction effects) results in incentive salience being assigned to the perception of conditioned stimuli that were originally neutral (such as the sight of a syringe or fruit machine, or in relation to self-harm, a blade) and their mental representations. Consequently, the addict forms an attentional bias to addiction-related stimuli, that is, it attracts and holds their attention. So incentive salience is another kind of conditioned response. Robinson and Berridge suggest that this response cannot be easily extinguished because the neuroadaptations that cause the brain to become hypersensitized to cues related to the addiction are irreversible.

2.3.3 Independent systems of wanting and liking

IST tackles one of the central paradoxes of self-harming behaviour: how can a behaviour that is unpleasant (or painful) be craved by an individual? Whilst OPT would suggest that the behaviour is reinforced by its pleasant opponent response (evidenced by subjective reports of positive affect), IST would suggest that 'wanting' is triggered by an independent neural system to 'liking', hence incessant and compulsive drug seeking may be evidenced independently of motivation to regulate affect. IST suggests that addicts develop an attentional bias to addiction-related stimuli, that is, cues associated with the behaviour attract and hold their attention, due to the process underlying incentive sensitization. In support of this proposition Lubman et al (2002) and Townshend and Duka (2001) found an attentional bias to stimuli associated with drug use in opiate addicts and alcohol use in heavy drinkers. Similarly, McCusker and Gettings (1997) found that gamblers showed a cognitive bias for gambling related words, in so far as that they demonstrated selective and automatic interference for gambling-related constructs on a Stroop task compared with controls (in this case, their non-gambling spouses).

2.3.4 IST and self-harm

If IST was the explanation of excessive wanting to self-harm despite its negative consequences, it would lead to a number of more specific predictions, particularly about attentional biases to self-harm related stimuli. Although DSH may be initiated as a response to social and emotional pressures, the theory predicts that with repeated DSH episodes, these functions will be replaced or supplemented by excessive wanting (rather than liking). This excessive wanting would be evidence by attentional biases to cues associated with self-harm. Consequently, as predicted by OPT, IST suggests that it is possible that the self-harming behaviour may become independent of the processes that initiated it, achieving 'functional autonomy' (Allport, 1937), but also (in contradiction to OPT) that the motivation to engage in the behaviour will in principle be independent from that caused by subjective pleasure, or tension relief.

2.4 Summary

On a prima facie basis, deliberate self-harm appears to meet clinical criteria for dependency and/or behavioural addiction. There is one exception –rather than the pleasurable high experienced from drugs or gambling, the initial effect of self-harm is

likely to be pain. How can this be explained? The two theories described in this chapter (OPT and IST) provide potential accounts for changing motivations to engage in this paradoxical behaviour. The Opponent Process Theory would suggest that the behaviour is reinforced by its pleasant opponent response (evidenced by subjective reports of tension relief), whilst the Incentive Sensitization Theory would suggest that 'wanting' is triggered by an independent neural system to 'liking', hence incessant and compulsive drug seeking may be evidenced independently of motivation to regulate affect. Empirically testable predictions can be formulated from these theories in order to test their application to the phenomenon of self-harm. The next chapter considers how these predictions may be tested.

CHAPTER THREE

Methodological issues associated with systematic analyses of DSH

Chapter Summary

The previous chapters suggested that self-harm may be viewed as an addictive behaviour and that theories of addiction may aid theoretical understanding of self-harm. The validity of applying these theories to DSH can be tested by considering whether self-harm meets the criteria for classification of addictions and whether predictions about self-harm behaviour made by these theories are met. However, self-harm is a private and unconventional phenomenon. Those who harm themselves are often ashamed of the behaviour, for this reason recruiting people who self-harm to take part in studies is necessarily problematic. Also, self-injury is by its own definition harmful, which makes it unethical to study as it occurs. Therefore, it may be easier to make testable predictions about the behaviour than it is to test them in practice.

The problems of privacy and ethics have been successfully overcome in other areas of study. For example, researchers in the field of addiction have faced similar dilemmas; those who drink excessively or take drugs are often shameful of the behaviour and potentially difficult to recruit. Moreover because most addictive behaviours persist in the face of escalating negative social and physical consequences, at some point it could be unethical to study them as they occur regardless of whether the drug of addiction is legal or illegal. Thus self-harm not only has theoretical and topographical links with addictions (as discussed in Chapters 1 and 2), it also has methodological links.

Many researchers argue that, given the multifaceted nature of addiction, the notion of a 'single specialised theory' of addiction and addictive behaviour is 'untenable' (Griffiths & Delfabbro, 2001, Marlatt & Gordon, 1985, Orford, 1985), and therefore that many perspectives, (for example, social, psychological and biological) and many different levels of analysis (e.g. explicit and implicit, qualitative and quantitative); play a part in increasing knowledge and understanding.

Retrospective self-reports of behaviours using methods such as questionnaires, interviews and functional analyses have been used in the field of addiction to collect

information on behaviours that researchers are unable to observe in-situ (e.g. Griffiths, 1993; Duffy and Milin, 1996; Miller and Plant, 1999). Each of these approaches has its strengths and weaknesses but all have the potential to be useful in the field of self-harm. Indeed, within the studies in this thesis specific questionnaire measures have been used to characterise the samples of participants and the topography of their self-harming behaviours. In the first two studies in this thesis (reported in Chapters 4 and 5) interview techniques have been used to derive contextually based information about initial and later DSH episodes and a specific functional analysis technique called 'chain analysis' (which is already used therapeutically to identify intra- and inter-psychic antecedents and consequences of the behaviour) has been used to collect retrospective self-report information about the motivation for and consequences of self-harm.

Research suggests however that humans are generally unable to report on their own experiences accurately, often choosing the most plausible and accessible explanations for their experiences even if these are misleading or inaccurate (Nisbett & Wilson, 1977). Therefore although self-reports of the experience of addictions may be of use for investigating beliefs about the behaviour, researchers have suggested they may not be objective or accurate reports of underlying processes which maintain it (Robinson & Berridge,1993). In the field of addiction, implicit responses to cues associated with experiences have therefore been used by psychologists to study behaviours and responses to behaviours which cannot be observed in-situ (Saladin, Drobes, Coffey, & Libet, 2002; Sayette, Martin, Hull, Wertz, & Perrott, 2003).

Researchers have developed experimental means of studying unconscious responses to cues, for example by measuring psychophysiological responses (e.g. heart rate, skin conductance, startle response) and unconscious behavioural responses to cues (Glautier, Drummond, & Remington, 1992; MacLeod et al., 1986). Most of this work has been conducted in the field of addiction, although implicit behavioural tests are also used in other fields of research, such as phobias and depression, and could be useful in the study of self-harm (MacLeod et al., 1986). Two specific implicit measures of behavioural responses to addiction related cues, the dot probe task (Lubman et al., 2000) and the stimulus response compatibility task (Bradley et al., 2004), have been used to test specific predictions relating to IST and the role of affect. This provides evidence for the validity of these techniques as a tool to test the

applicability of IST and OPT to self-harm. Studies incorporating these techniques are reported in Chapters 6 and 7.

3.1 Problems associated with the study of self-harm

This chapter will initially overview some of the methodological problems associated with studying self-harm. It will then consider how these problems have been overcome in other areas of study and how the techniques developed may be utilized to study self-harm.

The study of self-harm is hindered by two general categories of methodological problems; recruitment problems (that often result in sampling biases) and ethical problems (arising from the nature of DSH). This section will discuss implications of each of these problems in the study of DSH.

3.1.1 Recruitment problems and sampling bias

Many of those who self-harm are shameful of the behaviour (Burstow, 1992). They attempt to conceal evidence of it by concealing their wounds, suggesting they were accidental rather than intentional, and/or only engaging in the behaviour in private (Briere & Gil, 1998). The shame and stigma associated with self-harm makes its study problematic. Individuals are less likely to volunteer to participate in studies which examine behaviour which they view as shameful and private. This is highlighted by the small sample sizes in many published studies of self-harm. For example, Harris (2000) published a correspondence study with six women who regularly self-harmed. More recently, Sinclair and Green (2005) published a study in the British Medical Journal based on interviews with 20 participants with a history of self-harm.

Because recruitment of those who self-harm can be problematic, many studies recruit patient samples, amongst which self-harming behaviour is less secretive in that it is either incorporated into their diagnosis or discussed openly in therapy. Studies have reported that up to 65% of people who self-harm have a personality disorder (Evans, 2000), and repetitive attempts to harm oneself deliberately is one of the criteria for a clinical diagnosis of BPD (DSMIV-R, 1994). Consequently, many studies of self-harming focus on this psychiatric subgroup (e.g. Evans, 2000, Sansone et al., 2002; Wiederman et al., 1999) and neglect non-patient samples. Overcoming this selection bias in recruitment of participants to self-harm studies is important for a number of reasons. Clinical samples of self-harmers may be unrepresentative of all of

those who self-harm since their experience of DSH may be affected by co-morbid psychiatric conditions or the treatment they have received. Furthermore, research with non-clinical samples is necessary to explain why certain groups are reluctant to seek professional help, and how they can most effectively be supported. The studies in this thesis therefore aim to broaden the sample of those who self-harm, recruiting from community based (University) organisations alongside health service clinics and self-help groups.

3.1.2 Ethical issues

Self-injury is by its own definition harmful. As discussed in Chapter 1, 70% of those who repetitively self-harm report cutting themselves, whilst 35% burn themselves deliberately (Conterio & Favazza, 1986). Clearly it would be unethical to study these activities as they occur. This is supported by the British Psychological Society Ethical Regulations (BPS, 2002) which state that "Investigators have a primary responsibility to protect participants from physical and mental harm during the investigation" (p.11). This inability to study the behaviour in-situ presents major problems for would-be researchers. Historically, owing to this ethical issue, studies of self-harm have tended to rely on retrospective accounts by those who self-harm (e.g. Connors, 1996a, 2000; Favazza 1986, 1996; Miller, 1994; Solomon & Farrand, 1996; Suyemoto, 1998) despite the fact that establishing the reliability and validity of these reports presents a major challenge for researchers.

Self-harmers constitute a vulnerable subgroup. Although the evidence suggests that many self-harming acts are not generally intended to cause death; those who harm themselves deliberately are at greater risk of suicide. About half of those who commit suicide have a history of self-harm and 20-25% of all suicides attend hospital owing to a non-fatal act of DSH in the 12 months before their death (Foster et al., 1999). Regardless of a concurrent diagnosis of personality disorder, people who self-harm are therefore clearly vulnerable and researchers have a duty of care not to exacerbate their problems. The essential principle stated by the British Psychological Society in their Ethical Guidelines (BPS, 2002) is that "the investigation should be considered from the standpoint of all participants; foreseeable threats to their psychological well-being, health, values or dignity should be eliminated" (p.8). Because obeying this statement is difficult in the case of self-harming participants, those who self-harm can

be seen as 'too fragile' to engage in research; and research in the area of DSH has been relatively rare.

3.2 Methodological problems in the study of DSH

3.2.1 Similarities in DSH and Addiction

The recruitment and ethical problems associated with the study of self-harm are not unique to this area of research. Researchers in the field of addiction have had similar recruitment dilemmas to those in the field of self-harm (see Dolinsky & Babor, 1997). As discussed in Chapter 1, long term drug-use can arouse negative feelings, strong reactions and prejudice in clinicians and the general public, exacerbating drug users' feelings of shame, guilt and regret and increasing the likelihood of social isolation (Wise & Bozarth, 1987). Those who drink excessively or take drugs are often ashamed of the behaviour (Robbins, 1989). Because many of those with addiction problems may find it difficult to volunteer to participate in studies which examine behaviour that they view as shameful, addiction research is subject to recruitment problems including sample bias.

Researchers in the field of addiction have also had to face ethical dilemmas similar to those associated with DSH. Most addictive behaviours persist in the face of escalating negative social and physical consequences (Falk et al., 1983). However, some addictive behaviours may produce relatively instantaneous negative consequences (e.g. overdose of heroin), whilst others are likely to be more indirect or slow acting (e.g. liver failure through excessive alcohol consumption, financial difficulties because of the cost of engaging in the addiction). Because these distinctions are widely acknowledged, ethical committees have allowed some potentially addictive behaviours such as alcohol consumption to be observed in-situ (Glautier, Drummond, & Remington, 1992). It is however generally considered unethical to directly observe other directly harmful or illegal addictive behaviours, such as binge drinking or intravenous heroin use. Self-harm is similar to this latter category in that it would be unethical to observe it as it occurs. One exception to this may be retrospective observation of filmed self-harm behaviour – particularly where such behaviour is undertaken for reasons independent of research. However, filmed documentation of self-harm is rare and controversial and those whose who consent to videoing may represent a small subset of those who describe their self-harm as private and shameful.

This brief comparison shows that in addition to its theoretical and topographical links with addictions (as discussed in chapters one and two) self-harm also faces similar recruitment and ethical problems. The research field of addiction is nevertheless flourishing. Consequently methodologies developed to overcome these problems in the study of addictions may inform the study of self-harm. This section will consider how a number of techniques used in addiction research may be utilised in the study of self-harm.

3.2.2 Self-report methodologies

Retrospective self-reports of behaviours using methods such as interviews, questionnaires and functional analyses, are useful means to collect information on behaviours that researchers are unable to observe in-situ. These methods have been widely utilised in the field of addiction, since they provide an ethically alternative way to study harmful addictive behaviours. Each of these techniques is briefly reviewed below together with a discussion of why and how it might lend itself to the study of self-harm.

3.2.2.1 *Interview studies*

As previously mentioned, those with addiction problems may be less likely to volunteer to participate in studies which examine the behaviour they view as shameful. Therefore recruitment of those who engage in addictive behaviours (like recruitment of those who self-harm) can be problematic. Interview methods are particularly useful means to address this problem since a large amount of data can be collected from a smaller sample. For example, Griffiths (1993) reported a case study of an 18 year old former adolescent fruit machine addict with additional information from the addict's mother. This study examined a number of distinct stages and circumstances in the development of the addiction including discovery of the problem, the motivations to gamble constantly, the role of family distress, loss chasing, the excitement and skill in the maintenance of problem gambling, in addition to a personal examination of the problem's confrontation and eventual recovery. Furthermore, Duffy and Milin (1996) reported three case vignettes supporting the view that chronic cannabis use by adolescents may result in a clinically significant withdrawal syndrome and that the associated physiological symptoms directly contribute to the persistent use of the substance.

It is unlikely that such detailed information could be collected using alternative methodology. Interviews about addictive behaviours nevertheless have several drawbacks. Given the sensitive nature of the topic they can be time consuming and challenging to conduct. Additionally they are based in individuals' perceptions of their experience; since this is often retrospective the internal validity of these accounts may be compromised by memory biases, also the external validity of any conclusions may be affected by the sample sizes, hence any conclusions may be unsuitable to generalise to a larger population.

Notwithstanding these limitations, given the small research samples of individuals who self-harm, interview methods may be most beneficial to provide detailed accounts of the experience of DSH. Interview studies with individuals who self-harm have attempted to understand episodes of self-harm from the perspective of those who engage in the behaviour. For example Harris (2000) qualitatively examined of the motivations and interests of six women who self-harmed. She concluded that their self-harming acts possessed situated internal logic, whereas professionals tended to use rational logic in attempting to understand them. To date, however, no studies have systematically compared individuals' experiences of different phases of respondents' self-harming career despite anecdotal evidence that their experience of the behaviour changes over time (Schwartz et al., 1989). To address this gap in the literature, an interview study of initial and later experiences of self-harm is presented in Chapter 4 of this thesis.

3.2.2.2 *Questionnaire Studies*

Questionnaires are useful tools for increasing recruitment of participants in studies where the behaviour is shameful or illegal, since they can be completed anonymously. In the field of addiction, questionnaire responses have provided large data sets of specific information (Bisson, J., Nadeau, L. & Demers, A., 1999; Ramsay & Percy, 1997). The use of questionnaire methodology in the field of addiction and the validity of its application to the study of DSH is now briefly reviewed.

Many specific questionnaires have been developed in the field of addiction to aid the description of the typology of the behaviour (particularly frequency, dose, type of drug and history, e.g. Substance Misuse Assessment Questionnaire (SMAQ) Swadi,1997; Problem Oriented Medical Information System (PROMIS) Addiction Questionnaire; Lefever, 1988). These measures are often specific to the addictive

substance or behaviour therefore they need to be chosen with care. Additionally questionnaires are frequently used to describe the psychopathology of those who engage in addictive behaviours (e.g. The Millon Clinical Multiaxial Inventory-III Revised (MCM-III-R), Millon, 1994; Clinical Outcomes in Routine Evaluation, CORE System Group, 1998). Many of the tools have however been validated for specific populations (e.g. inpatient samples) so apt selection of measures is crucial to ensure that appropriate reliable and valid data is obtained.

Questionnaires about addictive behaviours have several benefits. They are less costly and time consuming than interviews and can be completed privately; consequently sample sizes in questionnaire studies of addictive behaviour are generally much higher than those of interview studies. For example, in a study by Miller and Plant (1999) 6,409 15- and 16-year-old students from 69 secondary schools within the UK responded anonymously to a questionnaire distributed to 9150 pupils about smoking, drinking and illegal drug use among secondary school pupils. Like interviews the drawback to using questionnaire methodologies is that they rely upon the accuracy and honesty of those completing the measures; which may affect the internal validity of the information, this will be discussed in more detail later in this chapter.

Owing to the stigma associated with many addictions, questionnaire methods have therefore been a useful means to collect privately information about addictive behaviour. These methods may therefore be usefully applied to collect specific information about the experience of self-harm as long as appropriate measures of self-harm are used.

The internet has also become a useful tool by which to collect data about behaviours which may be regarded as shameful as it enables participants to reveal information without having to meet an experimenter 'face to face'. It also has the benefits of greater flexibility in time and place of data collection, and can be less expensive (Brownlow & O'Dell, 2002). For these reasons it has been used with some success to collect data about addictive behaviours, such as alcohol (Kypri & Gallagher, 2003) and drug use (Nicholson, White & Duncan, 1999). Although internet recruitment and testing may have enabled participants to participate in studies about self-harm without having to identify themselves to an experimenter, the limitations of this methodology – namely that it would be difficult to follow up open ended answers, ethically manage any rise in urge to self-harm that might occur due to participation and ensure

appropriate conditions for behavioural testing across participants -- meant that it was not appropriate for the studies undertaken in this thesis. It may, however, be a useful tool for future large scale surveys of self-harm.

Currently there is little consistency in questionnaires used to measure self-harm. Tools currently in frequent use to measure the topography of DSH include single item measures (e.g. Boudewyn & Liem, 1995a; Martin & Waite, 1994); and short answer questionnaires (e.g. The Deliberate Self-harm Inventory (DSHI), Gratz, 2001). Often measures used ignore the frequency and severity of the behaviour (e.g. Baral et al., 1998; Schaffer et al., 1982). Moreover, standardised measures of self-harm often remain to be empirically validated (Favazza & Conterio, 1989; Zlotnick et al., 1996) or include both deliberate (i.e. those with immediate effect such as cutting, burning and bruising) and indirect self-harm behaviours (like driving dangerously, or entering into abusive relationships, which are harmful to a person in the long run although immediate physical damage is not the desired effect) (Sansone et al., 1998; Zlotnick et al., 1996).

The Deliberate Self-Harm Inventory (DSHI, Gratz, 2001) is a behaviourally-based, self-report questionnaire developed to assess various aspects of DSH, including frequency, severity, duration, and type of self-harming behaviour. It is one of the few measures to incorporate the operationally defined definition of DSH as a distinctive type of behaviour, characterised by "the deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage (e.g. scarring) to occur" (pp.253). Of those questionnaires which utilise this operationally defined definition, the DSHI was the only one presently empirically validated. The external validity of this measure was tested by comparing the results of this questionnaire with that of other measures purporting to assess similar constructs, the internal reliability of the DSHI was tested using split half item reliability checks, and the test-retest reliability of the measure was checked by re-testing the same population at two distinct time periods and checking the consistency of the findings. Preliminary data on the DSHI indicated that it has high internal consistency and good test-retest reliability (Gratz, 2001). For these reasons it was chosen to be used in the studies in this thesis to provide a behaviourally-based description of self-harming behaviours.

As mentioned earlier in this chapter, the studies in this thesis aim to broaden the usual research sample of those who self-harm, recruiting a community based sample

and self-help groups from organisations where DSH is likely to have a measurable prevalence (e.g. Universities) alongside health service clinics and self-help groups. The Millon Clinical Multiaxial Inventory III (MCMI-III-R: Millon, 1994) was chosen to provide a description of psychopathology of individuals who participated in the studies in this thesis. This is a 175 item self-report questionnaire designed to assess DSM-IV related Axis I and Axis II personality disorders and clinical syndromes. The inventory measures personality patterns and clinical symptoms across 26 scales. Internal consistency of the inventory is strong and test-retest reliability is good (Groth-Marnat, 1999). The MCM-III-R was chosen because it is shorter than many other diagnostic measures (e.g. Minnesota Multiphasic Personality Inventory-2™, Hathaway & McKinley, 1989) and is less intrusive than interview based screening assessments (e.g. Composite International Diagnostic Interview, WHO, 1990) it has also been widely used in both research and clinical contexts to screen populations (e.g. Craig & Olson, 1997; Gondolf, 1999).

The SCL-90-R (Symptom CheckList 90-Revised; Derogatis, 1993) was chosen to document the psychopathology of participants who had never self-harmed, since it has been more extensively used to reflect the psychological symptom patterns of non-patient, community-based (Eells, et al.,1994), as well as medical (de Carvalho, et al., 1998) and psychiatric (Carpenter& Hittner,1995), respondents, and non-patient norms are available (Derogatis, 1993). It is a 90-item self-report symptom inventory. Nine primary symptom dimensions are measured: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, Psychoticism; and three global indices of distress are reported - Global Severity Index, Positive Symptom Distress Index, and Positive Symptom Total. Internal consistency estimates have ranged from 0.77 to 0.90, and test-retest estimates have ranged from 0.78 to 0.90 (Derogatis, 1993).

To provide further descriptions of the anxiety levels of individuals who participated in the studies the State-Trait Anxiety Inventory (STAI; Spielberger, 1983), a 40 item self-report measure was used. This measure was chosen as it is short and easy to complete, and has been demonstrated to possess good reliability and validity (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983). A test of reading ability, The National Adult Reading Test (NART, Nelson, 1982), was also used to compare reading abilities between groups of participants. This test is a commonly used clinical and research tool. It involves reading aloud 50 irregularly spelled words whose

pronunciation can not be deduced by applying grapheme-to-phoneme rules (e.g. 'Drachm' pronounced 'dram'; 'Thyme' pronounced 'time', 'subtle' pronounced 'sutle'). The inter-rater reliability of this test is also good (Crawford, Parker, Stewart, Besson & Delacy, 1989; O'Carroll, 1987; Schlosser & Ivison, 1989).

3.2.2.3 *Functional analysis*

Functional analysis is a technique sometimes used by researchers to analyse variables affecting a phenomenon in human participants (e.g. Hill, et al., 1989; Jackson, et al, 1987). It generally involves identifying common rules and contingencies, relevant to an applied problem in order to generate a general model of a disorder that can be used as a framework to analyse an individual's situation (Hastings, 1993). Functional analysis has been used to model the causes of a number of behaviours including obsessive-compulsiveness (Queiroz et al., 1981), depression (Ferster, 1973) and addictions such as alcoholism (Marlatt & Gordon, 1985). One of the advantages of functional analysis is that it does not necessarily involve direct observation of the behaviours; when observation is unethical or unfeasible an interpretive model can be generated based on individuals' self-reports.

Functional analysis techniques are of heuristic use to study functions of self-harm because self-harm cannot be observed in-situ. Consequently, the availability of an interpretive model of self-harm that can be generated without direct observation of the behaviour is very useful. For this reason, functional analysis techniques are already used therapeutically to identify intra- and inter- psychic antecedents and consequences of self-harming behaviour as part of a 'chain analytic' approach (Linehan & Kehrer, 1993).

Usually used in therapeutic settings, chain analysis is described as "an exhaustive blow by blow description of the chain of events leading up to and following the (self-harm) behaviour" (Linehan & Kehrer, 1993, pp.437). Detailed chain analyses are regularly used within Dialectical Behavioural Therapy (DBT) to identify environmental and intra-psychic events that both precipitate and follow self-harm (Linehan & Kehrer, 1993). The first two studies reported in this thesis use this technique to collect retrospective observational information about the motivation for and consequences of self-harm.

3.2.3 Problems with self-report methods in the study of DSH

Protocol analysis, whereby individuals verbalise their thoughts, usually whilst completing a task, is a methodology for studying thinking that is well established in the fields of Cognitive Psychology (Crutcher 1994), Cognitive Science (Simon & Kaplan 1989), and Behavior Analysis (Austin & Delaney 1998). The central assumption of protocol analysis is that it possible to instruct subjects to verbalize their thoughts in a manner that doesn't alter the sequence of thoughts mediating the completion of a task, and can therefore be accepted as valid data on thinking. Correspondence between verbalized thoughts and actions isn't perfect however as not all thoughts which pass through attention are verbalised and some processing steps are argued to be 'short-circuited' with acquired skill. Additionally, the validity of verbally reported thought sequences depends on the time interval between the occurrence of a thought and its verbal report, for cognitive processes of longer duration, the problems of accurate recall of prior thoughts increases, with a corresponding decrease in validity of the verbal reports (Ericsson & Simon, 1993). Since self-harm can generally only be studied retrospectively, protocol analysis undertaken after the event may not accurately reflect thought processes occurring at the time of a self-harm episode.

Analysis of narrative accounts of addictions may enable us to consider the subjective experience of addicts; but many studies have shown that people might not always have access to information regarding the causes of their actions (Nisbett & Wilson, 1977). Research suggests that humans are generally unable to report on their own experiences accurately, often choosing the most plausible and accessible explanations for their experiences even if these are misleading or inaccurate. Nisbett and Wilson (1977) reviewed evidence, which suggests that there may be little, or no direct introspective access to higher order cognitive processes.
Subjects are sometimes:

a. unaware of the existence of a stimulus that importantly influenced an action (Valins & Ray, 1967; Zimbardo et al., 1969)
b. unaware of the existence of an action
c. unaware that the stimulus has affected the action

Accurate reports of cognitive processes will occur when influential stimuli are salient and are plausible causes of the responses they produce, and will not occur when

stimuli are not salient or are not plausible causes. For example, Latane and Darley (1970) reported that although people are less likely to help others in distress as the number of other bystanders increases, individuals seem 'utterly unaware of the influence of the presence of other people on their behaviour', and indeed insist that their behaviour is not influenced by the presence of others, despite demonstrations of bystander apathy. For these reasons, functional analysis of behaviours may uncover behavioural contingencies only when precursors to behaviours are salient or plausible causes or triggers. Indeed, some theories of addiction (e.g. schema based theories, Tiffany, 1990) suggest that drug using behaviours tend to be automatic, may occur in the absence of awareness and are difficult to impede in the presence of triggering stimuli.

This account is strangely reminiscent of Robinson & Berridge's (1993) suggestion that none of the psychological processes described in their model, except for subjective wanting ('craving') and subjective pleasure, are apparent to conscious awareness. Therefore although self-reports of the experience of addictions may be of use for investigating beliefs about the behaviour, they may not be objective or accurate reports of underlying processes which maintain it. For this it is necessary to consider implicit or unconscious responses.

3.3.4.Implicit Methodologies

Researchers in the field of addiction have studied implicit or unconscious processes in relation to addictive behaviour using both psycho-physiological and behavioural measures. The next section considers these studies and the potential to apply this methodology to study self-harm.

3.3.4.1 *Psychophysiological studies*

Psychophysiological responses to cues associated with addictions, such as alcohol and drugs, have been frequently studied during the past decade (Glautier, Drummond, & Remington, 1992; Saladin, Drobes, Coffey, & Libet, 2002; Sayette, Martin, Hull, Wertz, & Perrott, 2003). For example, studies have discovered that individuals instructed to hold drinks tend to demonstrate higher skin conductance and lower subjective pleasure ratings in response to alcoholic drinks versus non-alcoholic drinks, but individuals instructed to actually drink the beverages show the opposite response pattern (Glautier, Drummond, & Remington, 1992).

Studies using physiological measures, such as the study cited above, have been able to observe responses to alcohol related behaviours directly. Since it would be unethical to study deliberate self-harm in this way, psychophysiological responses to DSH are harder to study. However, in an attempt to uncover some of the physiological contingencies that might maintain self-harm, Haines et al. (1995) used imaginal presentation of self-harm, asking male prisoners to imagine a chain of events leading up to and following an act of self-harm, to approximate the experience of self-harm. By monitoring physiological changes in finger blood volume, heart rate, respiration and skin conductance whilst the prisoners were re-read a description they had given of the chain of events, they showed that a decline in these measures, which index tension relief, corresponded to imagining the act itself. This suggests that cues associated with self-harming behaviour may be successfully used to elicit unconscious responses. Indeed cues in many different forms (e.g. pictures, words, video, imaginal) have been used as an ethical alternative to direct observation of the behaviour to elicit responses to many different types of addictive behaviour (e.g. intravenous drug use, smoking, alcohol, gambling). These will be discussed in more detail in the next section.

3.3.4.2 *Behavioural measures*

The previous section discussed how cues may prompt psychological and psychophysiological responses. These cues can also be used to prompt behavioural responses. Although it is not possible to study illegal or dangerous behaviour directly, behavioural responses to cues involved in such activities can be measured in a number of ways. In research of responses to cues, behavioural measures are typically measured using paradigms from cognitive psychology which involve reaction time measures. Two paradigms are of particular interest e.g. stimulus response compatibility (SRC) tasks, (Bradley et al., 2004) and dot probe tasks (MacLeod et al., 1986) since they have been used to test predictions made by theories discussed in the previous chapter (Opponent Process Theory and Incentive Sensitization theory).

The stimulus response compatibility task

The stimulus response compatibility (SRC) task is based on the premise that valence of cues can be assessed from the speed at which they are approached or avoided. Participants are asked to move a manikin, using arrows on a keyboard as quickly as

they can, towards a word if it is presented in lower case and away a word if it is presented in upper case (or vice versa). This instruction can be affected by the nature of the cues themselves. Studies have found that it is harder to approach an unattractive word (e.g. EVIL) compared to a neutral word (e.g. SOCK; DeHouwer et al, 2001). Therefore, if participants evaluate cues as positive, they should be faster to make approach rather than avoidance movements to them relative to a neutral word. Therefore, this task is able to determine how positive the word is implicitly attributed to be from the speed of response to approach and avoid it, relative to the speed of response to approach and avoid a control word.

In a series of studies using stimulus response compatibility methods, Bradley and colleagues (Bradley et al., 2004; Mogg & Bradley, 2003; Field et al., 2004) have shown that smokers show greater preferences for (or are quicker to approach and slower to avoid) smoking-related rather than control cues, whereas this pattern was not evidenced in non-smokers. This bias was found to be positively correlated with maintenance of gaze on smoking-related cues (Mogg et al, 2003, Mogg & Bradley, 2004).

The Opponent Process Theory suggests that addictive behaviour is driven by affect regulation, consequently; cues associated with addiction should be positively valenced (associated with relief from withdrawal). This is supported by evidence that smokers show a preference for smoking-related rather than control cues. The Stimulus Response Compatibility test could be used to test this prediction with individuals who self-harm. For this reason, further details of this approach will now be discussed.

Bradley et al., (2004) used a typical stimulus response compatibility procedure. The methodology for this study is illustrated in Figure 3.2. The task consisted of two blocks of 100 computer based trials. Participants were told that their reaction times would be measured and were instructed to look at a computer screen. In each trial, a picture was displayed in the centre of the screen with a manikin figure presented either above or below it. The picture was either a smoking related or a control picture. The smoking pictures were colour photographs of smoking related scenes (e.g. woman smoking a cigarette) the control pictures were of other scenes matched as closely as possible for content (e.g. woman applying lipstick). The manikin was moved by pressing up or down arrows on a keyboard which moved the manikin up or down the screen.

In one block of trials, participants were instructed to move the manikin towards the picture if it depicted a smoking-related scene and away from the picture if the scene was not smoking-related. In the other block of trials, the participants were instructed to move the manikin away from smoking-related pictures and towards smoking-unrelated pictures. The picture and manikin disappeared as soon as the manikin reached the edge of the screen. There was a 1500ms interval between trials. The latency between each picture onset and response was recorded.

Within each block there were 20 practice and 20 test trials. During the test trials each of 20 smoking-related and 20 control pictures were presented twice, in a new random order for each participant. The manikin appeared above the picture 50% of the time and below it on the other 50%. The order of the blocks was also counterbalanced across participants. The trial procedure is illustrated in Figure 3.2. The results of a study using stimulus response methods to test predictions made by the Opponent Process Theory are presented in chapter six.

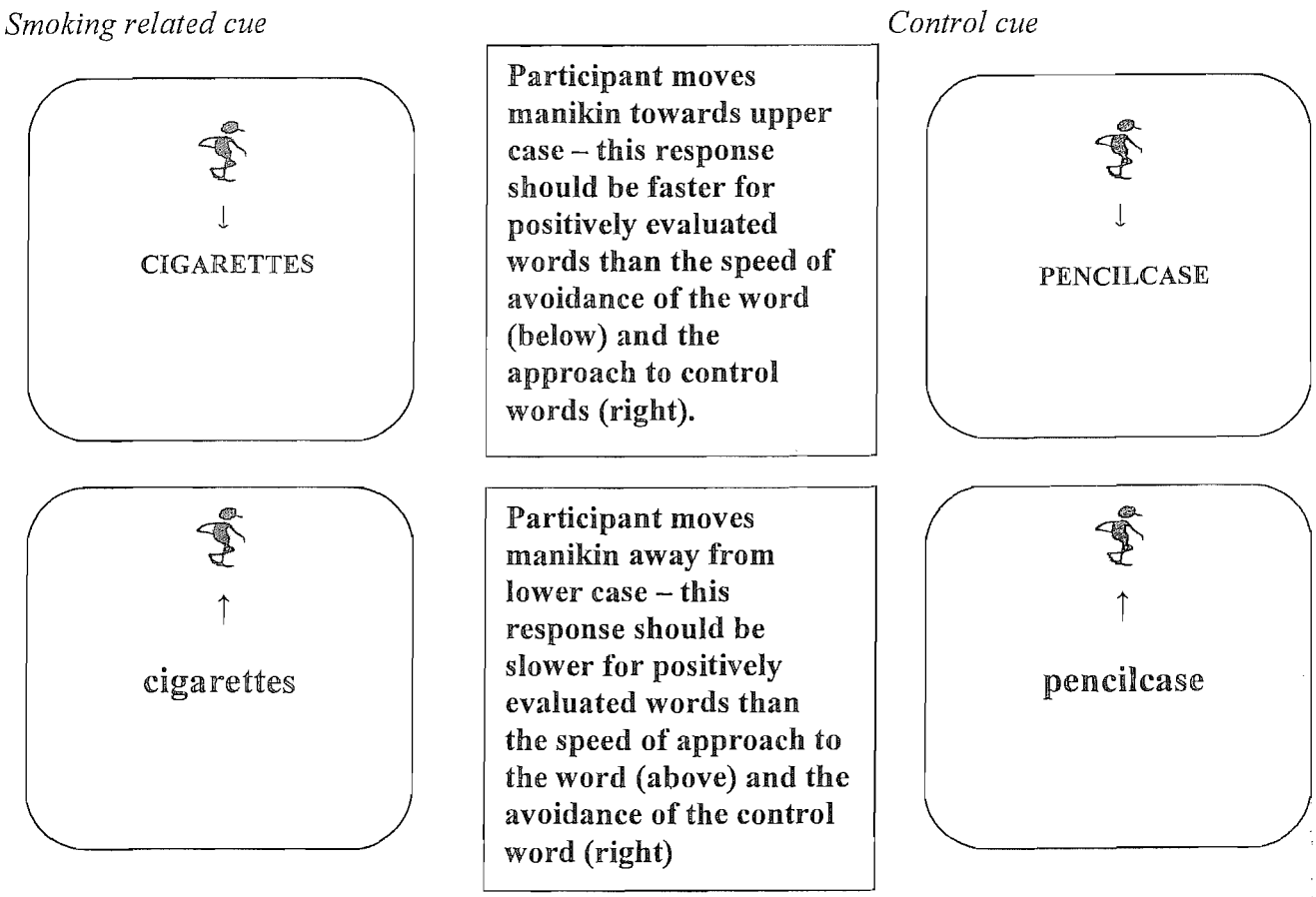

Figure 3.2 Representation of stimulus response compatibility task

The Dot Probe task

The dot probe task (MacLeod et al., 1986) has been used to provide a direct measure of the allocation of visual attention. The task is based on the premise that the spatial focus of attention can be accessed from the speed of manual responses to visual probes i.e. that individuals tend to respond faster to a probe stimulus in an attended rather than unattended region of a visual display (Mogg & Bradley, 1998). It has been applied extensively to studies of clinical anxiety, which suggest that clinically anxious individuals are excessively hypervigilant to threat and danger cues in their environment (MacLeod et al., 1986; Mogg & Bradley, 1998; Taghavi, 1999) and also has been used to study attentional biases associated with addictive behaviour (Lubman et al., 2000; Townsend & Duka, 2001). Therefore it seems reasonable to assume that this methodology could be used to study attentional biases to cues associated with self-harm. For this reason, further details of this approach will now be discussed.

