Suicidal thinking and psychological distress: The role of personality and cognitive factors

Rebecca Morrison

Department of Psychology
University of Stirling

December 2008

Thesis submitted for the degree of Doctor of Philosophy
University of Stirling

Acknowledgements

I would like to thank numerous people for their help and support over the past three years. First, I would like to thank those who gave up their time to participate in the various studies in this thesis. Second, I would like to thank the hospital staff who helped and supported my data collection for the clinical study, particularly Dr George Masterton and Dr Roger Smyth. Third, I would like to thank my friends and family for their encouragement and support throughout. Finally, I would also like to thank my supervisor Professor Rory O'Connor for all his invaluable help and assistance and my second supervisor Professor Ronan O'Carroll.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

Abstract

Objectives.   This thesis aimed to examine a series of personality and cognitive factors as prospective predictors of suicidal thinking and psychological distress. A secondary objective was to examine any causal relationship between rumination and attentional biases.

Method. In order to achieve the above objectives, a series of four studies were conducted. Studies one and three were prospective studies, using analogue samples, to examine the role of personality and cognitive factors in distress and suicidal thinking. In addition, study one also investigated the effect on attentional bias of manipulating rumination. Study two was an experimental study in which two different methods of manipulating attentional bias were piloted. The final study in this thesis employed a clinical sample of general hospital parasuicide patients to investigate whether relationships between personality and cognitive factors were replicable in a clinical population.

Results.   The personality and cognitive factors understudy were investigated within a research framework to examine their interactive effects. Hierarchical regression analyses revealed a number of moderating and mediating relationships between these personality and cognitive factors to prospectively predict both suicidal thinking and psychological distress. In addition, rumination was found to have a causal influence on positive attentional bias.

Conclusions. Evidence from this thesis links personality and cognitive factors to both suicidal thinking and psychological distress in a series of moderating and mediating relationships. These are discussed in relation to the possible theoretical and clinical implications.

1 Suicide and suicidal behaviour

1.1   Overview

This chapter aims to give an introduction to the area of suicide and suicidal behaviour research. To this end, definitional issues associated with research in the field of suicide are presented, before the extent of the problem of suicidality is outlined. Risk factors for suicidality are also summarised, followed by details of theoretical models which offer an account of suicidal behaviour.

1.2   Definitions

Suicidal thinking (or suicidal ideation) can be defined as thoughts about self-injurious behaviours, these can range from vague thoughts about hurting oneself at some undefined point in time to specific plans to engage in a specific behaviour with the intention of ending one's life (van Heeringen, 2001). The terms deliberate self-harm and attempted suicide refer to self-injurious, non-accidental behaviours which do not result in death. In contrast, completed suicide refers to a self-injurious non-accidental behaviour which does result in death.   Throughout this thesis, suicidal behaviour is frequently used as an umbrella category to refer to a series of thoughts and behaviours which can range from: suicidal thinking, to deliberate self-harm, to attempted suicide, right through to completed suicide.

There are a number of definitional issues associated with deliberate self-harm, attempted suicide and completed suicide (e.g. O'Connor & Sheehy, 2000) which mainly result from difficulties in establishing whether an individual intended to take their own life at the time of engaging in a particular behaviour. Numerous methodological issues make it difficult to accurately retrospectively assess an individual's intentions at the time of engaging in a particular behaviour (e.g.

memory biases, lack of evidence, social desirability etc). Consequently, measurements of these behaviours can be difficult to accurately compare.

In an attempt to remove the problems associated with trying to retrospectively infer intentions from an individual's behaviour, the term parasuicide was coined (Kreitman, 1976, 1977). Parasuicide can be used to refer to any self-injurious behaviour which is not accidental and does not result in death, including both those who do and do not want to die at the time of engaging in a particular behaviour. The terms parasuicide or deliberate self-harm are more commonly used in European research (e.g. Schmidtke et al., 1996; O'Connor, Rasmussen & Hawton, in press), whilst attempted suicide is the more frequently used term in North American research. In the present thesis the terms parasuicide, attempted suicide, deliberate self-harm and self injurious behaviour are used interchangeably (as in much of the literature). However, these terms are used in a purely descriptive manner without reference to suicidal intent of an individual.

1.3 The extent of the problem

Suicide is a large problem in the UK – it is the second most common cause of death (following accidental death) for males aged between fifteen and 44 years in England and Wales (Office for National Statistics, 2007). In Scotland, the problem is even greater with suicide being the most common cause of death for young men (aged 15-44 years) (General Registrar Office for Scotland, 2007). Indeed, data from 1998 to 2004 show that Scotland had the highest suicide rate in the UK: for males the rate was 50% greater than the overall UK rate and for Scottish females the suicide rate was double the UK average (Brock, Baker, Griffiths, Jackson, Fegan & Marshall, 2006). Consequently, the reduction of suicide is a public health priority

for both the UK and Scottish governments (Dept. of Health, 2002; Scottish Executive, 2003).

In addition to suicide as a cause of death, parasuicide is also a large problem in the UK. National statistics relating to the prevalence of parasuicide are harder to obtain than those for completed suicide, as unlike suicide as a cause of death, they are not nationally monitored in the UK. However, large scale survey research found that 4.4% of respondents reported engaging in suicidal behaviour during their lifetime, whilst 14.9% of those surveyed reported considering suicide at some point in their lives (Meltzer, Lader, Corbin, Singleton, Jenkins & Brugha, 2002). Additional research suggests that the UK has one of the highest rates of parasuicide in Europe (Schmidtke et al., 1996).

1.4   Risk factors for suicide

There are many risk factors for suicidal behaviour and these can be broadly categorised into clinical, social, genetic and psychological risk factors. Rather than provide an exhaustive list, this section aims to give a brief outline of some of the most frequently cited risk factors.

1.4.1   Clinical risk factors

The best predictor of completed suicide is past suicidal behaviour (e.g. O'Connor & Sheehy, 2000), which falls within the clinical category. Indeed between 40-60% of those who complete suicide will have previously harmed themselves (Hawton & Fagg, 1998; Rygnestad, 1988; Suokas & Lonnqvist, 1991; Foster, Gillespie & McClelland, 1997). Research in the UK has demonstrated that hospitalisation as a result of deliberate self harm is associated with an increased risk of death by suicide (Hawton & Fagg, 1998; Hawton, Zahl & Weatherall, 2003;

4

Hawton, Harriss & Zahl, 2006), particularly in the first year following

hospitalisation. As previous suicidal behaviour is a large risk factor for completed

suicide, research aimed at reducing the incidence of suicide often focuses on

individuals who engage in suicidal ideation or suicidal behaviour to help identify

predictors of completed suicide (e.g. Hawton, Houston, Haw, Townsend & Harriss,

2003).

       Another frequently cited clinical risk factor is depression. It has been

reported that around fifteen percent of those experiencing unipolar depression will

eventually complete suicide (Guze & Robins, 1970). However, more up to date

research argues that this may be an overestimation as it is based on a review of

seventeen studies where patients were mainly in secondary care facilities (Davies,

Naik & Lee, 2001). A more recent meta-analysis reduced this estimate to six

percent (Inskip, Harris & Barraclough, 1998), although critics argue this figure may

still be skewed by the inclusion of recurrent inpatients (Davies et al., 2001). Simon

and VonKruff (1998) found that the risk of suicide was over five times greater for

those receiving inpatient treatment for depression, compared to those receiving anti-

depressants in a primary care setting. This highlights the necessity of research

examining suicide risk in depressed patients to consider treatment as well as a

diagnosis of depression. Davies and colleagues (2003) go on to argue that a

diagnosis of depression as a sole risk factor for suicide would require almost 5000

interventions a year to prevent one suicide. This illustrates that although depression

can be a risk factor for suicide, it is also important to consider additional risk

factors. Put plainly, the majority of people who are depressed will not go on to

complete suicide, meaning it is important to examine additional factors which may

differentiate those people who complete suicide from those who do not.

1.4.2   Social risk factors

One of the most commonly cited social risk factors for suicide is interpersonal problems. In particular, relationship problems are often reported as a precipitant to suicidal behaviour (Vlachos, Bouras, Watson & Rosen, 1994; Hawton, Haigh, Simkin & Fagg, 1995). However, similar to depression, although interpersonal problems may often be cited as a precipitant to suicidal behaviour, the majority of individuals who experience interpersonal problems will not engage in suicidal behaviour so it is important to consider those risk factors which differentiate between individuals who will and who will not engage in suicidal behaviour following relationship difficulties.

A further commonly cited risk factor for suicide is social deprivation. In Scotland, research has demonstrated an association between suicide rates and indices of socio-economic status (e.g. McLoone, 1996, Boyle, Exeter, Feng & Flowerdew, 2005). Although social deprivation is a strong risk factor for suicide, it does not in itself explain why people take their own lives and may act as proxy for a number of different risk factors.   Thus, it is important for research to understand how or why social deprivation impacts on suicide, by examining potential mechanisms of this association. These mechanisms have received less research attention than the epidemiologic association between social deprivation and suicide. Nonetheless most authors agree that the mechanisms linking social deprivation to suicide are complex and interactive (e.g. Watt, 1996; Wilkinson, 1996).

1.4.3   Genetic risk factors

A number of genetic risk factors have been suggested to explain a predisposition to engage in suicidal behaviour. Evidence indicates that suicide often

runs in families – for example suicide risk is increased for persons with a parental history of suicide (Agerbo, Nordentoft, Bo Mortenson, 2002) – however it is difficult to separate the impact of genetics from that of upbringing in this association. Twin studies have been used in an attempt to disentangle the effects of genetics from other social factors and these provide mixed results. Some research indicates higher rates of suicide for monozygotic twins, although this association may be accounted for by the increased incidence of mental illnesses associated with suicide, as opposed to a direct genetic influence on suicide per se (Roy, Segal, Centerwall & Robinette, 1991). However, more recent evidence produces contrary results; a much larger scale Danish study found no difference in the suicide rate between monozygotic and dizygotic twins (Tomassini, Juel, Holm, Skytthe & Christensen, 2003).

Studies have also examined the rates of suicide in those who have been adopted and both their biological and adoptive relatives. The evidence for these adoptive studies finds higher rates of suicide in biological compared to adoptive relatives for adoptees who had completed suicide, compared to matched controls (e.g. Schulsinger, Kety, Rosenthal & Wender, 1979; Wender, Kety, Rosenthal, Schulsinger, Ortmann & Lunde, 1986), indicating a genetic component to suicidal behaviour.

However, it is unlikely that genetics alone can explain the complex phenomenon of suicidal behaviour, instead genetic risk factors may account for a predisposition to engage in suicidal behaviour, but whether an individual with a predisposition actually engages in suicidal behaviour will be influenced by numerous other risk factors – including the clinical, social and psychological risk factors highlighted. Indeed, it may be most useful to consider genetic risk factors

within the context of a diathesis-stress model, whereby genetic factors convey vulnerability to suicidal behaviour; however this genetic vulnerability (or diathesis) is only activated in combination with other risk factors.

1.4.4 *Psychological risk factors*

Psychological risk factors for suicidal behaviour aim to explain individual differences, which may in turn explain suicide risk. Identification of psychological risk factors for suicidal behaviour may be particularly pertinent (Williams, Van der Does, Barnhofer, Crane & Segal, 2008) because, unlike many social or genetic risk factors, psychological risk factors can often be modified, which allows for the development of treatments for at risk individuals (e.g. Townsend et al., 2001). Cognitive vulnerabilities which may predispose an individual to risk of suicide under certain circumstances have received increasing research attention in recent years. This has led to the identification of hopelessness as a key predictor of suicidal behaviour. Hopelessness can be defined as pessimism towards the future and has been described as the psychological construct most closely related to suicidal behaviour (Beck, Steer, Kovacs & Garrison, 1985; O'Connor, Sheehy & O'Connor, 2000). Indeed hopelessness has been shown to mediate the relationship between depression and suicidal behaviour (see O'Connor & Sheehy, 2000). Specifically the absence of positive thoughts about the future, as opposed to the presence of negative thoughts, is the component of hopelessness more closely associated with suicidal behaviour (MacLeod, Rose & Williams, 1993; MacLeod, Pankhania & Mitchell, 1997).

In addition to hopelessness, a number of other cognitive and personality factors have been identified as possible risk factors for suicide – these are discussed in Chapter 2.

1.5 Theories of suicidal behaviour

1.5.1 Biomedical v. Biopsychosocial Approach

The traditional approach to explain suicidal behaviour has centred on a biomedical model (O'Connor & Sheehy, 2000). According to this perspective, suicide is caused by a biological change in an individual, meaning the suicidal individual must be mentally ill. This approach disregards the impact of psychological and social factors on a person's health – viewing the mind and body as distinct entities (O'Connor & Sheehy, 2000). The biomedical model contrasts with evidence that not all completed suicides are carried out by individuals with a mental illness (e.g. O'Connor, Sheehy & O'Connor, 1999) and, as noted above, there are a number of social and psychological risk factors for suicide which do not fit with this biomedical approach. Consequently, in recent years there has been an increasing tendency to view suicide through a biopsychosocial model where biological, psychological and social factors play an interactive role in suicidal behaviour.

1.5.2 Diathesis-stress models

Following on from a biopsychosocial approach to understanding suicide, research has begun to explore diathesis-stress conceptualisations of suicidal behaviour (e.g. Bonner & Rich, 1988; Dixon, Heppner & Anderson, 1991). Diathesis-stress models are founded on the premise that predisposing (cognitive)

vulnerabilities, when activated by stress, predict suicidal behaviour. To this end, a number of vulnerabilities have been identified in the psychopathology literature, including dichotomous thinking (Litinsky & Haslam, 1998), impaired problem solving (Pollock & Williams, 2004), impaired positive future thinking (O'Connor et al., 2004) and perceived burdensomeness (Joiner et al., 2002). However, this thesis will focus on the vulnerabilities of rumination and perfectionism – these are discussed in detail in Chapter 2. The diathesis-stress perspective emphasises the importance of the interaction of factors in predicting suicide risk, as crucially the combination of the diathesis and the experience of stress is associated with increased suicidal behaviour, rather than either the diathesis or stress per se.

1.5.3   Escape Theory

A further biopsychosocial model which attempts to explain suicidal behaviour is Baumeister's (1990) Escape Theory. According to this perspective, suicidal behaviour is used as a means of escaping from the self and particularly from distressing self-awareness. Within this framework, suicidal behaviour is viewed as a consequence of progression through a series of six stages in which the individual escapes from unbearable pain both cognitively and physically (see Table 1.1).

Escape theory can also be used to explain deliberate self-harm, as Baumeister (1990) argues that deliberate self-harm also serves to allow escape from painful self-awareness, albeit on a more temporary basis than suicide.

Table 1.1. Stages of Escape Theory (Baumeister, 1990) (adapted from O'Connor & Sheehy, 2000)

Escape Theory Stage	Description
1. Falling below expectations	During stressful times we fall short of our expectations and standards.
2. Locating blame for the situation on oneself	The blame for this shortfall is attributed internally; leading to the next stage of negative self-awareness
3. Negative self-awareness	This negative self-awareness generates negative affect (depression)
4. Negative affect	To escape this painful self-awareness and depression we engage in cognitive deconstruction. This helps to compartmentalise our failings and attributions for failure.
5. Cognitive deconstruction	This cognitive deconstruction leads to disinhibition
6. Reduction of inhibitions	Because we are disinhibited we view suicide as more acceptable.

1.5.4 *Differential Activation Theory*

Differential Activation Theory (Williams et al., 2008) offers another biopsychosocial theoretical account of suicidal behaviour, based on the phenomena of cognitive reactivity. Cognitive reactivity can be thought of as the sensitivity to particular patterns of thinking which can be triggered by small changes in negative mood. This notion fits with the evidence that previously suicidal individuals, show significant decreases in interpersonal problem solving following a sad mood induction, compared to never suicidal controls (Williams, Barnhofer, Crane & Beck, 2005). Thus, small changes in mood can trigger thought processes which have previously heightened suicidal ideation. According to differential activation theory, hopelessness and suicidal thinking are initially experienced during an episode of depressed mood. At this point, depression, hopelessness and suicidal thinking become associated such that during future depressed mood, hopelessness and suicidal thinking will also be experienced (Joiner, 2002; Joiner & Rudd, 2000). From a Differential Activation perspective, rather than focussing on baseline levels of hopelessness or suicidal thinking, the ease in which hopelessness and suicidal thinking can be reactivated through small changes in mood, is the more crucial

factor (Williams et al., 2008). There are parallels between Differential Activation Theory and diathesis-stress accounts of suicidal behaviour, as both argue that suicide risk is increased when cognitive vulnerabilities interact with (or are activated by) other risk factors (either negative mood or life stress).

1.5.5 *Interpersonal Psychological Model*

Thomas Joiner recently proposed the Interpersonal Psychological Model (Joiner, 2005) which identified three factors necessary for an individual to die by suicide: (i) 'Acquired capability' to engage in lethal behaviour; (ii) 'perceived burdensomeness' to loved ones or society and; (iii) a feeling of 'thwarted belongingness'. Joiner argues that the first stage of 'acquired capability' is said to occur by a process of habituation to the process of self injury by repeatedly engaging in non-fatal suicidal behaviour. However, it is also acknowledged that this 'acquired capability' may also be achieved through a more indirect route through repeated exposure to pain or provocation (Stellrecht et al, 2006). The second necessary stage of 'perceived burdensomeness' refers to an individual's belief that a significant other or society in general, would be better off if they were dead. The final component in this model is 'thwarted belongingness', which refers to an individual feeling socially isolated and disconnected from other people or groups in society. According to the interpersonal psychological model, an individual will only die by suicide when they have achieved each of the components of the model. Thus, there is scope for intervention at any of the stages. According to this perspective, it is the interaction between an individual's prior experiences ('acquired capability') and their perception of themselves and their place within

society ('perceived burdensomeness' and 'thwarted belongingness') which results in death by suicide.