Townshend and Duka (2001) used a typical dot probe procedure to compare differences in attentional bias to alcohol-related stimuli between heavy social drinkers and non-drinkers. Participants were told that their reaction times to stimuli will be measured, and were instructed to look at a fixation cross in the centre of a computer screen. The cross was presented for 500ms. Immediately after the cross disappeared, pair of word or picture stimuli were presented simultaneously side by side. In experimental trials, one of these stimuli was associated with the addictive behaviour, the other was not (e.g. LAGER and BEARD) and in control trials both stimuli were neutral and non-addiction related (e.g. PENCIL and RULER). These stimuli were presented for 500ms. Immediately after the stimuli disappeared a small probe appeared to the left or right of the screen, in the centre of the location that was previously occupied by one of the stimuli. The probe took the form of an arrow pointing to the left or to the right. Participants were told to respond as quickly and as accurately as possible to the stimulus by pressing a response button on a response box corresponding to the orientation of the arrow, for example the right button if the arrow pointed to the right, a left button if it pointed to the left. The probe remained on the screen until the subject made a response. There was an interval of 1000ms between the participant's response and the fixation cross at the start of the next trial.

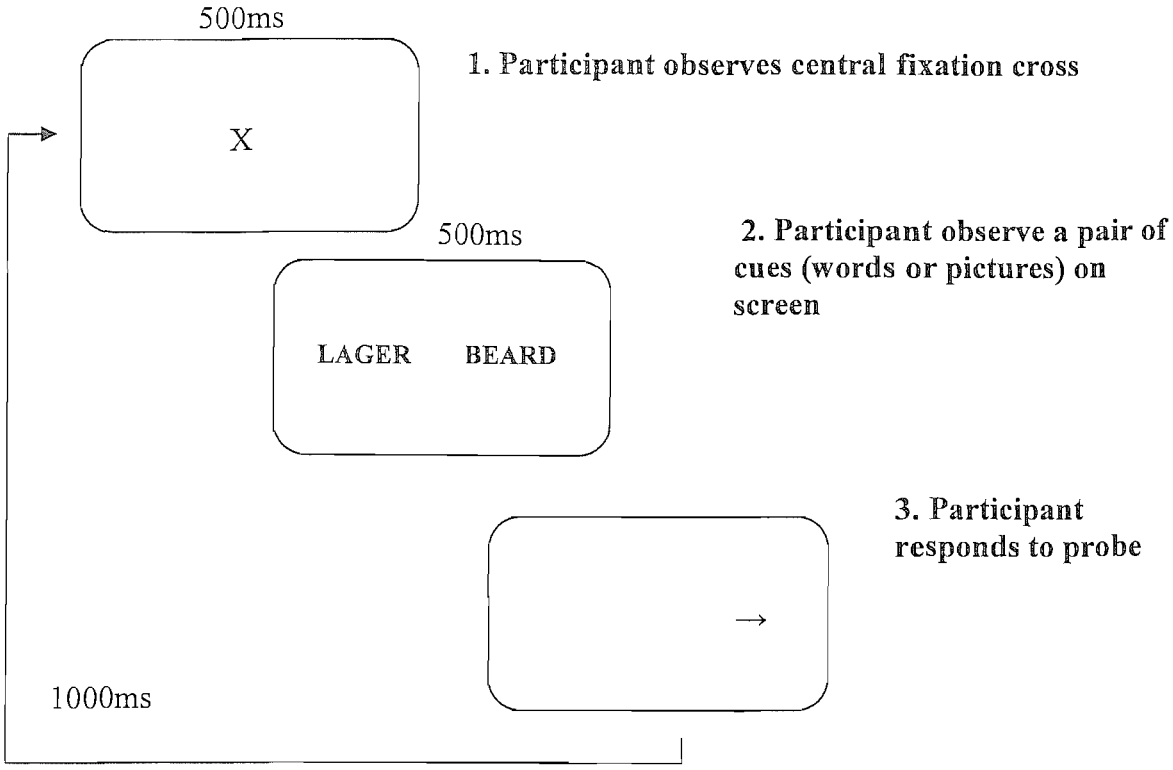

Figure 3.1 Representation of dot probe procedure

The experimental procedure is illustrated in Figure 3.1. There was a battery of 20 experimental and 20 control trials. Each pair of stimuli was randomly presented four times, stimulus location (left or right) and probe location (left or right) was randomised. Control pairs of stimuli were used as practice trials and fillers to make the purpose of the task less transparent, therefore responses to these trials were not incorporated into the final analysis.

Townshend and Duka (2001) showed an attentional bias to stimuli associated with alcohol use in heavy social drinkers. Heavy drinkers were faster to respond to probes in the same location as cues associated with alcohol. In Figure 3.1, therefore, a heavy drinker was quicker to respond to an arrow probe in the same location as the word 'lager' than an arrow probe in the same location as the word 'beard'. This supported predictions made by the Incentive Sensitization Theory which proposes that addicts have an attentional bias for cues associated with their addiction. If self-harm is considered to be an addictive behaviour, IST would predict that those who repetitively self-harm would have an attentional bias for cues associated with DSH. This could also be tested using the dot probe task. The results of a series of studies that used a dot

probe task to investigate attentional biases of people who self-harm are reported in chapter six.

3.3 The present thesis

This chapter has overviewed some of the methodological problems with studying self-harm. It then considered how these problems have been overcome in relation to the study of addictive behaviour and how these techniques may be utilized to study self-harm. A number of methodologies used by researchers in the field of addiction were identified which can be usefully applied to the study of self-harm. The next chapters will describe how these techniques were applied systematically to study self-harm as an addictive behaviour. Studies 1 and 2 (reported in chapters 4 and 5) make use of self-reports of self-harming behaviours, and changes in the behaviours (using structured interviews and questionnaires) by those who are currently self-harming regularly. The aim of this phase of the research was twofold: to consider how closely descriptions of self-harming behaviours fit diagnostic criteria for addictions, and to test predictions made by Opponent Process Theory (OPT) which may help to explain how the behaviour is maintained in the face of initial aversive responses. The third study (reported in chapter 6) makes use of SRC methodology in an implicit test of predictions made by OPT regarding the pleasantness of cues associated with self-harm. The final two studies (reported in chapter 7) use implicit computer based (dot probe) tasks to test predictions made by the Incentive Sensitization Theory (IST) of addiction which relate to attentional biases to cues associated with self-harm. This theory may help to explain how the behaviour is wanted, but not necessarily liked.

CHAPTER FOUR

Self-harm: Learning to escape - An interview study

Chapter Summary

Self-harm seems a somewhat puzzling and paradoxical behaviour. Many researchers have tried to elicit motivations for the behaviour by studying reports made by those who engage in self-harm. If self-harm is addictive, it would be reasonable to predict that the social and emotional factors which influence the first act of self-harm will be overshadowed in later episodes by factors which reinforce and contribute to the addictive nature of the behaviour. Few studies have however attempted to compare self-reported motivations to initiate the behaviour from those which maintain it. This is the aim of the first study in this thesis.

4.1 Abstract

Objective. Despite high incidences of self-harm, these behaviours remain perplexing and largely unexplained. Many researchers have studied motivations for this puzzling behaviour, yet few, if any, have attempted to tease apart motivations to initiate the behaviour from those which maintain it. This seems increasingly important given recent reports of the addictive nature of self-harm and was therefore the main objective of this study.

Method. The researcher undertook retrospective semi-structured interviews with seven men and 17 women who were currently self-harming. Within each interview participants gave in-depth descriptions of initial and recent self-harming episodes. An investigation of the motivational themes described in these accounts was undertaken.

Results. A few social and emotional motivations for initial episodes of self-harm were reported including imitating, expressing and for retribution. One theme dominated the motivation for recent episodes; twenty of the participants reported using self-harm as a tool to escape from negative states.

Conclusions. According to these accounts, the social and emotional factors that influenced the initiation of self-harming behaviour were overshadowed in time by the use of self-harm to escape from negative states. This parallels changes in motivation to engage in addictive behaviours reported by addicts. If validated by further studies with larger samples, the distinct difference in motivations for initial and recent episodes has important implications, specifically in the design of treatment versus prevention strategies, and developing accurate models and understanding of self-harm.

4.2 Introduction

Regular incidents of DSH produce dramatic, socially-mediated and detrimental effects including stigma, physical trauma, loss of income and of social support (Harris, 2000; Hawton et al., 1994, 1996). DSH interferes with therapy and interpersonal relationships (Favazza, 1989) can arouse negative feelings, strong reactions, and prejudice in both clinicians and the general public (Barstow, 1995; Conterio & Lader, 1998; Feldman, 1988; Linehan, 1993; Tantam & Whittaker, 1992; Walsh & Rosen, 1988), and many unintentionally result in death (Kernberg, 1987). So why in the face of these negative consequences do people harm themselves and continue to do so?

Many studies have investigated self-reports of possible motivations for DSH (e.g. Connors, 1996a; Favazza, 1996; Miller, 1994; Ousch et al., 1999; Solomon & Farrand, 1996; Suyemoto, 1998). However although several theoretical explanations of the phenomenon exist, few have attempted to tease apart motivations to initiate self-harm and motivational factors that may maintain it. This seems increasingly important given reports of its addictive nature (Favazza & Conterio, 1989; Favazza & Rosenthal, 1993). The distinct difference in motivations for initial and recent episodes would have important implications if evidenced, specifically in the design of treatment versus prevention strategies, and developing accurate models and understanding of self-harm.

Consequently, this study sought to investigate what factors motivate people to self-harm. Specifically, what self-reported factors initiate self-harming behaviour and what self-reported motivations do people give for its maintenance? In a field that is dominated by quantitative studies, the use of qualitative paradigms to address such issues provides data which is contextually embedded and sensitive to individual variability.

4.3 Method

4.3.1 Participants

Seven men and 17 women currently repetitively self-harming were recruited for this study. Given the private nature of this behaviour, recruiting those who are currently self-harming to talk in detail about their self-harming was a challenge. Consequently, this sample, which was recruited over the period of a year, was relatively small; but nevertheless comparable with other qualitative studies in this area (e.g. Harris, 2000).

To ensure a broad sample, participants were recruited from both clinical and non-clinical sources, including patient waiting lists at an outpatient intensive psychological treatment clinic, local mental health voluntary support groups, media advertisements and advertisements distributed at a UK university. Participants currently in therapy were excluded from the study as they may have been offered explanations for their self-harming behaviour which could have influenced their interpretation of the episodes and biased our findings. All participants gave their informed consent before participating in the study, which was approved by the University of Southampton Ethics Committee and Poole Local Medical Research Ethics Committee.

More than half the participants had harmed themselves severely enough to warrant emergency medical attention. The average length of self-harming history was 11 years (range 1 – 28 years, standard deviation 6. 7 years) and the average age of onset was 14 years.

4.3.2 Procedure

All participants attended a semi-structured interview, conducted in a private room at the University by the researcher, which was recorded for subsequent analysis. After obtaining demographic information (i.e. date of birth, gender and use of mental health services), they were asked to describe the first time that they harmed themselves deliberately and a recent, typical self-harm incident. The interviewer requested a free narrative of each episode with as much detail as possible. The order of reporting initial or recent episodes was counterbalanced across participants.

Participants were asked to rate their urge to self-harm before and after the interview. Those reporting increased urges were offered an immediate referral to a consultant clinical psychologist.

4.3.3 Data analysis

All interviews were fully transcribed and a thematic analysis of the motivational themes described in the initial and recent accounts was undertaken. All interviews were fully transcribed and a thematic analysis of the motivational themes described in the initial and recent accounts was undertaken. Thematic analysis was chosen as it aims to identify meanings that are valid across many participants, rather than undertake an in-depth analysis within one particular account (Joffe & Yardley, 2004). Grounded analysis (see Charmaz, 2003) was not considered to be suitable, since it is generally used to elucidate a process, rather than compare events. Similarly, more inductive, rather than deductive procedures, such as interpretive phenomenological analysis (IPA, see Osborn & Smith, 2003) or discourse analysis (see Willig, 2003), where a fine-grained analysis rather than a more generic overview of themes is conducted, was considered less suited to a broader investigation of themes between episodes.

The thematic approach developed from content analysis (Berelson, 1952) which is a technique for systematic qualitative analysis particularly used in mass communication research to numerically describe features of a given text or series of images (Marks &

Yardley, 2004). Content analysis involves counting the number of instances in which an established category is directly used in a text or image. In thematic analysis, a theme can refer to something directly observable, or it may refer to a more latent level, in which the theme is implicitly referred to. Therefore thematic analysis not only uses a systematic procedure to analyse frequency of codes but also enables analysis of the meaning of the codes in context, enabling a more complex and subtle analysis of the data.

In thematic analysis, themes are usually identified inductively; so themes emerge naturally from the data (Patton, 1990). Because the aim of the study was to identify content that was associated with motivation to self-harm, each transcript was analysed to establish themes associated with motivation to self-harm. Each participant's descriptions of early and recent self-harming episodes were coded separately. The functional unit of analysis was the sentence. A coding frame (or manual) was developed (see Appendix A) to set up the potential for a systematic comparison between the sets of text (Bauer, 2000). Each coding category had a label, an operationalisation of what the theme concerned and a chunk of text that should be coded as fitting into this category (as recommended by Yardley & Joffe, 2003). The analysis reflected presence/absence of a theme rather than frequency of its expression as the occurrence of different themes across episodes– rather than the frequency that they were cited – was the focus of the study.

4.3.4 Reliability

Transcripts of the chain analyses of all interviews were coded by two independent second raters to determine inter-rater reliability in reference to the presence or absence of each theme. Agreement ranged between 66% and 84%. In published studies themes have been agreed to be existent and stable if the identification of themes and evidence reaches 70% (Gavin, 2005). Therefore the reliability of the coding was considered satisfactory. To further enhance the reliability of the coding, all disagreements between the raters were resolved by discussion.

4.4 Results

Initial and recent episode of self-harm were analysed independently. Twenty-one of the recent acts involved cutting deliberately; one scratching, one burning and one

punching. Nineteen of the early acts also involved cutting deliberately, three were scratching and two were burning.

4.4.1 Initial Accounts: Self-harm as imitation, expression and retribution

Thematic analysis of the accounts of initial episodes of self-harm revealed a few motivational themes, incorporating imitation, expression and retribution.

4.4.1.1 *Imitation*

Imitation was defined in the coding manual as:

> "the observation of self-harm behaviour / behaviour that causes pain in others (e.g. peers, those held in high regard)"

There was evidence within the accounts of initial episodes of vicarious learning of self-harm, and consequent imitation of the behaviour. Six participants reported being influenced by peers and/or those they held in high regard:

> "I encountered it once when one of my friends showed me that he'd cut himself after he'd done badly in some exam. And I was totally shocked. I was probably about 13 and he'd scratched this thing on his arm, and he was showing me it. I couldn't believe it; I'd never seen anything like it. But that obviously started getting me used to it. I don't know if that was a direct influence on what happened but I guess sticking pins in myself was...I liked to see the blood, it was pretty cool." (Male, 27)

> "I think I picked it up at school. Other people at school had done it. None of my friends but other kids at school." (Female, 24)

> "At school we were doing a form of chicken scratches. Have you ever heard of them? You know how chickens scratch. What people were doing was scratching to see how long they could stand scratching themselves and get quite a nasty cut depending on how long you do it for." (Female, 34)

> "This thing with the compass at school for example, that was just because I wanted to try it, if he can do it I can do it." (Male, 25)

These accounts included learning through experiencing pain inflicted by others:

> "My dad was in the army and stuff, we used to fight a lot, obviously not real fights but play fights and stuff and it was like y'know you can really hurt each other doing that. Then we'd do the same at school as well, fighting and stuff. To be able to take pain was a good thing." (Male, 27)

> "I was having the hell knocked out of me at school... We've got an Aga, which is kind of hot plates, and if you hold it the hot plates are scolding. The first time was accidentally catching hold of it quickly so that your hand was very hot, then seeing how long you could hold it there. I was trying to increase my own pain threshold...trying to be less helpless." (Male, 22)

4.4.1.2 *Expression*

Some people report that they use self-harm as a way to communicate, especially if they feel unable to express their distress in any other manner (Sutton, 2002). In the coding manual Expression was defined as:

> "Communicating emotions or beliefs to others or expressing distress to self"

This was evident in five accounts of initial experiences of self-harm which focused particularly on expressing emotional pain to others. Examples of texts coded in this category are given below:

> "In a weird sort of way it was sort of like, it was look at me, I hurt. I've got an injury. I guess I was trying to show people I was in pain." (Female, 34)

> "When I was 14 I went public about my uncle (abusing me). I told a teacher at school and she told social services and social services had to tell my parents. They didn't believe me and still don't believe me till this day. I remember my parents arguing, and I locked myself inside their room for some reason, and there was my dad's penknife there...I just got the knife and started doing it to my wrists. .. I'd never heard of self-harm, I had no idea what it was. I think that my thoughts were that if they see what I'm doing then they'll believe me." (Female, 19)

> "I guess that maybe if anyone would ask me, I'd say that I've got something to show somebody to say just is how bad I was feeling, I've got something to show for it." (Female, 27)

In one of these early accounts, DSH was also used as a form of self-expression, for example, to self-validate emotional distress, or express intolerable emotional pain that cannot be expressed more directly.

> "I had an anxiety disorder and I was having panic attacks...I used to worry about my mum dying and sort of being left alone. I was very unhappy at school and even though I had friends I didn't feel like I had a friend that I could really sort of open up to and have a heart to heart with and I'm that kind of a person, I really need to express myself, so if somebody's like that then they can just drive themselves crazy, with their thoughts and that was me. So it was kind of that, manifesting physically the mental pain, making it physical. I sort of felt because it was some manifestation of the pain in my head, you are obviously not going crazy." (Female, 22)

4.4.1.3 *Retribution*

The definition of retribution given in the coding manual was:

> "Retribution for bad behaviours/thoughts/beliefs about self; punishing the self in the same way another would punish you for being bad."

Five accounts of initial episodes of self-harm focused on using self-harm as a form of self-control or retribution when thoughts, feelings or behaviours were perceived as negative or out of control. In these cases self-harm was used as a means to punish the self, in the same way as others may physically punish individuals when they perceive them to be at blame:

> Interviewer: What made you think about cutting yourself, why did you choose to do that?
>
> Interviewee: To punish myself... My wife had disappeared with the children.... I'd been seeing someone else.
>
> (Male, 44)

"I think I really just didn't like myself...I think it was probably more about wanting to punish myself than wanting to hurt myself, not liking myself."

(Female, 34)

"I was abused from about 7 to about 10 by my granddad. I just felt so bad inside with what had been done to me and that, because I'd never told anybody. Well it's like you think, was it my fault? Did I make him do it? I know it sounds weird but it felt like it had to be done. It was the right thing to do. It was like hurting myself was what I was supposed to do. I deserved it."

(Female, 31)

"I just thought that I was an evil person and that I deserved bad things and I deserved pain." (Female, 34)

"I suppose I felt my body was bad in some way, like I was bad and that by hurting myself then it was probably what I deserved anyway."

(Female, 27)

There were two accounts of initial episodes that incorporated themes which did not fit easily into any of the aforementioned categories. Both of these described discovering the association between stress-relief and self-harm through early episodes of scratching.

"Ever since I've been about 2, I've had eczema, and so when I was growing up to the age of about say 6 or 7, I used to scratch it, obviously as you do, to make it better. So to me, scratching has always been a relief to me. Always, always, always...Then what I did was scratching to the extent that it bled and then not letting it heal. I was doing that, I knew it wasn't eczema because I'd had eczema since I was little and knew it wasn't the same, but I didn't know it was self-harm. And then I said to my dad once, I said, look dad I'm like, sort of scratching myself to hurt myself, and I do it to relax, not because I'm itching, I'm doing to actually relax, do you not think that's a bit weird? And he didn't say anything, he just didn't reply. He just sort of sighed."

(Female, 21)

"(Scratching) always felt friendly I think, like a good thing to do. Sort of like a warm feeling, a comforting feeling." (Female, 34)

These early experiences taught associations between physical pain and stress relief, blurring the boundaries between early and later experiences of self-harm.

4.4.2 Recent Accounts: Self-harm as escape

There was less breadth of motivations evident in accounts of recent episodes; motivations cited for recent acts were very similar.

4.4.2.1 *Escaping negative states*

Twenty of the interviewees reported that controlling negative emotions and thoughts were the primary motivation for recent acts of self-harm, many, but not all, of which were triggered by specific stressful events:

"I have bulimia, I'd had a bad weekend with my eating and my husband and I had had a few problems. I was just feeling generally quite agitated and restless. I was pacing around, and it's like that (self-harm) kept popping into my mind. I think because over the years I've learnt that it relieves certain moods, it relieves certain feelings, that when it does sort of come into my mind its like an alternative to feeling the way I do, so it has some sort of appeal, you know?" (Female, 26)

"My dog died and although I'd only had him a year I was absolutely gutted. The feelings of loss were just so enormous that I needed something to relieve it. I bought the blades on Saturday; I guess there was a sort of excited anticipation because I knew that I was going to do it. Um, the feeling that I would get some relief. I was looking forward to getting some relief from the mental stuff in my head." (Female, 35)

"I'd just finished a presentation. I needed time to think about how the presentation had gone... I never usually get good marks and I'm always

> stressed about my grades, I was walking home thinking to myself I really want to go home and hurt myself because I needed to relieve the stress."
>
> (Female, 21)

Punishment was a theme which also emerged in one of the recent accounts of self-harm, however, rather than using self-harm as a means to punish the self, in the same way as others may physically punish individuals when they perceive them to be at blame; the behaviour during recent episodes was initiated from a desire to escape feelings of guilt:

> "I'd just slept with my best mate's girlfriend, which is not a natural thing for me to do. I felt awful that I'd done that to him, felt that it had changed me from who I am because I'm not like that. I thought it might help (relieve) my guilt if I just give myself a bit of a scratch with my Stanley knife."
>
> (Male, 23)

Three participants also reported using self-harm to escape from episodes of dissociation, where difficulties integrating sensory and emotional experiences, thoughts and memories were experienced, as described in the following quote:

> "When I woke up in the morning I was just really frustrated and panicky and hated myself and wanted to get rid of the feelings. But also there's a thing where I don't feel like I'm alive, and then I want to do something to prove that I'm alive. But I get really wound up inside, I just have to do something to get rid of it. So like you know that you are going to do it at some point."
>
> (Female, 34)

In the previous account, the participant describes harming herself to feel 'alive' or to escape from dissociative states. In their narratives of recent episodes, participants also reported using self-harm to escape from overwhelming awareness of thoughts, emotions or sensory information, or to dissociate.

> "As soon as it starts I just go completely numb, and that's what I want you see. I'll go from feeling very in touch with all of my feelings, to the extent that

> they are almost overwhelming, to feeling nothing, like being in a bubble... It's almost like floating through space and you can't hear anything, you don't realise time going by it's like you don't feel anything. That's why I know it works because what I want is to get away from the feelings that are upsetting me." (Female, 26)

4.4.2.2 *Escaping negative thoughts*

Linehan (1990) suggests that emotionally vulnerable individuals growing up within a particular set of environmental circumstances, where their feelings and behaviours are invalidated, may be susceptible to self-defeating behaviours (such as self-harm) and real or imagined feelings of abandonment. In the data that was collected there was evidence in four recent accounts of self-harm that the behaviour was also used as a tool to escape memories of invalidation or abuse or feelings of abandonment:

> "I'd had my first counselling session, I was abused by my granddad and I've just started counselling for it. I was sort of uptight all week about going, you know. And on the Friday the counselling bought up a lot of horrible memories, you know, things that I'd forgotten really, and I was really uptight. I tried having a bath and going for a walk and went to see my friend but I was still uptight and one of my coping strategies is to cut... There was a lot of anger and there were a lot of thoughts whizzing around my head, I even thought of cutting my head open just to let the bad thoughts out, I've done that before. I just couldn't stand it any longer really. I was so uptight, I just had to do it, it was the only way it was going to calm me down." (Female, 41)

> "I was going through all my old boxes and folders and piles of old paperwork when I came across all of these letters that I'd written (to myself) at school. When I was reading the letters I could feel myself getting upset and sort of triggering off all of the stuff from the past that I didn't want to think about. Memories. I don't remember the second I thought I'm going to cut myself because it wasn't really like that. When I'm feeling that bad, I always know that cutting myself would make it sort of bearable again, because when I'm cutting myself always, I don't know, it takes away some of the pain for a while. It stops me thinking about the past. You get relief from the first cut or

the first couple of cuts and then it's just like everything goes blank and you don't think about it." (Female, 19)

"When I was little my Uncle abused me and ever since then I've been getting flashbacks. Just like thoughts going around in my head about everything. So like, every day I get these voices in my head, things like that. That day I woke up and I'd had a nightmare, a dream about it, which is quite unusual. In the morning I was determined not to hurt myself and then by the end of the day it was just getting worse and worse you know. I could not hack it because I had these voices going on in my head. And so I gave in and said yes. I just had to do it. It was like a big relief to have got it out." (Female, 19)

"I'm lying there just trying to stop everything. Just stop the thoughts in my head going. Just stop the world really. I find that I've been trying to distract myself, like, I've just dragged a nail, or inadvertently sort of scratched myself." (Female, 21)

Indeed, within the accounts individuals describe how the drive to escape from unpleasant thoughts and emotions is powerful enough to motivate the behaviour to continue in the face of escalating negative consequences, leading to self-reported 'compulsion' to continue harming the self.

"I didn't realise how addictive it was, I didn't realise that I'd get trapped into it. I thought it was just going to be a one off."

(Female, 27)

"I know there's other ways that I can sort stuff out but I know that way works. I just know it; it becomes addictive. Just the feeling of it is pretty good, so sometimes you just do it for no other reason than that."

(Male, 23)

"If someone asked me now I'd say it's because it's a rush that is addictive and it's a very black and white solution to a very confused person."

(Female, 20)

4.5 Discussion

Self-harm has been described as an effective, albeit maladaptive coping mechanism (Sutton, 2002). Yet in these accounts it serves different functions at different stages of the behaviour. Initially individuals in this study described how their self-harm was motivated by a few social and emotional factors including imitating, expressing and for retribution. However, they learnt that it could be utilised as a powerful tool to escape from overwhelming negative thoughts and emotions. In terms of the self-reports, this appears to become the most powerful motivator in maintaining their self-harming behaviour. Indeed, for those interviewed in this study, the negative reinforcement of self-harming (via escape from unpleasant thoughts and emotions) appears powerful enough to motivate the behaviour to continue in the face of escalating negative consequences. For some, this led to self-reported 'addiction' or 'compulsion' to continue harming the self.

The social and emotional factors influencing initiation of initial self-harming episodes may be better understood in the context of psychological theories. For example, social learning theory (Bandura, 1973) encompasses the concept of vicarious learning; where through observation, actions are learnt and imitated. Crucially, modelling of the behaviour is contingent upon identification with the person being observed, such that those similar to (e.g. peers) or highly regarded (e.g. film/pop idols, older siblings) by the observer are more likely to be imitated. The vicarious nature of self-harm is supported not only by self-reports within this study, but also by many reports of contagion; particularly within residential care homes and prisons (Taiminen et al., 1998).

A common misconception of deliberate self-harm is that it is exclusively an attention seeking behaviour which often perpetuates stigmatised responses to those who self-harm (Smith et al., 1998). Although there was some evidence in these reports that DSH may constitute an indirect attempt to get a need met by communicating distress to society, many other motivations were also cited including DSH as a form of self-expression or retribution. There is evidence in the literature that suggests turning emotional pain towards the self (Ettinger, 1992) can indeed be a function of self-care, as those who self-harm learn through models that injury and care are associated, and attempt to self-care through self-injury (Simpson & Porter, 1981); or self-punishment, where the behaviour is used to act as punishment when thoughts,

feelings or behaviours are perceived as negative or out of control (Doctors, 1981; Suyemoto, 1998).

The individuals in this study described a distinct difference in their experience in motivations for initial and recent episodes. Those who self-harm reported that later self-harm episodes were generally motivated by a desire to escape negative thoughts and emotions. Similarly, in a recent study of problem gambling, Wood and Griffiths (2006) reported that escape was the prime characteristic of the gambling experience that facilitated the continuation of problem gambling among interviewed participants. Escape was achieved through mood modification, involving fantasies, dissociation and/or changes in arousal.

There is some consensus, within research that focuses on the functions of DSH, that self-harming behaviour has the capacity to relieve certain emotions and reduce tension, regardless of the reasons for the initiation of the behaviour (Haines et al., 1995). Affect regulation describes reports of cutting as a way of obtaining control over turbulent or unsettling emotions. In support of this finding, Briere and Gil (1998) discovered that abnormally high levels of fear, hurt, anger, loneliness, sadness and emptiness were reported before participation in injurious acts. After such behaviours had been undertaken, significantly lower levels of these emotions were reported. Similarly, in accordance with these findings, Kemperman et al. (1997) found that self-harm increased self-reports of positive affect, decreased negative affect and reduced 'unreal' or dissociative symptoms. However, although some perceive dissociative states as negative and so harm to escape from them, there is evidence that others self-harm to escape intense emotions and achieve dissociative states (Smith et al., 1998).

Because this study is based on a small sample of individuals who volunteered to talk openly and retrospectively about their personal experience of self-harming behaviour, generalizations about the findings are limited. Notwithstanding this, the study has a number of important implications. Theoretically, it highlights the importance of further study which distinguishes the factors which maintain self-harming from those which initiate it. Orford (1985, 2001) suggests that humans are liable to develop strong attachments to a range of activities which may be particularly risky. This attachment can become so strong that they develop an excessive appetite for the activity that leads to difficulty in moderating the behaviour. Like the individuals in this study, drug addicts describe how experience of initial drug sampling is motivated by social and emotional factors, including drug availability,

(Jaffee, 1965), personality predispositions (Shaffer, 2000), negative emotions such as anger, frustration, loneliness and unhappiness (Solomon, 1977), and peer group pressure (Dupre et al., 1995). Most addicts report however a need to regulate negative emotional states or thoughts, associated with drug withdrawal, as the primary motivation for later addictive behaviour (Falk et al., 1983). Given the compulsive nature of the behaviour and the associations between self-harming and other addictive behaviours, the field of addictions may be a useful arena to search for theories which might contribute to our understanding of factors which maintain the behaviour. Indeed, theories such as the Opponent Process Theory (Solomon & Corbit, 1974) predict precisely such changes in motivation to self-harm due to increased tension reduction with repeated elicitation of the behaviour.

Practically, if the distinction these individuals describe between precipitating factors associated with early acts and those maintaining later self-harm episodes are also found in larger, more representative samples of self-harmers, there may be some benefit in focusing prevention and treatment strategies independently. For these individuals prevention strategies which focused on means to support and facilitate social and emotional expression within vulnerable groups may have been of benefit. Also third wave behavioural treatments (such as Dialectical Behavioural Therapy, Linehan, 1990; and Acceptance and Commitment Therapy, Hayes et al., 1999) which focus upon mindful acceptance rather than avoidance of distress, may be of heuristic value for individuals, like those in this study, who are currently using self-harm to cope with distress.

CHAPTER FIVE

Deliberate self-harm as an addictive behaviour: An interview study

Chapter Summary

The previous study revealed a distinct difference in motivations for initial and recent episodes. Self-report of motivations for later episodes of self-harm were much more similar than those reported for initiating self-harming behaviour; supporting the addictive nature of the behaviour. Theories such as the Opponent Process Theory (Solomon & Corbit, 1974) predict precisely such changes in motivation to self-harm due to increased tension reduction with repeated elicitation of the behaviour. Although its addictive nature has been noted previously (Faye, 1995), DSH has yet to be considered with direct reference to diagnostic criteria for dependence or theories of addiction. The next study in this thesis aims, from the standpoint of psychological criteria of dependence and behavioural addiction, to examine the factors maintaining deliberate self-harm and tests a theoretical explanation of the development of deliberate self-harm using predictions made by the Opponent Process Theory of Addiction.

5.1 Abstract

Aim. From the standpoint of psychological criteria of dependence and behavioural addiction, to examine the factors maintaining deliberate self-harm and to test a theoretical explanation of the development of deliberate self-harm using predictions made by the Opponent Process Theory of Addiction.

Design. Self-report questionnaire followed by retrospective semi-structured interviews incorporating visual analogue scales and chain analysis techniques.

Participants. Seven males and 22 females currently repetitively self-harming.

Measurements. Features and functions of deliberate self-harm as measured by semi-structured interview, visual-analogue and Likert scales.

Findings: Coded analysis of the interview responses endorsed criteria for clinical dependence and behavioural addiction. When severity of injury was taken into account reported pain was significantly higher for initial episodes compared to later episodes and accidental episodes compared to intentional episodes. Additionally, positively directed changes in emotional state were reported supporting predictions made by the Opponent Process Theory of Addiction. Self-harm regulated the intensity of specific basic emotions, resulting in a significant drop in sadness and anger and a significant increase in the intensity of happiness in both initial and recent episodes. Also, urges to harm oneself were reduced by self-harm in both initial and later episodes.

Conclusions: Deliberate self-harm may be seen as a form of addictive behaviour. Theories of addiction (specifically the Opponent Process Theory) may go some way towards enhancing our understanding of the mechanisms that maintain deliberate self-harm. Further empirical research into the addictive nature of deliberate self-harm may successfully inform prevention and treatment strategies.

5.2 Introduction

This study aims to empirically investigate the notion of self-harm as addictive and test whether addiction theories may predict some of the features and functions of this behaviour. The importance of such work is twofold; primarily in providing empirically based evidence to guide healthcare providers towards appropriate diagnosis, treatments and care for those who are self-harming; and also to develop knowledge of models and functions of self-harm to aid understanding of the course of

the behaviour and how it might be influenced by environmental cues and physiological factors; and identify those at greatest risk of relapse and death.

The Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV) presents seven symptom categories for dependence: use despite negative physical consequences, impaired control, time spent procuring, neglect of other activities, unsuccessful quit attempts, tolerance and withdrawal. To meet a diagnostic criterion for dependence, three of more categories must be observed in a 12-month period. Although clinical interpretations of dependence have historically been restricted to drug and interpersonal contexts, Orford (1985, 2001) suggests that humans are liable to develop strong attachments to a range of activities which may be particularly risky. This attachment can become so strong that they develop an excessive appetite for the activity that leads to difficulty in moderating the behaviour. Griffiths (1995) also has argued that other activities such as gambling, computer gaming, and sex can be addictive. He formulated six symptom categories for "behavioural addiction": conflict, salience, tolerance, relapse and reinstatement, euphoria and withdrawal.[1] It is useful to consider whether DSH meets either of the very similar sets of criteria for dependence. This was the first aim of the present study. Assuming that such features are observed, it is valuable to consider whether theoretical accounts of addictive behaviour are of heuristic value in understanding the aetiology and symptomatology of DSH.

One such potentially applicable account, Opponent Process Theory (OPT) (Solomon & Corbit, 1974), assumes that powerful hedonic or affective environmental stimuli (e.g., aversive stimulation such as electric shock or positive stimulation such as drug ingestion) give rise to internal processes (a-processes) that produce corresponding states (A-states such as fear or euphoria). The a-processes automatically trigger opponent or b-processes, central nervous system mechanisms that give rise to oppositely valenced B-states (e.g., relief or dysphoria). Because the magnitude of the manifest state is the algebraic sum of the A and B states, the

[1] In an update of the components of behavioural addiction Mark Griffiths reclassified 'euphoria' as 'mood modification' (Griffiths, 2005). Mood modification encompasses the earlier criterion of a euphoric 'buzz' or 'high' but also allows for the inclusion of a tranquillizing and/or distressing feel of 'escape' or 'numbing'. In this study, the initial classification criteria incorporating 'euphoria' were used, as these published at the time of coding and analysis, however the implications of the more recent insertion of 'mood modification' is discussed later in the chapter.

amplitude of the initial A state declines as stimulation continues (e.g., less intense fear or euphoria). In addition to being slave processes, b-processes are assumed to be strengthened by repeated elicitation of the a-process and to decay only slowly. Thus, after several presentations of an eliciting stimulus, the corresponding b-process will continue well after the shorter lasting a-process—has ceased. An unopposed b-process gives rise to the manifest affective after-effect, a B state (e.g., prolonged relief or dysphoria). Solomon and Corbit (1974) suggest that OPT can in this way explain the paradoxical appeal of fear and pain inducing behaviours such as free-fall parachuting and exhausting exercise. Pain and fear are seen as a-processes which—after repeated elicitation—give rise to strong opponent processes characterised by the persistent pleasurable after-effects of these activities, such as exhilaration and a sense of physical well-being.

It could be argued that deliberate self-harm fits the OPT account. Stimulation produced by DSH releases an a-process (tension, pain) which in turn triggers the opponent b-process (tension relief, analgesia, euphoria). With repeated episodes of DSH, the opponent process will strengthen, moderating the initial affective response, increasing pain tolerance, and creating a long-lasting positive after-effect which mitigates against the chronically high levels of tension seen in self-harming patients (Clarke & Llewelyn, 2001).

Related research on classical conditioning (Siegel, 1984) suggests that the opponent b-process can be conditioned to environmental stimuli that regularly precede an affective stimulus. Thus, drug tolerance may in part result from an associatively cued b-process that has been initiated by drug-related stimuli even before the a-process has been triggered by the drug itself. Cues regularly preceding acts of self-harm might therefore reduce the negative affect these acts would otherwise elicit. Thus, although DSH may—perhaps must—first be instigated through the action of social learning factors (Taiminen, Kallio-Soukainen, Nokso-Koivisto & Helenius, 1998); many of those who continue to harm themselves may veridically report that they do so to relieve emotional tension (Lion & Conn, 1982).

The second aim of this study was thus to evaluate the utility of OPT in accounting for DSH. Opponent Process Theory makes a number of specific predictions regarding changes in motivation for, and experience of, self-harm over time. Specifically, in terms of a natural history of DSH, OPT predicts that, other factors being equal:

1. Acts early in a client's self-harming history (before the b-process has been strengthened by repeated elicitation) will be more painful than more recent acts.
2. The valued after-effects of DSH will be stronger in clients with a longer self-harming history (the b-process has been strengthened by repeated elicitation).
3. Episodes of accidental injury (where no conditioned b-process is triggered) will be more painful than episodes of self-harm.

Because it is not feasible to observe and measure self-harm directly, studies in this area have adopted imaginal scripted or retrospective approaches to test hypotheses. For example, Haines Williams, Brain and Wilson (1995) asked self-harming prisoners to imagine a chain of events leading up to and following an act of self-harm while monitoring physiological changes in finger blood volume, heart rate, respiration and skin conductance. They showed that tension relief, indexed by a decline in these measures, corresponded to imagining the act itself. In the present study, we similarly asked participants to describe and rate their self-harming experiences in the course of an interview.

5.3 Method

5.3.1 Participants

Participants for this study were recruited from the same clinical and non-clinical sources as the previous study (i.e. patient waiting lists at an outpatient intensive psychological treatment clinic, local mental health voluntary support groups, media advertisements and advertisements distributed at a UK university). Participants currently in therapy were excluded from the study for reasons described in the previous chapter. Seven males and 22 females were recruited.

All participants in the study were currently repetitively harming themselves. More than half the participants had harmed themselves severely enough to warrant emergency medical attention. The average length of self-harming history was 11 years (range 1 – 28 years, standard deviation 6. 7 years) and the average age of onset was 14 years (cf. Hawton et al, 2002). Twenty seven of the 29 participants were willing to give specific details of their self-harming history. Of these, all reported that they had cut themselves deliberately, 13 (48%) had burnt themselves deliberately, 22 (81%) had scratched or bitten themselves deliberately, 21 (78%) had punched themselves, 4 (15%) had ingested toxic substances and 16 (59%) had interfered with wounds to

prevent them healing. 21 (88%) of the recent acts involved cutting deliberately; one scratching, one burning and one punching. 19 (79%) of the early acts also involved cutting deliberately, three were scratching and two were burning.

The study was approved by the University of Southampton Ethics Committee and Poole Local Medical Research Ethics Committee. All participants gave their informed consent before participating.

5.3.2 Questionnaires

Prior to interview participants completed two self-report questionnaires. The Millon Clinical Multiaxial Inventory III (MCMI-III-R: Millon, 1994) and The Deliberate Self-Harm Inventory (Gratz, 2001). The MCMI-III-R is a 175 item self-report questionnaire designed to assess DSM-IV related Axis I and Axis II personality disorders and clinical syndromes. The inventory measures personality patterns and clinical symptoms across 26 scales. Internal consistency of the inventory is strong and test-retest reliability is good (Groth-Marnat, 1999). The Deliberate Self-Harm Inventory (DSHI) is a 17-item, behaviourally-based, self-report questionnaire developed to assess various aspects of DSH, including frequency, severity, duration, and type of self-harming behaviour. Preliminary data on the DSHI indicates that it has high internal consistency and good test-retest reliability (Gratz, 2001).

5.3.3 Procedure

All participants attended a 2 hr, semi-structured interview which was recorded for subsequent analysis. After obtaining demographic information (i.e. date of birth, gender, current marital status, occupation, habitation and use of mental health services), they were asked to describe three episodes of injury: the first time that they harmed themselves deliberately (initial episode), a recent, typical self-harm incident (typical episode), and a recent accidental injury (accidental episode). Initially, the interviewer requested a free narrative of each episode with as much detail as possible. This was followed by a prompted, detailed Chain Analysis (Linehan & Kehrer, 1993) seeking to identify both the environmental and intra-psychic events precipitating and following the self-harm. The order of reporting initial or recent episodes was counterbalanced across participants; the account of accidental injury followed both Chain Analyses.

To facilitate quantitative analysis of the episodic data, participants were asked to describe their emotions, urges and pain before and after each episode. They were also asked to rate the intensity of each dimension on a 5-point scale, ranging from 'none' through 'slight', 'moderate', and 'high' to 'extreme'.

For initial and typical episodes of DSH, participants were additionally asked to use two visual analogue scales to rate the overall painfulness and the injury (from 'no pain' to 'worst ever physical pain') and its severity (from 'least I've ever done to myself' to 'worst I've ever done to myself'). Analogue scales were also used by participants to rate episodes of accidental injury [1] in relation to episodes of deliberate injury occurring at around the same time, both for painfulness (from 'much less painful' to 'much more painful') and severity (from 'much less severe to 'much more severe').

The narrative descriptions of specific episodes were embedded in a more general discussion about self-harm. Additional key areas of the interview schedule focused upon self-harm history (including rates of DSH and preoccupation with self-harm), routines and procedures associated with episodes of self-harm, impacts and management of self-harm (including consequences, relapse and triggers to relapse) and control over self-harming behaviour.

Participants were asked to rate their urge to self-harm before and after the interview. Those reporting increased urges were offered an immediate referral to a consultant clinical psychologist (SC).

5.3.4 Data reduction and analysis

Interviews were fully transcribed and subjected to content analysis procedures [2] (Dey, 1993). The functional unit of analysis was the sentence. Because our aim was to identify content that was diagnostic of drug or behavioural dependence (based on DSM, IV; 1994 and Griffiths, 1995), each transcript was analysed to establish whether ideas relating to each of the symptom categories described above were present. Data thus reflected presence/absence of an idea reflecting a symptom category rather than frequency of its expression (cf. Hastings & Remington, 1993).

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[2] Owing to equipment failure, audio transcripts of five interviews were lost. Consequently, Chain Analysis results are based on data from 24 participants (7 males, 17 females) whilst the Visual Analogue data is based upon data from 29 participants (7 males, 22 females).

An index of pain in relation to severity of the injury (pain/severity index) was calculated by dividing the each pain rating by the corresponding severity rating for the injury.

To organise the self-reports of emotion into manageable yet structured parts, inclusion and categorisation criteria were established that enabled the responses to be sorted into the five basic emotion categories proposed by Power and Dalgleish (1998). These are shown in Table 5.1 overleaf, which also indicates how each reported emotion was categorised.

Scores for each of these basic emotion categories were then calculated for each of the five stages of each initial and typical episode. This was achieved using the most intense rating for each reported emotion category at each stage in the episode for each mood. For example, if a person reported ratings for "embarrassment" and "anxiety" of 3 and 5 respectively when the first thought of self-harm occurred, a fear score of 5 would be recorded for this point in the chain because using Power and Dalgleish's (1998) definition of fear ('a consequence of an appraisal of a physical or social threat to self or valued role or goal') both the reported emotions would be coded as "fear".

Table 5.1 *Coding of Emotions*

Basic emotion definitions				
Fear	Sadness	Anger	Happiness	Disgust
'physical or social threat to self or valued role or goal'	'loss or failure of valued role or goal'	'blocking or frustration of a role or goal through perceived agent'	'successful move towards or completion of a valued role of goal'	'elimination or distancing from person, object, or idea repulsive to the self and to valued roles and goals'

Reported 'moods' coded into basic emotion categories				
Fear	Sadness	Anger	Happiness	Disgust
Embarrassment	Depressed	Hate	Elation	None
Worry	Desperation	Dislike	Joy	
Anxiety	Despair	Jealousy	Love	
Panic	Helplessness	Agitation	Content	
	Hopelessness	Exasperation	Hope	
	Disappointment	Frustration	Pride	
	Emotional Pain	Annoyance	Comfort	
	Upset / distress		Calmness	
	Felt bad		Satisfaction	
	Guilt		Relief	
	Shame		Excitement	

Ratings of each basic emotion *before self-harm* and *after self-harm* were then calculated for each of the five emotions. Ratings before self-harm were a mean of ratings made when participants were describing first thinking about harming themselves and when they made the decision to harm themselves. Ratings after self-harm were a mean of ratings made when participants were describing periods during harming themselves (i.e. after they made the initial cut or injury) and directly after harming themselves.

5.3.5 Reliability

Six randomly selected interviews were fully coded by two independent second raters using the category system derived by the researcher to determine inter-rater reliability. Agreement ranged between 84% and 87%. In addition, the categorisation of reported emotions from all interviews was fully recoded by a second rater. Agreement was 91%. All disagreements between the raters were resolved by discussion.

5.3 Results

To reduce the likelihood of type two error, a significance level of 1% was applied to each analysis.

Measures of pathology were compiled using the most conservative clinical cut-off scores of the self-report Millon Clinical Multiaxial Inventory. A score of 85 or more for each dimension was indicative of a personality trait or clinical symptom.

Thirty eight percent (n=11) of the participants scored above the threshold for clinical diagnosis of Cluster B personality traits, of these 31 percent (n=9) of the participants met psychometric criteria for Borderline Personality Disorder (BPD) (cf. Herpertz, Sass & Favazza, 1997, who found 48% of their sample of self-injurers met the criteria for BPD). A similar proportion of respondents scored above the threshold for clinical diagnosis of Cluster C personality traits, particularly avoidant (28%, n=8) and dependent (31%, n=9) personality patterns. Additionally, over half of the sample (55%, n=16) scored above the threshold for depressive personality pattern.

5.4.1 Deliberate self-harm behaviour and psychological criteria of dependency

Table 5.2 shows the diagnostic criteria of dependence cited in DSM-IV (1994), portions of representative interview transcripts coded with respect to these criteria,

and the percentage (number) of participants whose accounts included content reflecting these criteria. Eighteen (75%) of the 24 participants endorsed three or more of the diagnostic criteria for dependency, thus fulfilling the conventional diagnostic criteria for a clinical diagnosis of dependency. When withdrawal as a positive state was incorporated into the criteria, 24 (100%) of the participants endorsed three or more criteria.

Table 5.3 shows the interview data in terms of the criteria for a behavioural addiction (Griffiths, 1995). Twenty-one (88%) of the 24 participants endorsed three or more of the criteria for behavioural addiction when withdrawal was conventionally defined as a negative state, but when withdrawal as a positive state was substituted twenty-four (100%) of the participants endorsed three or more of the criteria for a behavioural addiction.

The number of times participants had repetitively hurt themselves ranged from 10 to 100's, most (74%, n=20) of the sample simply reported '100+ times', 'many' or 'too many to count'. However there was no correlation between number of diagnostic criteria of dependency or behavioural addiction endorsed and length of self-harming history.

5.4.2 Pain and severity of deliberate self-harm

The ordinal nature of the response data and the small sample size dictated the use of non-parametric analyses, which, given that they are the most conservative tests, reduced the likelihood of Type I errors. Wilcoxon signed ranks tests were used unless otherwise stated.

Pain and Severity of Self-Harm: Initial versus late episodes of DSH. In terms of accounts of pain provided in the course of the interview, the typical episodes of self-harm were reportedly less painful than the initial episodes for 71% (n=17) of participants. A typical interviewee indicated: "To begin with it was very painful. I don't know if it was the worst ever pain that I've experienced but it would be quite high."

Table 5.2 *Participants endorsement of clinical criteria of dependency*

Diagnostic Criteria of Dependency (DSM IV)	Definition	Example Category / Statement	% of Respondents
Use despite negative Consequences	Continued use despite knowing it caused significant physical or psychological problems	"Because when I cut it tends to be on my right arm, the skin is like a grapefruit now, I could just peel it. It's lost all of its elasticity."	76% (n=19)
Impaired Control	Use in larger amounts or over a longer period of time than was intended	"I started on my arm and then I cut all of my stomach and then I cut all of my left leg really badly and really deeply…I just couldn't stop it… I really scared myself because it was one of the first times that I'd done more than I'd planned to do."	76% (n=19)
Time Spent Procuring	A great deal of time spent engaging in or recovering from use	"If it's burning it can be prolonged over half an hour to an hour period. If it's cutting…I think the longest I did it for was two hours once."	68% (n=17)
Neglect of other Activities	Caused a reduction in social, occupational or recreational activities	"(I avoid) anything that would show my scars, I mean I don't go swimming, because I've got scars all over my arms and stomach."	44% (n=11)
Unsuccessful quit Attempts	Unsuccessful attempts to cut down or control use	"I've tried a couple of times to tell myself that I'm not going to do it, but then the urges will just come on so strong that I've found I've ended up cutting anyway."	40% (n=10)

Increased tolerance	Need for markedly increased amounts to achieve an effect or a markedly diminished effect with continued use of the same amount	"I felt it more that first time than I ever felt it after that… I cut, not really deep, not like I did later on, so I still know which scars on my legs are from that (first episode)… they are quite different… much thinner."	56% (n=14)
Withdrawal Symptoms (Opponent Processes)	Unpleasant reactions to the cessation of the addictive activity *or* Pleasant reactions to the cessation of the addictive activity	*Tension* "(If I gave up self-harm) I'd be a really bad person to know I think. Very stressed at the end of the week."	8% (n=2)
		Positively directed changes in emotional state "I have very strong emotions and I don't know how to handle them so this cutting releases that and releases the pressure of it."	84% (n=21)

Table 5.3 *Participants endorsement of criteria of behavioural addiction*

Criteria of Behavioural Addiction (Brown, 1991)	Definition Category / Statement	Example	% of Respondents
Conflict	Conflicts regarding immoderate engagement in behaviours surrounding the addiction	*Interpersonal Conflict (conflicts with family, friends and partners)* "I can't see my daughter because of it. You can't hold down a job. Its affected relationships that I've been in."	84% (n=21)
		Intra-personal Conflict (conflicts with self e.g. experiencing sadness, guilt) "At the time, I'm thinking... I'm really glad I'm doing this because I'm helping myself. And then afterwards I'm like, that wasn't good, because I'd done that really."	80% (n=20)
		Conflicts with other Activities "I don't go swimming because I've got scars all over my arms and stomach."	48% (n=12)
Salience	The person's thinking, feelings and behaviour revolve around the addiction	*Cognitive Salience (thinking about the behaviour most of the time/daily)* "I suppose really to an extent I always tend to think about it... It's always there."	68% (n=17)

		Behavioural Salience "If it's cutting it could become very ritual. I'm cleaning out the bottom of the shower with disinfectant before I do anything. Then lining up everything that I'm going to use to clean myself with afterwards, sterilising everything, and then spending…(up to) two hours."	16% (n=4)
Tolerance	Increased engagement needed to experience the same effect or a markedly diminished effect with the same level of engagement	*Increased engagement* "It's very regular now. Much, much more regular."	20% (n=5)
		Diminished Effect "(The first few times I cut myself) there was quite a lot of pain…(the more recent times) I felt nothing."	56% (n=14)
Relapse and Reinstatement	Returns to a former state of addiction even after periods of abstinence	"It sort of tends to come in cycles. I won't do it for a while and then do it quite often and then not for a while."	40% (n=10)
Euphoria	Immediate increased level of hedonic tone as the addiction is pursued	"Before harming you can be like, I just can't cope with all this, and then you do, and then you're fine, you can go out and you've got more energy, it's just given you a boost."	8% (n=2)
Withdrawal Symptoms (Opponent processes)	Unpleasant reactions to the cessation of the addictive activity	*Tension* "(If I gave up self-harm) I'd be a really bad person to know I think. Very stressed at the end of the week."	8% (n=2)
	or Pleasant reactions to the cessation of the addictive activity	*Positively directed changes in emotional state* "If you are having a particularly bad day the cutting and like the blood coming up to the surface is like a release of that tension."	84% (n=21)

The respondents rated initial episodes as significantly more painful than typical episodes (z =-4.23, p =.001) but, although the mean ratings of severity during initial and typical episodes suggested a slight increase in severity of injury (initial episode severity mean = 34.11, SD = 24.44; typical episode severity mean = 38.69, SD = 26.74), the difference was not reliable (z <1). Nevertheless, the pain/severity indexes for initial and typical episodes of DSH, shown in Figure 5.1, were significantly different (z = -3.34, p =.001).

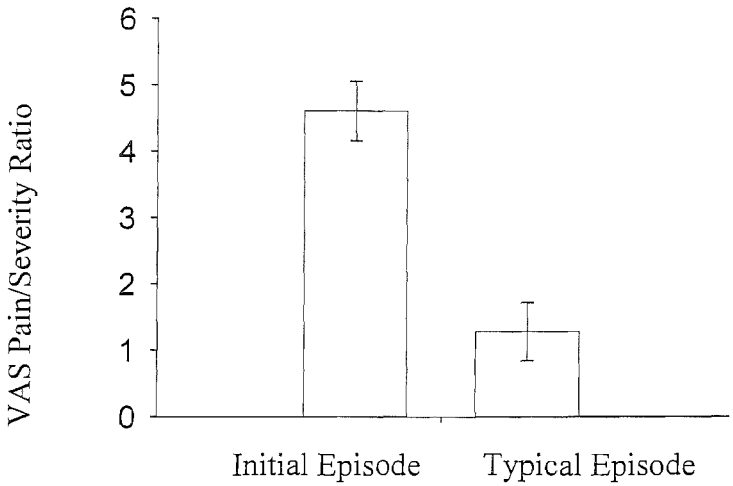


Figure 5.1
Means and standard errors of pain / severity ratio for initial and recent episodes

Further confirmation came from the chain analysis data. There was a significant increase in self-reported pain during the initial episode (z = -2.52, p = 0.012) but not the typical episode (z = -1.13, p = 0.257). Moreover, respondents indicated a significantly higher rating of pain during the initial compared with the typical episode at the first injury (z = -2.76, p = 0.006) although this was not significant after injury (z = -2.03, p =0.042; see Figure 5.2, overleaf).

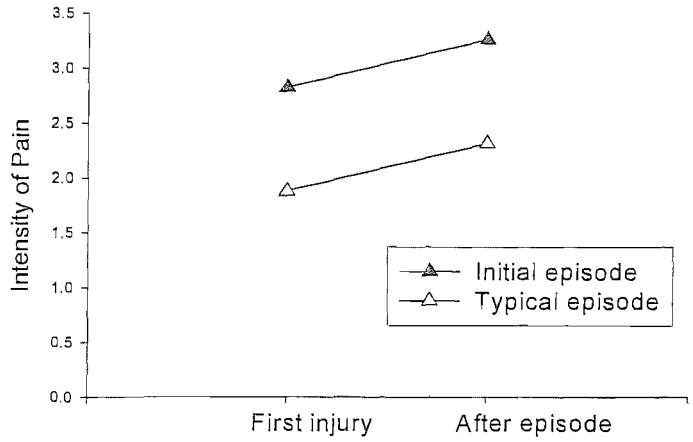


Figure 5.2
Mean pain ratings at first injury and after episode of deliberate self-harm for initial and recent episodes

Episodes of accidental injury. Participants rated episodes of accidental injury in relation to episodes of DSH occurring at around the same time, both for painfulness (from 'much less painful' to 'much more painful') and severity (from 'much less severe to 'much more severe'). Hence, Figure 5.3 shows ratings of relative pain and severity against a zero baseline. Accidental injuries were rated as significantly less severe ($t = -3.083$, $df = 18$, $p = 0.006$), however although there was a trend towards accidental injury being rated as more painful than self-harming injury, this was not significant ($t = 2.46$, $df = 18$, $p = 0.024$).

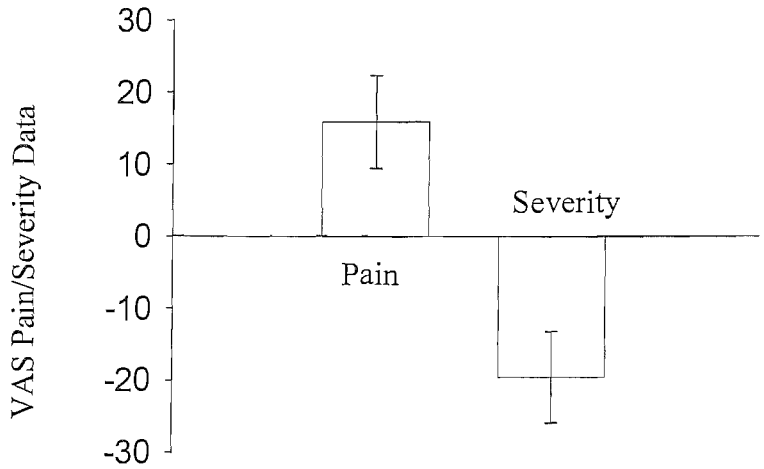


Figure 5.3
Means and standard errors of pain and severity for accidental episodes of injury in relation to episodes of deliberate self-harm occurring at around the same time

Consistent with this trend, more than twice as many participants reported experiencing more pain when they cut accidentally than when they self-harmed (46% compared to 21% who reported less pain). This difference was statistically significant ($\chi^2 = 14.028$, $df = 1$, $p = 0.001$). A third (32%) reported an absence of pleasure or relief in relation to accidental injury. For example, "It's the shock … that makes it feel more painful … It actually hurts me and I don't enjoy it. When I first started self-harming the pain was similar to accidental pain but as I've harmed more and more….I can no longer feel this pain. I recently got quite a nasty paper cut on one of my fingers, it wasn't at all like self-harming… It didn't bring any relief to any negative emotion."

5.4.3 Deliberate self-harm and the regulation of urges and emotions

Scrutiny of data obtained from the Chain Analysis focused upon urges, emotions and length of tension relief reported.

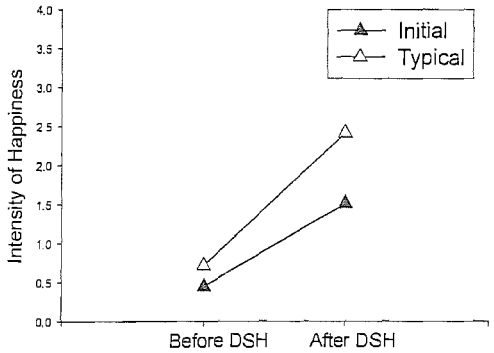
Urges. The bottom left hand panel of Figure 5.4 shows reported urges before and after DSH for initial and typical episodes. There was a significant drop in urges after self-harm within both episodes, $z = -3.41$, $p = 0.001$ and $z = -3.83$, $p = 0.001$ respectively, but no differences between self-reported urges during initial or recent episodes.

Changes in emotional state. 79% (n=19) of participants reported expectations of positive intrapersonal consequences of their self-harm, for example "It will provide relief, release all of the feelings"; "I know that it'll make me feel better… I'll feel completely calm, relaxed and happy afterwards". Consistent with this twenty-one (84%) of the 24 participants reported positively directed changes in emotional state after self-harming. For example: "I'll feel completely calm, relaxed and happy afterwards".

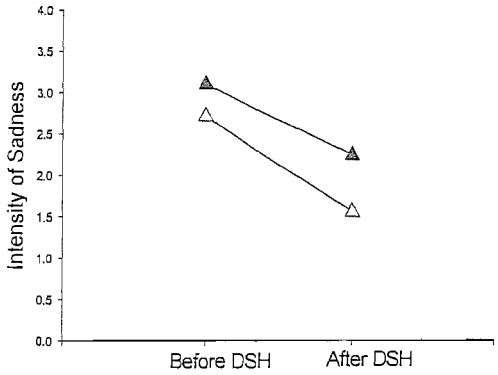
Ratings of the five basic emotions before and after DSH in initial and typical episodes are shown in the remaining panels of Figure 5.4. There were significant increases in reported happiness after self-harm during both initial and recent episodes, $z = -2.92$, $p = 0.003$ and $z = -3.58$, $p = 0.001$ respectively. Additionally, significant declines in reported anger and sadness after self-harm were observed within both initial episodes (anger: $z = -3.46$, $p = 0.001$; sadness: $z = -2.63$, $p = 0.009$) and typical episodes (anger: $z = -4.15$, $p = 0.001$; sadness: $z = -3.24$, $p = 0.001$). There were,

however, no reliable within-episode changes in fear. No moods were reported that would be coded as the emotion 'disgust'. No differences in self-reported intensities of the basic emotions between initial or typical episodes were reliable at either time-point in the episodes of DSH.

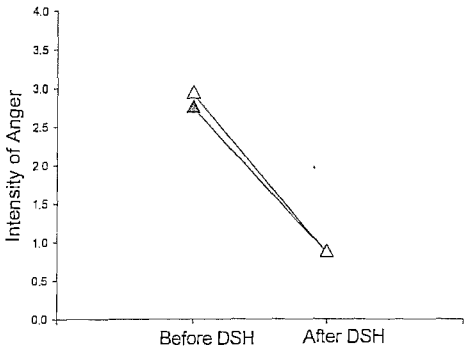
Happiness



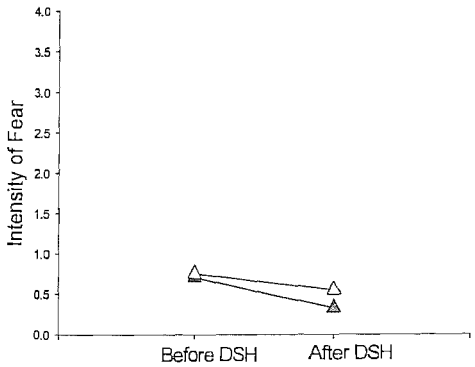
Sadness



Anger



Fear



Urges

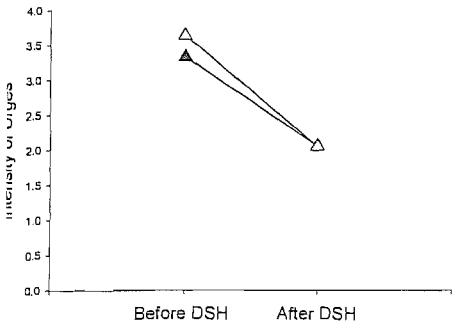


Figure 5.4
Mean intensities of urge and basic emotion ratings before and after deliberate self-harm for initial and recent episodes. Open triangles denote initial episodes, closed triangles denote typical episodes for all graphs

5.4 Discussion

All participants reported several aspects of their self-harming behaviour that corresponded to diagnostic criteria for addiction. Features characteristic of both pharmacological and behavioural dependency were heavily endorsed. Specifically, 'Use despite negative consequences' and 'Inter and intra personal conflicts' were the criteria most likely to be endorsed by participants. This is perhaps unsurprising given that conflicts generally arise from perceived negative consequences of addictions (Brown, 1993). 'Cognitive salience' and 'Time spent procuring' were also frequently endorsed highlighting the prominence of DSH in both the thoughts and behaviour of participants. Over 75% of the sample also endorsed the criteria of 'Impaired control' a criterion associated with substance dependency, rather than an explicit common component of behavioural addiction (Brown, 1991). Although the 'withdrawal symptoms' criterion was endorsed by fewest participants, this item was scored on the basis that the after-effects of addictive behaviour will be negative. On the contrary, most participants reported experiencing positive after-effects of DSH. The reason for this anomaly however, may be interpreted using the OPT account of addiction.

OPT suggests that in pharmacological dependency, the b-process—which follows a drug use episode and which is strengthened with repeated drug administration—is aversive precisely because the a-process is rewarding. In the case of DSH, however, the a-process produced, for example, by cutting is itself aversive (tension, pain) and this in turn triggers a rewarding opponent b-process (tension relief, analgesia, euphoria). With repeated episodes of DSH, OPT predicts that the opponent process will strengthen, moderating the initial affective response, increasing pain tolerance, and creating a long-lasting "positive withdrawal" state. Thus, the presence of the reported positive after-effects of self-harm, rather than undermining the OPT account of DSH, may support it.

This account is also supported by the reclassification of Griffith's component model of behavioural addiction, to include 'mood modification'. Mood modification incorporates the use of substances and behaviours as a way of producing a consistent shift in mood state. This fits with the descriptions of 'Positively directed changes in state' classified in this study (and endorsed by over 85% of the sample), whereby participants described DSH resulting in 'a release of tension' and escape from 'the pressures of (strong emotion)'.

The data regarding pain sensitivity during DSH provide further support for an OPT account. Initial episodes of self-harm were reported as significantly more painful in absolute terms, and more painful in relation to their severity, than typical episodes. Moreover, Chain Analyses revealed that pain increased following DSH only during initial episodes when, according to OPT, the b-process would not yet have been strengthened. The data overall suggest an increasing tolerance for the pain associated with DSH. Moreover, accidental acts of self-harm were perceived as more painful than self-harming acts. OPT again predicts this effect on the basis that conditioned b-processes elicited by characteristic rituals associated with self-harm are absent when injury is not deliberate.

These data further suggest that the self-infliction of pain is not the primary motivation for engaging in DSH. The Chain Analyses provided an alternative explanation, namely that the function of self-harm is to regulate emotion. The data strongly suggest that during episodes of self-harm, individuals experience positively directed changes in three of the five basic emotional categories identified by Power and Dalgleish (1998). The emotion of fear was noted by only very few respondents and disgust by none, but significant reductions in sadness and anger were widely reported, together with significant increases in happiness. The fact that, immediately following an episode of DSH, the urge to self-harm was reduced provides some further evidence for the self-regulatory role of DSH.

The quantitative findings reported thus far are consistent with previous anecdotal and qualitative reports of reductions in pain with repeated episodes of self-harm (Walsh & Rosen, 1988) and an emotional regulatory function of self-harm (Lion & Conn, 1982; Linehan & Kehrer, 1993). Moreover, OPT provides a useful account of how these functions might develop that is compatible with the data. There are, however, aspects of the data which OPT is unable fully to resolve. For example, given that opponent processes are strengthened by repeated elicitation, one might expect that reported emotional regulation would be more pronounced during typical than initial episodes but we found no evidence for this. One possibility is that the emotional regulation produced by an initial episode may have arisen in a different context to that produced in a typical episode. For example, the first time an individual carries out an act of self-harm, he or she may see it a unique achievement and this alone could account for the emotional change reported during the initial episode.

Additionally, however, OPT would predict an increased severity of injury across episodes due to an increasing tolerance for pain, yet no reliable difference was found.

The evidence from this study was therefore indicative that OPT may provide a useful explanation for the maintenance of DSH, however it was not wholly supportive. Given these discrepancies and the limited sample size of the study, a further experimental test of predictions made by OPT in relation to self-harm, using implicit tasks (e.g., the dot-probe task; Lubman, Peters, Mogg, Bradley, & Deakin, 2000) that are not susceptible to memory and interpretive biases inherent in subjective measures, would be useful to clarify the validity of applying this theory to these behaviours. This is the aim of the next study in this thesis.

CHAPTER SIX

Investigating the positive (valence) of cues associated with deliberate self-harm

Chapter Summary

The previous study suggested that deliberate self-harm may be seen as a form of addictive behaviour. It provided preliminary empirical evidence that theories of addiction (specifically the Opponent Process Theory) may go some way towards enhancing our understanding of the mechanisms that maintain deliberate self-harm. The study presented in this chapter use an implicit task (the stimulus response compatibility task) that is not susceptible to the memory and interpretive biases inherent in subjective self-report measures, to test predictions made by OPT regarding the importance of positive valence in maintenance of addictive behaviours. The findings may indicate whether the valence of the cues is aiding the maintenance of DSH, or whether motivation to maintain self-harming persists regardless of the valence attributed to the cues.

6.1 Abstract

Objectives. This study investigated whether people who deliberately and repetitively cut themselves or have done so in the past find cues associated with self-harm more positive than those who have never harmed themselves deliberately. It was designed to indicate whether the valence of the cues is aiding the maintenance of the behaviour, or whether motivation to maintain self-harming persists regardless of the valence attributed to the cues.

Design. Valence of cues was assessed using a stimulus response compatibility task. This computer based task measured latencies to move a manikin towards or away from cutting-related words and pictures. The dependent variable in this task was latencies in milliseconds to approach and avoid word and picture cues associated with deliberate self-harm. The independent variables were self-harming behaviour (currently self-harming, abstaining from self harming, never self-harmed) stimulus category (words or pictures) and direction of movement (approaching or avoiding the cues).

Method. Participants were asked to approach or avoid cutting-related cues depending on a semantically unrelated feature (i.e. whether the words were presented in upper or lower case, and whether the pictures were presented with a blue or yellow tint). Participants were also asked to subjectively rate the pleasantness of the stimuli.

Results. There was no difference between groups in response rates to approach and avoid stimuli associated with self-harm, relative to control stimuli. Also, participants currently self-harming and those abstaining did not rate cues associated with self-harm more positively than those who had never harmed themselves. The self-harm related pictures were subjectively rated as less pleasant than control pictures, whilst the self-harm related words were rated as more pleasant than the control words, for all groups.

Conclusions. These findings suggest that motivation to maintain self-harming may persist regardless of the attribution of the cues, consequently positive opponent processes (such as tension relief) evidenced by those who self-harm need not afford necessary or sufficient motivation for long-term continuation of the behaviour.

6.2 Introduction

Study Two supported the proposition that current understanding of the nature of addiction could provide a useful perspective from which to investigate the mechanisms underlying motivation for repetitive self-harm. The opponent process theory provides a testable explanation of the maintenance of self-harming behaviour with some face validity. Evidence from the previous study was indicative that OPT may provide a useful account of DSH; however there were aspects of the data which OPT was unable to fully resolve. Further experimentally based tests of OPT would therefore be useful to assess the validity of applying this theory to self-harming behaviours.

An OPT view of self-harm would suggest that the behaviour is reinforced by the positive hedonic tone of the opponent process (evidenced by subjective reports of tension relief). Therefore OPT predicts that cues associated with the behaviour would be positively valenced. This study aimed to test these predictions by assessing the hedonic tone of DSH cues using both explicit self-report measures and implicit computer based tasks.

As described in chapter 3, the stimulus response compatibility (SRC) task (Field et al, 2002; DeHouwer et al, 2001) has been used in psychology to provide a more direct measure of the allocation of the valence (or pleasantness/unpleasantness) of stimuli. The task is based on the premise that valence of cues can be accessed from the speed of approach or avoidance to cues. Using stimulus response compatibility methods, Bradley et al. (2004) demonstrated that smokers show greater preferences for smoking-related rather than control cues, compared with non-smokers, since smokers were quicker to approach and slower to avoid smoking related pictures compared to control pictures. This difference was not evidenced in non-smokers (see Chapter 3 for a full description of this study). Therefore, it is reasonable to assume that the dot probe task could be adapted to test reaction times to self-harming cues and neutral objects in order to consider this model in relation to DSH.

OPT predicts that participants who currently self-harm will evaluate cues related to self-harm positively. If this is the case, there should be within and between group differences in latencies to approach cues. Those currently self-harming should be faster to make approach rather than avoidance movements to DSH cues compared to control (non-DSH) cues, this difference should not be evidenced in the abstaining groups (where the association between self-harm behaviour and positive opponent

processes has been weakened) or control groups (where no association between self-harm behaviour and positive opponent processes has been experienced).

6.3 Method

6.3.1 Design

This study used a between subjects quasi-experimental design. Participants were allocated into one of three groups on this basis of reported self-harm behaviour (currently self-harming 'Current', abstaining from self harming 'Abstaining', never self-harmed 'Control'). A 3 x 2 x 2 factorial (ANOVA) design was employed. This created a group factor of self-harming behaviour consisting of three levels (currently self-harming, abstaining from self harming, never self-harmed). The other independent group factors were stimulus category (words or pictures) and direction of movement (approaching or avoiding the cues). The sample size of this study was determined by published studies using this methodology which had found significant within and between group differences (See Bradley et al., 2003). The minimum total sample size (n=36; i.e. 12 per group) was determined using an effect size from a published SRC study (Bradley et al., 2004; $\beta = 1.1$) for 80% power with alpha = 0.05.