1.5.6   Cry of Pain hypothesis

A final theoretical model based on an interactive biopsychosocial approach to predict suicide is the Cry of Pain hypothesis (Williams, 1997). This theory was proposed in an attempt to place the role of psychological research in the context of existing literature in biological and social fields. The Cry of Pain hypothesis views suicidal behaviour as a response to a situation which comprises of three components: defeat, inescapability and no prospect of rescue (see Figure 1.1).
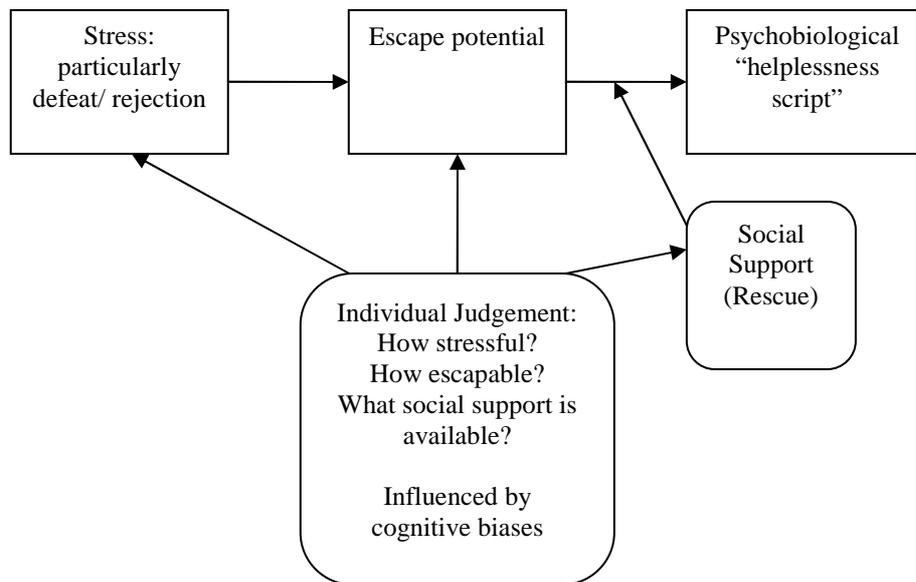
Figure 1.1. The Cry of Pain hypothesis (adapted from Williams & Pollock, 2001)

According to the Cry of Pain hypothesis, when an individual encounters a situation which they perceive to be defeating or rejecting they make a judgement about the escapability of the situation before assessing the potential for rescue from the situation. In circumstances where the defeating situation is perceived as

inescapable with no prospect of rescue, a psychobiological helplessness script is activated. This script results in the impulse to escape the situation through suicidal behaviour. However, whether an individual acts on this impulse will depend on a number of factors (e.g. knowledge and availability of means to do so). As can be seen from the model, perceptions regarding whether a situation is defeating, inescapable or has the potential for rescue are all individual judgements which will be influenced by psychological factors (such as cognitive biases). Again the model emphasises the interactive nature of risk factors for suicidal behaviour and also accounts for individual differences in response to the same set of stressful circumstances. The utility of the Cry of Pain hypothesis is supported by empirical research (O'Connor, 2003).

1.6   Summary

Suicidal behaviour is a large problem in the UK and particularly in Scotland. There are numerous interactive risk factors for suicide which can be broadly divided into clinical, social, genetic and psychological factors. Theoretical models, including diathesis-stress models, Escape Theory, Differential Activation Theory, the Interpersonal Psychological Model and the Cry of Pain hypothesis, aim to explain the interactions between risk factors to further our understanding of suicidal behaviour.

2 Cognitive and Personality Variables

2.1   Overview

The role of cognitive and personality factors in suicidality has been increasingly acknowledged in recent years.   This chapter aims to outline the cognitive and personality variables examined in this thesis before detailing how these variables have previously been related to suicidality and distress. In addition, any relationships between these cognitive and personality variables will also be discussed.

2.2   Rumination

2.2.1   *Definitions*

Rumination can be broadly defined as enduring, repetitive, self-focused thinking which is a frequent reaction to depressed mood (Rippere, 1977). However, over the last two decades several more detailed definitions of rumination have been proposed (Papageorgiou & Wells, 2004). Of these, a prominent theory has been put forward by Nolen-Hoeksema and colleagues: The Response Styles Theory (Nolen-Hoeksema, 1991).

2.2.1.1 Response Styles Theory

Nolen-Hoeksema argues that rumination or a ruminative response style[1] is repetitive thinking, occurring in response to sad or depressed mood, where an individual focuses on their symptoms and the causes and consequences of these symptoms (Nolen-Hoeksema, 1991).   These repetitive thoughts prevent an

---

[1] The terms ruminative response style and rumination are used interchangeably throughout.

individual from moving into active problem solving where the issues identified through rumination could be resolved. Instead, the individual becomes trapped in a cyclical process which serves to maintain their low mood (Nolen-Hoeksema, 2004). This tendency to ruminate in response to distress has been demonstrated to be a stable trait (e.g. Nolen-Hoeksema & Davis, 1999).

The Response Styles Questionnaire (RSQ: Nolen-Hoeksema & Morrow, 1991) has been developed to measure ruminative response style. When the scale was first devised, the ruminative component was usually operationalised on its own as a 22-item measure. However, in recent years, there have been concerns that the RSQ may be contaminated by items which are, in effect, assessing depressive symptoms rather than rumination (Treynor, Gonzalez & Nolen-Hoeksema, 2003). This led to re-analysis of the RSQ and (i) the subsequent removal of those items most closely associated with depression and (ii) the proposal that two components of rumination can be distinguished: reflection and brooding (Treynor et al., 2003). Reflection refers to self-focus aimed at problem solving in response to depressed mood. In contrast, brooding refers to ruminations comparing one's present situation with another unachieved benchmark.   Brooding has been demonstrated to be predictive of increased depression both concurrently and prospectively, whilst reflection has been shown to be associated with depression concurrently, but not prospectively (Treynor et al., 2003).   One interpretation of these findings is that although both brooding and reflection appear to be triggered by depressed mood (hence the cross-sectional associations), as reflection is not prospectively associated with depression it appears to be ultimately adaptive, perhaps through improving problem solving. In contrast, the concurrent and prospective associations between brooding and depression indicate its maladaptive properties. Thus, these two

components of rumination may illustrate the potentially adaptive and maladaptive aspects of rumination.

2.2.1.2 Alternative definitions of rumination

Aside from Nolen-Hoeksema's work, a number of other definitions of rumination have emerged. For example, Conway and colleagues (2000) proposed a definition of rumination which describes sadness focused rumination. According to this perspective, rumination reflects repetitive thinking about one's current feelings of sadness and the situation(s) which led these feelings to arise. These ruminative thoughts do not stimulate individuals to change their present circumstances and, unlike Nolen-Hoeksema's theory, these ruminations are not disclosed to others (Conway, Csank, Holm & Blake, 2000). However Treynor and colleagues (2003) argue that Conway's measure of rumination on sadness is likely to be confounded with measures of depression as over half of the items on the scale contain the words 'sad' or 'sadness'.

Another definition of rumination focuses on stress-reactive rumination (Robinson & Alloy, 2003). Stress-reactive rumination refers to ruminations following a stressful event, as opposed to rumination in response to depressed mood, as proposed by Nolen-Hoeksema. The content of stress-reactive ruminations focuses on negative inferences about a stressful event (Spasojević, Alloy, Abramson, Maccoon & Robinson, 2004). Stress-reactive rumination is highly correlated with Nolen-Hoeksema's response styles rumination (or depressive rumination); however, despite this overlap, there are a number of distinctions between the two conceptualizations (Robinson & Alloy, 2003). The main point of contention is that Nolen-Hoeksema posits that depressive rumination contributes to

the maintenance of depressive symptoms *after onset*, whilst Robinson and Alloy argue that stress-reactive rumination *influences the onset* of depressive symptoms. The notion of stress-reactive rumination fits with diathesis-stress conceptualizations of the relationship between rumination and distress (e.g. Morrison & O'Connor, 2005, Morrison & O'Connor, 2008a).

Other authors have proposed definitions of rumination which focus on its adaptive qualities. Martin and Tesser (1996) conceptualise rumination within a control theory perspective as "a manifestation of people's tendency to persist in goal-directed action until they have either attained their goal or given up the desire for it" (p.11). Control theory attempts to explain all behaviour, (including cognition) through the notion of feedback control, where individuals compare their current state with a desired outcome or goal and if they detect a discrepancy between the two then their behaviour is adjusted in an attempt to reduce this discrepancy (Carver & Scheier, 1982; Carver & Scheier, 1990; Carver & Scheier, 1998). Thus, from this perspective, rumination is a problem solving process used in an attempt to achieve particular goals. Despite these adaptive properties, some control theorists acknowledge that when goals become unattainable, ruminative processes may become maladaptive (e.g. Carver & Scheier, 1981). Martin & Tesser's (1996) notion of rumination is not necessarily incompatible with Nolen-Hoeksema's view that rumination is maladaptive. Given Treynor et al.'s recent reanalysis of the RSQ indicates brooding and reflection as the two components of rumination: it seems that brooding may be the maladaptive component mainly focussed on by Nolen-Hoeksema, whilst reflection is analogous to the adaptive component proposed by Martin and Tesser.

2.2.2   Differentiating rumination from other constructs

Rumination has been linked with a number of similar constructs. For example rumination is often compared with worry. However, although there are similarities between these two constructs, there are key differences which arguably distinguish them from each other. First, the temporal focus differs, although both rumination and worry can involve thoughts regarding the past, present and future (Borkovec, Robinson, Pruzinsky & DePree, 1983; Lyubomirsky, Tucker, Caldwell & Berg, 1999), rumination is more frequently associated with thoughts about the past (Wells & Matthew, 1994), whilst worry is more often associated with thoughts regarding the future (Borkovec, Robinson, Pruzinsky & DePree, 1983; Watkins, 2008). Second, worry is frequently conceptualised as an attempt to problem solve (Borkovec, Ray & Stober, 1998), which contrasts with the passive nature of a ruminative response style, although arguably the reflective component of rumination may represent a more problem solving oriented aspect of a ruminative response style.

Despite the distinctions between rumination and other related constructs argued by theorists, there has been a recent call to shift away from these distinctions and to refocus on examining the commonalities shared by these related constructs in an attempt to further understanding (Watkins, 2008). Watkins argues that as the process of repetitive thought underpins many different cognitive concepts, it may be more useful for research to focus on examining when repetitive thought is adaptive and when it is maladaptive, rather than looking for theoretical distinctions between related constructs.

2.2.3 Ruminative Response Style and Distress

Much of the work on rumination focuses on the relationship between a ruminative response style and the maintenance of depression: Initial levels of rumination have been associated with the maintenance of depressive symptoms after one year (Nolen-Hoeksema, McBride & Larson, 1997). However, research is increasingly finding relationships between a ruminative response style and other types of distress. A recent systematic review highlighted ten out of eleven identified studies found a relationship between rumination and suicidality (Morrison & O'Connor, 2008b, Appendix 1). Within this systematic review, each of the studies which conceptualised rumination in accordance with response styles theory found an association between rumination and suicidality, despite a variety of methodologies, populations and measures of suicidality. Research has examined the relationship between the subcomponents of rumination and suicidality with equivocal results. Brooding was demonstrated to be associated with suicidality in a number of prospective studies (O'Connor, O'Connor & Marshall, 2007; Miranda & Nolen-Hoeksema, 2007; O'Connor & Noyce, 2008). However the only case-control study identified by the systematic review (Crane, Barnhofer & Williams, 2007) found no differences in brooding between their three groups: (i) those had never been suicidal (ii) those who had previously experienced suicidal ideation and; (iii) those who had previously engaged in suicidal behaviour. However, Crane and colleagues also examined the balance of brooding compared to reflection scores within each group and found that suicide attempters had significantly higher scores for brooding items compared to reflective items. In contrast there was a trend approaching significance for the never suicidal group to have higher scores for reflective as opposed to brooding items.

With regards to reflection the evidence is even more equivocal as Miranda and colleagues (2007) found that after controlling for demographic variables and distress, reflection was predictive of suicidal ideation one year later in their general population sample. In contrast, O'Connor & Noyce (2008), again after controlling for demographic variables and initial suicide ideation, found no such relationship in a mixed general population/college student sample. However, the difference in sample size may go some way to explaining the differences in findings between these two studies, as Miranda and colleagues had a substantially larger sample (n=1134 versus n=153), which would have afforded greater statistical power to detect smaller effects (O'Connor & Noyce, 2008).

The case-control evidence in relation to reflection has found higher levels of reflection for never suicidal individuals compared with those who had previously engaged in suicidal behaviour, suggesting a protective effect of reflection (Crane et al., 2007). To the author's knowledge, no other studies have examined reflection in individuals who have specifically engaged in suicidal behaviour (as opposed to suicidal ideation), so the extent to which this protective effect of reflection is replicable remains unknown.

In addition to the relationship with suicidality, rumination has also been linked with anxiety (Nolen-Hoeksema, 2000) and cross-sectionally linked with hopelessness (Lam, Schuck, Smith, Farmer & Checkley, 2003). Furthermore, rumination has been shown to interact with perceived stress to predict change in hopelessness prospectively (Morrison & O'Connor, 2008a).

Nolen-Hoeksema's response styles theory views rumination as a response to a sad or negative mood. This contrasts with other cognitive theories of depression (e.g. Beck et al, 1979) which focus on negative cognitions activated by stressful life

events (using diathesis-stress models). A current debate in the literature pertains to a proposed extension of Nolen-Hoeksema's response styles theory to include Robinson and Alloy's (2003) notion of 'stress-reactive rumination'. Although interactions between rumination and stress are not reported in Nolen-Hoeksema's research (e.g. Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, 2000), there is evidence to suggest that a ruminative response style interacts with levels of stress to predict distress prospectively (Morrison & O'Connor, 2005; Morrison & O'Connor, 2008a). Thus, any examination of rumination must also consider levels of stress.

2.3 Attentional Bias

2.3.1 *Definitions*

Attentional bias can be thought of as a change in the orientation of an individual's attention resulting in the awareness of a specific feature of their environment (Williams, Watts, MacLeod & Mathews, 1988). This change may be conscious, but is more commonly unconscious (Williams et al., 1988). Attentional bias can be measured in a number of ways, including the dot-probe task (MacLeod, Mathews & Tata, 1986) and the emotional Stroop (Stroop, 1935) (see section 4.2.4). Importantly, the definition of attentional bias is dependent on the methodology used to measure it, as the different techniques employed often capture different components of the attentional process. For example whilst the emotional Stroop provides a measure of attentional interference, the dot-probe task provides a measure of selective attention (see Chapter 4 for a more detailed explanation). Attentional biases are usually defined with regards to a specific class of features. For example, attentional biases towards positive, negative or neutral information may all be examined.

2.3.2   Attentional bias and distress

Attentional bias has been linked with a number of measures of distress; however the evidence is not always consistent. There are a number of methodological issues, outlined below, which may explain this lack of consistency. Attentional bias towards negative stimuli has been associated with depression in some research (e.g. Beevers & Carver, 2003); however other studies have failed to demonstrate this relationship (e.g. MacLeod et al., 1986). Bradley, Mogg and Lee (1997) suggest that negative attentional biases are more frequently associated with depression in studies where negative stimuli are presented for longer durations (500-100 ms). Attentional biases may impact on distress at different stages in the attentional process (Bradley et al., 1997): (i) capturing attention – that is increasing the likelihood that an individual will initially attend to a particular class of information or: (ii) the maintenance of attention – meaning once individuals have attended to a particular class of information they experience difficulties in disengaging from it. Thus, the finding that attentional bias is more frequently associated with depression when stimuli are presented for longer periods of time suggests that the biases are resulting from a difficulty in disengaging from negative information, as opposed to a propensity to initially orient towards negative information. Recent research tracking eye movements is consistent with this as dysphoric individuals were found to spend longer gazing at negative scenes for than a non-dysphoric group, but there was no difference in initial orientation between the groups (Caseras, Garner, Bradley & Mogg, 2007).

With regards positive attentional biases in depression, the evidence is mixed. There is some evidence to indicate that depressed individuals lack the positive

attentional biases observed in non-depressed matched controls (McCabe & Gotlib, 1995; Suslow, Junghanns & Arolt, 2001). However, contrasting evidence from an eye tracker task shows that both dysphoric and non-dysphoric groups share a general tendency to initially orient towards positive compared to negative scenes and to maintain attention on positive as opposed to neutral scenes (Caseras et al., 2007).

Attentional biases have also been implicated in suicidal behaviour (Williams & Broadbent, 1986; Becker, Strohbach & Rinck, 1999). However, findings in this area are limited as the few existing studies use the emotional Stroop, a modified version of the Stroop task (Stroop, 1935), to measure attentional bias (e.g. Williams & Broadbent, 1986; Becker et al., 1999) (see Chapter 4 for more details). One of the few studies to examine attentional bias in relation to hopelessness found no association (Becker et al., 1999). However, as Becker and colleagues used an emotional Stroop measure of attentional bias, replication of this research using a more robust measure of attentional bias is required.

2.3.3 *Relationship between rumination and attentional bias*

Response styles theory posits that a mechanism by which rumination affects distress is through its impact on cognitive biases (Lyubomirsky, Caldwell & Nolen-Hoeksema, 1998). Research has demonstrated that rumination is associated with memory biases and biases in interpreting ambiguous situations (Lyubomirsky et al., 1998). A relationship between rumination and attentional bias, another form of cognitive bias, has been suggested by some authors (e.g. Bradley et al, 1997; Mogg & Bradley, 2005). If attentional biases toward negative stimuli reflect difficulty in disengaging from negative information, then a relationship between rumination and

attentional bias would seem likely. However, a paucity of experimental research has examined the nature of the relationship between these two variables. The authors are aware of only two studies, Williams and Broadbent (1986) and Joorman, Dkane and Gotlib (2006) which have examined correlations between rumination and attentional biases. Williams and Broadbent (1986) reported a significant positive correlation between rumination and attentional bias for negative stimuli. However, rumination was measured using one item where participants indicated "how ruminating they felt themselves to be (ruminating was defined as thoughts churning over and over in your mind)" (Williams & Broadbent, 1986 p.103) and attentional bias was measured using an emotional Stroop task. Joorman and colleagues (2006) found in a sample of depressed patients, that brooding rumination was correlated with attentional biases towards sad faces (in a dot-probe task), even after controlling for depression.

However, in order to examine any causal relationship between rumination and attentional bias it is necessary to use experimental manipulations. Two additional studies have used experimental methods to examine the relationship between attentional bias and rumination (Donaldson, Lam & Mathews, 2007; Morrison & O'Connor, 2008a). Donaldson and colleagues induced rumination and distraction in both patients with major depression and healthy controls, but found no difference in attentional biases between the rumination and distraction conditions in either the patient or the control groups. Nonetheless, they did find that trait levels of rumination were predictive of negative attentional bias (when stimuli were presented for 1000ms), in their patient sample, even after controlling for levels of depression.

Donaldson and colleagues suggest that their null findings for differences in attentional biases following rumination/distraction manipulations may have been a result of the lack of effect of the rumination and distraction induction procedures. They argue that their eight minute manipulation may not have been powerful enough to override the ingrained attentional responses in their sample of depressed individuals.

Morrison and O'Connor also utilised an experimental paradigm where participants were given either a positive or a negative mood induction followed by either a distraction or rumination manipulation. They found that for participants who received a negative mood induction, inducing rumination decreased positive attentional bias, whilst inducing distraction increased positive attentional bias. The difference between Morrison and O'Connor's and Donaldson and colleagues findings may result from the differing samples. As Morrison and O'Connor used healthy young adults, it may be that their attentional pathways are less deep-rooted and therefore more susceptible to the manipulation effects. However, further methodological variations may also account for the differences. First, the measures of attentional bias vary. Although both studies use dot-probe measure of attentional bias, Morrison & O'Connor present positive-negative word pairings, whilst Donaldson and colleagues present positive-neutral and negative-neutral word pairings. This is a crucial difference, as in Morrison and O'Connor's study it is unclear whether their reported decrease in positive attentional bias, following a rumination induction, was the result of *decreasing* attention toward positive words, or *increasing* attention toward negative words.