6.3.2 Participants

Eleven male and 44 females were recruited for this study. They were aged 18 and over and spoke English as their first language. Twenty participants (19 female, one male) were currently self-harming by deliberately cutting themselves (a 'Current' group). Fifteen participants (10 female, five male) had self-harmed in the past, but had abstained from cutting for more than six months (an 'Abstaining' group) and twenty participants (15 female, five male) had never deliberately cut themselves (a 'Control' group). The study sought to recruit 20 participants for each experimental group, but difficulties with recruitment of abstainers prevented this

Current and Abstaining participants were drawn from both service user and student populations. These participants were recruited by GP / Consultant Psychiatrist / Social worker referral or by advertisements posted around the University of Southampton campus. Members of the Control group were undergraduates recruited from the University by advertisements that asked for participants for a study of attention. All participants gave their informed consent before participating in the study, which was

approved by the University of Southampton Ethics Committee and Poole Local Medical Research Ethics Committee.

6.3.2.1 *Inclusion criteria*

To be included in the Current group, participants must have deliberately cut themselves, with the intention of causing harm, but not death, recently (i.e. during the previous month) and repetitively (i.e. more than once every two months). For inclusion in the Abstaining group, participants must have cut themselves deliberately in the past, but self-report that they have abstained for more than six months. The Control group only included (based on self-report) those who had never deliberately cut themselves.

6.3.2.2 *Exclusion Criteria*

Individuals who engaged in forms of self-harm other than cutting (e.g. overdosing, consuming household cleaners) were excluded from the study since the picture stimuli selected for the dot probe task were of tools for cutting oneself deliberately (e.g. knives and blades) and would therefore be irrelevant cues for people who did not cut themselves. With the exception of two abstaining participants, however, all participants had used methods additional to cutting (for example, burning, punching, drinking bleach) to harm themselves.

6.3.2.3 *Descriptives*

Demographic details of the sample and information regarding the DSH history of those who agreed to complete the questionnaire which documented their history of self-harm, are provided in Table 6.5.

Table 6.1 Demographic Characteristics and DSH history of self-harming and control groups

	Current		Abstaining		Control	
	Mean	SD	Mean	SD	Mean	SD
Age (yrs)	27.35	10.01	24.53	3.74	27.55	6.75
Age at DSH onset	14.10	9.71	13.30	3.63	----	----
Length of DSH history (yrs)*	12.70	12.30	5.50	4.10	----	----

		Current	Abstaining	Control
Gender	Female	19	10	15
	Male	1	5	5
Percent needing emergency DSH medical attention (N)		40% (8)	10% (2)	----

* Length of DSH history is the total number of years that the individual has/had regularly harmed themselves

6.3.3 Materials

6.3.3.1 *Apparatus*

The SRC task was programmed using C++ Borland Builder, Version 6 and run on a Spectrum Pentium 3 personal computer with a processing speed of 1GHz. All stimuli were presented using a 16 inch colour monitor. The dimensions of the screen and stimuli are illustrated in Figure 7.1.

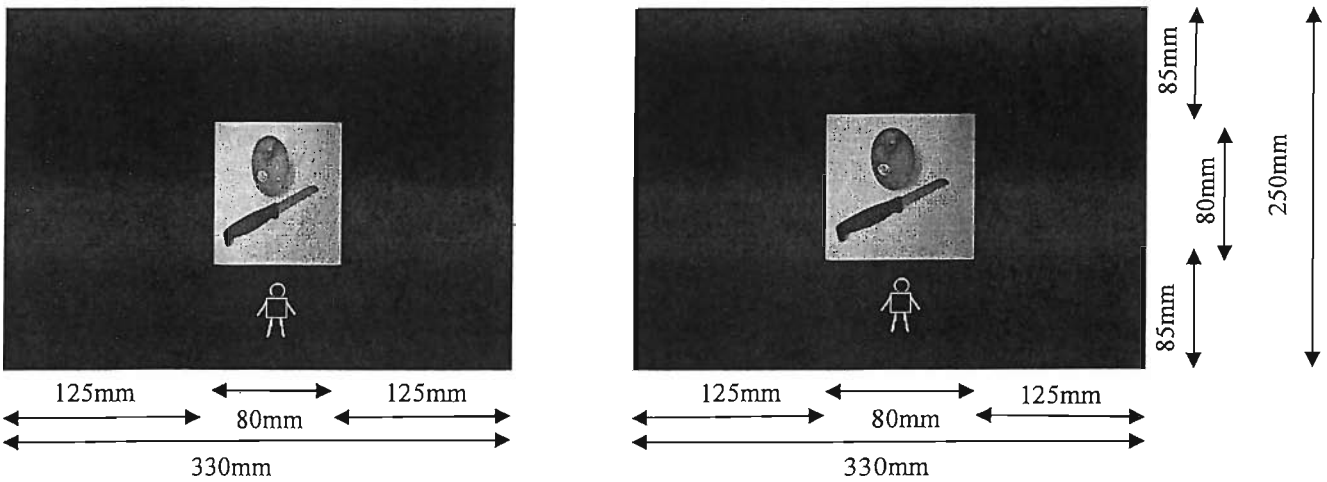


Figure 6.1 Two examples of screen views of stimuli and manikins (with dimensions)

6.3.3.2 *Stimulus materials*

Pictures. Forty pictures were prepared. These were sub-categorised into 20 experimental pictures and 20 neutral (control) pictures. All pictures were resized to the same 80mm x 80mm dimension using Adobe Photoshop.

Each of the 20 experimental pictures consisted of a self-harm (cutting) related digitised picture, featuring a cutting implement (e.g. razors, knives, scissors) (see Figure 7.2 for an example) presented in non-threatening naturalistic environments.

Previous studies have found that threatening stimuli are more likely to command attention (e.g. MacLeod et al, 1986, Mogg & Bradley, 1999). As this study aimed to investigate cues for self-harm (rather than threatening cues) cutting implements in the self-harm (cutting) related pictures were presented in non-threatening naturalistic contexts. For example, a picture which included a razor showed it on a bathroom shelf.

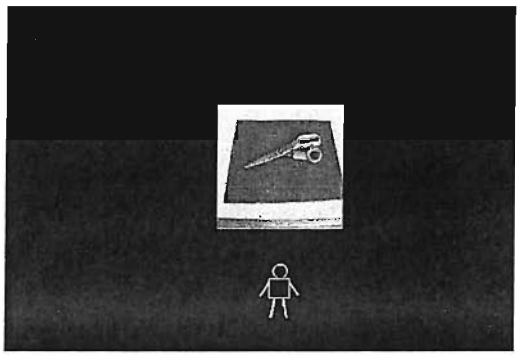


Figure 6.2 Example of an experimental picture as presented on screen

The 20 control pictures featured pictures of neutral implements not related to cutting presented in the same context as the self-harm pictures. An example (as presented on screen for this task) is shown in Figure 7.3.

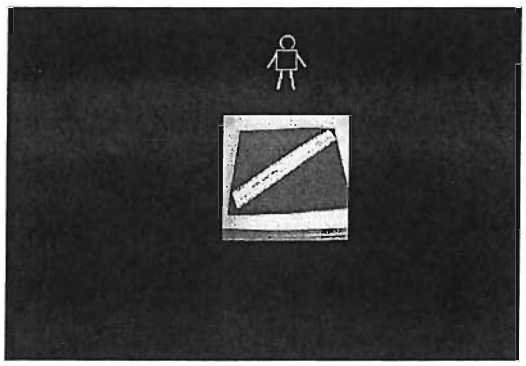


Figure 6.3 Example of a control picture as presented on screen

To test, prior to experimentation, that the cutting-related pictures had been adequately controlled for threat; twenty independent student raters (10 female, 10 male) judged the 20 cutting-related pictures, the 20 control pictures and 20 high valence, high arousal pictures taken from the International Affective Picture System (IAPS; Lang et al, 1995). The high arousal IAPS pictures were rated as significantly more threatening than the cutting-related pictures ($z = -3.920, p = 0.01$) and the control pictures ($z = -3.923, p = 0.001$).

A blue and yellow tint version of each photo was prepared using Adobe Photoshop. All photos were tinted to the same transparency (15%) using the same blue and yellow coloured tint to ensure consistency. See Appendix C for an illustration of all tinted picture stimuli.

Words. Forty word stimuli were used in this study. These were sub-categorised into 20 experimental self-harm (cutting) related words, relating to cutting implements and experiences (e.g. cutting, razor) and 20 control words of equal threat value (as assessed by six independent raters). The words were matched for length (see Table 6.2). Whilst these words were matched for length and subjectively rated 'threat' they were not matched prior to testing for word frequency in the English language. This may be important as novelty alone can influence attention and behavioural response. Post-hoc examination of norms reported in Kucera and Francis (1967) suggests however that, for those words listed, frequency of the two word lists were not significantly different ($U = 111, Z = -0.871, p = 0.401$; see Table 6.2).

Table 6.2 Table of word stimuli

Experimental word pairs			
Self-harm (cutting) related words	Word frequency (Kucera and Francis, 1967)	Words of equal threat value not related to cutting	Word frequency (Kucera and Francis, 1967)
MUTILATE	3	GANGRENE	Not listed
SLASH	3	MAFIA	Not listed
BLADE	13	VENOM	2
CUTTHROAT	1	TERRORIST	1
DISFIGURE	5	HURRICANE	8
CUTTING	66	MISSILE	48
ABRASION	1	BURGLARY	4
SCALPEL	Not listed	DENTIST	12
PIERCE	6	SPIDER	2
CARVE	3	STORM	26
SHARP	72	MUMPS	Not listed
SCISSORS	1	SKINHEAD	Not listed
SCRATCH	9	MEASLES	2
PENKNIFE	Not listed	JAUNDICE	Not listed
RAZOR	15	THEFT	10
SCAR	10	LION	17
STABBING	2	CONFLICT	52
WOUND	28	TIGER	7
KNIVES	3	SNAKES	26
SEVER	3	VIRUS	13

An uppercase and lowercase version of each word stimulus was prepared. All words were presented in black Times New Roman 36 point bold font on a white 80mm x 80mm background. These dimensions were retained in the on-screen presentation of the word stimuli (see Figures 7.5 and 7.6).

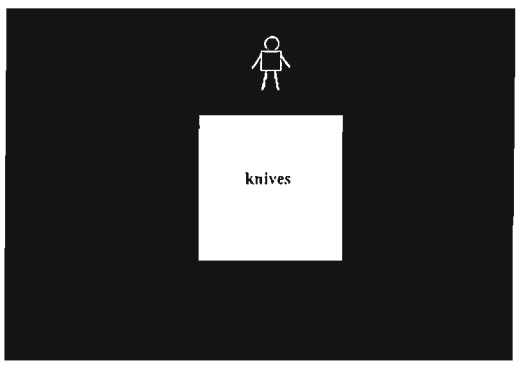


Figure 6.4 Example of an experimental word (lowercase) as presented on screen

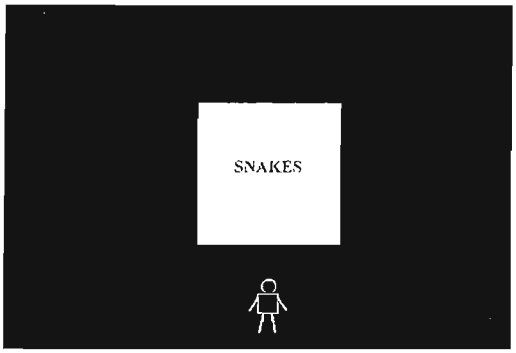


Figure 6.5 Example of a control word (uppercase) as presented on screen

6.3.3.3 *Questionnaires*

All participants completed The State-Trait Anxiety Inventory (STAI; Spielberger, 1983) and The National Adult Reading Test (NART, Nelson, 1982). Those who had or were currently self-harming completed The Millon Clinical Multiaxial Inventory III (MCMI-III-R: Millon, 1994) and The Deliberate Self-Harm Inventory (DSHI, Gratz, 2001) and those who had never self-harmed completed the SCL-90-R (Derogatis, 1993). Further information about these measures and the rationale for their use is presented in Chapter 3.

6.3.3.4 *Rating tasks*

All participants completed a rating task which asked participants to rate the pleasantness of each of the word and picture stimuli used in the experiment. Each stimulus was displayed on screen alongside a 7-point anchored scale. The rating scale ranged from –3 (very unpleasant) to +3 (very pleasant). Participants were asked to press one of seven keys correspondingly labelled from –3 to +3, to indicate how pleasant or unpleasant they found each cue.

6.3.4 Procedure

The three groups of volunteers completed the STAI (Spielberger, 1983), then undertook the computer task. The computer task procedure was based on that of Bradley et al. (2003) as described in Chapter 3. It consisted of four sets of 100 trials. Written instructions were given to participants prior to the start of the first set of trials.

These included an overall description of the task and specific instructions for the first set of trials (inserted according to which set of trials were initially presented) worded as follows:

> "This study will test your concentration and reaction times. At the start of each task you will see a black screen. This will be replaced with either a word or a picture. Next to the word or picture (either above or below) you will see a manikin (i.e. a stickman).
>
> **Instructions for specific set of trials inserted here***
>
> There will be 4 sets of tasks. Each set will start with 20 practice tasks, then 80 experimental tasks. You will be able to stop and have a rest between each set. Don't forget that you have the right to withdraw from the experiment at any time. Please ask the experimenter if you have any questions about the study."

Further written instructions were given to participants at the start of every subsequent set of trials (as detailed below).

Instructions for Word Task Set A:

> "If the word is in UPPER CASE please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin TOWARDS the word AS QUICKLY AS YOU CAN. If the word is in LOWER CASE please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin AWAY FROM the word AS QUICKLY AS YOU CAN."

Instructions for Word Task Set B:

> "If the word is in UPPER CASE please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin AWAY FROM the word AS QUICKLY AS YOU CAN. If the word is in LOWER CASE please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin TOWARDS the word AS QUICKLY AS YOU CAN."

Instructions for Picture Task Set A:

> "If the picture is tinted BLUE please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin TOWARDS it AS QUICKLY AS YOU CAN. If the picture is tinted YELLOW please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin AWAY FROM it AS QUICKLY AS YOU CAN."

Instructions for Picture Task Set B:

> "If the picture is tinted BLUE please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin AWAY FROM it AS QUICKLY AS YOU CAN. If the picture is tinted YELLOW please press the corresponding (UP↑ or DOWN↓) arrow on your keyboard to move the manikin TOWARDS it AS QUICKLY AS YOU CAN."

The experimental trials are illustrated in Figures 6.7 (using word cues) and 6.8 (using picture cues). In each trial, as described in the written instructions above, a cue was displayed in the centre of the screen and a manikin figure was presented either above or below the cue. The cue was either DSH related or a control. During the trials, participants responded by pressing the up or down arrows on a keyboard, which moved the manikin up or down the screen, respectively. The cue and manikin disappeared as soon as the manikin reached the edge of the screen or the cue. There was a 1500ms interval between trials. The latency was recorded between each cue onset and the response.

Each set of trials had a different stimulus response assignment. In Word Set A, participants were instructed to move the manikin towards the cue if it was upper case, and away if it was lower case. In Picture Set A, participants were instructed to move the manikin towards the cue if it was blue tinted and away if it was yellow tinted. In Word Set B and Picture Set B, these stimulus response relationships were reversed (i.e. participants were told to move the manikin away from the cue if it was upper case (for words) or blue tinted (for the pictures) and towards if it was lower case (for words) or upper case (for pictures). The order of assignments was counterbalanced across participants.

Within each set of trials each of the 40 stimuli were presented 4 times (varying stimulus type – tinted blue/yellow or upper/lower case – and direction of movement of the manikin – approaching or avoiding the cue) making a total of 160 experimental trials. The total number of experimental trials was determined by counterbalancing stimulus type and manikin direction but not positioning of the manikin – this was counterbalanced within the trials by randomly positioning the manikin above the manikin above the stimulus in 50% of trials and below in 50% of trials (illustrated in Figure 6.6).

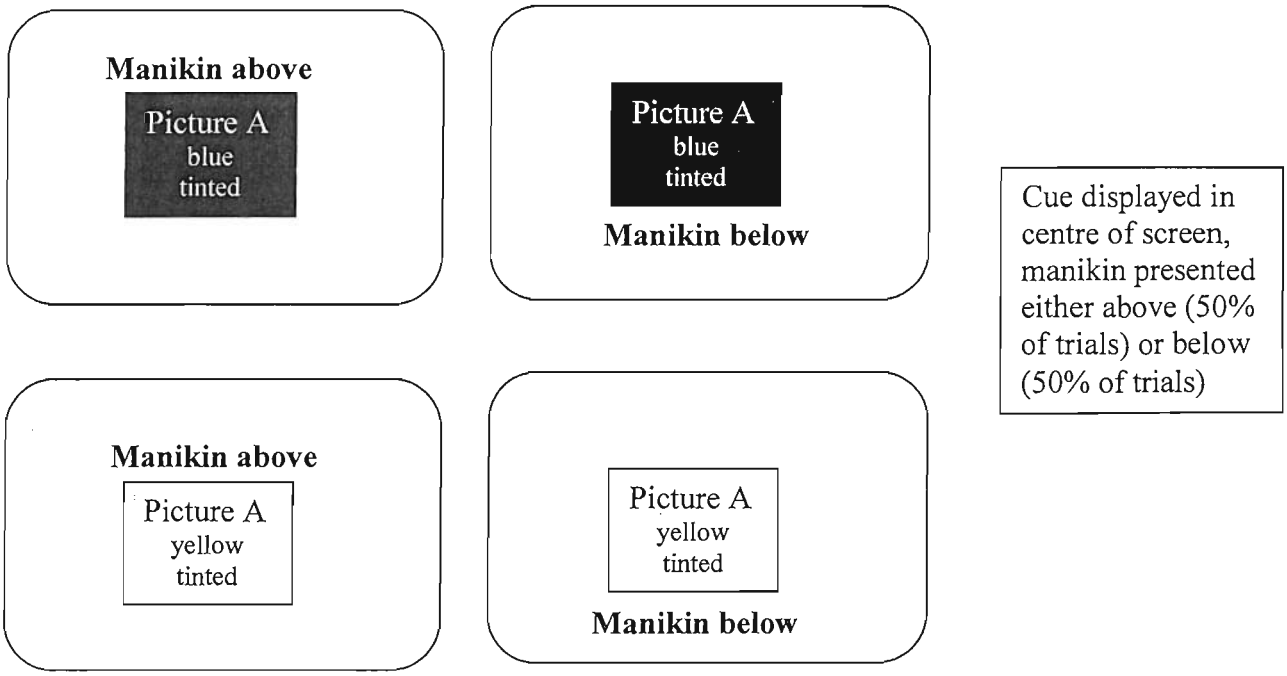


Figure 6.6 Counterbalanced presentations of pairs of tinted picture stimuli and manikin

After completion of the computer task, participants in the Control group completed the SLR-90 (Derogatis, 1993). Participants in the Abstaining and Control groups completed the MCM-III-R (Millon, 1994), the DSHI (Gratz, 2001) and the computer based rating task to describe how frequently the objects similar to the ones displayed in the picture stimuli had been used as self-harming tools. All participants then completed a short vocabulary test, The National Adult Reading Test (NART, Nelson, 1982) and rated the subjective pleasantness of the word and picture stimuli using the computer based rating task.

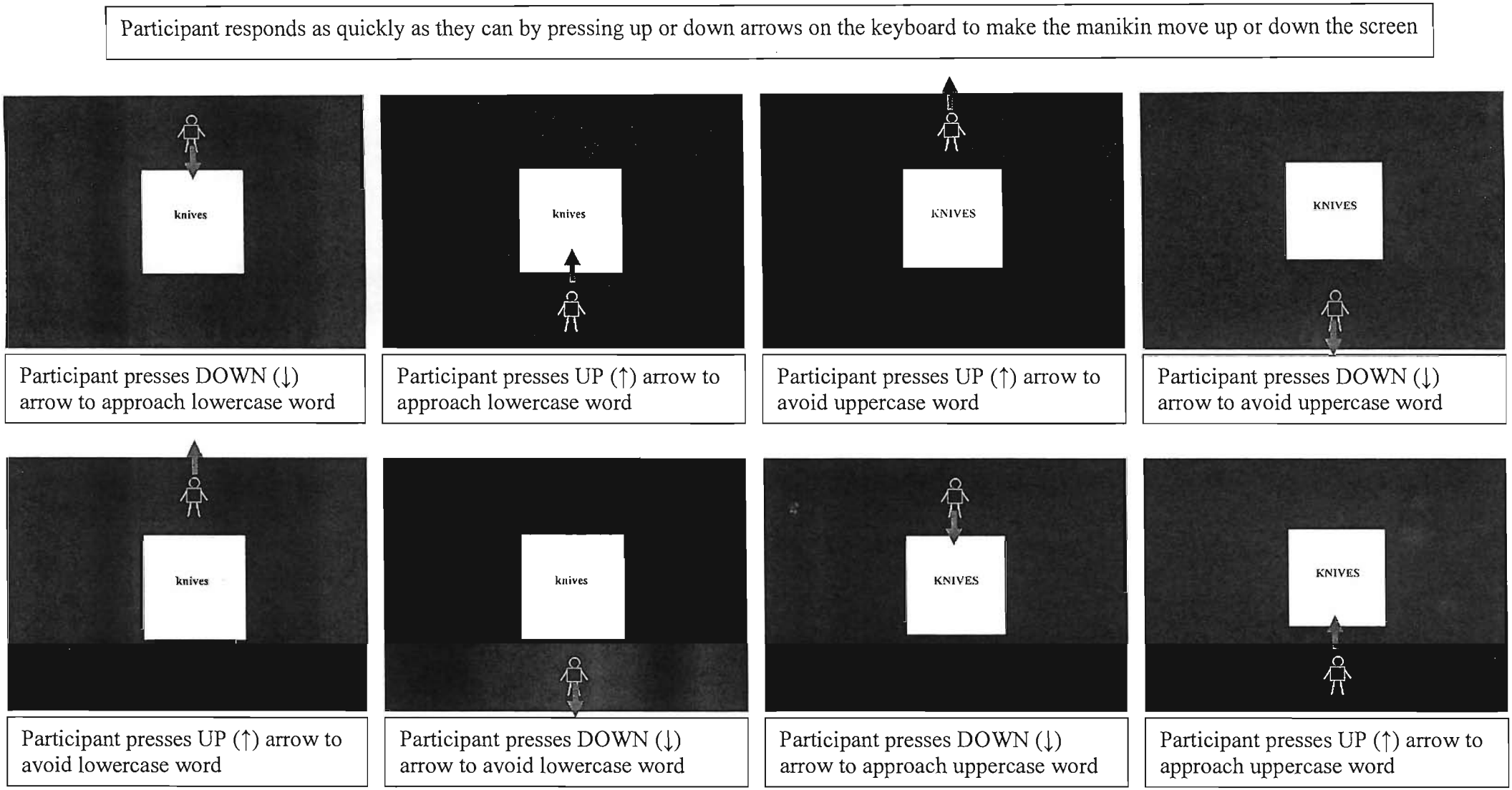


Figure 6.7 Illustration of word stimuli experimental trials

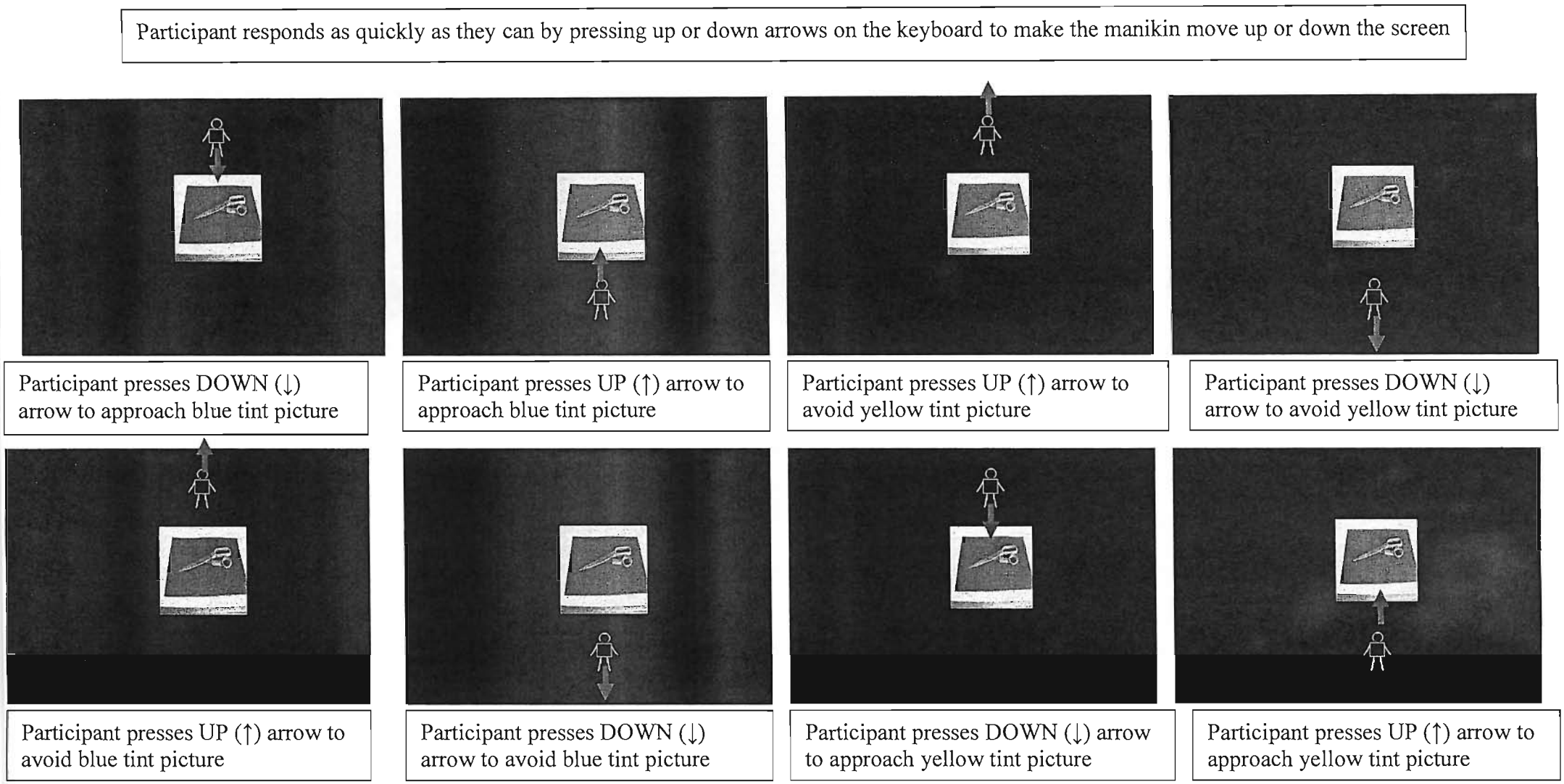


Figure 6.8 Illustration of picture stimuli experimental trials

6.4 Results

As in the previous study, a significance level of 1% was applied to ensure stringent test of hypotheses, and reduce the likelihood of type two error, given the number of analyses conducted.

6.4.1 Sample Characteristics

6.4.1.1 *Anxiety and Vocabulary Scores*

There was no significant difference between the vocabulary scores (Kruskal-Wallis $\chi^2 = 2.255$, $df = 2$, $p = 0.324$) of the groups. However, there was a significant difference between state anxiety of groups ($F(2,54)=7.389$, $p = 0.001$). Post hoc (LSD) comparisons reported significant differences between anxiety levels of those currently self-harming and controls ($p = 0.001$) however there was no significant difference in the anxiety scores of those currently self-harming and abstaining ($p = 0.022$) or the abstaining and the control group ($p = 0.259$). Given the quasi-experimental design of the study, participants were assigned to groups on the basis of their self-harming behaviours, therefore consequent analyses of reaction time data incorporated STAI-state anxiety score as a covariate.

Table 6.3 Characteristics of self-harming and control groups

	Current		Abstaining		Control	
	Mean	SD	Mean	SD	Mean	SD
STAI-state anxiety	46.00	11.15	37.13	12.21	32.85	9.83
Vocabulary-NART	36.72	10.19	38.93	5.90	42.17	4.06

6.4.1.2 *Normality tests*

Levene and Kolmogorov-Smirnov tests of the data of sample characteristics (see Table 6.4) indicated that the distributions of anxiety, age and onset of DSH did not violate the assumptions of normality. However, although the Kolmogorov-Smirnov test indicated that the scores of vocabulary were normally distributed, Levene's statistics indicated that there was heterogeneity of variance between the distributions.

Table 6.4 Tests of normality of sample characteristics data

	Degrees of freedom	Levene's *L*	*p*	Kolmogorov-Smirnov *K-S*	*p*
Vocabulary-NART	2, 53	0.215	0.079	0.380	0.001**
STAI-state anxiety	2, 53	1.474	0.233	0.078	0.200
Age	2, 53	0.252	0.778	0.110	0.200
Age at DSH onset	1, 34	0.853	0.364	0.928	0.364
Length of DSH history (yrs)	1, 34	0.146	0.200	4.704	0.039

Members of the three groups were matched as far as possible for age, therefore there was no significant difference between the ages ($F(2,54)=0.817$, $p = 0.447$) of the groups. The male/female ratio was however lower in the currently self-harming group than the other two groups. There was no significant difference between abstainers and those currently self-harming in either DSH history (Kruskal-Wallis $\chi^2 = 2.625$, $df = 1$, $p = 0.105$) or DSH onset ($t\ (35) = 0.410$, $p = 0.685$).

6.4.1.3 *Personality traits and clinical symptoms*

Measures of pathology within the experimental groups were compiled using the most conservative clinical cut-off scores of the self-report Millon Clinical Multiaxial Inventory (MCMI) as in the previous study. Personality traits and clinical symptoms of the self-harming groups are displayed in Table 6.5.

Of those who completed the MCMI[1], thirty-three percent (n= 5) of those in the Current group and 8% (n= 1) of those in the Abstaining group met psychometric criteria for Borderline Personality Disorder (BPD). A moderate proportion of respondents scored above the threshold for clinical diagnosis of Cluster C personality traits, particularly avoidant and dependent personality patterns. Additionally, nearly half of the sample scored above the threshold for a depressive personality pattern.

Those in the CURRENT group were not significantly more likely to score above the threshold for clinical diagnosis of Cluster B, Cluster C, BPD, avoidant, dependent or

[1] 2 abstaining and 5 current self-harming participants declined to complete the MCMIII-R

depressive personality traits than those in the Abstaining group. Measures of pathology within the control group were compiled using percentile positions relative to non-patient norms of the self-report SCL-90. Only 5% of the sample (i.e. 1 participant) scored above the 98th percentile of the normal distribution for depressive symptomatology; whilst none scored in the 98th percentile of the Global Severity Index. Further information about these personality types and traits is presented in Chapter 3.

Table 6.5 Personality traits and clinical symptoms of self-harming groups

	Current		Abstaining				
	n	%*	n	%*	χ^2	*df*	*p*
Cluster B	6	40	4	31	0.468	1	0.494
BPD	5	33	1	8	2.720	1	0.099
Cluster C	9	60	6	46	0.537	1	0.464
avoidant	4	27	1	8	1.709	1	0.464
dependent	3	20	3	23	0.039	1	0.843
Depressive	9	60	3	23	3.877	1	0.049

*Percentage values are calculated from the total participants per group who completed the MCM-III R

6.4.2 Stimulus Response Compatibility Task data

Response data to the word and picture experiments were treated independently, but using the same analysis techniques. Reaction time data from trials with errors was eliminated and any reaction times greater than 2 standard deviations from the mean were removed as outliers (Bradley et al, 1999). Data lost through errors and extreme response times was less than 5% of the total.

Table 6.6 displays the mean reaction time scores for each group (Current, Abstaining or Control) according to trial type (control or DSH cues) direction of correct response (avoid or approach) and presentation type (picture or word).

Table 6.6 Mean reaction times to approach and avoid control and DSH pictures and control and DSH words, for Current, Abstaining and Control groups. Standard deviations in brackets

	Mean Reaction times (ms)					
	Current		Abstaining		Control	
	DSH	Control	DSH	Control	DSH	Control
Words						
Approach	726	711	629	639	661	611
	(179)	(198)	(61)	(75)	(74)	(52)
Avoid	753	739	647	638	656	644
	(152)	(168)	(45)	(64)	(52)	(45)
Pictures						
Approach	735	747	662	681	606	591
	(177)	(198)	(104)	(99)	(106)	(85)
Avoid	772	748	692	721	636	625
	(178)	(158)	(100)	(138)	(82)	(68)

Because of the large standard deviations of the data, (mean RT range = 368, mean SD = 111) raw scores were transformed by $\log_{10}$ (as recommended by Taghavi, 1999). Levene and Kolmogorov-Smirnov tests of the data indicated that the logged picture reaction time distributions for control (L (2, 54) = 2.560, p = 0.087; KS = 0.747, p = 0.633) and DSH trials (L (2, 54) = 1.862, p = 0.166; KS = 0.663, p = 0.649) and the logged word reaction time distributions for control (L (2, 54) = 3.170, p = 0.051 ; KS = 0.973, p = 0.298) and DSH trials (L (2, 54) = 2.767, p = 0.072; KS = 0.598, p = 0.866) did not violate the assumptions of normality so parametric analyses were performed.

6.4.2.1 *Word stimuli data analysis*

A 3x2x2 repeated measures mixed analyses of covariance of the logged reaction time data, with the between group factor of group (Current, Abstaining or Control) and within group factors of type (control or deliberate self-harm related stimuli) and direction of correct response (approach or avoid) covarying for state anxiety was performed on the word data.

There was no significant group x type x direction ($F(2,48)=1.581$, $p = 0.216$) or group x type ($F(2,48) =1.260$, $p = 0.293$) interaction for the word stimuli, therefore no difference between groups in rates to approach and avoid stimuli associated with self-harm, relative to control stimuli.

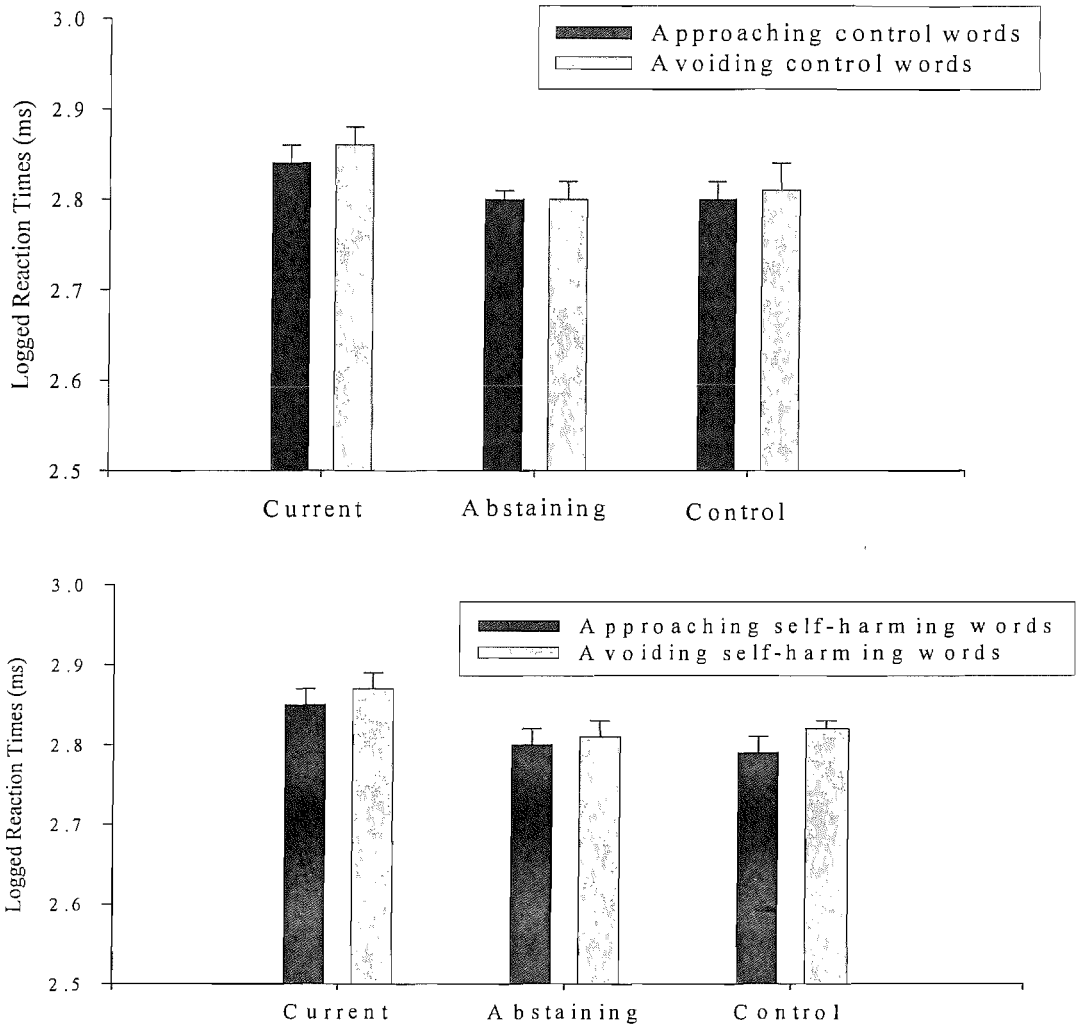


Figure 6.9 Mean logged reaction times to approach and avoid control words (top chart) and deliberate self-harm words (second chart) for Current, Abstaining and Control groups.

A 3x2 repeated measures mixed analyses of covariance of the logged reaction time data, with the between group factor of group (Current, Abstaining or Control) and direction of correct response (approach or avoid) was performed on the deliberate self-harm related word data. The findings were consistent with the previous analysis; no significant interaction was found between direction and group ($F(2,48)=1.278$, p =0.288) for the word stimuli.

6.4.2.2 *Picture stimuli data analysis*

A 3x2x2 repeated measures mixed analyses of covariance of the logged reaction time data, with the between group factor of group (Current, Abstaining or Control) and within group factors of type (control or deliberate self-harm related stimuli) and direction of correct response (approach or avoid) covarying for state anxiety was performed on the picture data.

There was no significant group x type x direction interaction for the picture ($F(2,49)=0.396$, $p=0.675$) stimuli, therefore no difference between groups in rates to approach and avoid stimuli associated with self-harm, relative to control stimuli.

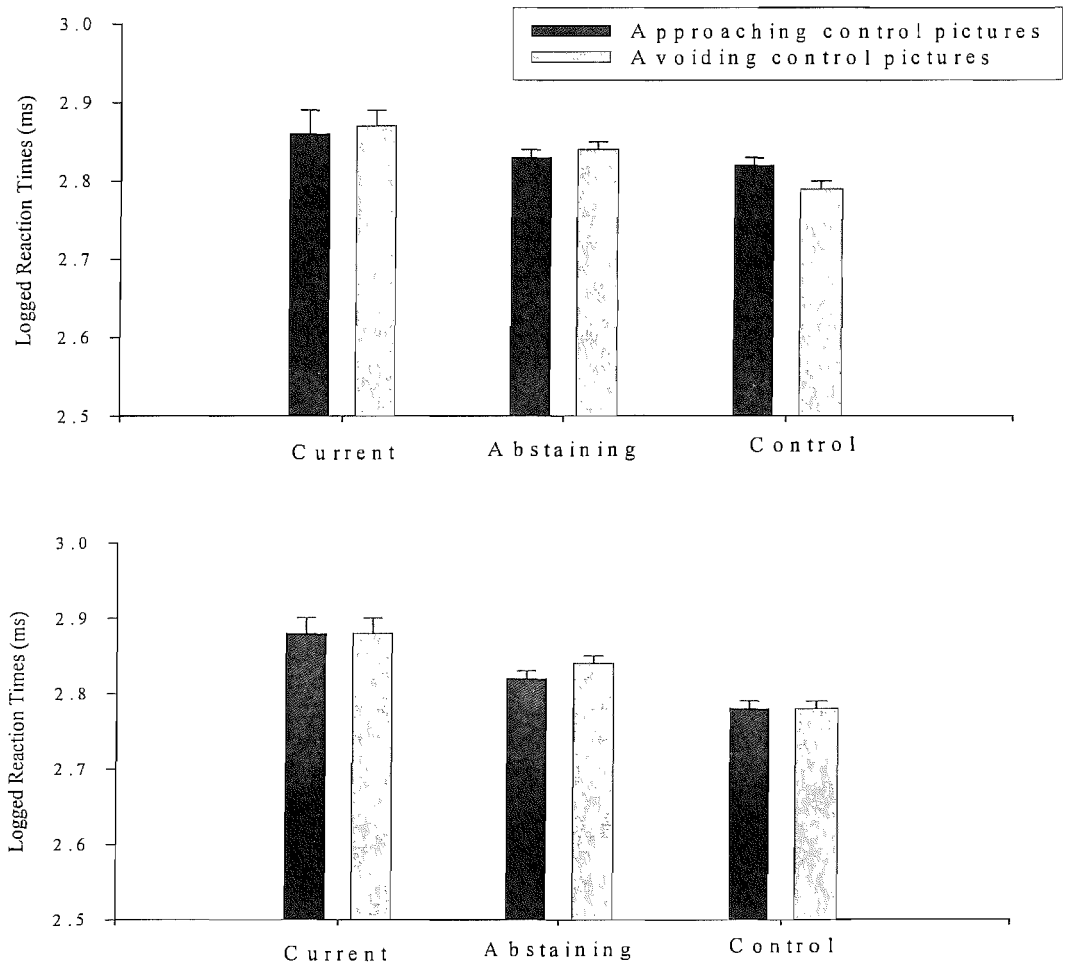


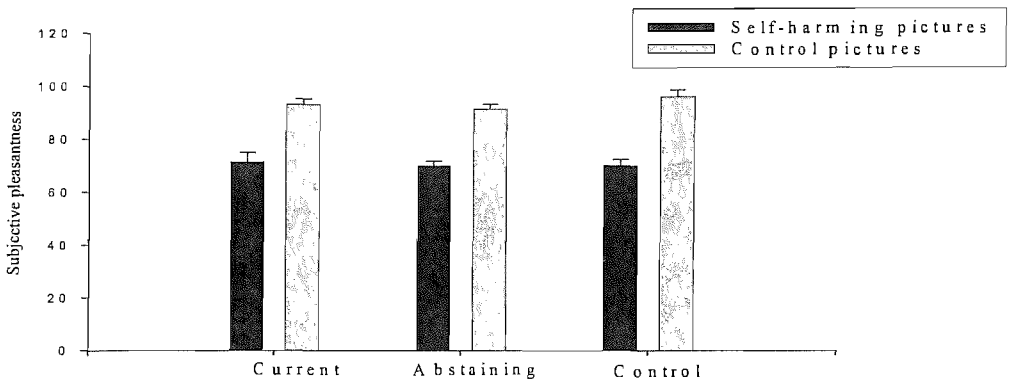
Figure 6.10 Mean logged reaction times to approach and avoid control words control pictures (top chart) and deliberate self-harm pictures (bottom chart) for Current, Abstaining and Control groups.

A 3x2 repeated measures mixed analyses of covariance of the logged reaction time data, with the between group factor of group (Current, Abstaining or Control) and direction of correct response (approach or avoid) was performed on the deliberate self-harm related picture data. The findings were consistent with the previous analysis; no significant interaction was found between direction and group for the picture stimuli ($F(2,49)=0.176$, $p=0.839$).

6.4.3 Rating task data

Twenty words associated with self-harm, 20 control words, 20 pictures associated with self-harm and 20 control pictures were rated for subjective emotional valence on a seven point scale by all participants. Summed scores (out of a possible total of 140) were calculated. To test the hypothesis that the experimental groups would rate words associated with self-harm as significantly more positive than the control words, compared to the control group, two 3x2 mixed design analysis of covariance (one for the word stimuli data, the other for the picture stimuli data) were carried out with group (Current, Abstaining or Control) as a between subjects variable and type (deliberate self-harm related or control) as a within subject variable. For the reasons given in section 6.4.1, state anxiety was incorporated as a covariate.

There was no significant group x type interaction for words ($F(2,52)=1.023$, $p=0.367$) or pictures ($F(2,52)=0.527$, $p=0.593$; see figure 7.2); although for both analyses there was a significant effect of type (words: $F(1,52)=31.432$, $p=0.001$; pictures: $F(1,52)=117.638$, $p=0.001$); the self-harm related pictures were rated less positively than control pictures, whilst the self-harm related words were rated as more positive than the control words, for all groups.



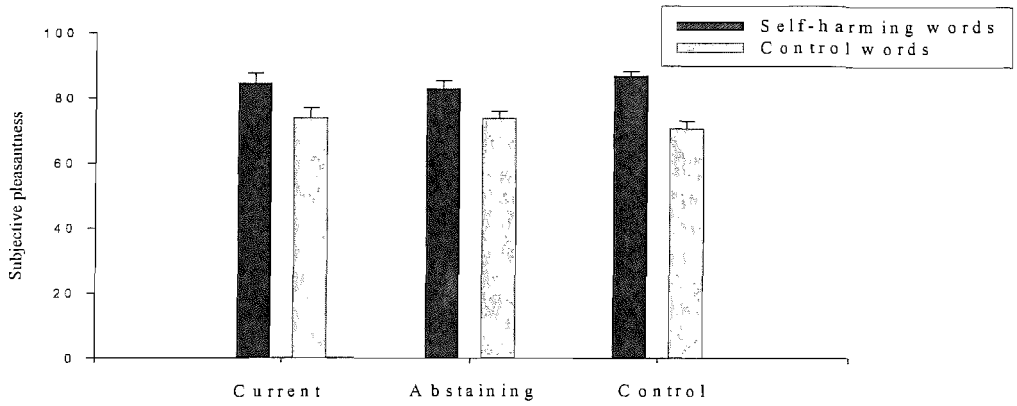


Figure 6.11 Summed subjective ratings of pleasantness of stimuli for Current, Abstaining and Control groups.

6.5 Discussion

This study used explicit and implicit measures of valence of cues to test predictions made by the Opponent Process Theory (OPT) in relation to self-harming behaviour. OPT predicts that participants who currently self-harm will evaluate cues related to self-harm positively.

In this study, participants currently self-harming and those abstaining did not rate cues associated with self-harm more positively than those who had never harmed themselves. The self-harm related pictures were subjectively rated less positively than control pictures, whilst the self-harm related words were rated more positively than the control words, for all groups. Although the control words were rated (prior to the study) as equally threatening as the self-harm words, they were viewed as more aversive than the DSH words during the study.

In the implicit task used in this study, participants who were currently self-harming did not evaluate cues related to self-harm positively. None of the groups was significantly faster to approach rather than avoid DSH cues compared with control (non-DSH) cues. Current groups were however slower overall to respond to DSH words and pictures than control groups.

It is unlikely that the lack of support for OPT could be due to type 2 error, since the procedure was identical to that undertaken by Bradley et al. (2004) who reported that smokers were faster to approach and slower to avoid cues associated with smoking compared to non-smokers. The power of the current study was also sufficient to identify effects of the size found by Bradley et al. (2004). The differences between

these studies were the sample (self-harmers rather than smokers) and the cues (self-harm related rather than smoking related cues).

The members of the abstaining group in this study were allocated based on self-report of their abstinence. Given that many find the behaviour shameful, it is possible that these reports might not be reliable. It would be, however, extremely difficult to check the validity of these reports in an ethical and sensitive manner. This may therefore have affected the validity of comparisons between abstainers and other groups however; a difference would still have been predicted between the controls and participants reporting that they were currently self-harming.

It could be argued that the cues for smoking are more specific to the act than the cues for self-harm (e.g. a cigarette is rarely used for activities other than smoking yet a blade has many uses other than self-harm) and smoking related cues are also more distinctive than self-harm cues (many implements can be used to harm oneself, however most smokers smoke cigarettes which look, if not identical, then highly similar) therefore it would be easier to generate cues which were relevant and closely associated with the behaviour for smokers. To address this problem, self-harmers recruited for this study were restricted to those who cut, and generic words related to self-harm were also used as cues. Despite these precautions, no differences in positive attribution of cues were found.

With the exception of two abstaining participants, however, all participants had used methods additional to cutting (for example, burning, punching, drinking bleach) to harm themselves. Therefore, some non-cutting stimuli might still have been pertinent for them within the DSH context, and indeed, the cutting-related stimuli might have primed an awareness of this. Additionally, some of the 'neutral' pictures could have related to DSH as well - for instance, a stapler, or paperclips could be used as instruments of self-harm. The DSH pictures were also presented in neutral context which might prime their neutral (rather than DSH) use e.g. a knife with an apple might prime it for cutting the apple, rather than cutting the self. Hence, it is possible that the DSH cues might not have been as potent a stimulus as intended – reducing the likelihood of identifying an effect.

The findings of this study are difficult to reconcile with OPT predictions as they suggest that motivation to maintain self-harming may persist regardless of the attribution of the cues. They also appear to be at odds with self-report of 'calm' just from seeing the box of blades (described in Chapter One) and other self-reports of

positive consequences of mood modification using DSH (as described in Chapters Four and Five). Although positive consequences of self-harm behaviour (specifically tension relief) may play some role in maintaining self-harm, these results suggest that it is unlikely that positive opponent processes alone are sufficient to maintain the behaviour. This is consistent with reports from the interview study reported in Chapter 4 of this thesis, in which a number of participants demonstrated an awareness of the increasing negative consequences of their behaviour, which appeared to outweigh any benefits afforded by tension relief. It is also consistent with reports from addicts, who often cite negative consequences which far outweigh the positive consequences of the behaviour (Robinson & Berridge, 1993).

Theorists (Robinson & Berridge, 1993) have developed a non-affect based account of addiction, (the Incentive Sensitization Theory; IST) in an attempt to explain compulsive engagement in socially unacceptable activities (like self-harm) which appear to occur without enjoyment in engaging in the behaviour and in spite of awareness of negative consequences. The following chapter will test this theory in relation to DSH.

CHAPTER SEVEN

Investigating attentional biases associated with deliberate self-harm

Chapter Summary

The previous studies suggested that deliberate self-harm may be seen as a form of addictive behaviour. They provided preliminary empirical evidence that theories of addiction (specifically the Opponent Process Theory) may go some way towards enhancing our understanding of the mechanisms that maintain deliberate self-harm. However, an implicit test of the predictions of OPT presented in the previous chapter suggested that motivation to maintain self-harming may persist although the cues are not positively valenced.

The two studies presented in this chapter use an implicit task (the dot-probe task; Lubman, Peters, Mogg, Bradley, & Deakin, 2000) that is not susceptible to the memory and interpretive biases inherent in subjective self-report measures, to test predictions made by another addiction theory (the Incentive Sensitisation Theory; Robinson & Berridge, 1993).

Attentional bias towards drug-related stimuli in opiate addicts and alcohol-related stimuli in heavy social drinkers has previously been demonstrated, supporting predictions made by the Incentive Sensitization Theory. To assess further the addictive nature of deliberate self-harm, the objective of these studies was to investigate whether people who deliberately and repetitively cut themselves (or have cut themselves deliberately and repetitively in the past) differed in their selective attention towards cutting related stimuli in comparison with a group who have never self-harmed.

Study Four was a preliminary investigation of attentional biases towards words and picture stimuli, exposed for 500ms. Study Five tested the robustness of findings from Study Four, by exposing the stimuli for less time (100ms), and additionally investigated variability in the biases associated with specific pictures of cues by incorporating ratings of personal relevance of the picture stimuli.

Dot Probe Study One: Investigating attentional biases associated with deliberate self-harm

7.1 Abstract

Objectives. Attentional bias towards drug-related stimuli in opiate addicts and alcohol-related stimuli in heavy social drinkers has previously been demonstrated supporting the incentive sensitization theory of addiction. To assess the addictive nature of deliberate self-harm, the objective of this study was to investigate whether people who deliberately and repetitively cut themselves (or have cut themselves deliberately and repetitively in the past) would show similar selective attention patterns towards cutting related stimuli.

Design. The dependent variable in this task was an index of attentional bias, derived from latencies in milliseconds to respond to a probe. The independent variables were self-harming behaviour (Currently self-harming, Abstaining from self harming, never self-harmed) stimulus category (words or pictures) and stimulus location (replacing a self-harm or control cue).

Method. Attentional bias (as defined in chapter 3) was assessed using cutting related pictures and words in a dot probe task. The stimuli were presented for 500ms.

Results. Current self-harmers showed greater vigilance for self-harm related words relative to neutral words, compared with Abstaining self-harmers and those who had never self-harmed. Abstaining self-harmers showed a lack of vigilance of word cues associated with self-harm, compared with current self-harmers and those who had never self-harmed. There were no significant differences in attentional biases to pictures associated with deliberate self-harm between the three groups.

Conclusions. The study confirmed that those currently self-harming do show a selective attentional bias towards deliberate self-harm related words, but also that those Abstaining from self-harm show a lack of vigilance to the same cues. Although the former result may be explained by the incentive sensitization theory, the latter is not as easily reconciled. Both findings may have important implications for addiction theorists and clinicians working with those who self-harm.

7.2 Introduction

Study Two supported the proposition that current understanding of the nature of addiction could provide a useful perspective from which to investigate the mechanisms underlying motivation for repetitive self-harm. The opponent process theory provides a testable explanation of the maintenance of self-harming behaviour with some face validity. However, an implicit test of the predictions of OPT presented in the previous chapter suggested that motivation to maintain self-harming may persist although the cues associated with the act are not positively valenced. This disputed predictions made by OPT in relation to DSH. Participants in the interview study reported in Chapter 5 endorsed many of the clinical criteria for dependence, however, indicating that it may still be useful to consider DSH as addictive.

Another theory of addiction, the Incentive Sensitization Theory (IST: Robinson & Berridge, 1993), discussed in chapter 3 of this thesis, provides an alternative perspective to that of OPT that can help explain how compulsions to engage in reinforcing but socially unacceptable activities (like self-harm) are triggered and maintained. This theory is of particular utility since it is a non-affect based account, that is, it suggests that the behaviour is not overwhelmingly motivated by affect. As IST does not rely on affect as an explanation for drug use it can be clearly distinguished from Solomon's (1977) theory. In IST, drug related cues potentiate the reinforcement value of a drug in the same way that food deprivation establishes food as a reinforcer. This process is biological and not linked to verbal behaviour (e.g. subjective liking) or positive affect. Therefore, IST is a useful tool to explain compulsive engagement in socially unacceptable activities (such as self-harm) since craving can occur without enjoyment in engaging in the behaviour and in spite of awareness of negative consequences.

The Incentive Sensitization Theory (IST) suggests that DSH cues would command attention. IST proposes that DSH cues trigger the incentive system because repeated stimulation with endorphins (evidenced as consequences of behavioural addictions such as gambling, and also of self-harm; Sandman, 1990, 1991; Meyer et al., 2004, as discussed in chapter 3) alter dopamine related brain systems that are associated with reward, causing these systems to become excessively sensitive (or 'sensitized') to specific stimuli associated with DSH, grabbing attention, and triggering a chain of behaviour that leads to an act of self-harm (see Chapter 3 for a description of these processes). Evidence that DSH cues command attention would therefore support the

proposition that processes of addiction (such as those described by IST) provide a useful perspective from which to investigate the mechanisms underlying motivation for repetitive self-harm.

Testing whether DSH cues command the attention of those who are currently deliberately and repetitively self-harming was the initial aim of this study. IST also indicates that DSH cues would continue to have incentive functions for abstaining self-harmers (i.e. those who repeatedly self-harmed in the past but have not done so for a significant period of time). This is because it hypothesises that the neuroadaptations which are triggered by repeated exposure to the addictive stimuli are irreversible. If DSH cues do capture the attention of those who currently self-harm, testing whether cues associated with DSH continue to command the attention of individuals who have previously engaged in repetitive self-harm but have abstained from the behaviour for a substantial period of time would enable a further test of the predictions of IST.

The SRC task does not enable specific predictions regarding the propensity of cues to grab attention to be tested, since speed of approach and avoidance of cues is not solely influenced by attention capture in this paradigm – it is also influenced by the positive valence attributed to the cues. Therefore a different task was employed.

The Dot Probe Task (MacLeod et al, 1986) is a paradigm which was designed to study visual attention by measuring the speed of manual responses to visual probes (Mogg & Bradley, 1998). Participants are asked to look at two picture or word cues on a computer screen, after a brief time interval the cues are replaced by a probe (usually an arrow) which is located in the position previously occupied by one of the cues. By recording the time a participant takes to respond to the probe a measure of attention to the cue previously located in the position occupied by the probe is gained (see Chapter 3 for a detailed description of the task).

Studies using dot probe tasks (e.g. MacLeod et al, 1986, Mogg & Bradley, 1998, 1999, Taghavi, 1999) have been conducted extensively during the last 20 years to investigate hypervigilance to threat and danger in clinically anxious populations. Within the last decade, dot probe tasks have also been used to investigate attention to cues associated with addictions. For example Lubman et al. (2000) used a dot probe task (described fully in chapter 3) to show that opiate addicts have an attentional vigilance to picture stimuli associated with drug use. Opiate users had relatively faster reaction times to probes that replaced drug pictures than probes that replaced neutral

pictures. The age matched non-drug using control group of staff members at drug services did not display this vigilance to drug related cues. Differences in attentional responses to drug cues were not due to differences in participants' anxiety (rather than their drug use), since anxiety scores (measured using the State-Trait Anxiety Inventory (STAI); Spielberger et al, 1970) were not correlated with attentional vigilance.

In a similar study (also described fully in Chapter 3), Townshend and Duka (2001) compared the responses of 16 occasional social drinkers and 16 non-dependent heavy social drinkers on two dot probe tasks, one using picture stimuli and the other using word stimuli. The reading level of the participants was assessed prior to the dot probe task using the National Adults' Reading Test (NART) (Nelson, 1982), to check that speed of responses to word stimuli would not be disproportionately confounded by reading ability between the groups.

The heavy social drinkers showed an increased attentional vigilance (also called an attentional bias) towards the alcohol-related picture stimuli when compared to the occasional social drinkers. There was no difference in attentional vigilance to alcohol related words between the groups. Bias towards threatening words has been shown previously with anxiety patients so the authors of this study found a lack of an effect in words in contrast to the pictures more difficult to interpret. However, they suggested that pictures (which in this study represented concrete rather than abstract alcohol-related representations) were more sensitive in generating attentional bias.

The present study was designed to test predictions from IST regarding reaction times to self-harming cues and neutral objects using a standard dot probe procedure (e.g. Lubman et al., 2000) with the addition of experimental stimulus cues associated with self-harm (such as pictures of knives and razor blades and cutting related words such as 'slash' or 'blood'). The study examined firstly whether DSH cues command the attention of those who are currently deliberately and repetitively self-harming (which would support IST), and secondly whether cues associated with DSH continue to command the attention of individuals who had previously self-harmed but had abstained from the behaviour for six months (IST predicts the cues would continue to command attention). This is the first time that this technique has been used to test attentional biases in a population of self-harmers.

7.3 Method

7.3.1 Design

This study used a between subjects quasi-experimental design. Participants were allocated into one of three groups on this basis of reported self-harm behaviour (currently self-harming 'Current', Abstaining from self harming 'Abstaining', never self-harmed 'Control'). A 3 x (2) x (2) factorial (ANOVA) design was employed. This created a group factor of self-harming behaviour consisting of three levels (currently self-harming, Abstaining from self harming, never self-harmed). The within-group factors were stimulus category (words or pictures) and stimulus location (replacing a self-harm or control cue). The dependent variable in this task was an index of attentional bias, derived from latencies in milliseconds to respond to a probe. The sample size of this study was determined by published studies using this methodology which had found significant within and between group differences (See Lubman et al., 2000). The minimum total sample size (n=36; i.e. 12 per group) was determined using an effect size from a published dot probe study (Bradley et al., 2004; $\beta = 0.8$) for 80% power with alpha = 0.05.

7.3.2 Participants

7.3.2.1 *Groups*

Eight male and 52 females were recruited for this study. They were aged 18 and over and spoke English as their first language. Twenty participants (18 female, two male) were currently self-harming by deliberately cutting themselves (a 'Current' group). Twenty participants (17 female, three male) had self-harmed in the past, but had abstained from cutting for more than six months (an 'Abstaining' group) and twenty participants (17 female, three male) had never deliberately cut themselves (a 'Control' group). Participants were recruited and allocated to each group in an identical process to the previous study (see Section 6.3.2). All participants gave their informed consent before participating in the study, which was approved by the University of Southampton Ethics Committee and Poole Local Medical Research Ethics Committee.

7.3.2.2 *Descriptives*

Demographic details of the sample and information regarding the DSH history of those who agreed to complete the questionnaire which documented their history of self-harm[1], are provided in Table 6.2.

Table 7.1 Demographic Characteristics and DSH history of self-harming and control groups

	Current		Abstaining		Control	
	Mean	SD	Mean	SD	Mean	SD
Age (yrs)	28.0	7.79	26.7	8.71	25.6	5.28
Age at DSH onset	13.7	9.45	14.4	5.27	----	----
Length of DSH history (yrs)*	10.2	7.98	7.8	12.12	----	----

		Current	Abstaining	Control
Gender	Female	18	17	17
	Male	2	3	3
Percent needing emergency DSH medical attention (N)		45% (9)	25% (5)	---

* Length of DSH history is the total number of years that the individual has/had regularly harmed themselves

7.3.3 Materials

7.3.3.1 *Apparatus*

The dot probe task was programmed using INQUISIT software package, Version 1.33 (Milisecond Software) and run on a Spectrum Pentium 3 personal computer with a processing speed of 1GHz. All stimuli were presented using a 16 inch colour monitor. The dimensions of the screen and stimuli are illustrated in Figure 6.1.

[1] 3 Abstaining participants declined to complete the Deliberate Self-harm Inventory

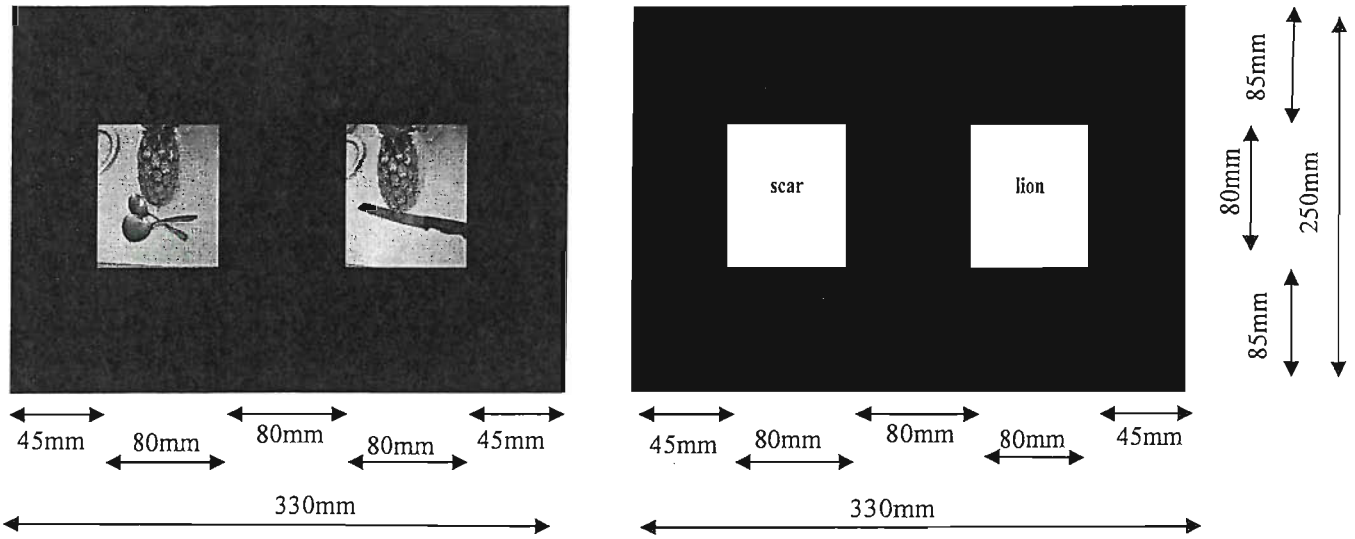


Figure 7.1 Two examples of screen views of stimuli (with dimensions)

7.3.3.2 *Stimulus materials*

Pictures. Forty experimental picture stimuli were prepared. These were sub-categorised into 20 experimental pictures and 20 neutral (control) pictures and were the same as the pictures used in the study in Chapter 6.

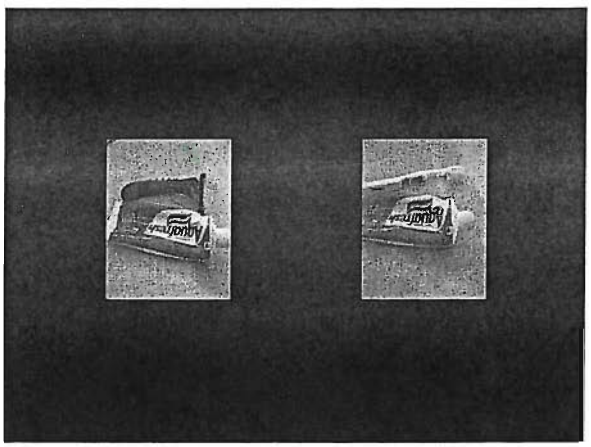


Figure 7.2 An example of an experimental picture pair as presented on screen

Twenty filler picture pairs were also prepared to be used in practice trials to orient participants to the procedure and as filler trials in the main task to make the purpose of the task less transparent to participants. These were selected from the International Affective Picture System on the basis of low arousal and neutral affect. Examples of these are shown in Figure 7.2. The filler pictures were selected from a system of

prepared pictures and were arranged to create categorically similar picture pairs (e.g. pairs of pictures of vehicles or pieces of furniture). All pictures were resized to the same 80mm x 80mm dimension using Adobe Photoshop

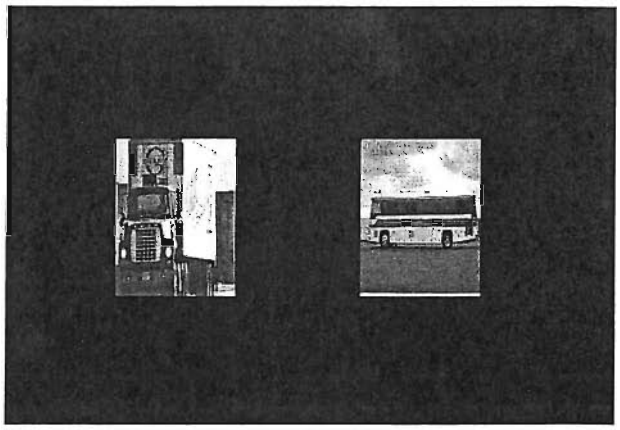


Figure 7.3 An example of a filler picture pair (of vehicles) as presented on screen

Words. Forty experimental word stimuli were used in this study. These were sub-categorised into 20 experimental words and 20 neutral (control) words and were the same as the words used in the studies in Chapter 6 (see Table 6.1 for lists of the words used). Twenty pairs of neutral filler words were also prepared; these were selected on the basis of low arousal and neutral affect. The words were matched for length (see Table 6.1).

All words were presented in uppercase black Times New Roman 36 point bold font on a white 80mm x 80mm background. These dimensions were retained in the on screen presentation of the word stimuli.

Table 7.2 Table of neutral word stimuli

Neutral filler words	
Neutral filler words	Neutral filler words matched by length
BATHROOM	DOORBELL
SHELF	TORCH
CARPET	DRAWER
LINEOLEUM	GROCERIES
EVIDENTLY	REPORTING
TOASTER	MIXTURE
MOLECULE	RADIATOR
PORTION	DENSITY
CELERY	GARAGE
INDOOR	TENANT
SPOON	RADAR
BUNGALOW	CUPBOARD
COOKING	FLANNEL
FARMYARD	GEOMETRY
SPONGE	BUCKET
HEATER	DUSTER
MATCHBOX	MATTRESS
REVISE	DIVERT
RECIPE	TEACUP
PREFIX	HYPHEN

7.3.3.3 *Questionnaires*

All participants completed The State-Trait Anxiety Inventory (STAI; Spielberger, 1983) and The National Adult Reading Test (NART, Nelson, 1982). Those in the Current or Abstaining groups completed The Millon Clinical Multiaxial Inventory III (MCMI-III-R: Millon, 1994) and The Deliberate Self-Harm Inventory (DSHI, Gratz, 2001) and those in the Control group completed the SCL-90-R (Derogatis, 1993). Further information about these measures and the rationale for their use is presented in Chapter 3.

7.3.4 Procedure

The three groups of volunteers completed the STAI (Spielberger, 1983), then undertook the dot probe task. The dot probe procedure was based on that of Lubman et al (2000) as described in Chapter 3. It consisted of two sets of 85 computer trials

(five of which were practice trials). The following written instructions were given to participants prior to the start of both sets of trials:

> "This study will test your concentration and reaction times. At the start of each task you will see a small cross in the centre of the screen. This will be replaced with either two words or two pictures. Then the words and pictures will disappear and an arrow will appear. The arrow will be pointing to the left (←) or to the right (→).When you see the arrow, please press the key on the keyboard that corresponds to the direction of the arrow AS QUICKLY AS YOU CAN. If the arrow is pointing to the left, press '←' and if the arrow is pointing to the right, press '→'.
> There will be 2 sets of tasks. Each set will start with 5 practice tasks, then 80 experimental tasks. You will be able to stop and have a rest between each set. Don't forget that you have the right to withdraw from the experiment at any time. Please ask the experimenter if you have any questions about the study."

The trial procedure is illustrated in Figure 7.4. A black computer screen replaced the screen with the probe as soon as a response had been made (or after 1000ms if no response was made).There was a 1500ms interval between trials. The latency was recorded between the appearance of the probe and the response. The trials were presented in a new random order for each participant.

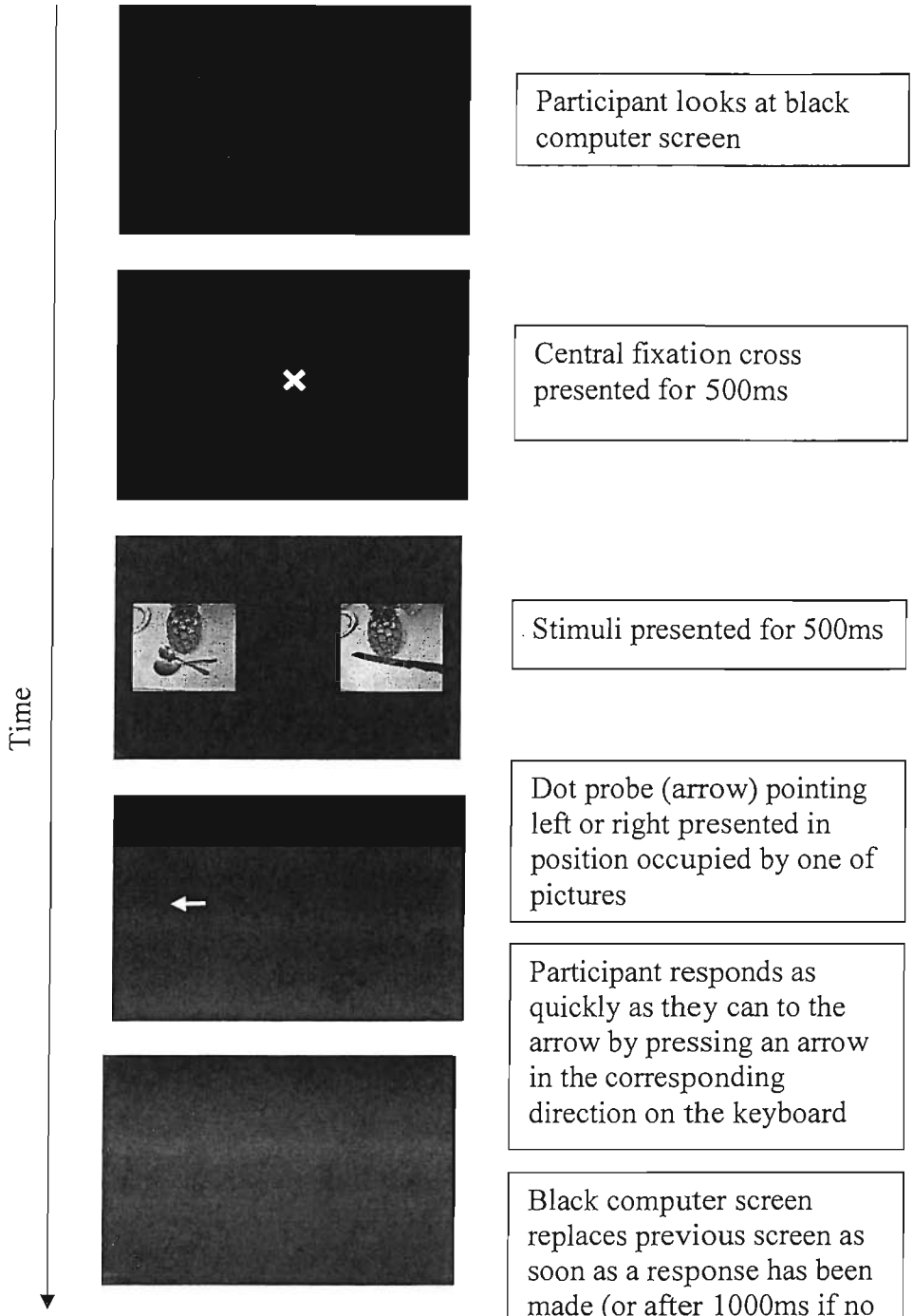


Figure 7.4 Illustration of the procedure of an experimental trial

There were two sets of trials; one using picture stimuli and the other using word stimuli. The order of these sets was counterbalanced across participants; however the procedure was identical between the sets. There was a break of 5 min between the word and picture tasks in order to reduce participant fatigue and enable the experimenter to prepare the new task.