A second methodological variation may also contribute to the differences between the two studies. Donaldson and colleagues measured responses in the dot-

probe task via a response box, whilst Morrison and O'Connor measured responses via a computer keyboard. Research indicates that using a response box to measure reaction times provides a more accurate result as there is minimal lag time between a response being made and the computer recognising and recording this response. The potential variation in lag time for a response box is consistently around 1 millisecond, whilst for a standard keyboard it varies between around 24 to 33 milliseconds (Plant, Hammond & Whitehouse, 2003), creating a larger margin for error. Thus there is a need for future research using a robust measure of attentional bias to further examine the causal relationship between rumination and attentional bias. In addition, there is also a need for research to examine the possibility of causation in the opposite direction, using an experimental manipulation of attentional bias to examine the impact on rumination.

2.4   Perfectionism

2.4.1   Definitions

Perfectionism is a well established predictor of psychological distress (e.g. Chang, 1998, 2000; Change & Rand, 2000; Flett, Hewitt & Dyck, 1989; Hunter & O'Connor, 2003). However, before examining how perfectionism has previously been linked with distress it is important to provide an operational definition of what we are referring to by perfectionism (Frost, Heimberg, Holt, Mattia & Neubauer, 1993). There is a general consensus that perfectionism is best viewed as a multi-dimensional construct (Hewitt & Flett, 1991; Frost, Marten, Lahart, & Rosenblate, 1990), however agreement over the definitions of these dimensions is less established. The present thesis focuses on a tripartite definition of perfectionism put forward by Hewitt and Flett (1991) which has received a great deal of research

attention in recent years. Hewitt and Flett (1991) distinguish three dimensions of perfectionism which they argue are enduring, deep-seated personality traits (Hewitt & Flett, 2002): (i) self-oriented perfectionism – self-imposed standards and expectations; (ii) other-oriented perfectionism – standards and expectations one holds for others; (iii) socially prescribed perfectionism – an individual's beliefs about the standards which others expect from them.

According to Hewitt and Flett (2002), self-oriented perfectionism refers to standards which are set by the self and apply to the self. The key characteristics associated with self-oriented perfectionism will be maintained across range of behavioural domains and include high motivation to be perfect, upholding unachievable standards even following failure and harsh self critique which focuses on personal inadequacies and mistakes.

Other-oriented perfectionism refers to standards which are set by the self, but are applied to others (Hewitt & Flett, 2002). Key characteristics of other-oriented perfectionism include a staunch desire for others to be perfect, setting high (sometimes unattainable) standards for others and engaging in harsh critiques of others. Similar to self-oriented perfectionism these characteristics should be applied across of range of behavioural domains. Consequently, other-oriented perfectionism may result in interpersonal and relationship difficulties for the perfectionist.

Unlike self and other oriented perfectionism, socially prescribed perfectionism refers to standards that are perceived to be held by others, but are aimed towards the self (Hewitt & Flett, 2002). The key characteristics of socially prescribed perfectionism include the notion that others hold unachievable, high

standards for the perfectionist and that these demands must be met in order to satisfy others.

2.4.2   *Relations between perfectionism and psychological distress*

There has been considerable debate in the literature regarding whether perfectionism is consistently maladaptive. The evidence appears to vary depending on the dimension of perfectionism under study as self-oriented, socially prescribed and other oriented perfectionism have been differentially associated with psychological distress. Socially prescribed perfectionism has been consistently implicated in psychological distress (e.g. Hewitt & Flett, 1991; O'Connor & Forgan, 2007; O'Connor & O'Connor, 2003; O'Connor & Sheehy, 2000). Lack of control has been proposed as an explanation for these findings, as individuals high in social perfectionism, feel that the external pressures on them to succeed are out with their influence, which increases their levels of distress (Hewitt & Flett, 1991).

However, the evidence for a link between self and other oriented perfectionism and distress varies. Self-oriented perfectionism has been demonstrated to interact with stress to predict depression, hopelessness and suicidal threat in clinical patients (e.g. Hewitt, Flett & Weber, 1994; Hewitt, Newton, Flett & Callander, 1997). However, other studies have failed to find this association (Hewitt, Flett, Turnbull-Donovan, 1992; O'Connor & Forgan, 2007). These conflicting findings may reflect the distinction between maladaptive and adaptive perfectionism. For example self-oriented perfectionism may lead to feelings of failure and self criticism when individuals fail to realise strict self imposed targets (Hewitt & Flett, 1991). However, it is also possible that self-oriented perfectionism may motivate some individuals to succeed (Hunter & O'Connor, 2003).   Thus,

although self-oriented perfectionism may be maladaptive in some contexts, for some individuals, it may also be adaptive for others.

The evidence for other-orientated perfectionism is even more mixed, with some studies suggesting it is linked with increased paranoia and phobic symptoms (Hewitt & Flett, 1991), whilst others suggest it is associated with a reduction in depression (Flett, Hewitt, Blankstein & Mosher, 1995) and suicidality (Hewitt, Norton, Flett, Callander & Cowan, 1998, Hunter & O'Connor, 2003). Although initial conceptualised as being detrimental (Hewitt & Flett, 1991), more recent research has suggested that other oriented perfectionism may reduce distress by reducing focus on the self and moving attention towards others (e.g. Hunter & O'Connor, 2003). This conceptualisation would fit with Baumeister's (1990) escape from the self model of suicidal behaviour, which posits that in some instances, focus away from the self can be constructive.

2.4.3 Relationship between perfectionism and stress

The relationship between perfectionism and stress may take a number of forms. It is possible that the relationship is a moderating one, in which the experience of stress increases the negative impact of perfectionism. Alternatively, perfectionism in itself may produce increased levels of stress, thereby indicating a mediating relationship.

Two competing theories have been proposed to explain the moderating relationship between perfectionism and stress to predict distress. The first is the specific vulnerability hypothesis (Hewitt & Flett, 1993) which posits that specific types of stressors have differential impacts on the individual dimensions of perfectionism. According to this perspective, socially oriented perfectionism should

interact with interpersonal stressors to predict increased distress, whilst self-oriented perfectionism should interact with attainment related stressors to increase distress. Empirical tests of this hypothesis have produced mixed results, with some providing support (or partial support) for the model (Hewitt & Flett, 1993; Hewitt, Flett & Ediger, 1996; Enns & Cox, 2006), whilst others did not (Hewitt, Caelian, Flett, Sherry, Collins & Flynn, 2002; Joiner & Schmidt, 1995; Enns, Cox & Clara, 2005).

A second hypothesis to account for the moderating relationship between perfectionism and stress to predict distress is the diathesis-stress hypothesis. According to this perspective, perfectionism will act as a diathesis, interacting with general stress to predict increased levels of distress. This model has received support from both cross-sectional (Hewitt & Dyck, 1986) and prospective studies (Flett et al., 1995; Chang & Rand, 2000) of university students. Thus, whilst the evidence for the specific vulnerability hypothesis is fairly mixed, there has been consistent support for the diathesis-stress hypothesis.

A mediating relationship between perfectionism and stress has received far less research attention than the moderating relationship (Hewitt & Flett, 2002). However, the limited evidence available indicates that stress mediates the relationship between perfectionism and both negative outcome and depression (Chang, 2000; Hewitt, Flynn, Mikail & Flett, 2001).

2.4.4   Relationship between perfectionism and rumination

Recent research has examined whether rumination may be a mechanism by which perfectionism affects distress. It seems highly likely that perfectionists who ruminate about their mistakes or failings will consequently experience increased psychological distress. Research by Flett, Madorsky, Hewitt, and Heisel (2002)

found that after controlling for rumination, the relationship between both self-oriented and socially prescribed perfectionism and distress was rendered non-significant. This suggests that rumination may mediate the perfectionism-distress link; however no formal mediation analyses were conducted by Flett and colleagues. O'Connor, O'Connor & Marshall (2007), provide both cross-sectional and prospective evidence to support the rumination as a mediator hypothesis. Specifically, they found brooding rumination to either fully or partially mediate the effects of both socially prescribed and self-oriented perfectionism on a range of measures including depression, hopelessness, suicidal thinking and psychological distress (as measured by the General Health Questionnaire). However, O'Connor and colleagues did not include a measure of reflective rumination in their research, so were unable to assess the extent to which these mediating relationships were specific to brooding, as opposed to reflective, rumination. Harris, Pepper & Maack (2008), examined the mediating role of both brooding and reflection in the perfectionism-distress relationship. Their cross-sectional study measured perfectionism in accordance with Frost and colleagues (1990) Multi-Dimensional Perfectionism Scale and found that rumination fully mediated the effect of maladaptive perfectionism on depressive symptoms. Further analyses examining the components of rumination established that brooding rumination fully mediated the maladaptive perfectionism-depression relationship, whilst reflection partially mediated this relationship. However, the measure of rumination used in Harris et al's study measured specific ruminations about failure in a test, as opposed to the more general tendency to ruminate in response to negative mood, normally measured by Response Styles theory.

2.4.5   Relationship between perfectionism and attentional bias

There has been little empirical research examining the role of attentional biases in perfectionism. However, given that perfectionists are excessively concerned with failure and achieving unrealistic standards, it seems possible that biases in attention towards negatively valenced stimuli, may exacerbate the levels of distress associated with perfectionism. In addition, as rumination has been shown to mediate the perfectionism-distress relationship and given the similarities between rumination and attentional biases, it seems appropriate that research should also consider the role of attentional biases in the perfectionism-distress relationship.

2.5   Goal Adjustment

2.5.1   Definitions

Persistence is generally thought to be adaptive characteristic which helps individuals to attain goals and is associated with enhanced wellbeing (Bandura, 1997). However, there are circumstances in which persistence may be maladaptive – such as instances where a goal is unlikely to be attained and persistence will only serve to increase the experience of failure.

Derived from self-regulation theory, goal adjustment focuses on situations where persistence may be maladaptive, by considering how individuals respond to situations in which they are unable to attain their personal goals (Wrosch, Scheier, Miller, Schulz & Carver, 2003). Two components of goal adjustment have been identified: goal disengagement and goal reengagement. Goal disengagement refers to an individual's ability to relinquish unobtainable goals by discontinuing their effort and commitment towards a particular goal in response to a threat to goal pursuit. Goal reengagement, on the other hand, reflects an aptitude to discover and

33

attempt to achieve alternative goals, following a threat to existing goal pursuit.

Thus goal adjustment can be viewed as an adaptive process by which individuals

give up on unachievable goals and move the focus of their goal pursuit to

alternatives.   These goal adjustment tendencies have been demonstrated to remain

stable across a range of different pursuits (Wrosch et al., 2003).

2.5.2   *Goal adjustment and distress*

Previous cross-sectional research has indicated that poorer goal adjustment

is associated with reduced wellbeing (Wrosch et al., 2003). Wrosch and colleagues

(2007) argue that goal disengagement and goal reengagement have differential

relationships with distress. According to this viewpoint goal disengagement is

associated with negative aspects of wellbeing, whilst goal reengagement is

associated with the positive aspects of wellbeing. This appears to be supported by

research to date. Goal disengagement has been cross-sectionally associated with

reporting fewer depressive symptoms (Wrosch, Miller, Scheier & Brun de Pontet,

2007). Prospectively, poor goal disengagement has been associated with increased

levels of C-reactive protein (a prognostic marker of immune function) (Miller &

Wrosch, 2007), which in turn, has been show to contribute to the development of

depressive symptoms (Miller & Blackwell, 2006).   In contrast, goal reengagement,

but not goal disengagement, has been cross-sectionally linked with purpose in life

(Wrosch et al., 2003) and suicidal thinking (O'Connor & Forgan, 2007). Although

suicidal thinking may not initially appear to be a positive aspect of wellbeing, this

relationship may be a reflection of the impact of failing to reengage on reasons for

living, which would be considered a positive outcome. Nonetheless the majority of

research examining goal adjustment has been cross-sectional in nature indicating that further prospective research is required.

2.5.3 The relationship between goal adjustment and perfectionism

Goal adjustment has also been demonstrated to influence the effects of perfectionism on distress. As perfectionism often involves setting unrealistic, unachievable goals, it is perhaps unsurprising that, in combination with poor goal adjustment, perfectionism would lead to increased levels of distress. O'Connor and Forgan (2007) found goal reengagement moderated and mediated the effects of socially prescribed perfectionism on suicidal thinking. This suggests that an individual's perception that significant others hold high standards and ideals for them, combined with a deficit in engaging with new goals when initial goal pursuit is threatened, was predictive of increased suicidal thinking.

2.5.4 The relationship between goal adjustment and rumination

As rumination can be thought of as a difficulty in disengaging from particular thoughts and behaviours, a relationship between rumination and goal adjustment may be expected. Wrosch et al. (2003) reported that both goal disengagement and goal reengagement were associated with fewer intrusive thoughts in their student sample. Whilst Miller and Wrosch (2007) suggest ruminations relating to goal pursuit may disrupt sleep and this may be an explanation for the increased levels of C-reactive protein (a prognostic marker of immune function) in individuals who were poorer at goal disengagement. It would therefore seem possible that goal adjustment may influence the established relationship between rumination and distress. However, to date, the relationship

between goal adjustment and rumination has received little attention (Watkins, 2008).

2.6   Summary

Research has highlighted a number of cognitive and personality variables which have been implicated in suicidality and psychological distress including: rumination, attentional biases, perfectionism and goal adjustment. In addition to being associated with distress these variables are often inter-related and this may influence their association with distress. By measuring these items concurrently the present thesis will be able to examine these possibilities across a series of studies.

3 Rationale and General Aims

3.1   Overview

This chapter aims to outline the overarching aims of the research conducted in this thesis. To this end, the general rationale behind the research will be summarised, before the general aims are discussed.

3.2   Rationale

The rationale behind each specific study is outlined separately at the start of each study. However, each individual study falls within the general rationale which underpins this thesis.

3.2.1   MRC Framework for interventions

In light of the increasing desire for evidence-based practice, the Medical Research Council (MRC) has produced a five phase framework for the development and evaluation of randomised controlled trials for complex interventions to improve health (MRC, 2000). A complex intervention is one which contains a number of components which may interact with each other. Theoretical models of suicidal behaviour (see section 1.5 for details) and previous empirical research (see Chapter 2) indicates that individual risk factors interact with each other to increase suicidal behaviour. This suggests that any attempt to intervene with at risk individuals will require a complex intervention tackling a number of elements. To this end, the current thesis has been designed to provide evidence to inform the first phase identified by the MRC – the pre-clinical or theoretical phase.   This thesis aims to build the evidence base with experimental and prospective research using both clinical and analogue studies to help understand the nature of the relationships

between key variables.   This, in turn, will inform future phases of the MRC framework in which interventions are developed and tested.

3.2.2   *Psychological distress and suicidal thinking*

Previous research has highlighted the association between suicidality and elevated levels of psychological distress (e.g. Rosario, Schrimshaw & Hunter, 2005; Morrison & O'Connor, 2008a).   Consequently, in this thesis, in addition to suicidal thinking, we also examined how the individual difference variables under study affected measures of psychological distress. Psychological distress was used as an umbrella term to include measures of depression, anxiety, hopelessness and dysphoria.   This method fits with the increasing use of a transdiagnostic approach, focussing on commonalities in the processes which may underpin varying psychological disorders (Harvey, Watkins, Mansell & Shafran, 2004).

3.3   General Aims

Although each of the studies in this thesis has a number of specific aims, there are a number of general overarching aims which apply across studies. These general aims are outlined below.

3.3.1   *Testing relationships between individual difference variables*

As can be seen in Chapter 2, a number of personality and cognitive variables have been implicated in suicidal behaviour and psychological distress. In addition, as noted above, both theoretical models of suicidal behaviour and empirical research highlight that risk factors for suicide can be numerous and interactive. Consequently, this thesis aims to examine the interactive nature of a series of

cognitive and personality risk factors. Perfectionism (particularly socially prescribed and self-oriented perfectionism) and rumination have both been persistently linked with suicidality in addition to psychological distress, as highlighted in two recent systematic reviews of the literature (O'Connor, 2007; Morrison & O'Connor, 2008b). To this end, the overarching aim of this thesis is to examine the role of specified cognitive variables (stress, goal adjustment and attentional bias) in the relationships between both perfectionism and distress and rumination and distress. In addition, we also examined the role of rumination in the perfectionism-distress relationship. Thus, we aim to test the models illustrated in Figure 3.1 and Figure 3.2. In each instance, we aim to consider the potential mediating and moderating influences.

Stress
Goal Adjustment
Attentional Bias
Rumination

Perfectionism
(self-oriented and
socially prescribed)

Psychological
distress and suicidal
thinking
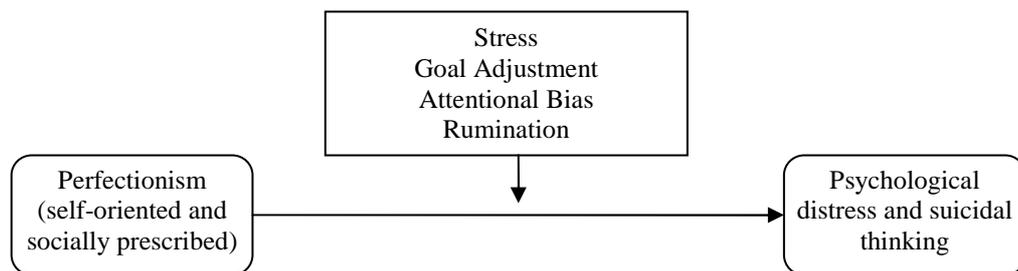
Figure 3.1.   Influences on the perfectionism-distress relationship

Stress
Goal Adjustment
Attentional Bias

Rumination

Psychological
distress and
suicidal thinking
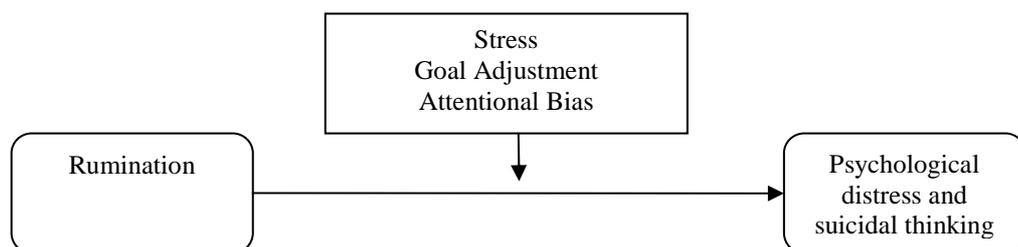
Figure 3.2. Influences on the rumination-distress relationship

3.3.2   *Testing relationships in different samples*

A further aim of this thesis was test the relationships under study in both analogue and clinical samples. Through this methodology we aimed to increase the

external validity of the findings and improve the relevance of any findings for future research aimed at developing intervention strategies in either population.