Within each set, participants were firstly presented with 5 practice trials. Each practice trial used one of 5 neutral (filler) picture or word pairs, selected at random from the twenty pairs of neutral (filler) pictures or words (as described in the materials section). Feedback was given on incorrect trials during the practice trials to orient participants to the procedure. Participants were then presented with 80 test trials. Each test trial used either one of the 20 experimental picture or words pairs (as described in the materials section) or one of the 20 neutral 'filler' picture or word pairs.

Each of the 40 stimulus pairs were randomly presented 4 times (varying stimulus location – to the right or left side of the screen – and probe location - the probe replacing either the right or left hand picture - as described in Figure 6.4) making a total of 160 experimental trials. The total number of experimental trials was determined by counterbalancing stimulus location and probe location but not arrow direction – this was counterbalanced by randomly allocating an arrow probe pointing left in 50% of trials and an arrow probe pointing right in 50% of trials (see Lubman, 2000). Trials which the probe replaced a DSH stimuli are described as *congruent*, trials which the probe replaced the control stimuli are described as *incongruent*. No feedback was given on the main task.

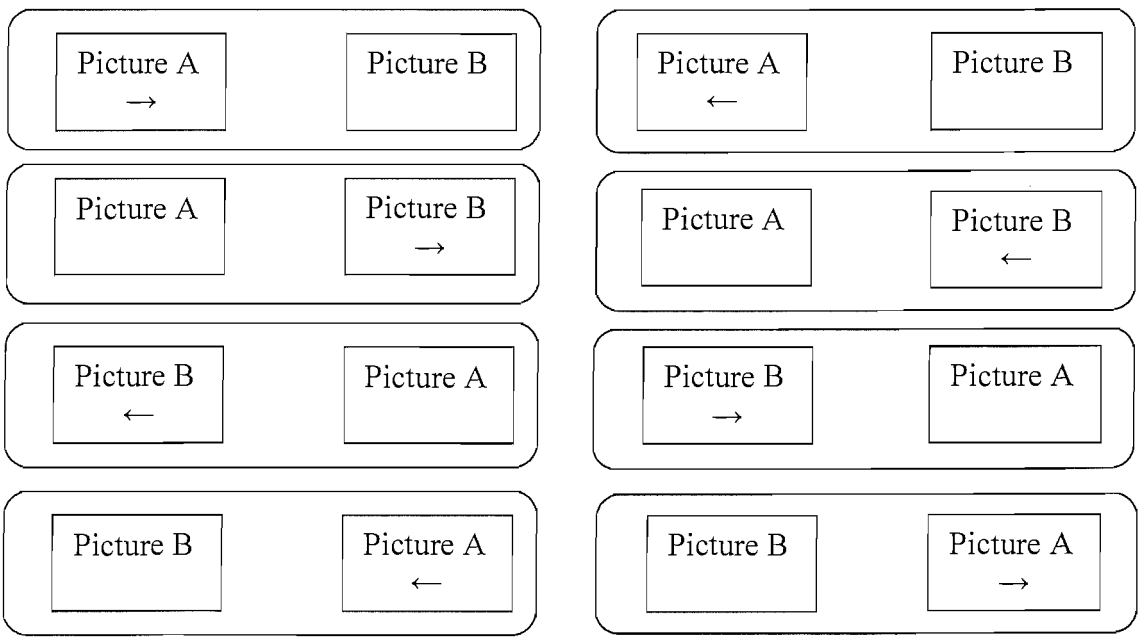


Figure 7.5 Counterbalanced presentations of pairs of picture stimuli and dot probes (arrows)

After completion of the computer task, participants in the Control group completed the SLR-90 (Derogatis, 1993). Participants in the Abstaining and Control groups completed the MCM-III-R (Millon, 1994), and the DSHI (Gratz, 2001). All participants then completed The National Adult Reading Test (NART, Nelson, 1982).

7.4 Results

As before, a significance level of 1% was applied to ensure stringent test of hypotheses.

7.4.1 Sample characteristics

7.4.1.1 *Anxiety and Vocabulary Scores*

The anxiety and vocabulary scores of the groups are reported in Table 6.2. There was no significant difference between the vocabulary scores ($F(2,59)=0.887, p = 0.418$) of the groups. However, there was a significant difference between state anxiety of groups ($F(2,59)=22.351, p = 0.001$). Post hoc (LSD) comparisons reported significant differences between anxiety levels of all three groups ($p<0.01$ in all comparisons); those currently self-harming had the greatest anxiety scores and those who had never self-harmed had the lowest anxiety scores. Given the quasi-experimental design of the study, participants were assigned to groups on the basis of their self-harming behaviours, therefore consequent analyses of reaction time data incorporated STAI-state anxiety score as a covariate.

Table 7.3 State anxiety and vocabulary scores of self-harming and control groups

	Current		Abstaining		Control	
	Mean	SD	Mean	SD	Mean	SD
STAI-state anxiety	52.6	9.02	40.8	13.13	30.5	8.72
Vocabulary-NART	33.2	9.28	36.5	5.96	35.7	7.60

7.4.1.2 *Normality tests*

Levene and Kolmogorov-Smirnov tests of the data of sample characteristics (see Table 6.3) indicated that the distributions of vocabulary, anxiety (L (2,59) = 2.088,

$p = 0.134$; $KS = 0.145$, $p = 0.200$), onset and history of DSH did not violate the assumptions of normality. Although the Levene's statistic for age scores indicated homogeneity of variance (L (2,59) = 0.271, $p = 0.763$), results of the Kolmogorov-Smirnov test indicated that the ages of the groups were not normally distributed (KS = 0.199, $p = 0.037$).

Table 7.4 Tests of normality of sample characteristics data

	Degrees of freedom	Levene's L	p	Kolmogorov-Smirnov K-S	p
Vocabulary-NART	2, 58	1.383	0.260	0.131	0.200
STAI-state anxiety	2, 58	2.088	0.134	0.145	0.200
Age	2, 58	0.271	0.763	0.199	0.037**
Age at DSH onset	1, 39	0.161	0.161	0.155	0.200
Length of DSH history (yrs)	1, 39	0.628	0.434	0.179	0.149

Members of the three groups were matched as far as possible for age and vocabulary. Therefore, as expected, there was no significant difference between the ages (Kruskal-Wallis $\chi^2 = 0.771$, $df = 2$, $p = 0.680$) of the groups. There was also no significant difference between abstainers and those currently self-harming in either the length of DSH history (t (40) = -0.272, $p = 0.787$) or age of DSH onset (t (40) = 0.707, p = 0.484).

7.4.1.3 *Personality traits and clinical symptoms*

Personality traits and clinical symptoms of the self-harming groups are displayed in Table 6.3. Measures of pathology within the experimental groups were compiled using the most conservative clinical cut-off scores of the self-report Millon Clinical Multiaxial Inventory (MCMI). A score of 85 or more for each dimension was indicative of a personality trait or clinical symptom.

Of those who completed the MCMI[2], forty-four percent (n= 8) of those currently self-harming and 18% (n= 3) of those in the Abstaining group met psychometric criteria for Borderline Personality Disorder (BPD). A moderate proportion of respondents scored above the threshold for clinical diagnosis of Cluster C personality traits, particularly avoidant and dependent personality patterns. Additionally, over half of the sample scored above the threshold for a depressive personality pattern. However those who were currently self-harming were not significantly more likely to score above the threshold for clinical diagnosis of BPD, Cluster C, dependent or depressive personality traits than those who were Abstaining from self harm but they were more likely to be avoidant. Further information about these personality types and traits is presented in Chapter 3.

Table 7.5 Personality traits and clinical symptoms of self-harming groups

	Current		Abstaining				
	n	%*	n	%*	χ^2	*df*	*p*
Cluster B	9	50	7	41	0.417	1	0.519
BPD	8	44	3	18	3.135	1	0.077
Cluster C	9	50	6	35	0.960	1	0.327
avoidant	6	33	0	0	7.059	1	0.008**
dependent	4	22	7	41	1.129	1	0.288
Depressive	12	67	10	59	0.404	1	0.525

*Percentage values are calculated from the total participants per group who completed the MCM-III R

Measures of pathology within the control group were compiled using percentile positions relative to non-patient norms of the self-report SCL-90-R. Only one participant scored above the 98th percentile of the normal distribution for depressive symptomatology (indicating clinically significant symptoms); whilst none scored in the 98th percentile of the Global Severity Index, which indicates respondent's global level of psychological distress.

[2] 3 Abstaining and 2 current self-harming participants declined to complete the MCMIII-R

7.4.2 Attentional task data

7.4.2.1 *Data preparation*

Response data to the word and picture experiments were prepared independently, but using the same process. In accordance with standard dot probe methodology (Lubman et al., 2000; Townshend & Duka, 2001) only reaction times to trials incorporating experimental (DSH) stimuli were analysed. Reaction times to filler trials were discarded since these were not central to the hypotheses of the study – they were incorporated only to make the purpose of the task less transparent to participants.

Reaction times to congruent and incongruent trials were considered separately for each participant. Trials containing errors (where an incorrect response was made i.e. the participant pressed a left arrow in response to a right arrow probe or vice versa) or outliers (where a response was made which was greater than 2 standard deviations from the mean response for that set of congruent or incongruent trials) were omitted (as recommended by Bradley et al, 1999). Data lost through errors and extreme response times was less than 5% of the total. A mean reaction time score for congruent and incongruent trials was calculated for each participant after omission of errors and outliers.

7.4.2.2 *Normality tests and transformations of the data*

Table 6.4 shows the mean reaction time scores for each group (Current, Abstaining or Control) for each presentation type (picture or word) and trial type (congruent - probe in same location as DSH stimulus and incongruent - probe in different location from DSH stimulus).

Table 7.6 Mean RT to DSH stimuli (in ms) in each condition

Stimulus Type	Trial Type	Current		Abstaining		Control	
		Mean	SD	Mean	SD	Mean	SD
Word	Congruent	582.75	78.99	562.64	54.55	524.04	62.56
	Incongruent	602.81	73.17	563.16	45.53	531.08	50.61
Picture	Congruent	622.28	58.77	594.69	51.25	551.89	54.60
	Incongruent	627.42	60.53	588.91	59.32	546.32	63.76

Note.
Congruent = probe in same location as deliberate self-harm stimulus
Incongruent = probe in different location from deliberate self-harm stimulus

Levene's test of the mean reaction time data indicated that the variances of both the word (L (2, 58) = 4.313, p =0.018) and picture (L (2, 58) = 3.825, p = 0.028) distributions were significantly heterogeneous between the groups, violating the assumptions of normality. Consequently raw scores were transformed by $\log_{10}$ (as recommended by Taghavi, 1999). Levene and Kolmogorov-Smirnov tests of the transformed data indicated that the logged picture reaction time distributions for congruent (L (2,59) =1.050, p = 0.357; KS = 0.114, p = 0.093) and incongruent trials (L (2,59) = 0.768, p = 0.469; KS = 0.117, p = 0.200) and the logged word reaction time distributions for congruent (L (2,59) = 0.109, p = 0.897; KS = 0.174, p = 0.116) and incongruent trials (L (2,59) = 0.029, p = 0.971; KS = 0.131, p = 0.200) did not violate the assumptions of normality so parametric analyses were performed.

7.4.2.3 *Analysis of differences in attentional bias to DSH stimuli between groups*

An attention bias score was calculated for each participant by subtracting the mean $\log_{10}$ response time when the dot probe and the DSH cue were in the same location from the mean response time when the probe and the cutting related cue were in different locations (cf. Lubman et al, 2000). Positive attentional bias scores values reflect vigilance to DSH cues and negative scores reflect attentional avoidance of the cues. Levene and Kolmogorov-Smirnov tests of the data indicated that the logged picture attentional bias distributions (L (2,59) = 2.866, p = 0.065; KS = 0.173, p = 0.119) and the logged word attentional bias distributions (L (2,59) = 2.344, p = 0.105;

$KS = 0.167, p = 0.146$) did not violate the assumptions of normality so parametric tests were performed.

Word stimuli analysis

To assess whether the Current group showed significant vigilance for the DSH words, relative to control words, their logged bias scores were compared against a value of zero (0 = no attentional bias) using a within subjects t-test. The result was significant, consistent with vigilance for DSH word cues (t (19) = 2.502, p = 0.022). The bias scores for DSH words of the Control group (t (19) 1.329, p = 0.200) and the Abstaining group (t (19) = 0.322, p = 0.751) did not differ significantly from zero.

A univariate analysis of variance of the logged dot-probe bias score data in relation to word stimuli, covarying for anxiety, demonstrated no significant effect of group (F(2,59)=3.075, p =0.05). This indicates no overall group differences in attentional bias to DSH word stimuli.

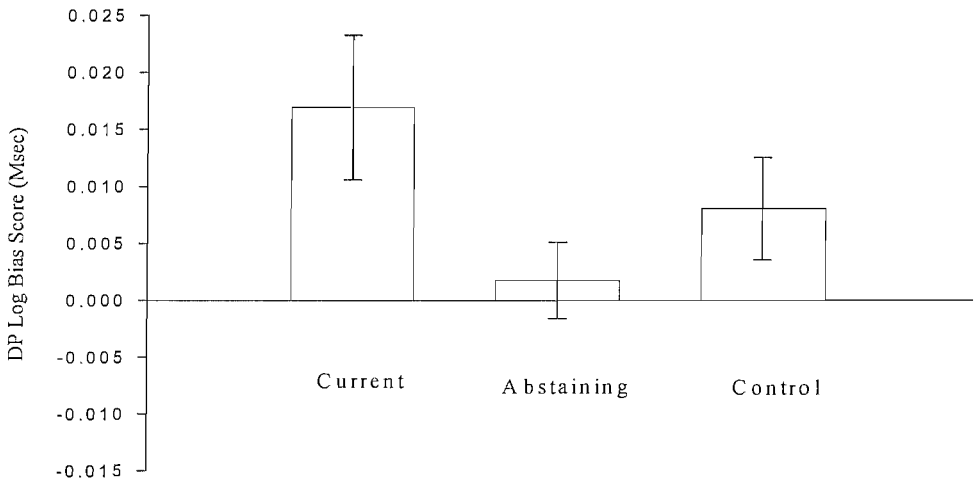


Figure 7.6 Standard error bar charts of mean attentional bias reaction time (RT) scores from logged reaction times in response to word stimuli for Current, Abstaining and Control groups.

Picture stimuli analysis

The bias scores for DSH pictures did not differ significantly from zero for any of the groups ($p > 0.01$). A univariate analysis of variance of the attentional bias scores in relation to picture stimuli, covarying for anxiety, demonstrated no significant difference in vigilance to DSH cues between the groups (F(2,59)=0.288, p =0.751).

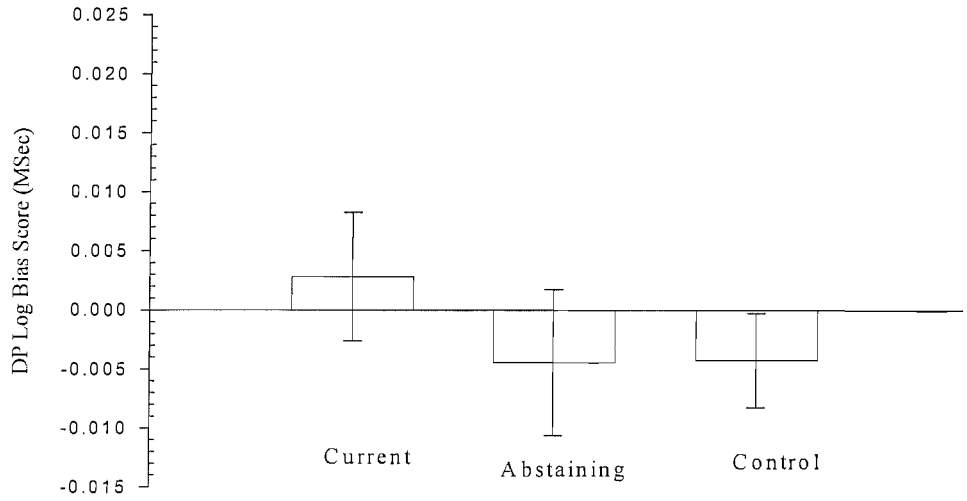


Figure 7.7 Standard error bar charts of mean attentional bias reaction time (RT) scores from logged reaction times in response to picture stimuli for Current, Abstaining and Control groups.

7.5 Discussion

This study used a dot probe task to test whether DSH cues commanded the attention of those who are currently deliberately and repetitively self-harming (which would support IST). It also assessed whether cues associated with DSH continued to command the attention of individuals who had previously repetitively self-harmed but had abstained from the behaviour for six months.

Considering, first, data relating to the word stimuli, there was evidence that those currently self-harming showed greater vigilance for self-harm related words relative to control words. The scores of the control group of participants who had never harmed themselves deliberately and those in the abstaining group, showed no vigilance for DSH words.

Evidence that DSH word cues command the attention of those who currently self-harm supports the proposition that processes of addiction (such as those described by the Incentive Sensitization Theory) provide a useful perspective from which to investigate the mechanisms underlying motivation for repetitive self-harm since an IST interpretation of DSH predicts that DSH cues would command attention as incentive cues.

As an attentional bias for DSH word cues was demonstrated for those who currently self-harm, it was possible to explore whether word cues associated with DSH continue to command the attention of individuals who had previously engaged in repetitive

self-harm but have abstained for six months. In this study neither the Abstaining nor Control group scores demonstrated greater vigilance for self-harm related words relative to control words. Whilst those who currently self-harm had an attentional vigilance to DSH words, abstainers appeared to display a lack of vigilance rather than a genuine avoidance of the cues.

An IST interpretation of DSH predicts that the cues would continue to command the attention of abstainers since the neuroadaptations triggered by repeated exposure to the addictive stimuli (which underpin the incentive value of the cues) are irreversible. The results from this study appears to refute this, since vigilance to DSH cues was not evidenced in the Abstaining group, suggesting that Abstaining self-harmers are less at risk of relapse than would be predicted by IST. These results must be treated tentatively however since attentional bias scores to word cues by those currently self-harming was not found to be significantly different between all three groups.

In contrast to responses to self-harming words, no significant vigilance to DSH pictures by those currently self-harming was evidenced.

These results are the reverse of those of a similar study by Townshend and Duka (2001) which found heavy social drinkers showed an increased attentional vigilance towards alcohol-related picture stimuli but not word stimuli when compared to the occasional social drinkers. The authors of this study suggested that pictures (which in this study represented concrete rather than abstract alcohol-related representations) were more sensitive in generating attentional bias. This raises some important questions about the external validity of findings with specific stimuli, which will be discussed in the final chapter.

One possible, albeit post-hoc, explanation for the differences in responses to picture and word stimuli found in these studies may be the interpretations of stimuli which are made by participants. In the current study, the word cues were generic cutting related items e.g. 'blade', 'slash', on the other hand the pictures were of specific tools e.g. knives, scissors; which may have been quite unlike the tools used by some participants. All those who engage in cutting use a blade and draw blood, but not necessarily using the specific blade or in the context which was illustrated in the picture cues presented. Perhaps cues of this kind are more idiosyncratic, in the same way that some alcoholics have favourite drinks and some drug users have particular rituals they follow when administering their drugs. Further investigation of attentional biases to specific cues and individual ratings of relevance of specific cues would

enable investigation of this. One way to experimentally address this issue would be to ask participants to rate how frequently (if ever) they have used the self-harm cues depicted in the dot probe stimuli pictures to harm themselves, and subsequently to test whether for those participants who self-harm, use of the cues depicted is associated with attentional bias towards them.

Researchers using dot probe tasks have recently started to draw a distinction between "relatively fast, automatic shifts of attention (e.g. occurring within 50-200ms of a novel stimulus appearing in the visual field) and deliberate, intentional shifts of attention which tend to have a slower time course" (Bradley et al, 2005, p.2). They argue that, when stimuli are shown relatively briefly (e.g. 100ms) the dot probe response is likely to record the initial direction of attention and rapid, automatic processes may be playing an important role in mediating this initial attentional bias. However, when the cues are presented for longer (e.g. 500ms or more), there is greater opportunity for attention to shift repeatedly between the cues while they are displayed, so this bias measure is more likely to reflect maintained attention (Bradley et al., 2005). Since longer response times enable individuals to scan and shift their gaze, responses to dot-probes at longer exposure times may not be reliable measures of overall attention to a stimulus.

Similarly, Fox, Russo and Dutton (2002) pointed out that in a traditional probe-detection task, because both locations are task-relevant, and presentation times of 500ms are relatively long, participants may attend alternately to both locations and then continue to dwell on stimuli that capture attention once they have been detected. Thus it becomes virtually impossible to distinguish between differences in initial orienting and differences in attentional dwell time, as it is difficult to distinguish whether apparent attention capture is due to attention at the location of the probe, or avoidance from the other location. They argue that a task more conducive to investigating disengage mechanisms is one in which a threat-related or neutral cue is presented alone for a very brief period in one of two possible locations then there is no competition for attentional resources, and capture can more appropriately be examined. An alternative method may be to exposure cues for a much shorter time period (that allows less time for visual scanning).

Therefore the conclusions from this study could be strengthened if it could be shown that the same effect occurred even with short exposure times (e.g. 100ms) which are too brief to allow extensive scanning of the word stimuli or shifts in gaze

(Bradley et al, 1998). To address these issues the next study will replicate and extend this study with 100ms exposure times, incorporating investigation of attentional biases to specific cues.

Dot Probe Study Two: Investigating the reliability and specificity of attentional biases associated with deliberate self-harm

7.6 Abstract

Objectives. In this study self-harm related stimuli were presented to participants at 500 ms and 100 ms exposure time. 100ms was chosen as it is too short to allow extensive scanning of the word stimuli or shifts in gaze (Bradley et al, 1998). Attentional biases to specific visual cues and their relationship to specific self-harm tools used by participants were also explored.

Design. The dependent variable in this task was an index of attentional bias, derived from latencies in milliseconds to respond to a probe. The independent variable was self-harming behaviour (Currently self-harming, Abstaining from self harming, never self-harmed).

Method. Attentional bias was assessed using cutting related pictures and words in a dot probe task. The stimuli were presented for 100ms and 500ms.

Results. When stimuli were presented for 500ms, Current self-harmers showed greater vigilance for self-harm related words relative to neutral words, compared with Abstaining self-harmers and those who had never self-harmed. Abstaining self-harmers showed an avoidance of word cues associated with self-harm, compared with Current self-harmers and those who had never self-harmed. When stimuli were presented for 100ms, there was no difference between the groups in their attention to self-harm and neutral cues. Additionally, there were no significant differences in attentional biases to pictures associated with deliberate self-harm between the three groups. Knives and razors were rated by those who had self-harmed as more frequently used than scissors or other household objects. Both Abstaining and Current groups were significantly more vigilant to self-harm related stimuli rated as 'frequently used' than those rated as 'never used'.

Conclusions. The study replicated findings from Study One using a 500ms exposure time. The findings were not replicated at 100ms exposure times. No attentional biases were found to picture cues, however this may have been due to variations in relevance

of the stimuli since participants who self-harmed displayed significantly greater vigilance to stimuli rated as highly relevant to their self-harming history. These findings may have important clinical and theoretical implications in relation to disengagement from triggers to self-harm and exposure to self-harm cues.

7.7 Introduction

Since the Incentive Sensitization Theory (Robinson & Berridge, 1993) suggests that repeated pairing of cues with the consequence of addictive behaviour result in the cues commanding attention, naturally, there should be a greater propensity for attentional bias to cues that have been more frequently associated with the behaviour. For example, if an addict always injects rather than smokes a particular drug, there will be a greater association between the presence of the needle and the drug effects, than between the presence of a roll of cigarette papers and the drug effects. Similarly, if an individual who self-harms always cuts him/herself with a kitchen knife, s/he may not associate a different tool such as a disposable razor, with self-harm.

Individual ratings of the use of specific tools to self-harm would enable an exploration of the association between attentional biases and specific cues. IST would predict a greater propensity for attentional bias to cues which have been used frequently to self-harm, compared to those which have never been used.
This was explored by this study.

IST suggests that once triggered the incentive salience effects would be maintained even in the absence of the behaviour. The findings of the previous study appear to contradict this hypothesis, suggesting that Abstaining self-harmers are less at risk of relapse than would be predicted. However, this conclusion would be strengthened by replication. Additionally, in the previous dot probe study, stimuli were exposed for 500ms, an interval sufficient to enable individuals to consciously shift their attention repeatedly between the cues while they were displayed. IST predicts that the reward system is sensitized so that the initial orientation of attention is 'captured' by the associated cue and rapid, automatic processes may play an important role in mediating this initial attentional bias. Given that abstainers have a behavioural repertoire that involves avoiding - rather than engaging - in the behaviour, any opportunity to scan the cues is likely to make the abstainers more avoidant. A more rigorous test of an IST interpretation of DSH would therefore involve demonstrating that the same effect occurred even with short exposure times (e.g. 100ms) which are too brief to allow

extensive scanning of the word stimuli or shifts in gaze. Hence this study was designed to test the hypotheses addressed by the previous study, but in this case treating the duration of cue exposure as a variable (exposing cues for both 500ms and 100ms).

7.8 Method

7.8.1 Design

This study used a between subjects quasi-experimental design. Participants were allocated into one of three groups on this basis of reported self-harm behaviour (currently self-harming 'Current', Abstaining from self harming 'Abstaining', never self-harmed 'Control'). A 3 x (2) x (2) x (2) factorial (ANOVA) design was employed. This created a group factor of self-harming behaviour consisting of three levels (Currently, Abstaining, Control). The within-group factors were stimulus category (words or pictures) stimulus location (replacing a self-harm or control cue) and stimulus exposure time (100ms or 500ms). The dependent variable in this task was an index of attentional bias, derived from latencies in milliseconds to respond to a probe.

7.8.2 Participants

Eleven male and 44 female participants were recruited for this study. Owing to difficulties in recruiting participants (as discussed in Chapter 3), the SRC study (presented in Chapter 6) and this study were undertaken by the same sample of participants. Full demographic details of the sample have been provided in sections 6.3.2, 6.4.1 and Table 6.1. The studies were counterbalanced within the testing sessions to control for order effects. All participants gave their informed consent before participating in the study, which was approved by the University of Southampton Ethics Committee and Poole Local Medical Research Ethics Committee.

7.8.3 Materials

7.8.3.1 *Stimulus materials*

The picture and word stimuli used and their mode of presentation were identical with the previous dot-probe task (detailed in section 7.3.3).

7.8.3.2 *Questionnaires*

Participants completed identical questionnaires to the previous study. Data on the reliability and validity of the questionnaires is cited in Chapter 3.

7.8.3.3 *Rating Task*

Participants in the Current and Abstaining groups also completed a rating task. This task displayed the self-harm related picture stimuli used in the experiment on a computer screen and required participants to rate if they had ever used any objects like the ones in each picture to harm themselves deliberately. Each stimulus was presented for 2000ms. After a pause of 500ms, a 3 point response scale was displayed on the screen. The response choices were as follows: 0, no never, 1, yes occasionally, 2, yes frequently. Participants were asked to press one of three corresponding keys, to indicate if they had ever used an object like the one in the picture to harm themselves deliberately.

7.8.4 Procedure

The three groups of volunteers completed three pre-test measures as described in section 7.3.3. The procedure was the same as used in the previous dot probe study. The stimuli were presented in four blocks (pictures presented for 500ms, words presented for 500ms, pictures presented for 100ms, words presented for 100ms) with 5 mins rest between them. The order of block presentation was counterbalanced across participants.

Each pair of stimuli were randomly presented eight times, four times at 500ms exposure times and four times at 100ms exposure times with stimuli location (left or right) and dot probe location (left or right) randomised (as described in section 7.3.4). Therefore, including neutral 'filler' stimuli trials there were a total of 160 presentations of word pairs and 160 presentations of picture pairs.

After the computer task participants completed the NART and those in the Current and Abstaining groups also completed the stimulus rating task.

7.9 Results

7.9.1 Sample Characteristics

Full demographic details of this sample are presented in section 7.4.1.

7.9.2 Attentional task data

7.9.2.1 *Data preparation*

The data were organised in the same manner as the previous study (see section 7.4.2). The percentage of overall data lost owing to errors was 5% in each group for each (word and picture, 100ms and 500ms stimulus exposure) condition. The mean percentage of outliers was 5-8% for each group for each condition.

7.9.2.2 *Normality tests and transformations of the data*

Table 7.7 shows the mean reaction time scores for each group (Current, Abstaining, Control) for each presentation type (picture or word), trial type (congruent and incongruent) and stimulus presentation time (100ms, 500ms).

As in the previous dot probe study, due to the heterogeneity of variance between the groups (Levene tests: Word, L (2,113)=10.155, p =0.001; Pictures, L (2, 113)=3.140, p =0.047) scores were transformed by $\log_{10}$ (as recommended by Taghavi, 1999) and an attentional bias score was calculated.

Levene and Kolmogorov-Smirnov tests of the data indicated that the logged picture attentional bias distributions for 100ms stimulus exposure (L (2,54) = 0.466, p = 0.630; KS = 0.187, p = 0.095) and 500ms stimulus exposure (L (2,54) = 1.740, p = 0.186; KS = 0.159, p = 0.200) and the logged word attentional bias distributions for 100ms stimulus exposure (L (2,54) = 0.911, p = 0.405; KS = 0.189, p = 0.073) and 500ms stimulus exposure (L (2,54) = 2.316, p = 0.109; KS = 0.189, p = 0.165) did not violate the assumptions of normality so parametric tests were performed.

Table 7.7 Mean RT (in ms) in each condition

Stimulus Type	Trial Type	Current		Abstaining		Control	
		Mean	SD	Mean	SD	Mean	SD
100ms stimulus presentation:							
Word	Congruent	591.48	101.38	543.59	41.79	530.77	65.72
	Incongruent	586.36	103.67	552.95	46.45	529.58	69.60
Picture	Congruent	631.33	117.81	578.75	37.67	563.88	64.75
	Incongruent	627.28	119.86	567.61	45.57	553.67	62.98
500ms stimulus presentation:							
Word	Congruent	549.13	62.43	532.71	45.94	528.25	64.79
	Incongruent	566.17	74.76	519.18	41.02	527.39	66.22
Picture	Congruent	606.39	78.55	553.43	38.22	543.86	61.16
	Incongruent	612.66	97.54	561.05	52.74	542.57	59.33

Note. Congruent = probe in same location as deliberate self-harm stimulus
Incongruent = probe in different location from deliberate self-harm stimulus

7.9.2.3 *Analysis of differences in attentional bias to DSH stimuli between groups*

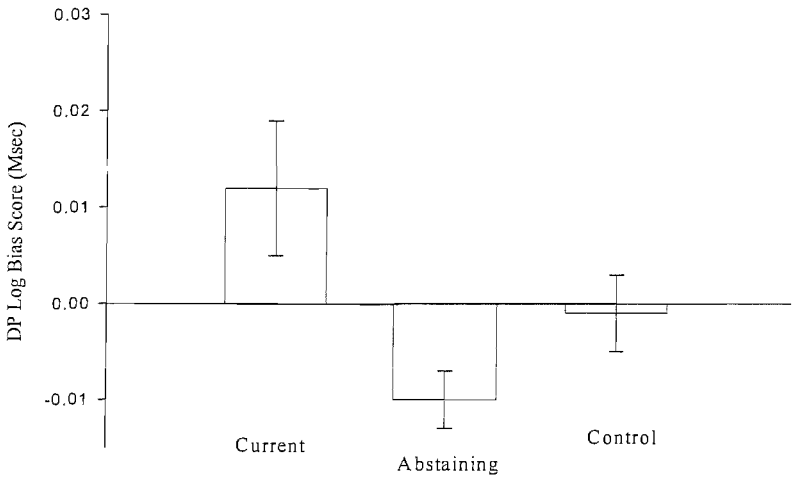
Word stimuli analysis

To assess whether the current self-harmers showed significant vigilance for the DSH words, relative to control words, when cues were exposed for 500ms and 100ms, their logged bias scores were compared against a value of zero (0 = no attentional bias) using a within subjects t test. At 500ms exposure, the bias scores for DSH words of the Current (t (19) 1.733, $p = 0.101$) and Control (t (19) = -0.200, $p = 0.844$) groups did not differ significantly from zero. However, the bias score of the Abstaining group (t (14) = -3.269, $p = 0.006$) did differ significantly from zero, indicating relative avoidance of the cues. The bias scores for DSH words did not differ significantly from zero for any of the groups ($p > 0.01$) at 100ms exposure.

As in the previous sets of analyses, an attentional bias score was calculated for each participant. Two independent univariate analyses of the logged dot-probe attentional

bias data in relation to word stimuli covarying for anxiety, at 500ms and 100ms exposure times demonstrated no significant effect of group at either 500ms exposure times ($F(2,49)=3.442$, $p=0.04$) or 100ms exposure times ($F(2,48)=1.253$, $p=0.295$).

500ms



100ms

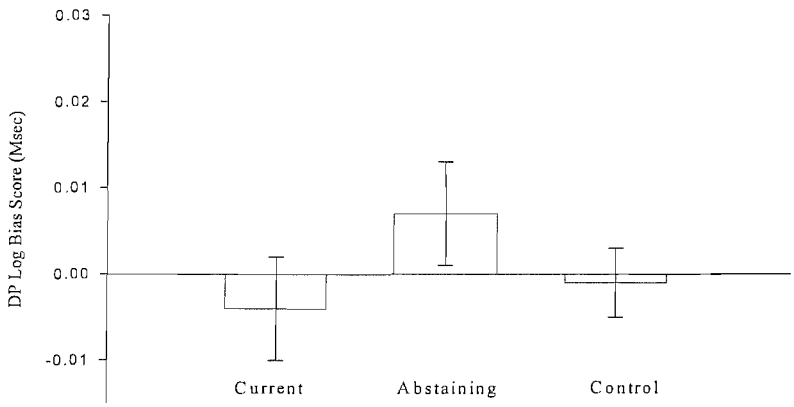


Figure 7.8 Mean attentional bias scores for each group in response to word stimuli at 500ms and 100ms stimulus exposure times

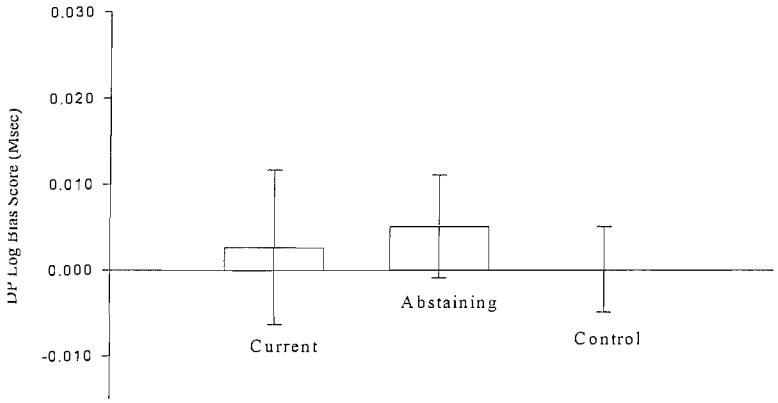
Picture stimuli analysis

To assess whether the current self-harmers showed significant vigilance for the DSH pictures, relative to control pictures, when cues were exposed for 500ms, their logged bias scores were compared against a value of zero (0 = no attentional bias) using within subjects t test. The bias scores for DSH pictures did not differ

significantly from zero for any of the groups ($p > 0.01$) at either 100ms or 500ms exposure.

Two independent univariate analyses of the logged dot-probe attentional bias data in relation to picture stimuli covarying for anxiety, demonstrated no significant effect of group at either 500ms ($F(2,48)=0.152$, $p=0.859$) or 100ms ($F(2,49)=0.261$, $p=0.771$) exposure times.

500ms



100ms

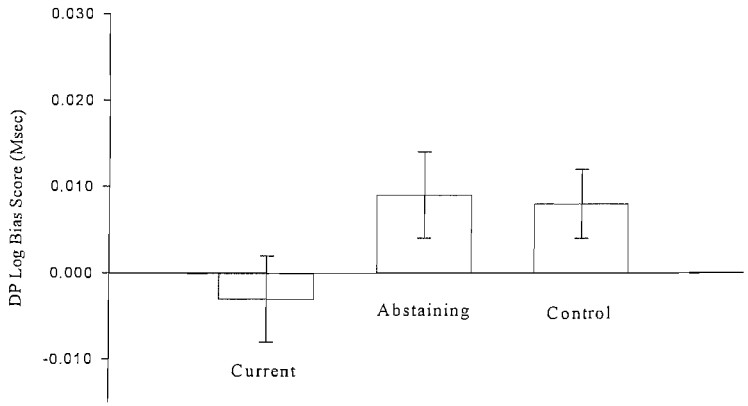


Figure 7.9 Mean attentional bias scores for each group in response to picture stimuli at 500ms and 100ms stimulus exposure times

7.9.2.4 *Testing the effect of specificity of cues on attentional bias*

Consistent with findings from the previous study, no significant difference in attentional biases to DSH pictures was evidenced between the groups. This is a problematic finding since it appears to contradict the results of the word-based dot

probe task in the previous study. In the introduction to this study it was suggested that further exploratory investigation of attentional biases to specific cues and individual ratings of relevance of specific cues may enable insight into such disparities. In order to facilitate this, the twenty self-harm related pictures were rated for familiarity of use as self-harming tools by the experimental (currently self-harming and Abstaining from self-harm) groups on a three point scale (0, no never used, 1, yes occasionally used, 2, yes frequently used). Summed scores (out of a possible 40) were calculated.

Grouped ratings

Total 'frequency of use' scores were calculated for each participant by totalling the ratings of use of each stimuli from the rating task described in section 7.8.3 (0=never used, 1 = occasionally used, 2=frequently used). There was no significant difference ($t(35)=-0.461$, $p=0.648$) in mean 'frequency of use' scores for those currently self-harming (mean = 13.63, sd = 7.71) and those Abstaining (mean = 14.93, sd = 8.08). There was however a significant difference between the ratings of the different types (razors, knives, scissors, other) of tools (Kruskal-Wallis $\chi^2 = 16.149$, $df = 3$, $p = 0.001$), knives and razors were rated as more frequently used than scissors and other tools ($p=0.01$).

Analysis of rated stimuli

Figure 7.10 illustrates the mean logged dot probe bias scores for stimuli rated Never Used and Frequently Used in the rating task by the Current and Abstaining groups. A univariate analysis of fixed factors of group (Current, Abstaining) and stimuli rating (Never Used, Frequently Used) and the dependent variable of logged bias scores was performed to consider the relationship between the ratings of the stimuli and consequent bias scores. A main effect of group ($F(1,357) = 9.929$, $p = 0.002$) was reported: the Current group displayed more attentional vigilance to the DSH cues than the Abstaining group. A main effect of rating ($F(1, 357) = 10.650$, $p = 0.001$) was also found: both groups were more vigilant to stimuli rated as Frequently Used than those rated as Never Used. There was no significant interaction between group and rating ($F(1, 357) = 0.012$, $p = 0.912$); the association between stimulus rating and attentional bias did not differ significantly across the two groups.

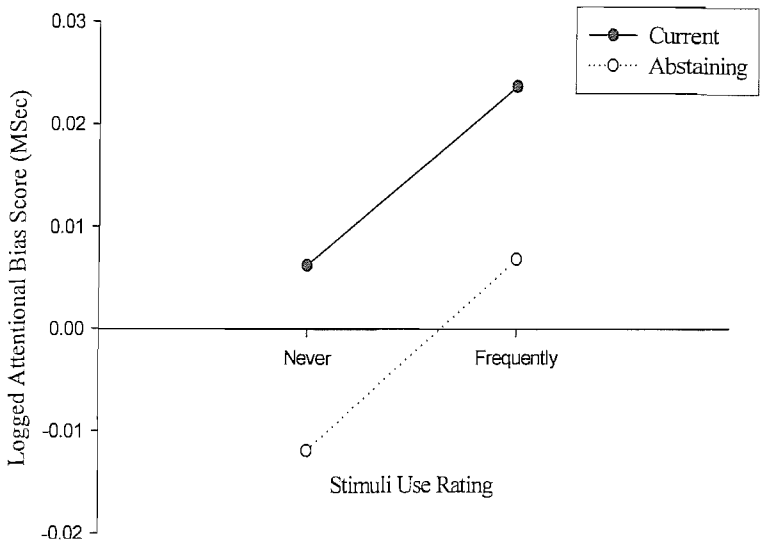


Figure 7.10 Line graph of mean logged attentional bias scores for each group in response to picture stimuli rated as never and frequently used

A paired t-test of the bias scores for Current and Abstaining group responses to stimuli frequently used reported a significant difference between the scores (t (95)=1.895, p =0.001). The Current groups attentional bias score was significantly different (t (51)=3.415, p = 0.001) from zero (no bias), indicating attentional vigilance for these stimuli, whilst the Abstaining groups score was not significantly different from zero (t (43) = 1.332, p = 0.190), therefore a lack of vigilance.

7.10 Discussion

This study used a dot probe task to test predictions from the Incentive Sensitization Theory (IST) regarding reaction times to self-harming cues. The first aim of this study was to test the reliability of the results of the previous study by investigating if similar patterns of attentional bias would be evidenced at 500ms and very short (100ms) exposure times, which are too brief to allow extensive scanning of the stimuli or shifts in gaze. Since IST proposes that repeated pairing of the cues with addictive behaviours result in attentional bias, the second aim of this study was to explore the discrepancy in patterns of bias to word and picture stimuli evidenced in the previous study, by testing whether similar patterns of attentional biases are found if solely responses to cues rated as relevant (i.e. frequently used) are analysed.

In this study, current self-harmers did not show greater vigilance for self-harm related words relative to neutral words, therefore the findings from the previous study

were not replicated. Indeed, abstainers appeared to avoid word cues associated with self-harm – an effect not evidenced in the previous study. One potential reason why the results were not replicated could be that due to difficulties recruiting participants who self-harm, a number of participants (12 current and 9 abstainers) had also participated in the previous dot probe study (see Table 8.1, Chapter 8). For these participants, therefore, the DSH cues may have been more familiar (and thus less potent) and the purpose of the study more transparent. This in turn may have affected the results. A more stringent test would therefore incorporate a naïve sample.

Additionally, no vigilance to DSH word cues was evidenced by any group at 100ms exposure times. These findings appear to contradict IST, since this would predict that once triggered the incentive salience effects would be maintained even in the absence of the behaviour. Attentional biases for drug related words presented for 100ms and 500ms have been demonstrated in visual probe tasks (Franken, Kroon & Hendriks, 2000; Stormark, Field, Hugdahl & Horowitz, 1997). Researchers working in this area (e.g. Field et al, 2004) have however suggested that the 100ms exposure time is more likely to represent initial orienting of attention, whilst longer exposure times are more likely to represent maintenance of attention. The results of this study indicate that those who are abstaining from self-harm shift their attention away from self-harm stimuli, whilst this was not found in those currently self-harming or who had never self-harmed.

As in the previous study; no significant difference in attentional bias to DSH related pictures with picture stimuli was found between those who currently self harmed, abstained from self-harm or had never self-harmed, at either 500ms or 100ms stimulus exposure times. Since IST proposes that repeated pairing of the cues with addictive behaviours result in attentional capture, the second aim of this study attempted to explore the discrepancy in patterns of bias to word and picture stimuli evidenced in the previous study, by testing whether similar patterns of attentional biases may be found if responses to picture cues rated as most frequently used are analysed.

Knives and razors were reliably rated as more frequently used by those who had self-harmed than scissors or other household objects. There was a significant difference in attentional bias scores for those stimuli rated as frequently used, compared to depictions of those never used. Analysis of attentional bias to picture cues rated as 'frequently used' resulted in a pattern of results similar to those found in response to the word cues in the previous study: those in the Current group showed

vigilance to these cues, whilst those in the Abstaining group did not. This suggests that providing cues which are relevant to each individual is an important factor in identification of attentional biases, and may explain the lack of significant findings in response to picture stimuli in the previous study.

An additional analysis (detailed in Appendix E) was undertaken of 500ms data from Study One and the 500ms data from Study Two to increase the predictive power of these results. The results were consistent with those found in the independent analyses of data from the first dot probe study. Therefore, the studies in this chapter supported some (but not all) of the predictions that IST would make in relation to DSH. The strengths and limitations of the studies in this thesis and, in the light of these studies, the use of such perspectives to aid understanding and treatment of self-harm are discussed in the final chapter of this thesis.

CHAPTER EIGHT

Clinical and theoretical implications

Chapter Summary

This thesis presented a series of studies with the aim of investigating and systematically analyzing self-harm as a form of addictive behaviour. A number of research questions pertaining to the maintenance of deliberate self-harm, grounded in models of addiction with the potential to be empirically addressed, were proposed. This chapter starts with a synopsis of the main findings of these studies, then, after considering how successfully the studies in this thesis addressed the challenges associated with the systematic analysis of DSH, the clinical implications of these findings are considered in relation to the treatment of self-harm.

8.1 Main Findings

This thesis presented a series of studies with the aim of investigating and systematically analyzing self-harm as a form of addictive behaviour. Study One revealed a distinct difference in self-reported motivations for initial and recent episodes. A few social and emotional motivations for initial episodes of self-harm were reported including imitating others, expressing emotional states and retribution. In contrast, one theme dominated the motivation for recent episodes; using self-harm as a tool to escape from negative states. Self-report of motivations for later episodes of self-harm were therefore much more similar than those reported for initiating self-harming behaviour; supporting the addictive nature of the behaviour. Additionally, a number of participants made unprompted comments about their perception of the behaviour as addictive.

Study Two also indicated that deliberate self-harm may be seen as a form of addictive behaviour. Coded analysis of the interview responses in this study endorsed all criteria for clinical dependence and behavioural addiction except the 'withdrawal symptoms' criterion. This anomaly could, however, be interpreted using the Opponent Process Theory account of addiction. OPT could account for the presence of positive, rather than negative, after effects of the act.

Additionally, Study Two revealed that when severity of injury was taken into account, reported pain was significantly higher for initial episodes compared to later episodes and accidental episodes compared to intentional episodes. Acts of self-harm also reportedly regulated the intensity of specific basic emotions, resulting in a significant drop in sadness and anger and a significant increase in the intensity of happiness. These findings supported an OPT interpretation of the behaviour. There were, however, aspects of the data which OPT was unable to resolve. For example, there was no evidence that emotional regulation was more pronounced during later than initial episodes and no reliable increase in the severity of injury between these episodes. Therefore the results indicated that OPT may go some way towards explaining the mechanisms maintaining the behaviour, but that further experimental tests of the theory in relation to the behaviour were necessary.

Study Three, an implicit stimulus response compatibility (SRC) task, tested predictions made by OPT regarding the importance of positive valence in maintenance of the addiction, using an experimentally-based paradigm. Those who currently self-harmed or had self-harmed in the past were not significantly faster or

slower to approach or avoid stimuli associated with self-harm, than those who had never harmed themselves. Additionally, participants currently self-harming and those abstaining did not rate cues associated with self-harm more positively than those who had not engaged in DSH. Because the procedure used was identical to previous SRC studies, and the power of the study was adequate, it was unlikely that the lack of significant differences between the groups was due to a type 2 error. Therefore, the results support the premise that motivation to maintain self-harming may persist in the absence of a positive attribution of valence to the cues. This refutes predictions made by the Opponent Process Theory.

Studies Four and Five used a different implicit task (variations of a dot probe task) to test predictions made by another theory of addiction (the Incentive Sensitisation Theory; Robinson & Berridge, 1993), an account which suggests that addictive behaviour is not overwhelmingly motivated by affect. In the first dot probe study, an attentional bias toward self-harm related words was demonstrated by current self-harmers – participants in this group showed greater vigilance for self-harm related words relative to neutral words - supporting predictions made by the theory. Those abstaining from self-harm however, did not show attentional vigilance to DSH words and there were no significant differences in attentional biases to pictures associated with self-harm between the three groups, contradicting predictions made by IST.

A post-hoc explanation for the differences in response to pictures and word stimuli was the interpretation of stimuli made by the participants – that is, that some cues were more relevant to the behaviour of those who self-harm than others, in the same way that alcoholics have favourite drinks and some drug users have particular rituals they follow when administering their drugs. In Study Five, individual ratings of relevance of specific cues were used to investigate this possibility. Additionally, a more stringent test of these findings using short stimulus exposure times that were too brief to allow extensive scanning of the stimuli or shifts in gaze were used.

In Study Five, current self-harmers did not show greater vigilance for self-harm related words relative to neutral words, therefore the findings from the previous study were not replicated. Indeed, abstainers appeared to avoid word cues associated with self-harm – an effect not evidenced in the previous study. These findings appear to contradict IST, since this would predict that once triggered the incentive salience effects would be maintained even in the absence of the behaviour, however given the

lack of replication across the dot probe studies further testing of these hypotheses is necessary, particularly with novel or naïve samples.

Although there were no significant differences in attentional biases to pictures associated with deliberate self-harm between the three groups in the fifth study, analysis of attentional biases to picture cues rated as 'frequently used' resulted in a pattern of results similar to those found in response to the word cues in the first dot probe study: those in the current group showed vigilance to the cues, whilst those in the abstaining group did not. This indicates that providing cues which are relevant to each individual is an important factor in identification of attentional biases, and may explain the lack of significant findings in response to picture stimuli in the previous dot probe study. When stimuli were presented for 100ms, there were no differences between the groups in their attention to self-harm and neutral word and picture cues, refuting predictions made by IST.

In summary, the findings indicated that deliberate self-harm may be seen as a form of addictive behaviour. Since addiction is a multifaceted behaviour that is strongly influenced by contextual factors it cannot be encompassed by any single theoretical perspective (Griffiths, 2005) however theoretical accounts, such as OPT and IST, may contribute to an understanding of underlying motivations which may influence addictive behaviour. In the studies in this thesis, some evidence supporting predictions made by the Opponent Process Theory and some evidence supporting predictions made by the Incentive Sensitization Theory was discovered. Although neither theory appeared to consistently explain all incidences of engagement and abstinence in deliberate self-harm, the findings indicate that theories of addiction may enhance the understanding of mechanisms that maintain the behaviour.

8.2 Addressing the challenges associated with systematic analysis of DSH

In Chapter Three of this thesis a number of issues which have made the study of self-harm problematic were discussed. These included problems with recruitment and ethical issues associated with studying a harmful behaviour. How successfully were these problems addressed by the studies in this thesis?

8.2.1 Recruitment problems and sampling bias

Acts of DSH are often private and for some, shameful (Burstow, 1992). This often makes recruitment for studies of self-harm problematic. Indeed, although participants

for these studies were recruited over a relatively lengthy period (two and a half years) often it was difficult to recruit a novel sample to participate in each study. Therefore, as detailed in Table 8.1, below, many of the participants took part in more than one of the experimental studies in this thesis. This may have contributed to the lack of replication within the experimental studies since the cues would no longer be novel to those participating in more than one experimental study, and the purpose of the studies may have been more transparent to repeaters.

Table 8.1 Table of participants replicated in experimental studies

Study	Participants	Status
Dot Probe Study One	20 currently self-harming	8 taken part in previous interview studies
	20 abstaining from self-harm	2 taken part in previous interview studies
	20 controls (never self-harmed)	all first study
Dot Probe Study Two / SRC Study (Studies run concurrently)	20 currently self-harming	12 taken part in previous dot probe study
	15 abstaining from self-harm	9 taken part in previous dot probe study
	20 controls (never self-harmed)	5 taken part in previous dot probe study
All Studies	49 currently self-harming	**Total sample = 73 self-harming 35 controls**
	24 abstaining from self-harm	
	35 controls (never self-harmed)	

Participants in the studies within this thesis represented those willing to share their experiences of self-harm with a researcher. They may be selective subset of the population of those who engage in this behaviour. The demographic details of those with a history of self-harm who participated in these studies and the characteristics of their self-harming behaviours were however consistent with those reported in other studies. Overall, 24% of the participants who had self-harmed in these studies were male and 76% female. This is similar to the gender ratios reported in the literature in this area (Babiker & Arnold, 1997; Health of the Nation, 1994). Additionally, the average age of onset of self-harm across the studies was 14 years, which is consistent with published data (Pattison & Kahan, 1983). Cutting was the most common method of self-harm reported by participants, which also concurred with current knowledge (Conterio & Favazza, 1986).

Clinical samples of those who self-harm, which are often used in published studies of self-harm, may be unrepresentative of all those who harm themselves deliberately, since their experience of DSH may be affected by co-morbid psychiatric conditions (Evans, 2000) or the treatment they have received (Linehan, 1993). The studies in this thesis recruited individuals who self-harm from non-clinical, as well as clinical, sources, by recruiting from community based organisations (e.g. Universities) and self-help groups, alongside health service clinics. A cohort of self-harmers who did not demonstrate the expected patterns of psychopathology were identified. In these participants (who included those currently self-harming and those abstaining), Cluster C (avoidant and dependent) personality disorder characteristics were as prevalent as those of borderline personality disorder (BPD). These patterns of psychopathology have not previously been noted in self-harming literature; however they have important implications, since they indicate that research focusing solely on participants with BPD (e.g. Evans, 2000; Sansone et al., 2002; Wiedermen et al., 1999) is not necessarily representative of the self-harming population as a whole.

This finding raises an important question, which could be investigated in future research studies: Are the individuals who reported Cluster C personality characteristics a sub-clinical group who dabble in self-harm, but never present to NHS services, or do these individuals present to services at a later date? If the latter is the case, then this group may provide indicators of those at risk of presenting to services in the future, and aid targeting of early intervention strategies.

Problems recruiting adequate numbers of participants for studies of DSH were also discussed in Chapter Three. Although the sample sizes of these studies were of sufficient power to detect experimental differences in behavioural responses, and were comparable to sample sizes in published studies of those who self-harm (Harris, 2000; Sinclair & Green, 2005) or are addicted to drugs (Townshend & Duka, 2001; Lubman et al., 2000), they were insufficient to draw firm global conclusions about the nature and demographics of the population without replication using larger samples. Therefore, in order to be truly representative of those who self-harm, further research should consider sampling from a broader population.

Additionally, The MCMIII, which was used to assess the psychopathology has been criticised for its propensity for type two errors, or 'over-reporting' (Morgan, Schoenberg, Dorr & Burke, 2002), therefore to address the possibility that the identification of cluster C psychopathology in the studies was an artefact of the

measuring tool used, the application of more stringent measures (e.g. the Clinical Outcomes in Routine Evaluation, CORE System Group, 1998) to studies of individuals who self-harm recruited from non-clinical sources would be pertinent.

8.2.2 Ethical Issues

In addition to its theoretical and topographical links with addictions, as discussed in the early chapters of this thesis, self-harm also faces similar ethical problems. Like many other addictive behaviours, it would be unethical to study self-harm in-situ due to its harmful consequences. Therefore, the studies in this thesis utilised approaches which had been applied to the study of addiction (i.e. retrospective accounts and implicit methodologies) to investigate the emergence and development of DSH. How successful was the application of these methods in systematically analysing DSH?

8.2.2.1 *Use of retrospective accounts to consider the emergence and development of the behaviour*

As discussed in Chapter Three, most studies of DSH (e.g. Doctors, 1981; Smith et al., 1998) consider generic motivations and consequences of the behaviour, rather than characteristics of the emergence and development of the behaviour. To investigate the latter, Study One in this thesis studied retrospective accounts of DSH, to compare motivations for early self-harm episodes in comparison to later self-harm episodes. Although the themes identified concurred with those evidenced in previous studies (Simpson & Porter, 1981; Ettinger, 1992, Doctors, 1981, Herpentz et al., 1995) important differences between the two types of episodes were discovered. A few social and emotional motivations for initial episodes of self-harm were reported, however one theme dominated the motivation for recent episodes; using self-harm as a tool to escape from negative states. Similarly, early episodes of drug sampling are influenced by many factors, such as drug availability (Jaffee, 1965), personality predispositions (Shaffer, 2000), and social influences such as peer group pressure (Dupre et al., 1995) but most addicts report a need to regulate emotional states or thoughts as the primary motivation for later addictive behaviour (Falk et al., 1983). Consequently, the findings from Study One usefully provided support for viewing self-harm behaviour as addictive.

Retrospective accounts may however be susceptible to memory biases. For example, many studies have indicated that a person's current sense of self (including

beliefs, goals) influences how they recall their past (e.g. Fischhoff & Beyth, 1975; Greenwald, 1980), also people tend to appraise the past in ways that allow them to view themselves favourably (Wilson & Ross, 2000). These factors may affect the reliability and validity of the accounts.

This problem could be addressed in future studies by conducting longitudinal studies of those who self-harm, however this would involve identifying those who self-harm early in their self-harm career, which may be problematic given the shame that is often associated with early acts. A further method would be to collect accounts of a cross-sectional sample of those who self-harm at different stages in their self-harm career. This method is not without drawbacks however, since individuals may vary in their ability to introspect. Some individuals are able to identify their emotions and talk openly and at length about their experiences of self-harm, whereas others may have difficulty identifying their emotions (commonly associated with borderline personality disorder, Linehan, 1990) and articulating their DSH experience, particularly if they experience dissociative symptoms prior to, during or directly after the act (Feldman, 1988). In order to address these problems, models of the behaviour, in the form of measures of behavioural responses to self-harm cues, were used in the later studies in this thesis.

The impact of biases in memory may also be controlled by comparing changes within, rather than between, episodes of self-harm. There is some consensus, within research that focuses on the functions of DSH, that self-harming behaviour has the capacity to relieve certain emotions and reduce tension, regardless of the reasons for the initiation of the behaviour (Linehan et al., 2000). Few studies have attempted to analyses moment-by-moment changes that occur within episodes of self-harm however, so this supposition is generally based on qualitative interpretations of accounts (Harris, 2000) or psycho-physiological studies of changes in response to self-harm scripts (Haines et al., 1995, as discussed in Chapter One).

In Study Two, subjective retrospective ratings of moment-by-moment changes in emotional regulation within initial and recent episodes were analyzed to empirically test changes in emotional regulation using a micro-analytic approach for the first time. According to the findings of this study, acts of self-harm reportedly resulted in a significant drop in sadness and anger and a significant increase in the intensity of happiness. This is consistent with findings by Kemperman et al. (1997) who asked individuals to rate changes in mood before, during and after a typical DSH episode.

They reported that DSH increased positive affect and decreased negative affect, although no statistical analysis of the data was undertaken. In an alternative study, Haines et al. (1995) reported trends towards self-reports of emotional changes in anger, fear and happiness, in response to imagining self-harm episodes; however, these changes did not reach statistical significance until the final stages of the episode. Participants in this study reported continued negative feelings during the act of self-harm despite reduced psycho-physiological arousal. These seemingly inconsistent findings may have been due to the characteristics of the sample which only included incarcerated individuals. The experience of incarceration may have confounded the emotional well-being of the participants. Psycho-physiological responses to self-harm scripts alongside subjective reports of emotional changes in non-incarcerated individuals need to be tested in order to address whether this finding is represented in non-prisoner populations.

Although questions have been raised in this discussion as to the reliability and validity of self-report methodologies, the conceptual view of self-harm as an addiction, as endorsed by these retrospective accounts, appears to fit with current knowledge of the physiological basis of DSH. DiChiara (2000) examined the role of dopamine in addiction, proposing that the initial process by which an individual learns to associate the rewarding properties of a drug with drug-related stimuli is facilitated by an increased dopamine release in the NA shell. Consequently cues associated with drug use acquire excessive motivational properties, and the drug acquires excessive control over behaviour (DiChiara, 1998, 1999). Winchel and Stanley (1991) explored the possible biological involvement of the opiate system, dopaminergic dysregulation, and the serotonergic system, and in particular, linked these to the release of endogenous opiates, higher levels of these were found in patients engaging in self-harm behaviour (Briere & Gil, 1998). Increased dopamine activation is also associated with hyperactivity of the amygdala, which is seen in patients with borderline personality disorder (Jentsch, 1999). Therefore, according to both OPT and IST, these people may be vulnerable to associating the rewarding properties of self-harm (i.e. tension relief as a result of increased endorphins) with self-harm related stimuli, so that self-harm related stimuli acquire excessive motivational properties, and individuals experience impaired control over their behaviour. Further research on the association between DA release and self-harm behaviours and cues would aid investigation of this hypothesis.

8.2.2.2 *Use of implicit methodologies to experimentally test predictions*

As discussed in Chapter Three, self-reports of the experience of addictions may be of use for investigating beliefs about the behaviour, but they may not be objective or accurate reports of underlying processes which maintain it (Nisbett & Wilson, 1977). Studies Three, Four and Five in this thesis used implicit methods, commonly used to study addictions (i.e. SRC and dot probe methodologies), to test two theories of addiction (OPT and IST), in order to consider if they may enhance understanding of the mechanisms which maintain the behaviour.

Although some of the findings supported predictions made by OPT and IST, not all predictions were realised. In some instances the lack of support could be attributed to methodological problems, for example, these studies highlighted the importance of personalised cues in reactivity to stimuli associated with self-harm, suggesting adequate ecological validity could only be achieved when stimuli were matched to experiences. However, in other instances the results were less easily reconciled.

For example, in Study Three, those who currently self-harmed or had self-harmed in the past were not significantly faster or slower to approach or avoid stimuli associated with self-harm, and did not rate cues associated with self-harm more positively, than those who had never harmed themselves. This refuted predictions made by the Opponent Process Theory. Moreover, they contradicted Bradley et al. (2004) who found, using an identical paradigm that smokers were quicker to approach and slower to avoid cues associated with smoking. It could be that the initial consequences of self-harm (i.e. pain) are sufficient to over-ride the positive consequences afforded by the tension relief. An alternative view is that addictive behaviour is motivated by processes other than, or additional to, affect. This proposition led to the testing of an alternative theory (IST).

Some empirical evidence supporting IST was found using implicit methodology – an attentional bias toward self-harm related words was demonstrated by current self-harmers using a dot probe task – participants in this group showed greater vigilance for self-harm related words relative to neutral words in the first dot probe study. This indicates that these methods may be usefully applied to study self-harm, and that there may be utility in the application of theories of addiction to this behaviour.

Those abstaining from self-harm however, did not show attentional vigilance to DSH words – indeed, in the second dot probe study an avoidance of DSH word cues was found. IST would predict that biases to cues persist because the neuroadaptations

which render the individual susceptible to cues associated with the addiction are irreversible, yet, to the author's knowledge, no data supporting this proposition using implicit methods has been published, especially using populations of drug addicts.

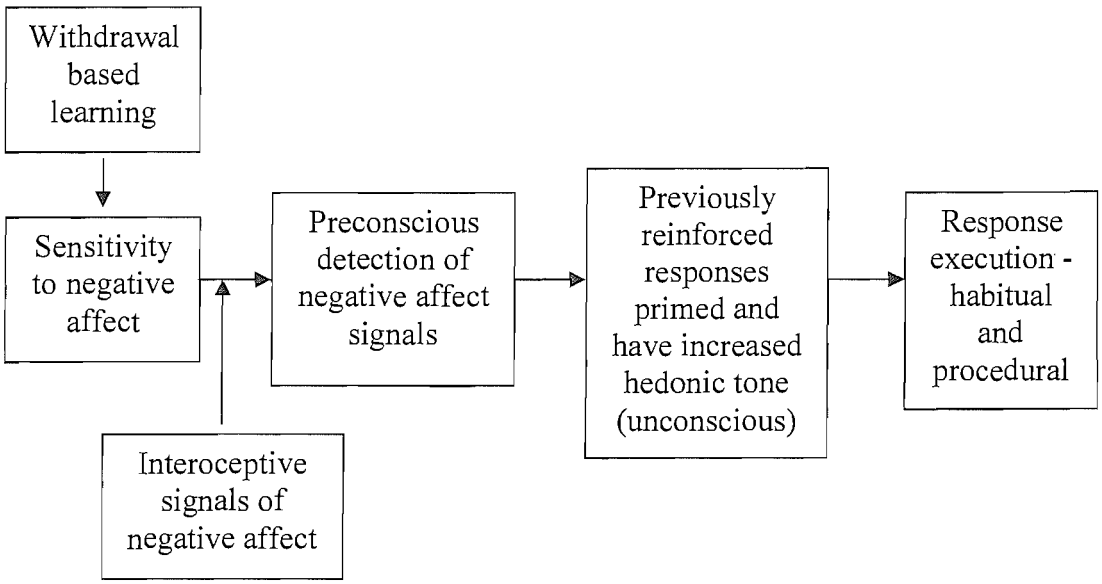
Experimentally-based studies of drug and alcohol addicts using the methods described in this thesis (i.e. dot probe, SRC) rarely include abstainers. Where abstainers have been used (e.g. Waters, Shiffman, Bradley & Mogg, 2003; Field, Mogg & Bradley, 2004) the length of abstinence is generally minimal (e.g. a day to two weeks). A more stringent test of IST predictions would be possible if there was good data regarding whether those who had abstained from drug and alcohol addictions for a significant period of time display attentional biases to drug-related cues. It would also be useful to test whether such abstainers initially orient their attention away from stimuli associated with their addiction, or if they are able to disengage their attention from addiction related stimuli more successfully than those who are currently engaging in their addiction. Studies of eye-movements (e.g. Field et al, 2004) and tasks which focus on disengagement of cues (e.g. Fox et al, 2002) would aid these investigations.

Quasi-experimental methodology is generally employed to test differences between addicts and non-addicts in response to cues using dot probe and SRC methods. The studies in this thesis were no exception; participants were recruited and allocated, rather than randomly assigned, to a group (Current, Abstaining or Control) based on their self-harming behaviour. Consequently, significant differences between groups on measures which may have confounded participants' response rates were controlled for statistically. For example, significant between group differences in self-reported anxiety were identified in Studies Three, Four and Five, so anxiety was statistically controlled in subsequent analyses.

A more recent theory (Baker et al., 2004) has proposed, however, that anxiety mediates the role of incentive bias. Baker et al.(2004) suggest that attentional bias may be associated with increased negative affect, because negative affect (which may be experienced due to cognitive interpretation of external stressors or through drug withdrawal) is associated with a decrease in dopamine activation, biasing information processing and reducing responding to conventional reinforcers (DiChiara, 1995). According to Baker et al. (2004) a significant difference in anxiety between the groups would be seen as important, and would in itself lead to other predictions related to addictive behaviour.

At low levels of affect, Baker et al (2004) propose that drug taking is habitual or procedural, at moderate levels of affect cravings are experienced consciously, allowing cognitive control to exert an inhibitory response, whilst at high levels of affect craving may be experienced consciously but incentive sensitization of the cues inhibits the addict's ability to choose long term benefits over short term goals (see Figure 8.1 for an illustration of the components of Baker et al's (2004) model at low and high levels of affect).

Low Levels of Affect



High Levels of Affect

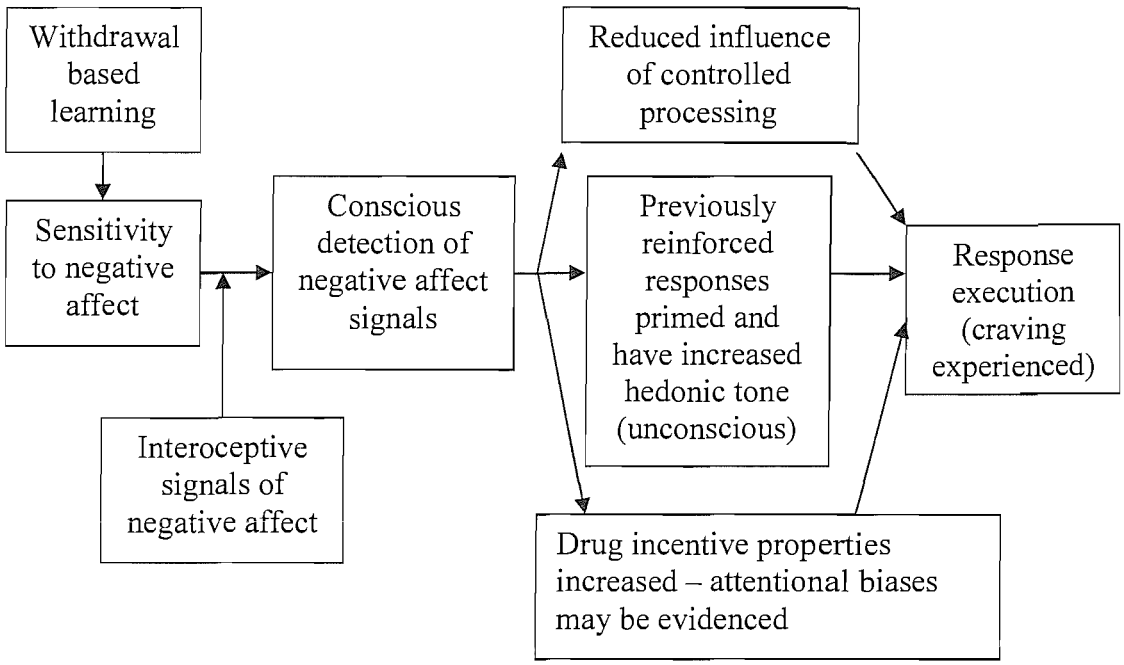


Figure 8.1 The Affective Processing Model of Negative Reinforcement (Baker et al, 2004, p. 35/36)

In support of this model, Field, Mogg and Bradley (2004) found that level of craving accounted for differences in attentional biases for regular cannabis users – while those reporting higher craving displayed attentional vigilance to cannabis related words those reporting low levels of craving did not.

There is evidence that *most* episodes of DSH occur when an individual is experiencing abnormally high levels of fear, hurt, anger, loneliness, sadness and emptiness (Brier & Gil, 1998). Seventy percent of self-harm episodes are also estimated to be precipitated by a personal problem (Bancroft et al., 1977). Self-harmers are known to experience dysphoria and anhedonia which is associated with dopamine decrease (Koob et al, 1996), so, according to Baker et al.'s model; this would accentuate their vulnerability to response biases and consequent addiction.

If cognitive processing (and specifically attentional biases) are influenced by affect and drug availability, as proposed by this model, factors other than current self-harm behaviour may influence the display of attentional biases. For example, if this model is applied to self-harm, one prediction would be that self-harmers with high levels of

anxiety would display greater attentional biases to cues associated with self-harm than those with low levels of anxiety.

Further tests of this model in relation to DSH using implicit measures of cognitive processes under varying conditions of withdrawal, affect and availability would help to test these predictions. For instance, a within-subjects design, whereby attentional bias to self-harm related cues is measured using a dot probe task under 'anxiety-provoking' and 'calm' conditions, using standardised mood manipulation techniques, such as imagery procedures, music, or changing task demand (Schutte, 2002) could be used. According to Baker et al.'s (2004) model, those who self-harm should display attentional bias to self-harm cues under 'anxiety-provoking', rather than 'calm' conditions.

8.3 Clinical implications

Therefore, the studies in this thesis have shown that DSH can usefully be viewed as an addictive behaviour. How can evidence from this research be applied to the treatment of those who self-harm? There is a great deal of variability in provision, uptake and adherence to treatments for self-harm and considerable uncertainty about which forms of treatment are most effective for those who harm themselves. Reports suggest that around 50% of people who attend Accident & Emergency following an episode of self-harm do not wait for, or are not offered, an assessment with a mental health practitioner (Horrocks et al., 2003). After psychological assessment, treatments are highly variable, waiting lists for treatments may be lengthy and dropout rates for outpatient treatment programmes following an episode of self-harm are generally high (around 40%) (van Heeringen, 1992).

Interventions offered to people who have self-harmed may be pharmacological (e.g. antipsychotic or antidepressant drugs) and/or psychological (e.g. problem-oriented therapies, CBT, dialectical behaviour therapy) however the issue of appropriate treatment for these behaviours remain contentious. Hawton et al (1998) evaluated the effectiveness of ten different approaches to treating deliberate self-harm, these included problem solving therapies, pharmacological treatments and insight-orientated therapies. The problem solving studies (Gibbons et al., 1978; Hawton et al., 1987; Salkovskis et al., 1990; McLeavy et al., 1994) showed a distinct reduction in deliberate self-harm, but the combined results of these studies did not reach statistical significance. A study of Flupenthixol, an antidepressant drug treatment, also showed

significant reduction in repeat self-harm (Montgomery et al., 1979), but it was a very small study and there is some concern that the possible side effects of flupenthixol outweighed any benefit. The only trials showing a significant decrease in repeat self-harm among the experimental group were the Dialectic Behavioural Therapy (DBT) studies (the DBT group had fewer repeaters, Linehan et al., 1991). However, large scale, multi-centre trials of DBT have yet to be conducted.

If deliberate self-harm can be established both clinically and scientifically as a potentially addictive behaviour, there are important practical and theoretical implications. In terms of practice, the treatment of pharmacological addictions has been the subject of clinical work for many decades and treatment interventions shown to be successful in managing drug dependence may also be relevant to the to the treatment of DSH. Theoretical models of addiction may also guide extinction of the behaviour and the maintenance of abstinence.

8.3.1 Pharmacological Treatment

Most work on the pharmacological treatment of self-injury has focused on samples with learning difficulties. For example, Buzan et al (1995) found that opiate antagonists (Naltrexone & Naloxone) were effective in reducing the rates of self-injurous behaviour in 50% of those studied. However, Sonne et al (1996) administered naltrexone to 5 BPD patients and found a decrease in self-harming behaviour whilst medicated, and subsequent increase post-medication. Similar positive effects have been found for a new class of atypical neuroleptics which tend to bind to dopamine and serotonin receptors (e.g. Clozapine (Chengappa et al., 1995; Hammock et al., 1995) Risperidone and Olanzapine (Khouzam & Donnelly, 1997). However, there have not been well controlled double blind crossover studies of the effects of these drugs, and therefore any anecdotal reports must be treated with caution. Also, there can be aversive side effects to these drugs, for example, clozapine carries a risk of white blood cell abnormalities.