3.3.3 Testing new relationships

The personality and cognitive variables understudy within this thesis were selected as they bear a number of theoretical similarities and there appears to be potential for many of these variables to influence each other (as noted above). However, to date, a number of these relationships have yet to be empirically examined. This thesis will therefore test a number of relationships for the first time including: (i) the impact of goal adjustment as a mediator or moderator in the relationship between rumination and distress; (ii) the role of attentional bias as a mediator or moderator in the perfectionism-distress relationship; (iii) the role of goal adjustment as a mediator or moderator in the prospective relationship between perfectionism and distress; (iv) the role of stressful life events as a mediator or moderator of the relationship between rumination and distress and; (v) formal analysis of stress as a mediator of the relationship between rumination and distress.

3.3.4 Relationship between rumination and attentional bias

An additional aim was to empirically examine the relationship between rumination and attentional bias. To this end, we aimed to examine any causal relationship between rumination and attentional bias. Thus, study one (Chapter 5) aims to examine the impact of manipulating rumination on attentional bias and study two (Chapter 6) aims to explore the impact of manipulating attentional bias on rumination.

3.4   Summary

In order to provide evidence to inform the first, theoretical phase of the MRC framework for complex interventions, this thesis aims to examine the role of a series of cognitive variables in the relationship between both perfectionism and rumination with measures of suicidal thinking and psychological distress in both analogue and clinical samples. An additional aim was to examine any causal relations between rumination and attentional bias.

4 General Methodology

4.1   Overview

The following chapter outlines the measures employed throughout this thesis. As there is overlap between many of the measures throughout studies one, three and four, this outline aims to avoid unnecessary repetition. Nonetheless, each individual study contains a brief summary of the measures used alongside the procedure employed.   Cronbach's alpha levels are reported individually for each study.   Table 4.1 provides a summary of the measures used within each individual study; this is followed by a detailed description of each of the measures in turn. To aid comprehension, measures are subdivided into three categories: (i) predictor variables; (ii) outcome variables and (iii) manipulation procedures. As the methodology in study two does not overlap with other studies in this thesis, this will be discussed in detail within Chapter 6.

Table 4.1. Summary of measures used in each study

	Measures at Time One	Measures at Time Two
Study One	Rumination (Short RSQ)	Perceived Stress (14-item PSS)
	Attentional Bias	Depression and anxiety (HADS)
	Perfectionism (45-item MPS)	Dysphoria (CESD)
	Goal Adjustment (GAS)	Hopelessness (BHS)
	Depression and anxiety (HADS)	Suicidal Thinking (SPS)
	Dysphoria (CESD)	
	Hopelessness (BHS)	
	Suicidal Thinking (SPS)	
	Mood (VAS & POMS)	
	Mood Manipulation	
	Rumination/Distraction Manipulation	
Study Two	Attentional Bias	Attentional Bias
Study Three	Rumination (22-item RSQ)	Rumination (22-item RSQ)
	Perfectionism (45-item MPS)	Perceived Stress (14-item PSS)
	Goal Adjustment (GAS)	Stressful Life Events (LESS)
	Perceived Stress (14-item PSS)	Depression and anxiety (HADS)
	Stressful Life Events (LESS)	Dysphoria (CESD)
	Depression and anxiety (HADS)	Hopelessness (BHS)
	Dysphoria (CESD)	Suicidal Thinking (SPS)
	Hopelessness (BHS)	
	Suicidal Thinking (SPS)	
Study Four	Attentional Bias	Perceived Stress (4-item PSS)

Rumination (22-item RSQ)	Depression and anxiety (HADS)
Perfectionism (15-item MPS)	Hopelessness (BHS)
Goal Adjustment (GAS)	Suicidal Thinking (SPS)
Perceived Stress (4-item PSS)	
Depression and anxiety (HADS)	
Hopelessness (BHS)	
Suicidal Thinking (SPS)	

4.2 Predictor variables

4.2.1 Rumination

The Ruminative Response Scale (RRS) of the Response Styles Questionnaire (RSQ) (Nolen-Hoeksema & Morrow, 1991) provided a measure of participants' ruminative tendencies in negative situations (see Appendix 2). Participants were asked rate each of the 22 items on a 4-point scale according to the frequency with which they react in this manner when 'sad, down or depressed'. Higher scores reflect a greater ruminative response style in negative situations. The scale has demonstrated significant test-retest reliability over one year ($r = .47$, $p<.01$) and construct validity (Just & Alloy, 1997; Nolen-Hoeksema & Morrow, 1991).

The RRS scale is also available as a 10-item measure known as the Ruminative Response Scale (Short Form) (Short RRS: Davis & Nolen-Hoeksema, 2000) (items 1, 3, 4, 6, 9, 13, 16, 17, 18, 19). Initially, the short form of the scale was argued as preferable to the original measure, as it omits a number of items which may reflect "automatic negative thoughts" (Nolen-Hoeksema, personal communication). However, recent research has highlighted the overlap between items on the RRS and measures of depression. This led Treynor and colleagues (2003) to reanalyse the RRS, removing the items most associated with depressive symptoms and differentiating two components of rumination: brooding and reflection. Brooding (items 5, 10, 13, 15, 16) and reflection (items 7, 11, 12, 20, 21)

scores can each be calculated by summing five items from the original 22-item RRS. Example items include 'Think about a recent situation wishing it had gone better' (brooding) and 'Go away by yourself and think about why you feel this way' (reflection). Test-retest reliability of the brooding and reflective components of rumination over one year has been demonstrated (r=.60 and r=.62 respectively) (Treynor et al., 2003).

4.2.2   Perfectionism

The Multidimensional Perfectionism Scale (MPS) (Hewitt & Flett, 1991) provided a 45-item measure of perfectionism (see Appendix 3). This can be subdivided into three subscales, each with fifteen items, measuring three dimensions of perfectionism: (i) Self-oriented perfectionism (items 1, 6, 8, 12, 14, 15, 17, 20, 23, 28, 32, 34, 36, 40 and 42), the extent to which an individual has a desire to be perfect and has high expectations for their own achievements (e.g. "One of my goals is to be perfect in everything I do"); (ii) Socially prescribed perfectionism (items 5, 9, 11, 13, 18, 21, 25, 30, 31, 33, 35, 37, 39, 41 and 44), the extent to which individuals believe that others have unrealistic expectations of them (e.g. "The people around me expect me to succeed at everything I do"); (iii) Other-oriented perfectionism (items 2, 3, 4, 7, 10, 16, 19, 22, 24, 26, 27, 29, 38, 43 and 45), the extent to which an individual has high expectations of others (e.g. "If I ask someone to do something, I expect it to be done flawlessly"). Higher scores on each subscale are indicative of increased levels of that particular dimension of perfectionism (items 2, 3, 4, 8, 9, 10, 12, 19, 21, 24, 30, 34, 36, 37, 38, 43, 44, and 45 are reverse scored). The test-retest reliability over a three month period has been established

for the self, other and social subscales (r = .88, .85, .75 respectively), in addition to construct validity with other perfectionism measures (Hewitt & Flett, 1991).

A shorter version of the MPS containing only fifteen items has been developed through factor analysis of the original scale (Cox, Enns & Clara, 2002) (items 6, 10, 13, 14, 19, 24, 28, 31, 33, 35, 39, 40, 42, 43, 45). In this shorter version, each of the three dimensions of perfectionism is measured by five items. The original MPS and the shorter version have been shown to be highly correlated and Cox and colleagues (2002) argue that the shorter version provides a better fit for the hypothesised three factor model of perfectionism.

4.2.3 Goal Adjustment

The Goal Adjustment Scale (GAS: Wrosch, et al, 2003) provided a 10-item measure of both goal disengagement (an individual's ability to give up unattainable goals) and goal reengagement (an individual's ability to engage with other new goals, if existing goal pursuit is threatened) (see Appendix 4). Participants were asked to think about how they would usually react when forced to stop pursuing an important goal and to indicate the extent of their agreement with each statement using a five-point scale. Example items include 'It's easy for me to reduce my effort towards the goal' (goal disengagement) and 'I start working on other new goals' (goal reengagement). Goal disengagement is calculated by computing the mean of four items (items 1, 3, 6 and 8 – items 3 and 6 are reverse coded), whilst goal reengagement is calculated by computing the mean of the remaining six items (items 2, 4, 5, 7, 9 and 10). Higher scores on the scale are indicative of an increased ability to disengage from existing goals or reengage with new goals, following a threat to goal pursuit.

4.2.4   Attentional Bias

Two main paradigms have been used as experimental measures of attentional bias: (i) emotional Stroop and; (ii) the dot-probe task. The emotional Stroop is a modified version of the Stroop task (Stroop, 1935). This requires participants to read aloud the colour of the ink that emotional words are printed in. Participants are timed on this task and longer timings are thought to represent increased attentional bias. Although this task measures attentional bias in relation to interference in colour naming, it is unable to provide any information on the mechanisms of these attentional biases, for example, is interference in the colour naming of words a result of participants attending to negative words, or is it due to cognitive efforts to suppress negative words – both situations would produce the same results (e.g. increased trial lengths) on the emotional Stroop test. Moreover, MacLeod (2005) questions whether the Stroop even necessarily measures selective attention as 'The fact that colour information receives inadequate attention does not require the conclusion that attention is diverted instead to the processing of word content' (p. 52). Another criticism of the emotional Stroop is that it does not allow a direct comparison of patterns of attentional bias for different stimuli. For example, larger attentional biases towards negative words, in comparison to positive words, may be a result of a bias to attend to negative as opposed to positive words, or a preference to attempt to suppress negative as opposed to positive words. This is an often cited weakness of the emotional Stroop test (e.g. de Ruiter & Brosschot, 1994; Bradley et al, 1997) and can be overcome through the use of the dot-probe task (MacLeod et al, 1986) in research. Unlike the Stroop, the dot-probe task is a measure of selective attention, where participants are presented with two different

46

types of stimuli simultaneously (e.g. negative and neutral words) and differing patterns of attention to these stimuli can be calculated.

Consequently, we adopted a dot-probe measure of attentional bias. This consisted of 8 baseline trials and 60 experimental trials. Each trial in this task began with a fixation cross presented in the centre of the screen for 500 ms. This was followed by the simultaneous presentation of two words, one above and one below centre (in the baseline trials strings of the letter X were used instead of words). The words were 3.5cm apart and remained on the screen for 750 ms. Immediately following the word pair presentation, a dot-probe appeared in the location of one of the previous words and participants used a response box to indicate the spatial position of the probe. The participants' response concluded each trial, and after a 1000 ms rest, the next trial began. Participants' reaction times were measured and quicker reaction times were taken to indicate that participants were attending to the word previously in the same location as the probe.

The words used in this task were selected from a standardised list created by John (1988) and consisted of both positive and negative words, each paired with a neutral word matched for length and frequency of usage (see Appendix 5). Of the 60 experimental trials, 30 consisted of positive-neutral word pairings and 30 consisted of negative-neutral word pairings. The probe followed the neutral word in half of the trials, and followed the negative/positive word in the remainder of the trials. The presentation order of the word-pairings was randomised.

Following Mogg, Bradley and Williams (1995) attentional bias scores were calculated by subtracting the mean response times from trials where the probe was in the same location as the valenced word from the mean response times in those trials where the probe was in a different location from the valenced word.

Attentional bias scores were calculated separately for positive and negative stimuli. This can be calculated in using the following equation:

[(Valenced word upper, probe lower + Valenced word lower, probe upper) – (Valenced word upper, probe upper + Valenced word lower, probe lower)] / 2

Positive attentional bias values indicate increased attention towards the valenced stimuli in comparison to the neutral stimuli, whilst negative values reflect "avoidance" of the valenced stimuli.

4.2.5   Perceived Stress

Despite a plethora of research, there is still no single measure of stress which has emerged from the stress literature. Nonetheless, there is increasing consensus over a cognitive conceptualisation of stress (Lazarus, 1999), meaning measures of stress which focus on the cognitive aspects are becoming increasingly popular. Consequently, the Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983) was developed to provide a measure of stress appraisal - specifically, the extent to which an individual perceives life as out with their control, unpredictable and demanding. The PSS provided a 14-item measure of global self appraised stress (e.g. 'How often have you felt nervous and stressed?') (see Appendix 6). Participants indicated how they had been feeling over a specified period of time on a four-point scale. Higher scores indicate greater levels of perceived global stress. Test-retest validity of the PSS over a six week period has been reported as $r = .55$ (Cohen et al., 1983). A shorter, 4-item, version of the PSS (Cohen et al., 1983) is

also available and was used in study four with our clinical sample to reduce the burden of questions on participants (items 2, 6, 7 and 14).

The focus of the PSS on self-appraised life stress avoids the numerous problems associated with life event checklist measures of stress. One of the largest criticisms of checklist measures of stress is that they attempt to provide an objective measure of stress – implying that the event in itself is the cause of stress (Cohen et al., 1983). This is in contrast to the notion that individuals interact with their environment and events will be appraised as stressful depending on individual factors such as perception of coping resources or support available (e.g. Lazarus, 1966). Further difficulties with checklist measures of stress include problems with ensuring the checklist is comprehensive, for example research has highlighted that life events checklists often omit events particularly salient for women (Makosky, 1980) or minority ethic groups (Rabkin & Struening, 1976). An additional problem is that some life events measured by checklists may confound with symptoms of the disorders they are trying to predict, such as difficulties in sleeping or reduced appetite (Herbert & Cohen, 1996) and this may account for any observed relationship. A further criticism of life events checklists relates to the onset of stress following a life event. Most checklist measures use a one year period, based on the assumption that this is the timeframe in which a stressful event will have an impact, however the evidence to support this is limited (Munroe, 1982). This raises the supplementary problem of the accuracy of retrospective reporting of life events, as obviously the dates of some types of life events will be more memorable than others (Herbert & Cohen, 1996).

4.2.6   Stressful Life Events

Despite the limitations of life event checklist measures of stress noted above, in study three we employed a checklist measure of stress to allow comparison between this and our measure of perceived stress. The Life Events Scale for Students (LESS; Linden, 1984) was adopted as it provided a measure appropriate to our participant population (see Appendix 7). Participants were asked to indicate whether they had experienced a particular life event within a specified time period. In total, 36 life events were measured, including 'death of a parent' and 'losing a part-time job'. Each of these life events has been weighted according to severity and these weighted responses were totalled to provide a stressful life events score. Although originally developed in Canada the LESS has been validated for use in a British sample (Clements & Turpin, 1996) and the British weightings were used in our research. Reliability of the LESS (i.e. the correlation between two sets of scores taken on two different occasions, but each referring to the same time period) has been shown as .66 for one month and .61 for six months (Clements & Turpin, 1996). The consistency of the LESS (i.e. the extent to which the same events are reported for two sets of scores taken on two separate occasions, but each referring to the same time period) has been demonstrated as 61% over one month and 54% over six months (Clements & Turpin, 1996).

4.3   Measures of distress

4.3.1   Hopelessness

The Beck Hopelessness Scale (BHS; Beck, Weissman, Lester & Trexler, 1974) measures pessimism towards the future (e.g. 'It's very unlikely that I will get any real satisfaction in the future') and has been shown to be predictive of

completed suicide (Beck, Steer, Kovacs & Garrison, 1985). This 20-item scale asked participants to indicate their agreement or disagreement with each item (items 1, 3, 5, 6, 8, 10, 13, 15, and 19 were reverse scored) with regard to their current state of mind (see Appendix 8). Higher scores indicate greater levels of hopelessness. The reliability and validity of the BHS has previously been demonstrated (Beck et al., 1974).

4.3.2   Anxiety and Depression

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) is 14-item scale which divides into two subscales, each with seven items, measuring depression (even numbered items) and anxiety (odd numbered items) (see Appendix 9). Participants were asked to rate the how often they felt a particular way over the past few weeks on a four-point scale. Sample items include 'I feel as if I am slowed down' and 'Worrying thoughts go through my mind'. Higher scores in each subscale indicate greater levels of anxiety and depression respectively (items 1, 3, 5, 6, 8, 10, 11 and 13 are reverse scored). The HADS was initially developed as tool to screen for anxiety and depression in non-psychiatric hospital patients, consequently there are no items referring to symptoms of a somatic nature which may be confounded with the physical difficulties often found in general hospital patients. Reviews papers have concluded that the HADS is a reliable and valid measure in both clinical and general population samples (Hermann, 1997; Bjelland, Dahl, Haug & Neckelmann, 2002).

4.3.3 *Dysphoria*

The Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) provided a 20-item measure of dysphoria (e.g. 'I felt that I was just as good as other people') (see Appendix 10). This measured the frequency with which participants experienced depressive symptoms over the past week on a four point scale. Higher scores on this measure are indicative of increased dysphoria (items 4, 8, 12 and 16 are reverse scored). The CES-D has been established as a reliable and valid measure in a student population (Radloff, 1989).

4.3.4 *Suicidal Thinking*

The Suicide Probability Scale (SPS; Cull & Gill, 1988) is a 36-item tool used to assess suicide risk in both clinical and non-clinical populations. The scale consists of four subscales measuring hopelessness, suicidal ideation, negative self-assessment and hostility. In the present research we employed the Suicide Ideation subscale only, which provided an eight item measure of suicide ideation (e.g. 'In order to punish others, I think of suicide') (see Appendix 11). Participants were asked to rate how frequently they experienced particular thoughts or feelings in the past week on four point scale. Higher scores were indicative of increased suicide ideation. This measure of suicide ideation was selected because as well as being predictive of suicide risk (e.g. Larzelere, Smith, Batenhorst & Kelly, 1996; Witte, Fitzpatrick, Joiner, Bradley & Schmidt, 2005) it has demonstrated sensitivity to changes in suicidality (e.g. Rudd, Rajab, Orman, Stulman, Joiner & Dixon, 1996). The reliability and validity of the SPS has previously been demonstrated (Cull & Gill, 1988).

4.3.5   Mood

A ten centimetre visual analogue scale (Aitken, 1969), anchored at sad and happy, provided a measure of participants' mood. An additional measure of mood was provided by the Profile of Mood States (POMS; McNair, Lorr and Droppleman, 1971). The POMS required participants to rate a series of 65 adjectives on a five point scale in accordance with their current feelings (items 22 and 54 are reverse coded) (see Appendix 12). The POMS subdivides into 6 subscales: tension, depression, anger, vigour, fatigue and confusion.   The sum of the items in each subscale provides a total score for the subscale.   A total mood disturbance score can be calculated by summing the tension, depression, anger, fatigue and confusion subscales and subtracting vigour. Greater scores are indicative of increased mood disturbance. The POMS has previously been demonstrated to be reliable and valid (McNair et al., 1971).

4.4   Manipulation Procedures

4.4.1   Rumination and Distraction Manipulations

Both the rumination and distraction manipulations were based on procedures developed by Nolen-Hoeksema and Morrow (1993), adapted by Lavender and Watkins (2004) for use with British participants. Participants were asked to visualise, focus and concentrate on a series of 45-items in an eight minute self-paced task (see Appendix 13 and Appendix 14). In the rumination condition, these items related to either symptoms, emotions, or the self, however they were not specifically directed to think about negative emotions or traits. For example, participants were requested to think about 'the physical sensations you feel in your body', 'how awake or tired you feel now', 'what your feelings might mean' and 'the

degree of relaxation or agitation you feel'. In the distraction condition each item was focussed externally away from the self and was unconnected to feelings or symptoms. Example items included think about 'raindrops sliding down a window pane', 'the layout of a typical classroom', 'a double-decker bus driving down a street' and 'two birds sitting on a tree branch'.   Previous research using this method has found that, for individuals in a negative mood, the rumination manipulation increases depressed mood, whilst the distraction manipulation alleviates depressed mood (e.g. Lyubomirsky, Caldwell & Nolen-Hoeksema, 1998).

4.4.2   Positive and Negative Mood Manipulations

The mood induction task followed Moore and Oaksford's (2002) procedure where an adaptation of the Velten mood induction procedure (Velten, 1968) was combined with music and a specific request to participants to try to alter their mood state. Negative mood was induced using a series of statements presented on a computer screen which participants were asked to read aloud. Statements included 'Just when I think things are going to get better, something else goes wrong' and 'People annoy me; I wish I could be by myself' and were accompanied by Barber's Adagio for Strings and Mahler's 5th Symphony Adagietto. The positive mood induction followed the same procedure with a series of statements including 'I have complete confidence in myself' and 'I feel light hearted', accompanied by Mozart's Einekleine Nachtmusik 1st, 3rd and 4th movement. The use of a combination of methods to induce a particular mood has been shown to be most effective methodology (Martin, 1990).

5 Study One: A self-report and experimental study to examine moderating and mediating influences in the relationships between rumination and perfectionism and distress.

5.1 Abstract

Objectives. This study aimed to examine the role of individual difference variables, in the relationships between both perfectionism and distress and rumination and distress. A further aim was to test the causal role of rumination in attentional bias.

Design. A test-retest design was utilised. The prospective nature of this study allowed for predictions of distress over time, controlling for initial levels of distress.

Method. Ninety nine student participants completed initial measures of rumination, perfectionism, goal adjustment and psychological distress and attentional bias. Participants then completed experimental manipulations of mood and rumination before re-completing a measure of attentional bias. Approximately five weeks later, 83 participants re-completed self report measures of psychological distress.

Results. The effect of manipulating rumination on attentional bias was examined by analysis of variance. Moderating and mediating influences on the relationship between both perfectionism and rumination and distress were examined through a series of multiple hierarchical regression analyses.

Conclusions. We found evidence of a causal relationship between rumination and positive attentional bias where inducing rumination showed a trend to increase positive attentional bias, whilst the opposite effect occurred following

the induction of distraction. Stress, rumination and goal adjustment and positive attentional bias were found to moderate and / or mediate the relationship between perfectionism and distress. In addition, stress both mediated and moderated the relationship between rumination and distress, whilst goal disengagement also moderated this relationship. These findings are discussed in relation to previous research.

5.2   Introduction

5.2.1   *The relationship between attentional biases and rumination*

As outlined in section 2.3.3, there are a number of theoretical similarities between rumination and attentional bias. However, in order to examine the possibility of causation between rumination and attentional bias, there is a need for an experimental manipulation of rumination. Nolen-Hoeksema and Morrow (1993) have developed a rumination manipulation procedure which will allow for causation between rumination and attentional bias to be examined in the present research. In addition, as the effects of rumination/distraction inductions appear to vary by mood (e.g. Lyubomirsky & Nolen-Hoeksema, 1995), an experimental negative mood manipulation will also be employed.

5.2.2   *Influences on the perfectionism-distress relationship*

As summarised in section 2.4.2, perfectionism has consistently been linked with psychological distress (although this relationship varies as a function of the dimension of perfectionism under study). A number of variables have been outlined as having a possible impact on the perfectionism-distress relationship including

stress, rumination, goal adjustment and attentional bias (see sections 2.4.3, 2.4.4, 2.5.3 and 2.4.5 for full details).

5.2.2.1 Stress

Stress has previously been shown to moderate the relationship between self-oriented perfectionism and depressive symptoms (Flett et al, 1995). However, other research failed to find this association, instead reporting that socially prescribed perfectionism interacted with stress to predict hopelessness and psychological symptoms (Chang & Rand, 2000). Thus, the specific nature of any diathesis-stress relationships between the different dimensions of perfectionism and different measures of distress remains unclear, indicating a need for prospective research to examine this further.

Stress may also impact on the perfectionism-distress relationship through a mediating relationship. From this perspective the experience of perfectionism, through setting unattainable goals and targets, actually generates stress which, in turn, increases the levels of distress experienced. Previous research using Frost and colleagues Multi-dimensional Perfectionism Scale (Frost, Marten, Lahart & Rosenblate, 1990) found that stress partially mediated the relationship between perfectionism and negative psychological outcome (Chang, 2000). One cross-sectional study found that interpersonal problems mediated the relationship between socially prescribed perfectionism and depression (Hewitt, Flynn, Mikail & Flett, 2001). However, there is a need for further research to examine this area.

5.2.2.2 Rumination

Recent research has indicated a role for rumination to mediate the impact of perfectionism on distress (Flett et al., 2002; O'Connor et al., 2007; O'Connor & Noyce, 2008; Harris et al., 2008) (see section 2.4.4 for details). It is also possible that rumination may moderate the impact of perfectionism on distress, such that the adverse consequences of perfectionism are amplified by perseverative ruminative thinking.   However, this possibility has to date received little research attention, an issue which will be addressed in the current study.

5.2.2.3 Goal adjustment

Perfectionism often involves setting unrealistic and unachievable goals, therefore it is perhaps little surprise that it should be related to goal adjustment (see section 2.5.3 for more details). However, this is a much under-researched area. One study examining this relationship cross-sectionally found that goal reengagement both moderated and mediated the effects of socially prescribed perfectionism on suicidal thinking (O'Connor & Forgan, 2007). However, the nature of this relationship over time remains unexplored.

5.2.2.4 Attentional Bias

There has been little empirical research examining the role of attentional biases in the perfectionism-distress relationship. However, given that perfectionists are excessively concerned with failure and achieving unrealistic standards, it seems possible that biases in attention towards negatively valenced stimuli, may exacerbate the levels of distress associated with perfectionism (e.g. attentional biases may moderate the perfectionism-distress relationship). However, it is also

possible that perfectionism alters an individual's pattern of attention such that they increasingly attend towards negative stimuli and/or away from positive stimuli (e.g. attentional biases may mediate the perfectionism-distress relationship). The current study will investigate both of these possibilities.

5.2.3   Influences on the rumination-distress relationship

Similar to perfectionism, rumination has also been persistently linked with measures of distress (see section 2.2.3 for full details). A number of variables may impact on the rumination-distress relationship including stress, goal adjustment and attentional biases. The present study examines these possibilities through a prospective design.

5.2.3.1 Stress

Recent theorists have proposed the concept of stress-reactive rumination, where ruminations occur in response to a stressful life event (Robinson & Alloy, 2003) (see section 2.2.1.2 for more details). However, the moderating effects of stress on the rumination-distress relationship are not routinely reported. Nonetheless, there is some evidence to suggest that a ruminative response style interacts with levels of stress to predict social dysfunction, dysphoria, hopelessness and suicidal thinking (Morrison & O'Connor, 2005, Morrison & O'Connor, 2008a). In contrast, the possible mediating effects of stress on the rumination-distress relationship have yet to be empirically examined (i.e. the extent to which rumination results in increased stress, which in turn increases distress).

5.2.3.2 Goal adjustment

There is some indirect evidence to link goal adjustment with rumination. Both goal disengagement and goal reengagement have both been associated with lower levels of intrusive thoughts (Wrosch et al., 2003). In addition, ruminations relating to goal pursuit have been suggested to disrupt sleep and provide a mechanism for goal adjustment to affect immune functioning (Miller and Wrosch, 2007). However, the extent to which goal adjustment directly impacts on the rumination-distress relationship has yet to be explored, something which is addressed in the present study.

5.2.3.3 Attentional bias

As highlighted in section 2.3.3, there has been little research examining the relationship between rumination and attentional bias. If attentional biases towards negative stimuli reflect a difficulty in disengaging from negative information then it would seem likely that attentional bias may moderate the rumination-distress relationship. It is also possible that ruminative tendencies increase the likelihood of attending to more negative stimuli and less to positive stimuli, which indicates the possibility of attentional biases mediating the impact of rumination on distress.

5.2.4 Aims

The current study had two main aims: (i) to examine the effect of manipulating rumination on attentional bias and; (ii) to test the moderating/mediating roles of a series of cognitive and personality variables on the established relationships between both perfectionism and distress and rumination

and distress (see Figure 5.1 and Figure 5.2). To this end, a series of research
questions and specific hypotheses are outlined in section 5.2.5.

5.2.5   Research questions and hypotheses

*1) Does manipulating rumination affect positive or negative attentional
bias?* Given the theoretical similarities between rumination and attentional bias and
previous research in this area, we hypothesised that inducing rumination would
decrease positive attentional bias and increase negative attentional bias.

*2) Does stress moderate and/or mediate the perfectionism-distress
relationship?* Based on previous research findings, we hypothesised that stress
would moderate the both the self-oriented perfectionism-distress relationship and
the socially prescribed perfectionism-distress relationship, consistent with a
diathesis-stress paradigm, such that increased self or social perfectionism in
combination with increased stress would be predictive of greater distress. We also
hypothesised that stress would mediate the socially prescribed perfectionism-
distress link, consistent with previous findings.

*3) Does rumination moderate and/or mediate the perfectionism-distress
relationship?* Following previous research findings we hypothesised that
rumination would mediate both the socially prescribed perfectionism-distress
relationship and the self-oriented perfectionism-distress relationship, such that
increased rumination combined with increased socially prescribed or self-oriented
perfectionism would be predictive of increased distress.   We made no specific
predictions regarding the possible moderating effect of rumination on the
perfectionism-distress relationship due to a lack of previous research in this area.

4) Does goal adjustment moderate and/or mediate the perfectionism-distress relationship? Following previous research, we hypothesised that goal reengagement would both moderate and mediate the socially prescribed perfectionism-distress relationship, whereby low goal reengagement, in conjunction with high socially prescribed perfectionism, would be predictive of increased distress.

5) Does attentional bias moderate and/or mediate the perfectionism-distress relationship? Given the lack of previous research in this area we made no specific hypothesis about the impact of attentional bias on the perfectionism-distress relationship.

6) Does stress moderate and/or mediate the rumination-distress relationship? Following previous research evidence, we hypothesised that stress would moderate the relationship between rumination and hopelessness and suicidal thinking, such that high stress combined with high rumination would be predictive of increased hopelessness and suicidal thinking. A lack of research evidence meant we made no specific predictions about the nature of any mediating effect of stress on the rumination-distress relationship.

7) Does goal adjustment moderate and/or mediate the rumination-distress relationship? There is a lack of empirical research in this area on which to base our hypothesis, however given the anecdotal evidence from discussions of previous research we hypothesised that both goal disengagement and goal reengagement would moderate the rumination-distress relationship, where lower levels of either goal disengagement or goal reengagement when combined with high stress, would be predictive of increased distress.

8) Does attentional bias moderate and/or mediate the rumination-distress relationship? We did not make a specific hypothesis regarding the impact of attentional bias on the rumination-distress relationship due to a lack of previous research in this area.
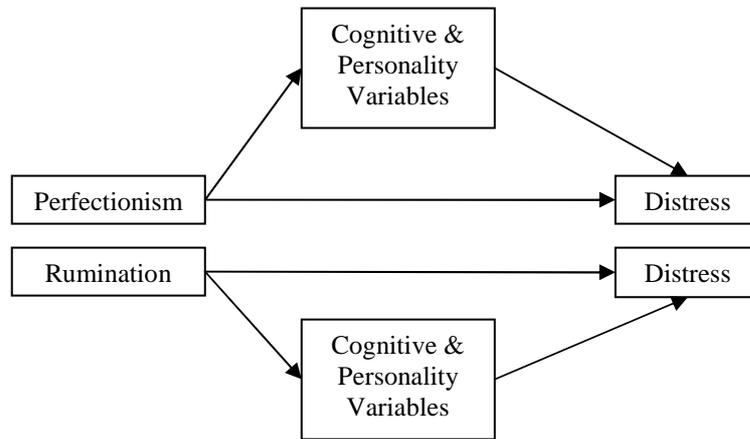
Figure 5.1. Mediating relationships explored in study one.
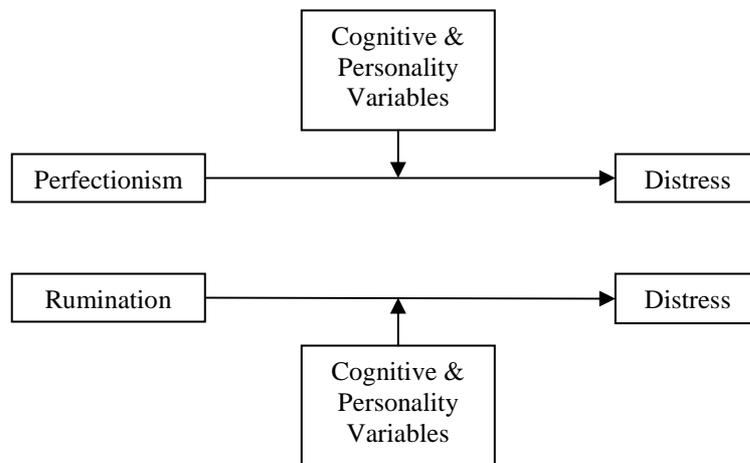
Figure 5.2. Moderating relationships explored in study one

5.3   Method

5.3.1 *Participants*

Ninety-nine students were recruited from a Scottish University. Participants were volunteers recruited via an online experiment management system and they

were offered course credit in return for participation. All participants were first informed that participation was voluntary and confidential and even after giving initial consent, they were free to withdraw at any stage. Participants were aged between 17 and 68 years with a mean age of 22.47 years (SD=7.58). Thirty-five males and 64 females participated in the study. The majority of participants were not married (94.9%).

Eighty-three of the original participants went on to complete self-report measures at time two (T2), between eighteen and ninety days after T1 (mean gap = 35.82 days), representing an 83.8% response rate at T2. Participants who did not complete T2 measures did not significantly differ in age or marital status from those who did. However, proportionately more males (n = 10) than females (n = 6) did not complete T2 measures (χ^2 = 6.15 (1), p<.05).

5.3.2   Measures

Rumination. The Response Styles Questionnaire (Short Form) (Short RSQ: Davis & Nolen-Hoeksema, 2000) provided a measure of participants' ruminative tendencies in negative situations (e.g. 'I think about a recent situation, wishing it had gone better') (see section 4.2.1 for more a more detailed description). Internal consistency in this sample was good (Cronbach's α = .84-.90).

Hopelessness. The Beck Hopelessness Scale (BHS; Beck, Weissman, Lester & Trexler, 1974) measured pessimism towards the future (e.g. 'It's very unlikely that I will get any real satisfaction in the future') (see section 4.3.1 for more a more detailed description). Satisfactory internal consistency was achieved in this sample (α > .84 at both administrations).

Anxiety and Depression. The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) measured both depression and anxiety (e.g. 'I feel as if I am slowed down' and 'Worrying thoughts go through my mind') (see section 4.3.2 for more a more detailed description). Cronbach's alpha in this sample ranged from .71 - .82 across administrations, indicating adequate internal consistency.

Dysphoria. The Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) provided a measure of dysphoria (e.g. 'I felt that I was just as good as other people') (see section 4.3.3 for more a more detailed description). Internal consistency in this sample was good across each time point (range of α = .89 - .93).

Suicidal Thinking. The Suicide Ideation Subscale of the Suicide Probability Scale (SPS; Cull & Gill, 1988) provided a measure of suicide ideation (e.g. 'In order to punish others, I think of suicide') (see section 4.3.4 for more a more detailed description). Internal consistency in this sample was acceptable (range α = .86 - .87).

Perfectionism. The Multidimensional Perfectionism Scale (MPS) (Hewitt & Flett, 1991) provided a measure of perfectionism (see section 4.2.2 for more a more detailed description). Cronbach's alpha in this sample was good (range α = .77-.93).

Goal Adjustment. The Goal Adjustment Scale (Wrosch, et al, 2003) provided a measure of both goal disengagement and goal reengagement (see section 4.2.3 for more a more detailed description). Internal consistency in this sample was confirmed (Cronbach's α range = .84-.88).

Stress. The Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983) measured global stress in the weeks between time one and time two (e.g. 'How often have you felt nervous and stressed?') (see section 4.2.5 for more a more detailed description). Internal consistency in this sample was satisfactory (Cronbach's α = .89).

Mood. A ten centimetre visual analogue scale, anchored at sad and happy, provided a measure of participants' mood (Aitken, 1969). An additional measure of mood was provided by the Profile of Mood States (POMS; McNair, Lorr and Droppleman, 1971). The POMS required participants to rate a series of 65 adjectives on a five point scale in accordance with their current feelings (see section 4.3.5 for more a more detailed description). Greater scores are indicative of increased mood disturbance. Internal consistency was confirmed in this sample (range of α = .79 - .95)

Attentional Bias. A dot-probe task (MacLeod et al, 1986) was used to provide a measure of attentional bias. This consisted of 8 baseline trials and 60 experimental trials. Each trial in this task began with a fixation cross presented in the centre of the screen for 500 ms. This was followed by the simultaneous presentation of two words, one above and one below centre (in the baseline trials strings of the letter X were used instead of words). The words were 3.5cm apart and remained on the screen for 750 ms. Immediately following the word pair presentation, a dot-probe appeared in the location of one of the previous words and participants used a response box to indicate the spatial position of the probe. The participants' response concluded each trial, and after a 1000 ms rest, the next trial began. Participants' reaction times were measured and quicker reaction times were

taken to indicate that participants were attending to the word previously in the same location as the probe.

The words used in this task were selected from a standardised list created by John (1988). Each positive and negative word was paired with a neutral word matched for length and frequency of usage. Of the 60 experimental trials, 30 consisted of positive-neutral word pairings and 30 consisted of negative-neutral word pairings. The probe followed the neutral word in half of the trials, and followed the negative/positive word in the remainder of the trials. The presentation order of the word-pairings was randomised.

Rumination and Distraction Manipulations. Both the rumination and distraction manipulations were based on procedures developed by Nolen-Hoeksema and Morrow (1993), adapted by Lavender and Watkins (2004) for use with British participants. Participants were asked to visualise, focus and concentrate on a series of 45-items in an eight minute self-paced task (see section 4.4.1 for a more detailed description).

Positive and Negative Mood Manipulations. The mood induction task followed Moore and Oaksford's (2002) procedure where an adaptation of the Velten mood induction procedure (Velten, 1968) was combined with music and a specific request to participants to try to alter their mood state.   Negative mood was induced using statements including 'Just when I think things are going to get better, something else goes wrong' and was accompanied by Barber's Adagio for Strings (see section 4.4.2 for a more detailed description)

5.3.3   Procedure

Prior to the collection of any data, ethical approval was obtained from the University Psychology Department's ethics committee. At time one (T1), participants first completed the dot-probe task to provide a baseline measure of attentional bias. This was followed by a series of self-report measures tapping rumination, dysphoria, depression, anxiety, hopelessness, suicidal thinking, perfectionism, goal adjustment and mood.   Participants then completed a negative mood induction, followed by the appropriate rumination or distraction manipulation.   Participants then re-rated their mood and re-completed the dot-probe task. Finally, participants completed a positive mood induction to restore their mood prior to leaving the experiment.