As mentioned previously, there is some evidence of a decrease in self-harm behaviour following treatment with the antidepressant Flupenthixol with a small sample of 18 self-harmers (Montgomery et al., 1979), however other studies have reported no impact of antidepressants on DSH (Hirsch et al., 1982; Montgomery et al., 1983).

Given therefore that there is little evidence that any pharmacological intervention is wholly efficacious in treating DSH, psychological interventions are the most frequently used treatment in this area. The next section considers how conceptualisation of DSH as an addiction may inform psychological treatments for self-harm.

8.3.2 Psychological interventions

The studies in this thesis suggest that treating self-harm as an addiction has some validity. Methods of treating addictions may not necessarily relate directly to knowledge of their underlying mechanism, for example behavioural methods (such as Cognitive Behavioural Therapy) may work on addictive behaviour despite the fact that addiction has an underlying biological mechanism. However, an understanding of the processes that trigger and maintain addictive behaviour, and how they lead to the symptoms experienced, may enhance understanding of the reasons why some treatments are more effective than others. It may also lead to the development of more effective methods of treating addictive behaviour. This is particularly important given the high percentage of relapse following a decision to give up an addictive pattern of behaviour (Prochaska, DiClemente & Norcross, 1992).

As discussed in Chapter One, most researchers now agree that a person's use of drugs progresses through stages. Studies One and Two confirmed that those who self-harm may also experience changes in their behaviour over time, which parallel those experienced by drug addicts (Falk et al., 1983). Those who self-harm, like those who abuse drugs, cycle several times through stages of change before achieving long-term maintenance (Prochaska, DiClemente & Norcross, 1992). Delivering interventions appropriate to the stage of an individual's addiction is increasingly being viewed as an important factor in treatment efficacy (Prochaska & DiClemente, 1999; Marlatt & Witkiewitz, 2002). Consequently, the following sections will discuss potential interventions for self-harm at each stage of the addictive processes.

8.3.2.1 *Interventions at the stage of Precontemplation : Harm Reduction Strategies*

Many individuals experiencing problems related to their addiction are not interested in changing their behaviour, or perceived that they are 'unable' to change it, and would most likely be characterized in the precontemplative stage of the transtheoretical model (Prochaska & DiClemente, 1984). Harm reduction approaches

advocate the treatment of addicts at any stage of their addiction, providing 'low threshold, easy access, non-stigmatized, and flexible treatment options with a variety of goals and approaches catered to the needs of each individual patient.' (Marlatt & Witkiewitz, 2002, p. 13). The ethos of this approach is that regardless of the treatment goal, treatment is preferable to no treatment. Harm reduction shifts the focus away from the behaviour itself to the consequences of the behaviour.

Harm reductions models focus on prevention as well as treatment approaches. Prevention efforts focus on skills training and psycho-education, and treatment approaches incorporate goal choice and lifestyle considerations within a broader context of the social, physical, and psychological world of the individual person. Consequently, addicts who are unable to commit to complete abstinence are guided to decrease their addictive behaviour and change their beliefs towards their addiction, using methods such as motivational interviewing (e.g., discussing the negative consequences the person is experiencing) to motivate the desire for positive change (DiClemente, 1999). Overall, empirical studies have demonstrated that harm reduction approaches to alcohol problems are at least as effective as abstinence-oriented approaches at reducing alcohol consumption and alcohol-related consequences (see Marlatt & Witkiewitz, 2002).

The application of these approaches to the treatment of DSH has yet to be formally documented and evaluated; however, some health care professional recommend an approach of 'harm minimisation' rather than abstinence, suggesting an initial step towards abstinence from self-harm may involve supporting an individual to tolerate some time between the impulse to harm and inflicting the injury (Crowe & Bundark, 2000). There are recent reports in the media that pilot schemes providing 'safe environments' for controlled self-harm in psychiatric hospitals are currently being implemented alongside advice on use of clean implements and cleaning of wounds (Curtis, 2006). Additionally, some practitioners recommend alternative means of self-harm without causing tissue damage, to minimise harm, for example, by holding ice cubes, or snapping elastic bands onto wrists (Sutton, 2002).

8.3.2.2 *Interventions at the stage of Contemplation: Acceptance based strategies*

At the contemplation stage of addiction, individuals are ambivalent about change, and generally are not considering changing their patterns of behaviour in the short-term (Prochaska & DiClemente, 1984).

Acceptance and commitment therapy (Hayes, 1994) helps clients make contact with thoughts, feelings, memories, and physical sensations that have been feared and avoided. Clients learn to recontextualize and accept these private events, develop greater clarity about personal values, and commit to needed behaviour change. Controlled trials of these therapies have demonstrated some success at aiding heroin (Hayes et al, 2002) and cigarette smokers (Bissett, 2001) with commitment to change and consequent abstinence.

In the first study reported in this thesis, those repetitively self-harming consistently reported using self-harm as a tool to escape from negative states; this concurs with significant levels of avoidant personality patterns in the sample. Since repetitive self-harm is often used as a means of avoiding negative states, treatments such as acceptance and commitment therapy, or mindfulness techniques, which focus on acceptance may also be helpful in aiding those who engage in DSH to commitment to behavioural change.

Mindfulness or being mindful is being aware of yourself in the present moment. It is a meditative practice which involves suspending judgement or reflection and simply observing the moment in which you find yourself. This technique is being increasingly incorporated into modern therapies (e.g. dialectical behavioural therapy, mindfulness based therapy, mindfulness based cognitive therapy) and has been used with success to help those with borderline personality disorder cope with labile emotions and urges to self-harm (Linehan, 1990).

8.3.2.3 *Interventions at the stage of Action: Distress tolerance and Problem solving strategies*

In the action stage of addiction, the individual commences practising new (non-addiction related) behaviours whilst abstaining from old (addictive) behaviours (Prochaska & DiClemente, 1984). The studies in this thesis considered the application of the Opponent Process Theory to aid understanding of the maintenance of the behaviour. The findings suggest that increasing positive opponent processes (longer lasting more intense experiences of tension relief and decreasing pain) may reinforce the behaviour, although this may be insufficient to maintain the behaviour exclusively in the long term. What implications does the application of OPT to DSH have for the commencement of abstinence?

In terms of application of the Opponent Process Theory, the b-process motivates the behaviour (either aversively or pleasantly). Therefore, motivation to cease the behaviour must be at least as strong as the intensity of the b state for abstention to occur (Solomon, 1977). Many affective or cognitive features may intensify the experience of the b-process; therefore treating the addiction should focus on minimising the associative influences that might arouse the conditioned b-process. In Solomon's words "Abrupt, involuntary withdrawal (cold turkey), in a physically and socially unfamiliar environment, should be optimal for obtaining the lowest possible levels of b-process magnitude and for weakening the b-process." However, such techniques will not eliminate the b-process from occurring the next time cues associated with the behaviour are encountered, posing a significant challenge for abstainers.

The potential for generalisation of aversive qualities of a and b processes provides another challenge. Solomon suggests that a variety of emotional, hedonic or motivational processes may be substituted for the b-process of a given addiction, therefore, addicts need to be protected from, or learn alternative ways of managing, as many aversive affective influences as possible. The success of problem solving therapies, particularly those that include tools for distress tolerance (such as DBT see Linehan & Kehrer (1993) for an overview) could be attributed to their ability to address such problems.

8.3.2.4 *Interventions at the stage of Maintenance: Cue exposure strategies*

Within the maintenance stage of an addiction, a continued commitment to sustaining the new behaviour needs to be maintained (Prochaska & DiClemente, 1984). The Incentive Sensitisation Theory suggests an important role for implicit wanting (or craving) of addictive substances and behaviours, which may pose a challenge to individuals struggling to maintain abstinence during the maintenance stage. These cravings may be activated by cues associated with the behaviour; and in turn, these cues become salient.

The implicit studies in this thesis provide evidence of attentional bias to personalised self-harming stimuli in those currently self-harming and some evidence of attentional avoidance of these cues in those abstaining from self-harm. Although there is some debate in the literature as to whether attentional bias index motivational processes (Robinson & Berridge, 1993) or cause drug seeking behaviour (Franken,

2003) in many cognitive based models reactivity to drug cues remains one of the important factors involved in maintenance of the addictive behaviour. Reactivity to cues and drug cravings have been treated in a number of ways.

Cue exposure is a relatively new treatment approach that involves exposing addicts to cues associated with their addiction while concurrently addressing and attempting to lessen the desire to use. Specifically, cue exposure provides the opportunity to practice coping responses (e.g. relaxation) in the presence of a cue related to the addiction, increasing the likelihood that the response will be used in future real life cue exposures (Monti et al., 1989). However, the success of cue exposure therapy in eliminating drug cravings has been limited (Powell et al., 1990).

Although there is evidence that repeated exposure to drug-related stimuli can decrease craving (Childress et al., 1988; O'Brien et al., 1992), it appears that some of the autonomic responses to drug cues are more resistant to extinction than the subjective effects. For example, non-specific changes in mood state (especially anger) can rapidly reinstate conditioned stimulus-induced drug craving (Childress et al., 1993). A number of explanations have been offered for this finding.

According to the Incentive Sensitization Theory, this might occur because the neuroadaptations underlying sensitisation persist, despite extinction of the conditioned control of sensitisation. That is, "the ability of conditioned stimuli to control the expression of sensitisation may be thought of as learning related neuroadaptations layered 'on-top' of the neuroadaptations responsible for sensitisation, but which do not directly alter or reverse the neuronal changes responsible for sensitisation." (Robinson & Berridge, 1993).

However, no evidence of persisting attentional bias to self-harming related cues in those abstaining from self-harm, was found in the studies in this thesis. Baker et al. (2004) suggest that biased information processing is associated with high levels of negative affect, inhibiting the addict's ability to choose long term benefits over short term goals. The Opponent Process Theory also suggests that changes in mood state motivate drug seeking behaviour (as drug administration is negatively reinforced by it's potential to regulate affect); therefore, changes in mood state may also become conditioned stimuli (i.e. strongly associated with opponent processes) with the potential to trigger withdrawal symptoms, if they regularly precipitate drug taking behaviour. Stewart and Wise (1992) suggest that as CS can control sensitisation, potentially, learning strategies could be developed that serve a similar function.

Consequently, in order to successfully implement cue exposure for self-harmers, it may be that the individuals need to be exposed to cues and learn alternative strategies at times of high negative affect. To the author's knowledge, there is currently no empirical research on the success of cue exposure therapies with those who deliberately self-harm, although funding for such work has been secured (Remington & Clarke, 2003).

8.3.2.5 *Interventions at the stage of Relapse: Attentional training strategies and Staff based support*

The typical addict is unsuccessful in abstaining for long periods of time, unfortunately relapse to previous patterns of addictive behaviour despite periods of abstinence is common (Hunt & Matarazzo, 1973)

Some researchers argue that attentional bias, or the extent to which addicts are distracted by stimuli associated with their addiction, should indicate an individuals' motivation to indulge in their addiction (Sayette, Shiffman, Tiffany, Niaura, Martin & Shadal, 2002). If this is the case, indices of attentional bias may be used to identify those who are at greatest risk of relapse. Tests of applications of the knowledge of cognitive biases to the treatment of addicts would be exceedingly useful for clinicians (e.g. as indicators of vulnerability or relapse) but have not yet been undertaken.

Studies Four and Five in this thesis identified that abstainers were able to avoid or disengage their attention from word stimuli associated with self-harm more quickly than those currently self-harming. This finding may have important implications. Franken (2003) suggests drug-related cues cause drug seeking behaviour, consequently, if drug users could be trained to allocate their attention away from these cues, or suppress their awareness of drug cues through selective inattention, their craving and engagement in the addiction may be reduced. Similarly, Cox and Klinger (1998) suggest that if addicts are able to be distracted by non-drug activities (rather than maintaining an attentional bias for drug-related cues) then they will be less likely to relapse.

As discussed in Chapter One of the thesis, self-harm, like other addictive behaviours, often interferes with therapy and interpersonal relationships (Favazza, 1989), can arouse negative feelings, strong reactions, and prejudice in both clinicians and the general public (Barstow, 1995; Conterio & Lader, 1998; Feldman, 1988; Linehan, 1993; Tantam & Whittaker, 1992; Walsh & Rosen, 1988) and may

unintentionally result in death (Kernberg, 1987). Often the behaviour and individual become labelled as 'manipulative', leading to depersonalised, punitive responses by family, friends and staff (DeRose & Page, 1985; Ramon, 1980; Smith et al., 1998) exacerbating feelings of shame, guilt and regret and increasing the likelihood of social isolation. Encouraging re-engagement with services in order to provide support following relapse is a challenge for practitioners. In order to address this, some health care establishments have used postcards to invite those who present at Accident & Emergency services to re-engage with mental health services, with some success (Cross, 2005), however the attitudes of staff towards those who self-harm is crucial in their continued engagement with services (National Institute of Clinical Excellence, 2004).

Recognising self-harm as potentially addictive may positively influence the attitudes of healthcare practitioners and carers to self-harmers (Markham & Trower, 2003). For example, understanding that impaired control often characterises self-harming patients may encourage practitioners to recognise the compulsive and debilitating nature of the behaviour, contradicting the entrenched and stigmatising view of DSH as a form of "attention-seeking behaviour" and aiding practitioners to support those who relapse in a positive, non-judgemental manner.

8.4 Summary

The studies in this thesis have indicated that self-harm can usefully be seen as a form of addictive behaviour. They have provided empirical support for the proposition that theoretical accounts of addiction may enhance understanding of mechanisms that maintain deliberate self-harm. This emphasises the importance of further testing of theories of addiction (e.g. those proposed by Baker et al, 2004) in relation to self-harm.

The findings from these studies have also pointed towards a number of clinical applications that may help individuals who are struggling to quit harming themselves, suggesting for example that techniques focusing on acceptance and mindfulness (e.g. acceptance and commitment therapy, DBT, mindfulness based cognitive therapy) and harm reduction, as well as managing exposure to cues and attentional biases (e.g. cue exposure, attentional training) may help individuals to cope with urges to harm themselves and aid abstinence.

In the time it took to compile this thesis more than 50,000 teenagers in the UK have been hospitalised following an incident of DSH (Mental Health Foundation, National Enquiry into Self-harm, 2006). Recent research suggests that 1 in 15 young people self-harm, and the incidence of self-harm in the UK is amongst the highest rate in Europe (Mental Health Foundation, National Enquiry into Self-harm, 2006). Further research into the validity and usefulness of applying these techniques would therefore be invaluable given the emotional distress that is associated with the epidemic of this debilitating and increasingly prevalent behaviour.

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Appendices

A: Coding manual for Study One
B: Coding manual for Study Two
C: Picture cues (tinted) as used in SRC task
D: Dot Probe Study One, true mean reaction times and mean reaction times adjusted for state anxiety
E: Additional Dot probe analysis:
500ms data for Dot Probe Study One and Dot Probe Study Two

Appendix A

Study 1 – Coding Manual

1. Use a new coding sheet for each interview extract. Read the extract from the interview transcript a sentence at a time.

2. Decide if the sentence is relevant to any of the topics (underlined) in this manual.

3. If so, indicate which category (in *italics*) of response the sentence belongs to, by placing a tick in the box next to the category.

4. Place the sentence number from the transcript (e.g. Line 15) next to the category on the coding manual.

****

1. Imitation

"the observation of self-harm behaviour / behaviour that causes pain in others (e.g. peers, those held in high regard)"

the observation of self-harm behaviour

e.g. "I think I picked it up at school. Other people at school had done it. None of my friends but other kids at school."

☐

the observation of behaviour that causes pain in others

e.g. "My dad was in the army and stuff, we used to fight a lot, obviously not real fights but play fights and stuff and it was like y'know you can really hurt each other doing that. Then we'd do the same at school as well, fighting and stuff. To be able to take pain was a good thing."

☐

2. Expression

"Communicating emotions or beliefs to others or expressing distress to self"

Communicating emotions or beliefs to others

e.g. "In a weird sort of way it was sort of like, it was look at me, I hurt, I've got an injury. I guess I was trying to show people that I was in pain."

☐

Expressing distress to self

e.g. "I really need to express myself, so it was kind of that, manifesting physically the mental pain...making it physical."

☐

3. **Retribution**

"Retribution for bad behaviours/thoughts/beliefs about self; punishing the self in the same way another would punish you for being bad."

e.g. "I think I really just didn't like myself...I think it was probably more about wanting to punish myself than wanting to hurt myself, not liking myself."

☐

4. **Association between scratching and relief**

"Learnt association between self-harm and relief/positive affect through early episodes of scratching"

e.g. "Ever since I've been about 2, I've had eczema, I used to scratch it to make it better. So to me, scratching has always been (a) relief."

☐

6. **Escape**

"Using self-harm to escape negative emotions / produce a different emotional state"

e.g. "I was walking home thinking to myself, I really want to go home and hurt myself because I needed to relieve the stress."

e.g. "I want to get rid of those emotions. As soon as it starts I just go completely numb, and that's what I want you see. It's almost like floating through space...it's like you don't feel anything."

☐

"Using self-harm to escape from negative thoughts"

e.g. "I even thought of cutting my head open just to let the bad thoughts out, I've done that before."

☐

Appendix B

Study 2 – Coding Manual

1. Read the interview transcript a sentence at a time.

2. Decide if the sentence is relevant to any of the topics (underlined) in this manual.

3. If so, indicate which category (in *italics*) of response the sentence belongs to, by placing a tick in the box next to the category.

4. Place the category number (e.g. 5.2) next to the sentence on the transcript.

****

Use of Mental Health Services

Are you currently using any mental health services?

- o *No*
- o *No, not currently but have used mental health services in the past*
  'Just before I came here to Uni, I had about 3 months with a private psychologist, and then shortly after I came here I went to the University (counselling service) for a year, well just under a year.'
- o *No, but currently on a waiting list for therapy*
  'No, I'm just on the waiting list for here (IPTS)'
- o *Yes*
  'At the moment I'm seeing two key workers'

What type of support are you receiving / have you received?

- o *Educational Psychology*
- o *University Counselling*
- o *Private Psychologist*
- o *Key Workers*
- o *Skills/ Therapy group*
- o *Psychiatrist*
- o *Therapist*
- o *Clinical Nurse*
- o *GP*
- o *Other* *Please specify* .....

What quantity of support are you receiving / have you received?

- 6.1 *Weekly*
- 6.2 *Once a fortnight*
- 6.3 *Once every 3 weeks*
- 6.4 *Once a month*
- 6.5 *Irregular / Less than once a month*

Descriptions of self-harming behaviour

Use despite negative consequences
Continued use despite knowing it caused significant physical or psychological problems

e.g. "Because when I cut it tends to be on my right arm, the skin is like a grapefruit now, I could just peel it. It's lost all of its elasticity."

☐

Impaired Control
Use in larger amounts or over a longer period of time than was intended

e.g. "I started on my arm and then I cut all of my stomach and then I cut all of my left leg really badly and really deeply…I just couldn't stop it… I really scared myself because it was one of the first times that I'd done more than I'd planned to do."

☐

Time Spent Procuring
A great deal of time spent engaging in or recovering from use

e.g. "If it's burning it can be prolonged over half an hour to an hour period. If it's cutting…I think the longest I did it for was two hours once."

☐

Neglect of other Activities
Caused a reduction in social, occupational or recreational activities

e.g. "(I avoid) anything that would show my scars, I mean I don't go swimming, because I've got scars all over my arms and stomach."

☐

Unsuccessful quit attempts
Unsuccessful attempts to cut down or control use

e.g. "I've tried a couple of times to tell myself that I'm not going to do it, but then the urges will just come on so strong that I've found I've ended up cutting anyway."

☐

Increased tolerance

Need for markedly increased amounts to achieve an effect or a markedly diminished effect with continued use of the same amount

e.g. "I felt it more that first time than I ever felt it after that... I cut, not really deep, not like I did later on, so I still know which scars on my legs are from that (first episode)... they are quite different... much thinner."

☐

Withdrawal Symptoms

Unpleasant reactions to the cessation of the addictive activity i.e.tension

e.g. "(If I gave up self-harm) I'd be a really bad person to know I think. Very stressed at the end of the week."

☐

Or *Pleasant reactions to the cessation of the addictive activity i.e. positively directed changes in emotional state*

e.g. "I have very strong emotions and I don't know how to handle them so this cutting releases that and releases the pressure of it."

☐

Conflict

Conflicts regarding immoderate engagement in behaviours surrounding the addiction

Interpersonal Conflict (conflicts with family, friends and partners)
e.g. "I can't see my daughter because of it. You can't hold down a job. Its affected relationships that I've been in."

☐

Intra-personal Conflict (conflicts with self e.g. experiencing sadness, guilt)
e.g. "At the time, I'm thinking... I'm really glad I'm doing this because I'm helping myself. And then afterwards I'm like, that wasn't good, because I'd done that really."

☐

Conflicts with other Activities
e.g. "I don't go swimming because I've got scars all over my arms and stomach."

☐

Salience

The person's thinking, feelings and behaviour revolve around the addiction

Cognitive Salience (thinking about the behaviour most of the time/daily)
e.g. "I suppose really to an extent I always tend to think about it... It's always there."

☐

Behavioural Salience
"If it's cutting it could become very ritual. I'm cleaning out the bottom of the shower with disinfectant before I do anything. Then lining up everything that I'm going to use to clean myself with afterwards, sterilising everything, and then spending...(up to) two hours."

☐

Tolerance

Increased engagement needed to experience the same effect or a markedly diminished effect with the same level of engagement

Increased engagement

e.g. "It's very regular now. Much, much more regular."

☐

Diminished Effect

e.g. "(The first few times I cut myself) there was quite a lot of pain…(the more recent times) I felt nothing."

☐

Relapse and reinstatement

Returns to a former state of addiction even after periods of abstinence

e.g. "It sort of tends to come in cycles. I won't do it for a while and then do it quite often and then not for a while."

☐

Euphoria

Immediate increased level of hedonic tone as the addiction is pursued

e.g. "Before harming you can be like, I just can't cope with all this, and then you do, and then you're fine, you can go out and you've got more energy, it's just given you a boost."

☐

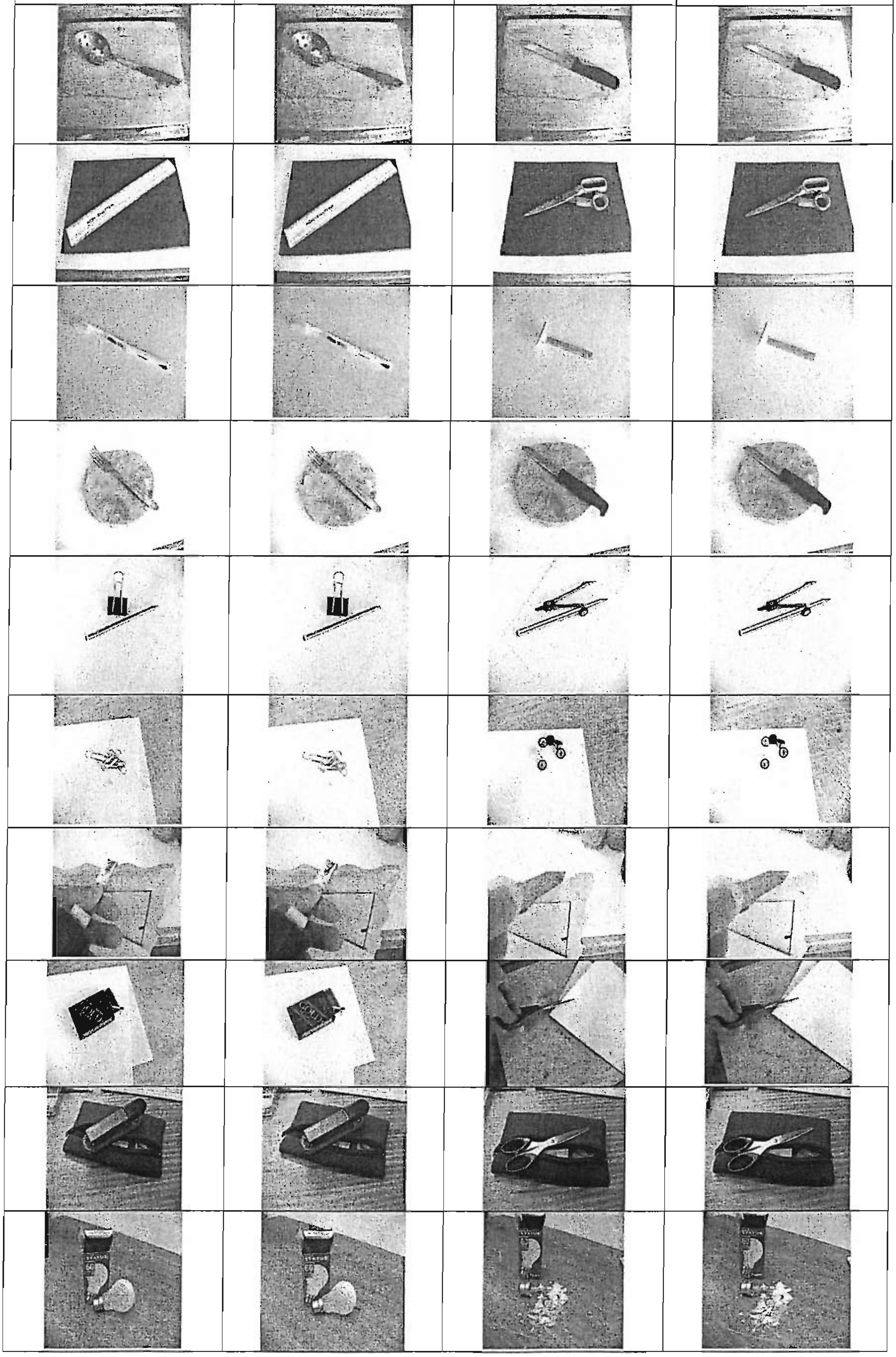
Urges to self-harm

Prior to interview:

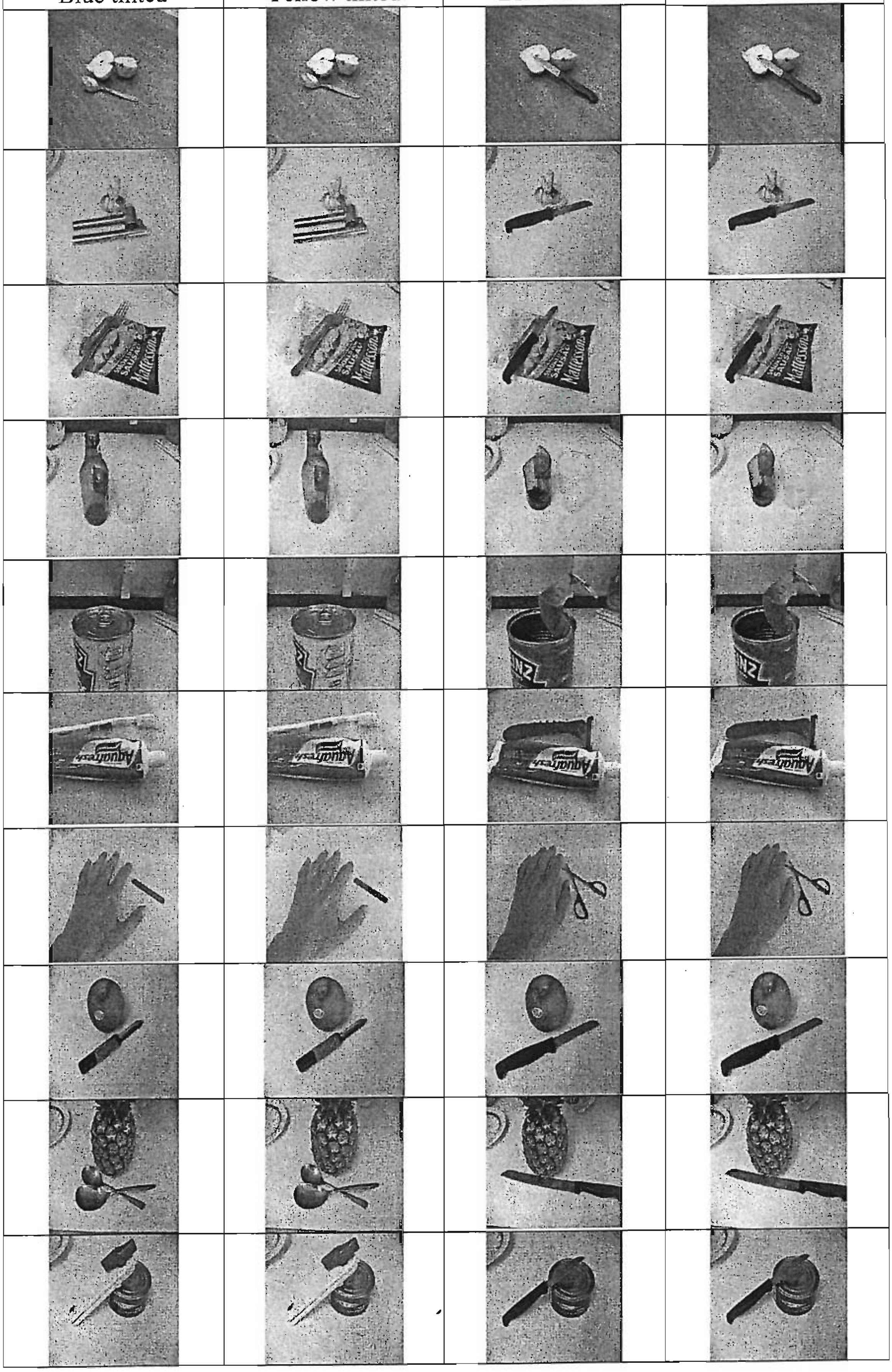
After interview:

Appendix C Picture Cues used for SRC task

Control Blue tinted	Control Yellow tinted	Experimental Blue tinted	Experimental Yellow tinted



Control Blue tinted	Control Yellow tinted	Experimental Blue tinted	Experimental Yellow tinted



Appendix D

Dot Probe Study One, true mean RTs and mean RTs adjusted for state anxiety

TableA.1 True mean reaction time (RT) scores and mean RT adjusted for state anxiety in response to word and picture stimuli data from Study One

Stimulus Type	Trial Type	Current	Abstaining	Control
		Mean	Mean	Mean
Word	Congruent			
	True	582.75	562.64	524.04
	Adjusted	569.66	563.20	536.60
	Incongruent			
	True	602.81	563.16	531.08
	Adjusted	595.05	563.49	538.50
Picture	Congruent			
	True	622.28	594.69	551.89
	Adjusted	618.93	594.83	555.09
	Incongruent			
	True	627.42	588.91	546.32
	Adjusted	620.53	589.20	552.91

Appendix E

Analysis of 500ms data from Study One and Study Two

To increase the predictive power of the results, data from the previous 500ms exposure dot probe study was combined with data from the current 500ms exposure dot probe study. Therefore data from 40 participants in the CURRENT group, 35 participants in the ABSTAINING group and 40 participants in the CONTROL group were analysed.

Log_{10} transformed data was used to maintain the assumptions of normality. Two 3x (2) mixed group (CURRENT, ABSTAINING, CONTROL) by trial type (congruent, incongruent) ancovas of logged reaction time scores (covarying for anxiety) to words exposed for 500ms and pictures exposed for 500ms were undertaken.

Word stimuli **Picture stimuli**

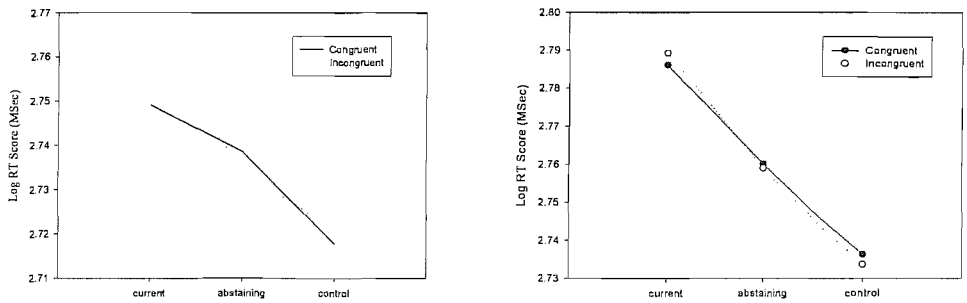


Figure A.1 True mean logged reaction time (RT) scores in response to word and picture stimuli data from Study One and Study Two for 500ms exposure times

Word analysis

There was no main effect of group on the logged dot probe reaction times to words (F (2,113) = 2.653, p = 0.075), but the interaction between trial type and group (F (2,113) = 6.568, p = 0.002) was highly significant indicating that the difference in speed of responses to congruent and incongruent trials was not consistent across all groups.

Picture analysis

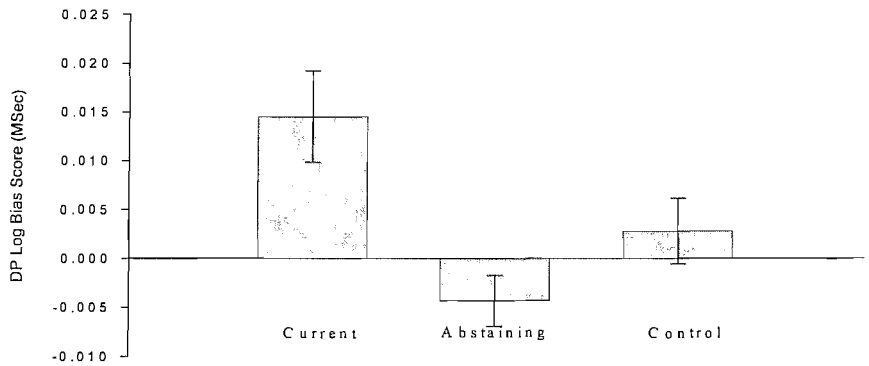
There was no interaction between trial type and group (F (2,113) = 0.126, p = 0.882) but there was a highly significant main effect of group on the logged dot probe reaction times to pictures (F (2,113) = 6.947, p = 0.001). Follow-up Least Significant Difference (LSD) tests demonstrated significant differences between all three groups (p<0.05); so the overall reaction times of current self-harmers were significantly

slower than that of abstainers, which in turn were significantly slower than the controls.

Further analysis of word data

To clarify the analyses, a further univariate analysis of the attentional bias scores of the word reaction time data (computed as described in the previous study), covarying for anxiety, was conducted. A highly significant effect of group (F (2,113)=5.459, p = 0.006) was found. This suggests overall group differences in attentional bias to DSH word stimuli, corresponding with the interaction between trial type and group in the previous mixed design analysis.

Word 500ms



Pic 500ms

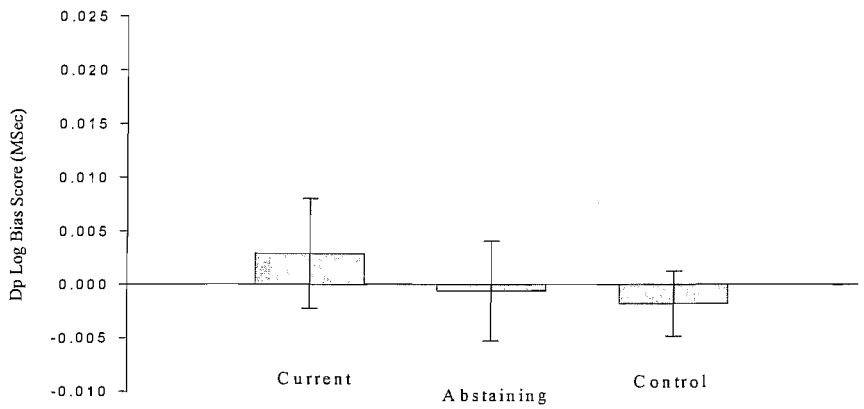


Figure A.2 Error bar chart to illustrate the interaction between stimulus exposure time and group for mean attentional bias scores from logged reaction times from Study One and Study Two in response to word (top) and picture (below) stimuli exposed for 500ms

Follow-up Least Significant Difference (LSD) tests of the word stimuli data reported highly significant differences between attentional bias scores for those in the CURRENT group and those in the ABSTAINING group ($p = 0.001$). Those in the CURRENT group were significantly more vigilant to DSH word cues than those in the ABSTAINING group. There was no significant difference between attentional bias scores of those in the CURRENT group and those in the CONTROL group ($p = 0.061$), or those in the ABSTAINING and CONTROL groups ($p = 0.204$).

To assess whether the CURRENT group showed significant vigilance for the DSH words, relative to control words, their logged bias scores were compared against a value of zero (0 = no attentional bias) using a within subjects t test. The result was highly significant, consistent with vigilance for DSH word cues (t (39) = 3.085, p = 0.004). The bias scores for DSH words of the CONTROL group (t (39) =0.819, p = 0.418) and the ABSTAINING group (t (34) = -1.647, p = 0.109) did not differ significantly from zero. The bias scores for DSH pictures did not differ significantly from zero for any of the groups (p>0.05).