At time two (T2), approximately five weeks later, participants were asked to re-complete self-report measures of rumination, dysphoria, depression, anxiety, hopelessness and suicidal thinking in addition to a measure of perceived stress. A flow chart of the procedure for study one can be seen in Figure 5.3.
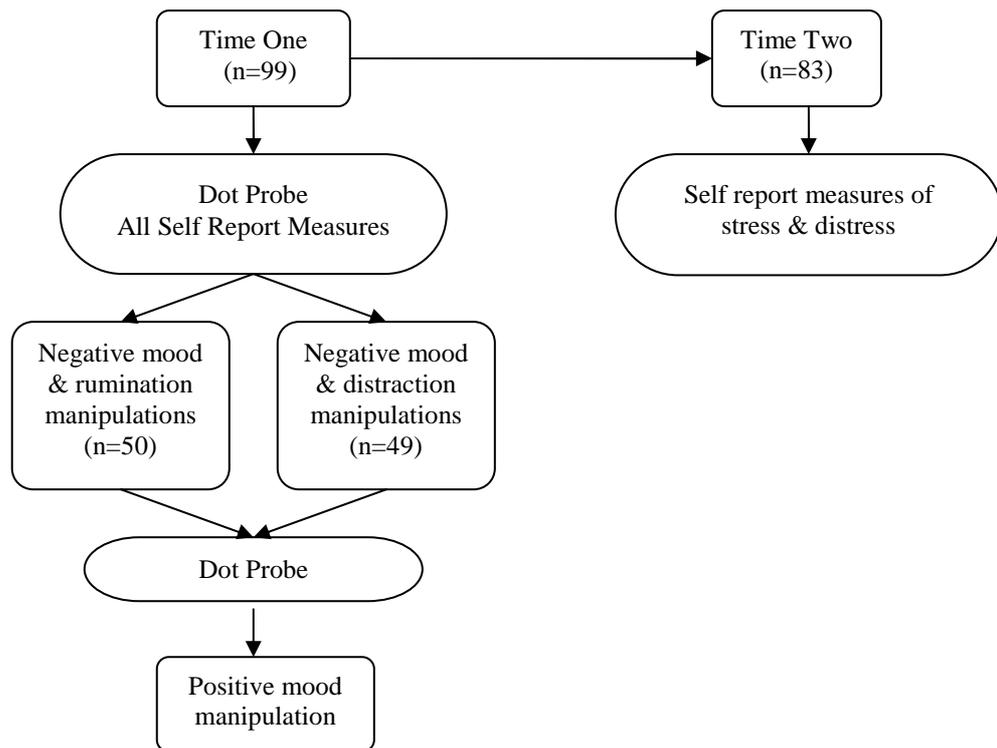
Figure 5.3. Flow chart of study one procedure

5.3.4   Power, sample and analytic strategy

The impact of the manipulation of rumination on attentional bias was examined through repeated measures analysis of variance. Our sample of 99 participants allowed for the detection of a small to medium sized effect (f = 0.20) between groups with 95% power and a 5% significance level. The relationships between other study variables were examined through a series of multiple hierarchical regression analyses. The follow up sample of 83 participants provided these regression analyses with up to 95% power to detect a medium to large sized effect (f^2 = 0.30) with a 2.5% significance level in an analysis with five predictors.

5.4 Results

5.4.1 *Manipulation Check*

In order to examine whether the mood and rumination/distraction manipulations had the anticipated effects, repeated measures ANOVA were conducted. These analyses examined any change in both the Profile of Mood States (POMS) and visual analogue measures of mood from pre-to-post manipulations, between groups. There were no significant differences on POMS scores between groups prior to manipulations ($F (1, 98) = .26$, n.s.). Analysis of POMS total mood disturbance scores pre- and post-manipulations showed the group x time interaction just failed to reach conventional levels of significance ($F (1, 97) = 3.34$, p=.071). Table 5.1 illustrates that although both groups increase in mood disturbance from pre to post manipulations, this increase was larger for the rumination group, as expected.

There was no significant difference in visual analogue mood scores between groups prior to manipulations ($F (1, 98) = .35$, N.S). Analysis of visual analogue mood scores from pre-to-post manipulations showed a significant manipulation group x time interaction ($F (1, 97) = 9.47$, p<.01). Table 5.1 illustrates that although both groups decrease in happiness following manipulations, this decrease is larger for the rumination group, as expected. A t-test confirmed that the rumination group had significantly lower happiness scores post manipulations ($t (97) = -1.99$, p <.05).

Table 5.1. Means and standard deviations for POMS total mood disturbance and Visual Analogue Scale (VAS) pre and post manipulations, split by group.

Manipulation Group	POMS Pre-Manipulation Mean (SD)	POMS Post- Manipulation Mean (SD)	VAS Pre-manipulation Mean (SD)	VAS Post-Manipulation Mean (SD)
Rumination	17.70 (32.10)	37.00 (36.59)	69.60 (18.65)	49.54 (20.47)
Distraction	14.44 (31.06)	26.04 (32.40)	67.27 (20.51)	57.24 (18.51)

5.4.2   Attentional Bias

Prior to calculating attentional bias, consistent with other studies in the field (e.g. Beevers & Carver, 2003; Bradley et al., 1997), all incorrect responses along with very fast (less than 200 ms) and very slow (over 2000 ms) responses were identified and along with outlying responses (more than 2 standard deviations above an individual's mean score) were excluded from all analyses, to minimise the impact of outliers on results. This excluded data accounted for 4.5% of total responses.

Following Mogg, Bradley and Williams (1995) attentional bias scores were calculated by subtracting the mean response times from trials where the probe was in the same location as the valenced word from the mean response times in those trials where the probe was in a different location from the valenced word. Attentional bias scores were calculated separately for positive and negative stimuli. This can be calculated using the following equation:

[(Valenced word upper, probe lower + Valenced word lower, probe upper) – (Valenced word upper, probe upper + Valenced word lower, probe lower)] / 2

Positive attentional bias values indicate increased attention towards the valenced stimuli in comparison to the neutral stimuli, whilst negative values reflect "avoidance" of the valenced stimuli.

In order to control for changes in reaction time, a standardised change score (Judd & Kenny, 1981) for baseline reaction time was calculated using the following equation (Beevers & Carver, 2003):

Change in baseline reaction time = Mean Baseline Reaction T2 – (Mean Baseline Reaction T1 x Standard Deviation Baseline Reaction T2 / Standard Deviation Baseline Reaction T1)

5.4.3   Correlations between variables

Table 5.2 illustrates the correlations between all variables. Initial negative attentional bias was significantly negatively correlated with self-oriented perfectionism (r = -.182, p<.05) and suicidal thinking at T2 (r = -.188, p<.05) and positively correlated with HADS Anxiety at T2 (r = .182, p <.05). Initial positive attentional bias did not significantly correlate with any other variable. Negative attentional bias following manipulations negatively correlated with initial rumination, self-oriented perfectionism, anxiety at T1, dysphoria at T1, stress and rumination at T2 (range of r = -.185- -.235). Positive attentional bias following manipulations was significantly positively correlated with depression at T1 (r = .266, p<.01). Initial rumination was positively correlated with self-oriented (r = .240, p <.01) and socially prescribed perfectionism (r = .383, p<.01) in addition to stress (r = .511, p<.01), rumination at T2 (r = .697, p<.01) and each measure of distress at both time points (range of r = .330-.527). All dimensions of perfectionism were intercorrelated (range of r = .186-.492). In addition, self-oriented perfectionism positively correlated with anxiety at T1 (r = .280, p <.05) and suicidal thinking at T1 (r = .168, p<.05) and T2 (r = .234, p<.05) and negatively correlated with goal disengagement (r = -.384, p<.01). Other oriented perfectionism was negatively correlated with hopelessness at T1 (r = -.190, p<.05). Socially prescribed perfectionism significantly positively correlated with each measure of distress and stress (range of r = .283-.494) as well as negatively correlating with

goal reengagement (r = - .208, p<.05).   Goal disengagement positively correlated

with goal reengagement (r = .209, p<.05) and negatively correlated with

hopelessness (r = -.248, p<.05) and suicidal thinking at T2 (r = -.205, p<.05). Goal

reengagement negatively correlated with hopelessness, depression, dysphoria and

suicidal thinking all at T1 and hopelessness at T2 (range of r = -171 – -.367).

Finally, each measure of distress was positively intercorrelated and also

significantly positively correlated with stress (range of r =.363-.801).

Table 5.2. Correlations, means and standard deviations of all variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. -ve Bias T1	-																				
2. +ve Bias T1	-.078	-																			
3. -ve Bias T2	.099	.058	-																		
4. +ve Bias T2	-.006	-.016	.112	-																	
5. RSQ T1	.020	-.041	-.219*	.043	-																
6. Goal Dis	.140	.056	.125	-.045	.048	-															
7. Goal Re	.002	.056	-.003	-.003	.012	.209*	-														
8. Self	-.182*	.023	-.205*	-.032	.240**	-.384**	-.026	-													
9. Other	-.091	.097	-.162	-.106	-.012	-.146	.073	.492**	-												
10. Social	-.007	.112	-.159	.000	.383**	-.126	-.208*	.454**	.186*	-											
11. BHS T1	-.012	.064	-.090	.015	.364**	-.014	-.322**	-.024	-.190*	.422**	-										
12. Anx T1	.079	.022	-.185*	.111	.506**	-.134	-.128	.208*	-.050	.438**	.363**	-									
13. Dep T1	-.043	.020	-.047	.266**	.402**	-.072	-.225*	.102	-.074	.478**	.486**	.561**	-								
14. CESD T1	-.092	.108	-.197*	.076	.527**	.084	-.171*	.072	-.034	.444**	.515**	.609**	.590**	-							
15. SPS T1	-.088	.028	-.014	.031	.446**	-.080	-.243**	.168*	-.070	.410**	.519**	.499**	.512**	.533**	-						
16. BHS T2	-.026	.115	-.154	.151	.393**	-.248*	-.367**	.144	-.170	.436**	.844**	.484**	.605**	.565**	.652**	-					
17. Anx T2	.189*	.124	-.170	.128	.392**	-.168	-.140	.137	-.037	.332**	.379**	.699**	.465**	.545**	.368**	.603**	-				
18. Dep T2	-.065	.032	-.165	.114	.330**	-.177	-.157	.148	-.026	.420**	.467**	.588**	.680**	.583**	.409**	.639**	.733**	-			
19. CESD T2	-.139	.073	-.063	-.029	.391**	-.146	-.120	.161	-.008	.412**	.445**	.664**	.552**	.666**	.497**	.637**	.733**	.801**	-		
20. SPS T2	-.188*	-.013	-.139	.031	.434**	-.205*	-.165	.234*	-.047	.283**	.399**	.505**	.426**	.562**	.786**	.572**	.385**	.433**	.541**	-	
21. PSS T2	-.017	.070	-.235*	-.027	.511**	-.049	-.176	.129	-.084	.494**	.453**	.590**	.555**	.726**	.401**	.575**	.600**	.626**	.654**	.446**	-
22. RSQ T2	.007	-.037	-.197*	-.013	.697**	.046	.091	.279**	.044	.400**	.266**	.406**	.421**	.495**	.374**	.450**	.395**	.427**	.528**	.483**	.651**
Mean Score	6.02	1.50	6.31	2.47	20.90	2.80	3.82	62.62	54.35	50.22	3.97	7.38	3.18	13.25	1.14	3.80	7.12	3.29	12.66	1.20	23.56
SD	28.38	20.54	27.93	25.55	5.56	0.95	0.55	18.41	11.81	13.32	3.63	3.44	2.81	9.90	2.50	3.87	4.04	3.08	10.74	2.57	8.83

Note: -ve Bias T1=Negative attentional bias pre-manipulations; +ve Bias T1=Positive attentional bias pre-manipulations; -ve Bias T2= Negative attentional bias post manipulations; +ve Bias T2=Positive attentional bias post manipulations; Goal Dis=Goal Disengagement; Goal Re=Goal Reengagement; Self=Self-oriented perfectionism; Other = Other oriented perfectionism; Social=Socially prescribed perfectionism; Anx T1= HADS Anxiety T1; Dep T1= HADS Depression T1; Anx T2=HADS Anxiety T2; Dep T2=HADS Depression T2

* Correlation is significant at the .05 level (one-tailed), ** Correlation is significant at the .01 level (one-tailed)

5.4.4 Change in attentional bias

To investigate change in attentional bias from pre to post manipulations, between groups analysis of variance was conducted, using change in response to baseline stimuli as a covariate, to control for differences in baseline reaction time. Table 5.3 shows the means scores and standard deviations for negative and positive attentional bias pre and post manipulations, split by group. There was no significant difference in negative attentional bias between groups, prior to manipulations ($F_{(1, 98)} = .20$, n.s.). Following manipulations, as can be seen in Table 5.3, there was almost no change in negative attentional bias for the rumination or distraction groups ($F_{(1, 96)} = .03$, n.s.).

Prior to manipulations there was no significant difference in positive attentional bias between groups ($F_{(1, 98)} = 2.11$, n.s.) (see Table 5.3). Following manipulations, the rumination group showed an increase in positive attentional bias, whilst the distraction group showed a decrease in positive attentional bias, this group x time interaction showed a trend towards significance ($F_{(1, 96)} = 3.11$, p = .08). Thus, after the mood and rumination manipulations, participants completing a rumination induction increased in positive attentional bias and those completing a distraction manipulation decreased in positive attentional bias. However there was no change in the negative attentional bias scores of either group.

Table 5.3. Means and standard deviations of attentional bias pre and post manipulations

Manipulation Group	Negative Attentional Bias Pre-Manipulation Mean (SD)	Negative Attentional Bias Post-Manipulation Mean (SD)	Positive Attentional Bias Pre-manipulation Mean (SD)	Positive Attentional Bias Post-Manipulation Mean (SD)
Rumination	7.30 (29.84)	7.75 (25.80)	1.45 (18.58)	5.03 (24.97)
Distraction	4.71 (27.04)	4.83 (30.14)	4.51 (22.15)	-0.13 (26.13)

5.4.5   Differences in distress between T1 and T2

As can be seen in Table 5.2, hopelessness (t (82) = .89, n.s.), anxiety (t (82) = .97, n.s.) and dysphoria (t (82) = .64, n.s) all decreased from T1 to T2, whilst depression (t (82) = .05, n.s.) and suicidal thinking (t (82) = -.19, n.s.) increased between T1 and T2, however paired t-tests revealed that none of these changes in distress were significant. Table 5.4 illustrates effect sizes for these differences in distress between T1 and T2.

Table 5.4. Effect size *r* for the differences in distress between T1 and T2

Measure of distress	Effect size r for change between T1 and T2
Hopelessness	0.02
Depression	-0.02
Anxiety	0.04
Dysphoria	0.03
Suicidal Thinking	-0.02

5.4.6   Moderation Analyses

A series of regression analyses were used to test the moderating relationships between variables, as outlined in the research questions for this study. As there was a lack of variance between the measures of distress at time one (T1) and time two (T2), we conducted the analyses in two different ways, to minimise the risk of failing to detect salient findings. Specifically, analyses were conducted separately to examine: (i) the prediction of distress prospectively (i.e. whether our predictors measured at T1 were associated with distress at T2) and; (ii) the prediction of *change* in distress from T1 to T2 (i.e. whether our predictors measured at T1 were associated with distress at T2, after controlling for initial levels of distress). In the interest of brevity, and to limit the risk of Type I errors associated with multiple analyses, analyses were not conducted to examine the role of moderation in the cross-sectional data only. In addition, as we conducted two sets

of analyses, following Donaldson and colleagues (2007) we set the level of statistical significance at .025 (i.e. .05/2). Analyses were conducted separately to examine: (i) the self-oriented perfectionism-distress relationship; (ii) the socially prescribed perfectionism-distress relationship and; (iii) the rumination-distress relationship.

Prior to analysis, predictor variables were centred, as recommended by Aiken and West (1991). In each regression analysis the dependant variable was the measure of distress at time two. As a gender bias is frequently associated with rumination, the effect of gender was controlled for in the first step of each analysis involving rumination, along with time one distress, where appropriate. The second step of the analysis contained the main effect variables (for example: self-oriented perfectionism, and stress), whilst the final step contained the appropriate multiplicative terms for these main effect variables (for example: self-oriented perfectionism x stress).

Significant interactions were plotted at high and low levels of each of the interaction terms, consonant with Aiken & West (1991). These interactions were then probed post-hoc using simple slope analysis to determine whether either slope significantly differed from zero, again consonant with Aiken and West (1991).

5.4.7 The effect of moderation in the perfectionism-distress relationship in the prospective data

5.4.7.1 Stress as a moderator in the perfectionism-distress relationship

5.4.7.1.1 Self-oriented perfectionism-distress relationship

As a main effect, stress was significantly predictive of hopelessness ($\beta = .55$, $t (82) = 5.90$, $p < .0001$), anxiety ($\beta = .60$, $t (82) = 6.60$, $p < .0001$), depression ($\beta =$

.61, t (82) = 6.93, p <.0001), dysphoria (β = .65, t (82) = .7.56, p <.0001) and

suicidal thinking (β = .373, t (82) = 3.88, p <.0001). The interaction between self-

oriented perfectionism and stress was predictive of suicidal thinking at T2 (β = .29, t

(82) = 2.96, p <.01). A plot of the lines of best fit for this interaction can be seen in

Figure 5.4. Post hoc analyses revealed that the high slope significantly differed

from zero (β = .42, t (82) = 3.39, p <.001). In other words, there was a general trend

for high stress to be associated with higher levels of suicidal thinking; however

these negative consequences were amplified further by self-oriented perfectionism.
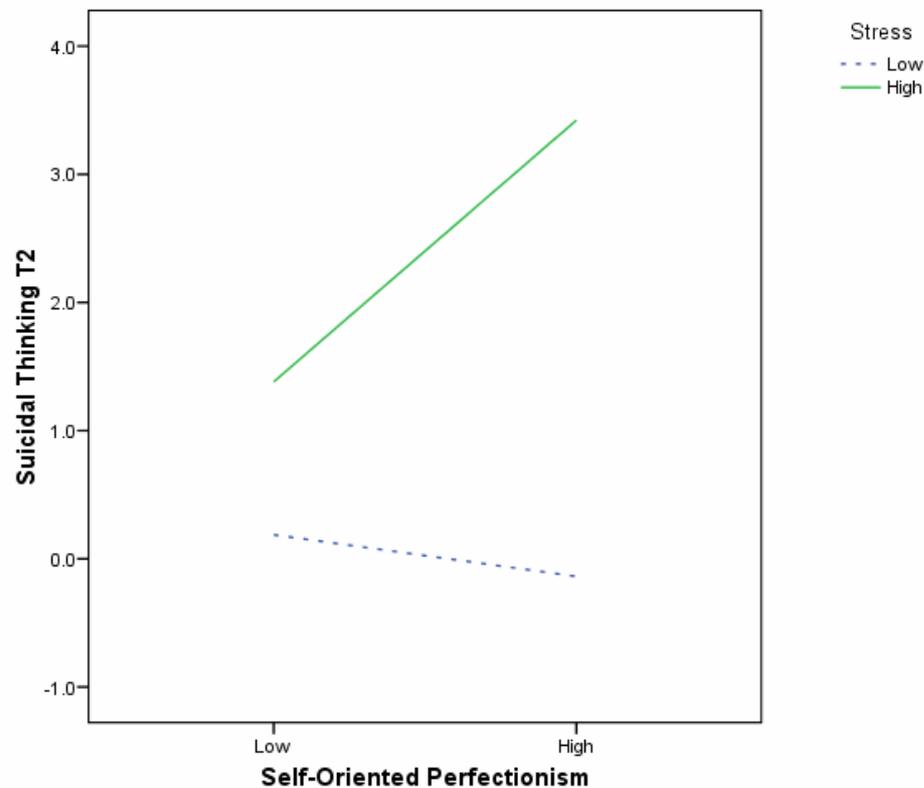
Figure 5.4. Self-oriented perfectionism x stress to predict suicidal thinking T2 (without controlling for T1 distress)

5.4.7.1.2 *Socially prescribed perfectionism-distress relationship*

As a main effect stress was significantly predictive of hopelessness (β = .46,

t (82) = 4.62, p <.0001), anxiety, (β = .58, t (82) = 5.65, p <.0001), depression (β =

.54, t (82) = 5.75, p <.0001), dysphoria (β = .59, t (82) = 6.19, p <.0001) and

suicidal thinking ($\beta = .39$, t (82) = 3.48, p <.001). The interaction between socially

prescribed perfectionism and stress was predictive of depression ($\beta = .22$, t (82) =

2.64, p <.01) and showed a trend towards significance to predict hopelessness ($\beta =$

.20, t (82) = 2.20, p =.031) and suicidal thinking ($\beta = .22$, t (82) = 2.21, p = .030). A

plot of the lines of best fit for the interaction between socially prescribed

perfectionism and stress to predict depression can be seen in Figure 5.5. Post hoc

analyses of this interaction revealed that the high slope significantly differed from

zero ($\beta = .33$, t (82) = 2.82, p <.01).   In other words, there was a general trend for

high stress to be associated with higher levels of depression; however these negative

consequences were amplified further by social perfectionism. Similar (non-

significant) trends were observed for hopelessness and suicidal thinking.
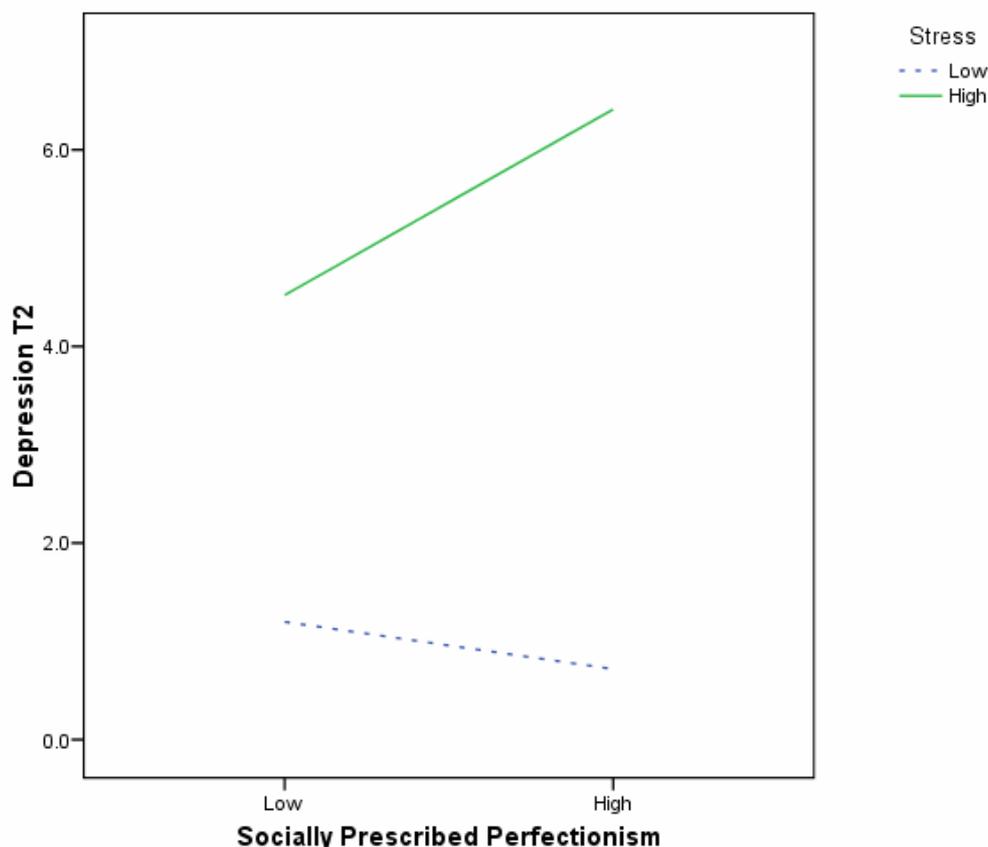
Figure 5.5. Socially prescribed perfectionism x stress to predict depression at T2 (without controlling for T1 distress)

5.4.7.2 Goal adjustment as a moderator in the perfectionism-distress relationship

5.4.7.2.1   Self-oriented perfectionism-distress relationship

The interaction between self-oriented perfection and goal disengagement was predictive of hopelessness (β = -.26, t (82) = -2.49, p <.025), dysphoria (β = -.28, t (82) = -2.49, p <.025) and suicidal thinking (β = -.470, t (82) = -4.65, p < .0001). Plots of the lines of best fit for these interactions can be seen in Figure 5.6, Figure 5.7 and Figure 5.8, respectively. Post hoc analyses revealed that for the interactions to predict hopelessness (β = .36, t (82) = 2.59, p <.025), dysphoria (β = .37, t (82) = 2.55, p <.025) and suicidal thinking (β = .58, t (82) = 4.40, p <.0001) the low slope significantly differed from zero. Thus low goal disengagement combined with high self-oriented perfectionism was predictive of increased hopelessness, dysphoria and suicidal thinking.
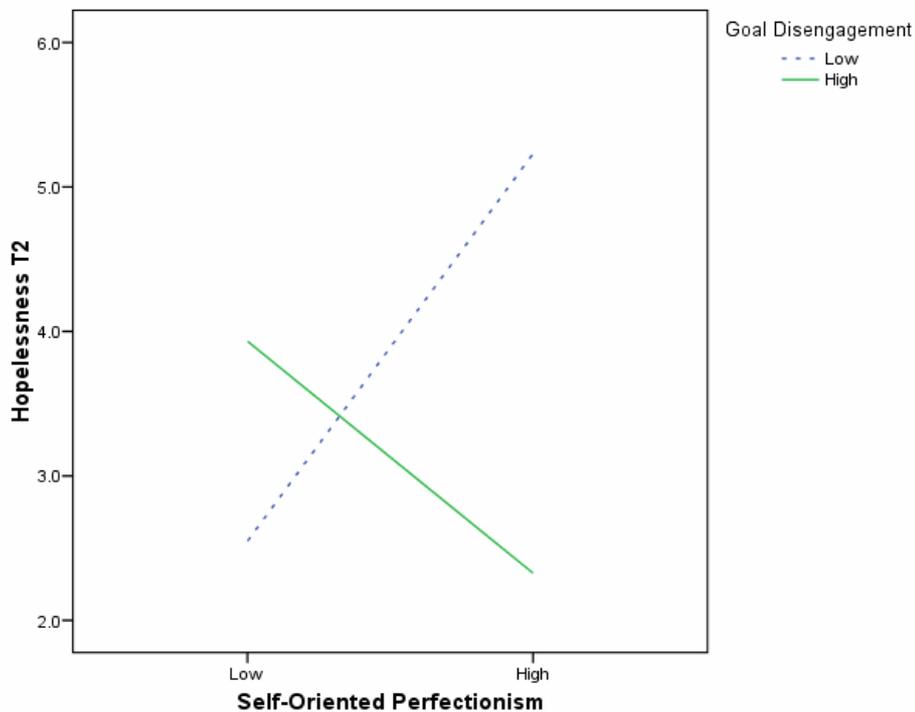
Figure 5.6. Self-oriented perfectionism x goal disengagement to predict hopelessness T2 (without controlling for T1 distress)
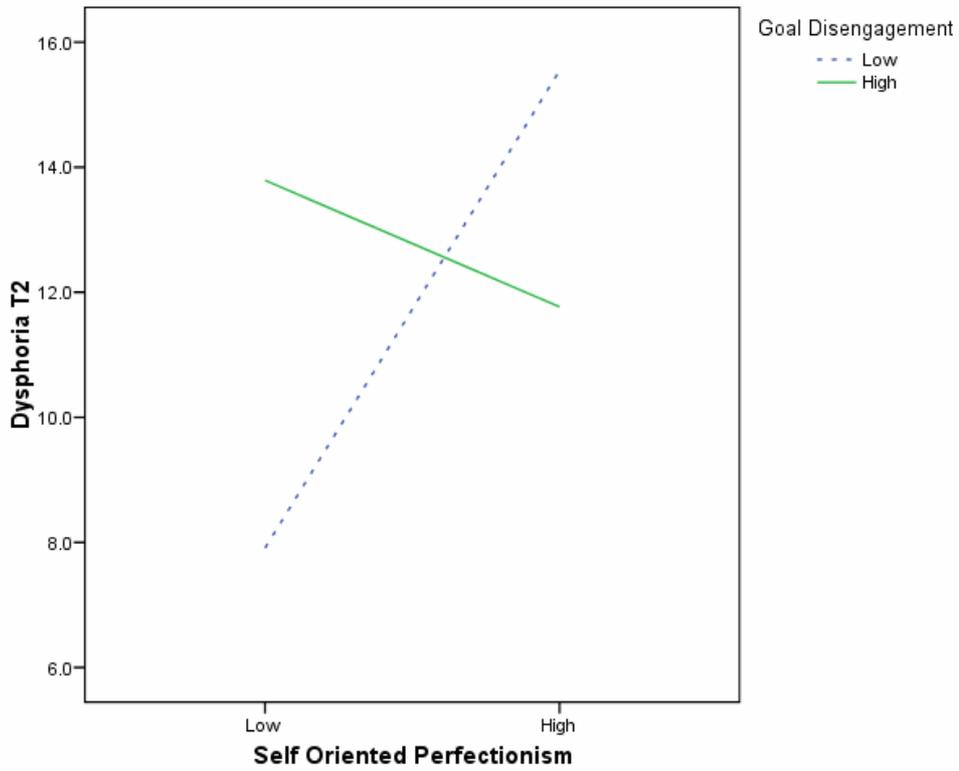
Figure 5.7. Self-oriented perfectionism x goal disengagement to predict dysphoria at T2 (not controlling for T1 distress)
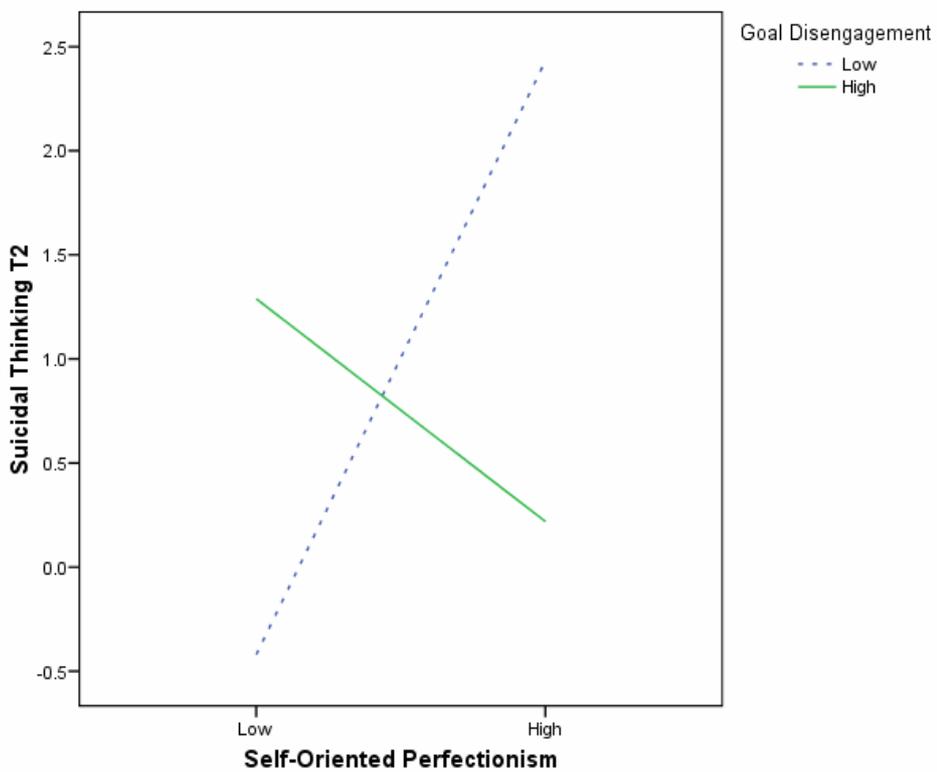
Figure 5.8. Self-oriented perfectionism x goal disengagement to predict suicidal thinking at T2 (without controlling for T1 distress)

Socially prescribed perfectionism-distress relationship

As a main effect, socially prescribed perfectionism was predictive of

hopelessness (β = .36, t (82) = 3.73, p <.0001), anxiety (β = .30, t (82) = 2.75, p

<.01), depression (β = .39, t (82) = 3.68, p <.0001) and dysphoria (β = .39, t (82) =

3.65, p <.0001). The interaction between socially prescribed perfectionism and goal

disengagement was predictive of suicidal thinking (β = -.40, t (82) = -3.45, p <.001).

A plot of the lines of best fit for this interaction can be seen in Figure 5.9. Post hoc

analysis of this interaction revealed that the low slope significantly differed from

zero (β = .54, t (82) = 4.15, p < .0001). Thus, high socially prescribed perfectionism

combined with low goal disengagement was predictive of increased suicidal

thinking. The interaction between socially prescribed perfectionism and goal

reengagement also showed a trend towards significance to predict hopelessness (β =

-.23, t (82) = -2.03, p =.046).
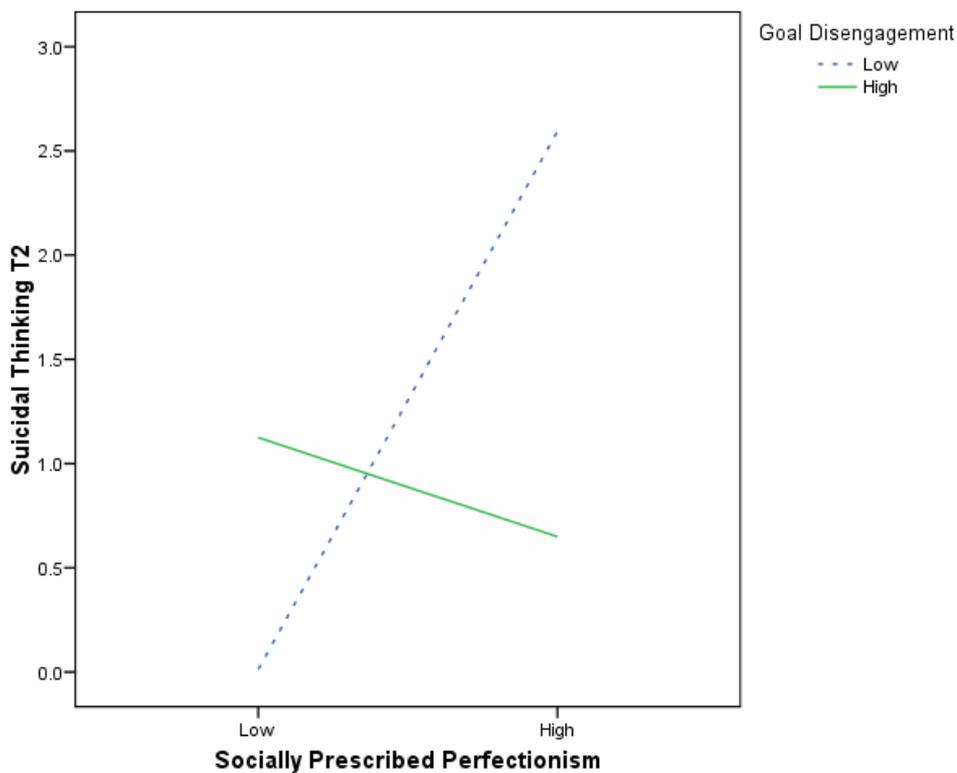
Figure 5.9. Socially prescribed perfectionism x goal disengagement to predict suicidal thinking T2 (not controlling for T1 distress)

5.4.7.3 Rumination as a moderator in the perfectionism-distress relationship

5.4.7.3.1   Self-oriented perfectionism-distress relationship

As a main effect, rumination was predictive of hopelessness (β = .37, t (82) = 3.42, p <.001), anxiety (β = .38, t (82) = 3.52, p < .001), depression (β = .30, t (82) = 2.68, p <.01), dysphoria (β = .382, t (82) = 3.52, p <.001) and suicidal thinking (β = .362, t (82) = 3.50, p <.001). However, no significant interactions were observed between rumination and self-oriented perfectionism to predict any measure of distress.

5.4.7.3.2   Socially prescribed perfectionism-distress relationship

As a main effect, rumination was predictive of anxiety (β = .29, t (82) = 2.64, p <.01), dysphoria (β = .25, t (82) = 2.34, p <.025) and suicidal thinking (β = .33, t (82) = 3.11, p <.01). Also as a main effect socially prescribed perfectionism was predictive of hopelessness (β = .36, t (82) = 3.45, p <.001), depression (β = .37, t (82) = 3.61, p <.001) and dysphoria (β = 327, t (82) = 3.12, p < .01). The interaction between socially prescribed perfectionism and rumination was predictive of suicidal thinking (β = .26, t (82) = 2.54, p <.025) and showed a trend towards significance to predict depression (β = .22, t (82) = 2.19, p = .031).   A plot of the lines of best fit for the significant interaction to predict suicidal thinking can be seen in Figure 5.10. Post hoc examination of this interaction revealed that the high slope significantly differed from zero (β = .45, t (82) = 2.85, p < .01). In other words, for low rumination there was no difference in suicidal thinking between low and high social perfectionists, however for high rumination high social perfectionists reported

higher levels of suicidal thinking than low social perfectionists. A similar (non-significant) trend was observed for depression.
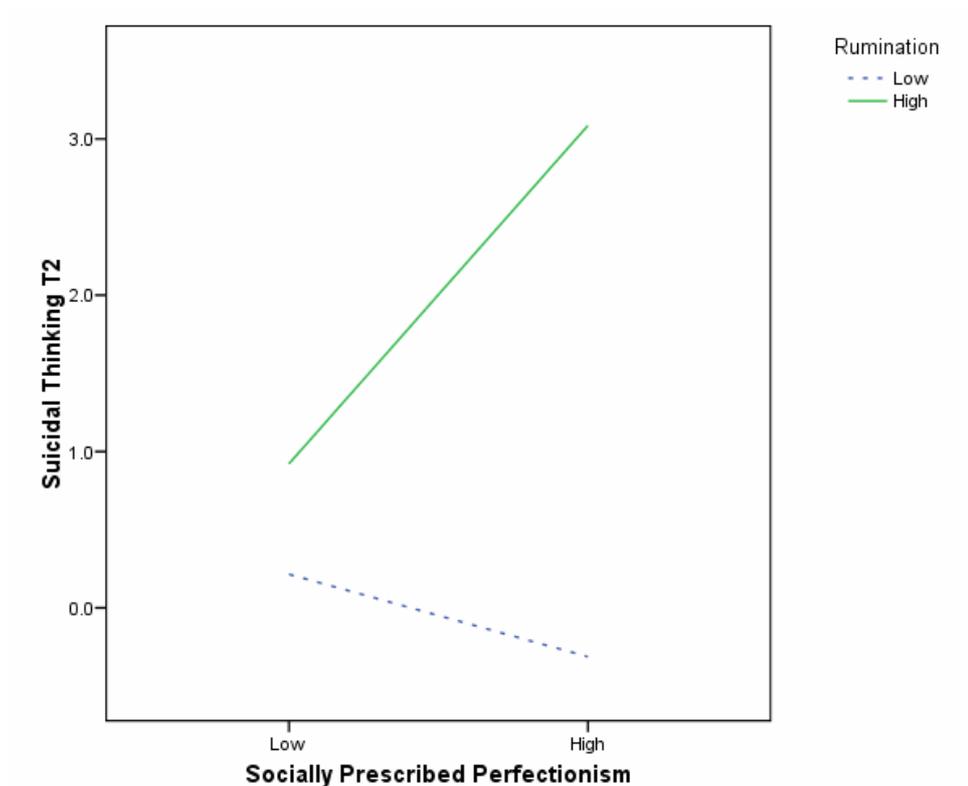
Figure 5.10. Socially prescribed perfectionism x rumination to predict suicidal thinking T2 (not controlling for T1 distress)

5.4.7.4 Attentional bias as a moderator in the perfectionism-distress relationship

5.4.7.4.1   Self-oriented perfectionism-distress relationship

As a main effect, negative attentional bias showed a trend towards significance to predict anxiety (β = .25, t (82) = 2.13, p =.036). However, no other significant main effects or interactions were observed to predict any other measure of distress.

As a main effect, socially prescribed perfectionism was predictive of hopelessness ($\beta = .41$, t (82) = 4.08, p <.0001), anxiety ($\beta = .32$, t (82) = 3.06, p <.01), depression ($\beta = .41$, t (82) = 3.99, p <.0001), dysphoria ($\beta = .40$, t (82) = 3.88, p <.0001) and suicidal thinking ($\beta = .28$, t (82) = 2.56, p <.025). The interaction between socially prescribed perfectionism and positive attentional bias showed a trend towards significance ($\beta = .22$, t (82) = 2.05, p = .044) to predict hopelessness at T2.
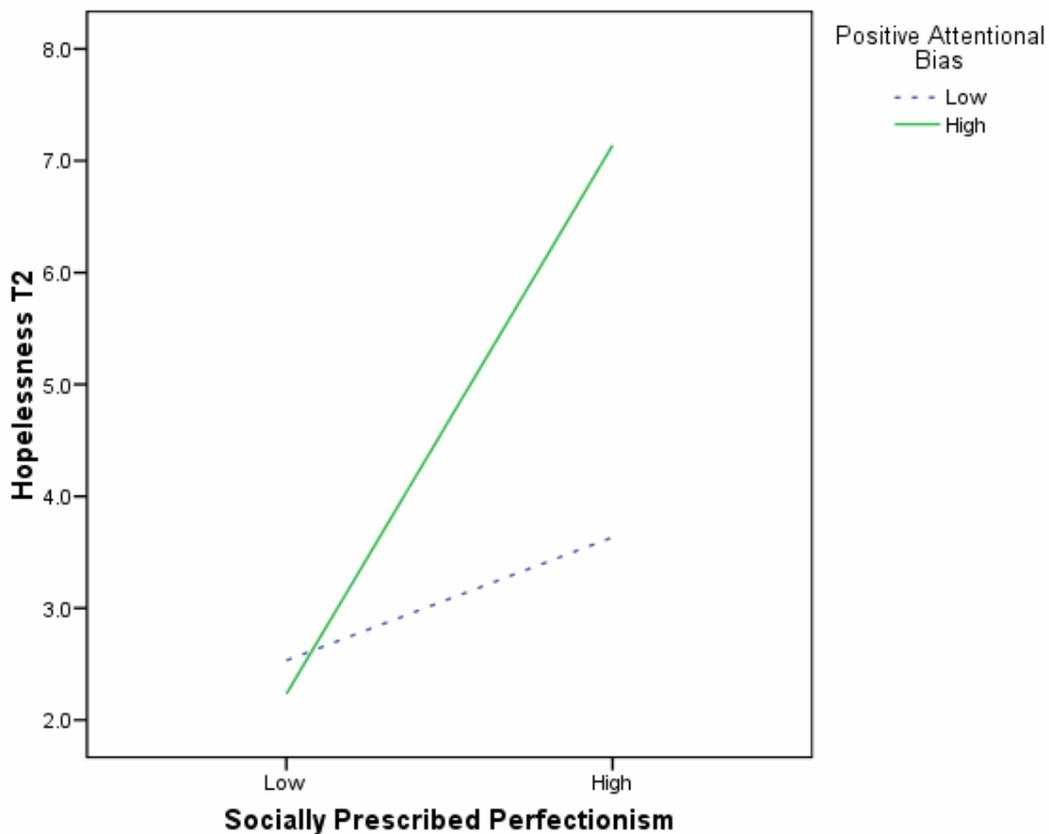
Figure 5.11. Socially prescribed perfectionism x positive attentional bias to predict hopelessness T2 (not controlling for T1 distress)

5.4.8 The effect of moderation in the perfectionism-distress relationship when predicting change in distress

5.4.8.1 Stress as a moderator in the perfectionism-distress relationship

5.4.8.1.1 Self-oriented perfectionism-distress relationship

As a main effect, stress was predictive of hopelessness ($\beta = .22$, t (82) = 3.51, p <.001), anxiety ($\beta = .30$, t (82) = 3.11, p <.01), depression ($\beta = .36$, t (82) = 3.94, p <.0001) and dysphoria ($\beta = .38$, t (82) = 3.22, p <.01). The interaction between self-oriented perfectionism and stress was predictive of change in suicidal thinking ($\beta = .19$, t (82) = 2.79, p <.01). A plot of the lines of best fit can be seen in Figure 5.12. Post hoc examination of this interaction revealed that the high slope significantly differed from zero ($\beta = .23$, t (82) = 2.66, p <.01). Thus, high social perfectionism combined with high stress was predictive of increased suicidal thinking.
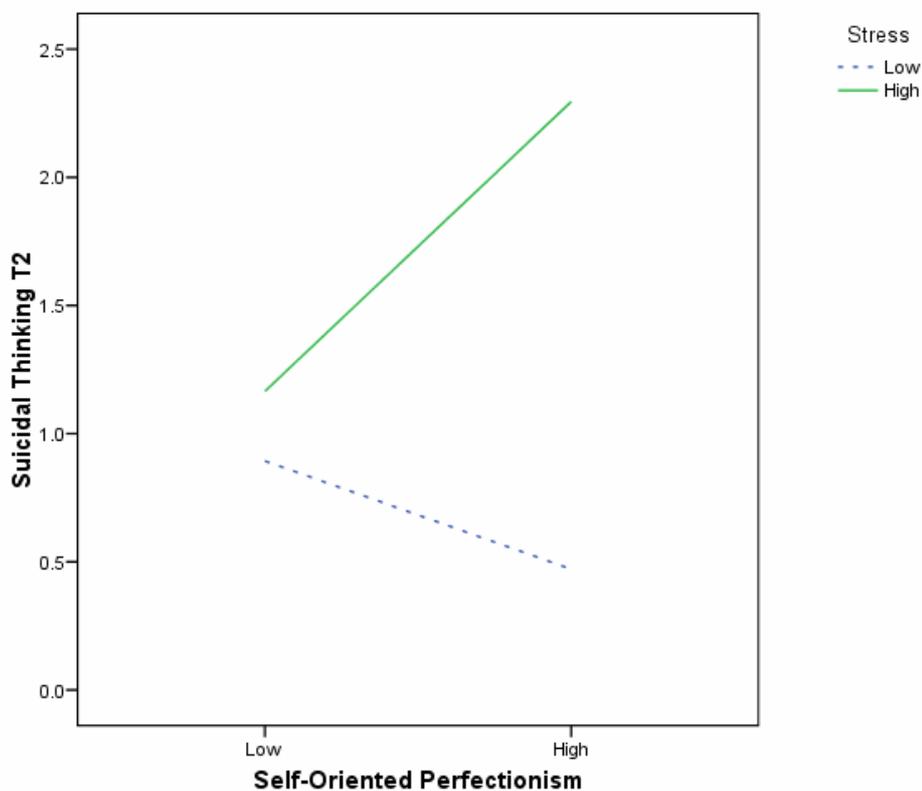
Figure 5.12. Self-oriented perfectionism x stress to predict change in suicidal thinking

5.4.8.1.2   Socially prescribed perfectionism-distress relationship

As a main effect, stress was predictive of hopelessness (β = .24, t (82) = 3.59, p <.001), anxiety (β = .31, t (82) = 3.09, p <.01), depression (β = .37, t (82) = 3.89, p <.0001), dysphoria (β = .35, t (82) = 2.91, p <.005) and suicidal thinking (β = .21, t (82) = 2.58, p <.025). However, no interaction effects were observed between socially prescribed perfectionism and stress to predict change in any measure of distress at T2.

5.4.8.2 Goal adjustment as a moderator in the perfectionism-distress relationship

5.4.8.2.1   Self-oriented perfectionism-distress relationship

Self-oriented perfectionism interacted with both goal disengagement (β = -.24, t (82) = -3.47, p <.001) and goal reengagement (β = .18, t (82) = 2.36, p < .025) to predict change in suicidal thinking. Plots of the lines of best fit for these interactions can be seen in Figure 5.13 and Figure 5.14. Post hoc analyses revealed that for the interaction between self-oriented perfection and goal disengagement the low slope significantly differed from zero (β = .24, t (82) = 2.51, p <.025). In contrast, for the interaction between self-oriented perfectionism and goal reengagement the high slope showed a trend towards significantly differing from zero (β = .18, t (82) = 1.93, p =.057). Thus, high self-oriented perfectionism when combined with low goal disengagement was predictive of increased suicidal thinking and when combined with high goal reengagement showed a trend towards predicting increased suicidal thinking.
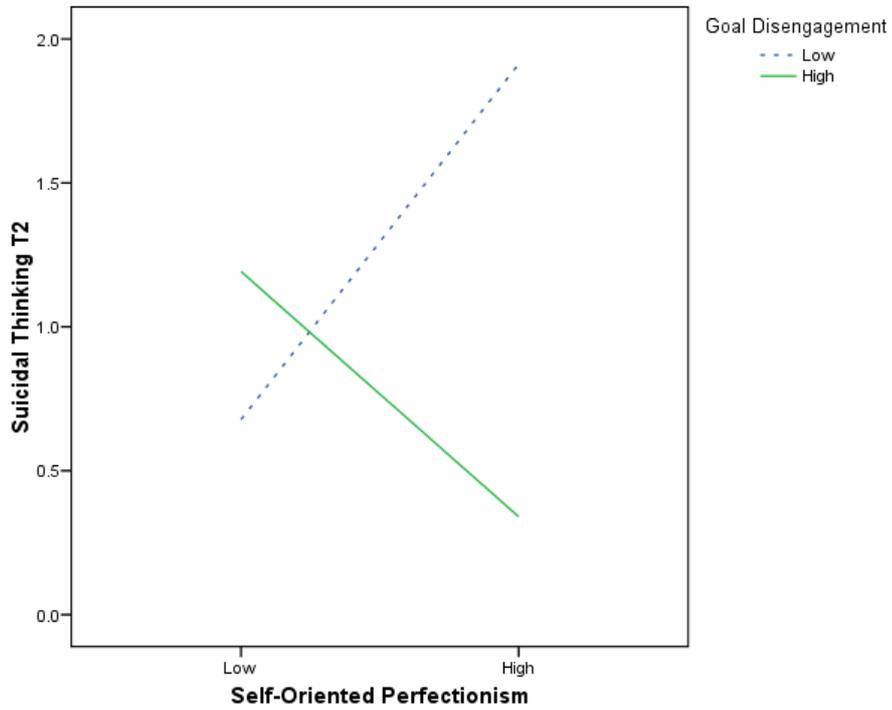
Figure 5.13. Self-oriented perfectionism x goal disengagement to predict change in suicidal thinking.
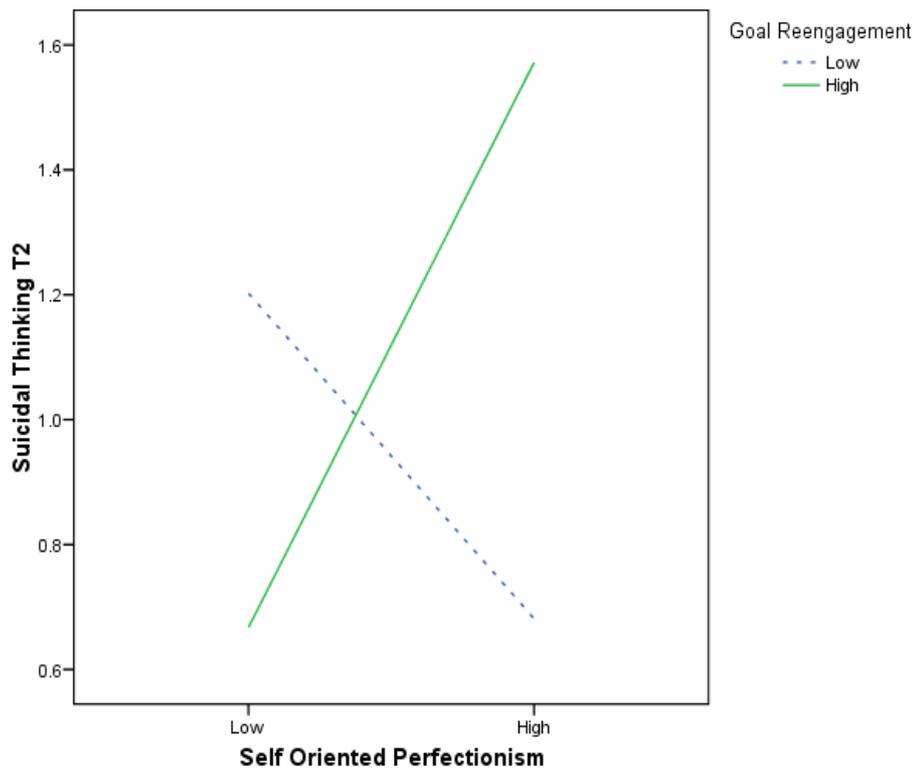
Figure 5.14. Self-oriented perfectionism x goal reengagement to predict change in suicidal thinking

5.4.8.2.2   Socially prescribed perfectionism-distress relationship

As a main effect, goal disengagement was predictive of change in hopelessness ($\beta = -.14$, t (82) = -2.37, p <.025). Socially prescribed perfectionism interacted with both goal disengagement ($\beta = -.33$, t (82) = -4.77, p <.0001) and goal reengagement ($\beta = .313$, t (82) = 4.30, p <.0001) to predict change in suicidal thinking. Plots of the lines of best fit for these interactions can be seen in Figure 5.15 and Figure 5.16. Post hoc examination of these interactions revealed that for the interaction between socially prescribed perfectionism and goal disengagement the high slope significantly differed from zero ($\beta = -.24$, t (82) = -2.47, p <.025). For the interaction between socially prescribed perfectionism and goal reengagement neither the high nor the low slope significantly differed from zero. Thus high social perfectionism combined with high goal disengagement was predictive of decreased suicidal thinking.
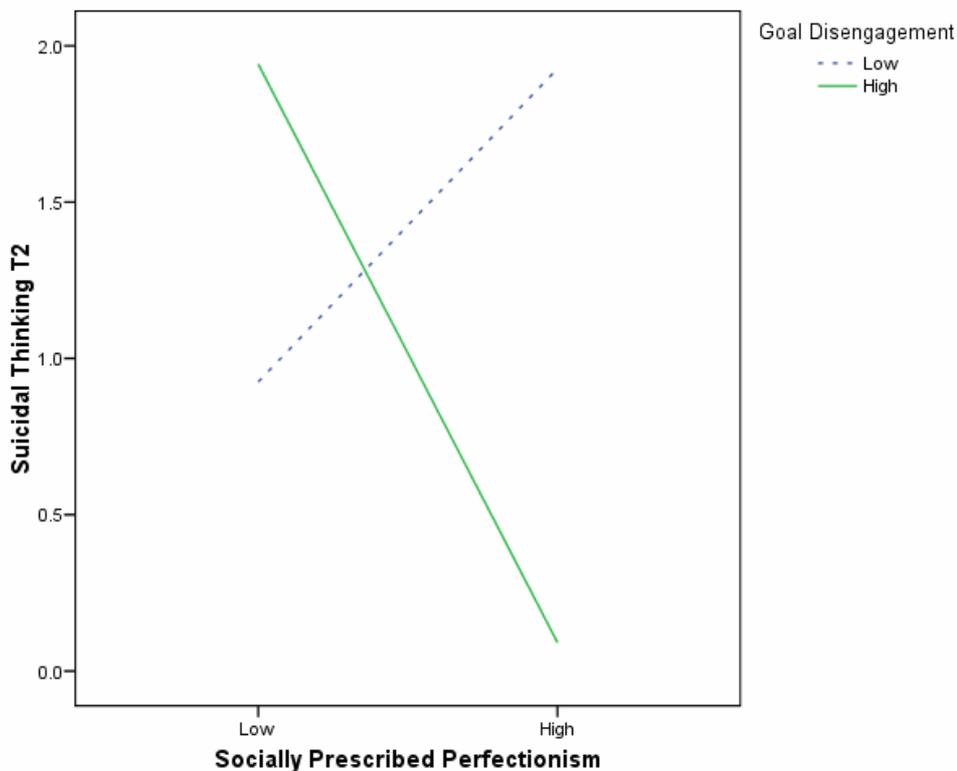
Figure 5.15. Socially prescribed perfectionism x goal disengagement to predict change in suicidal thinking.
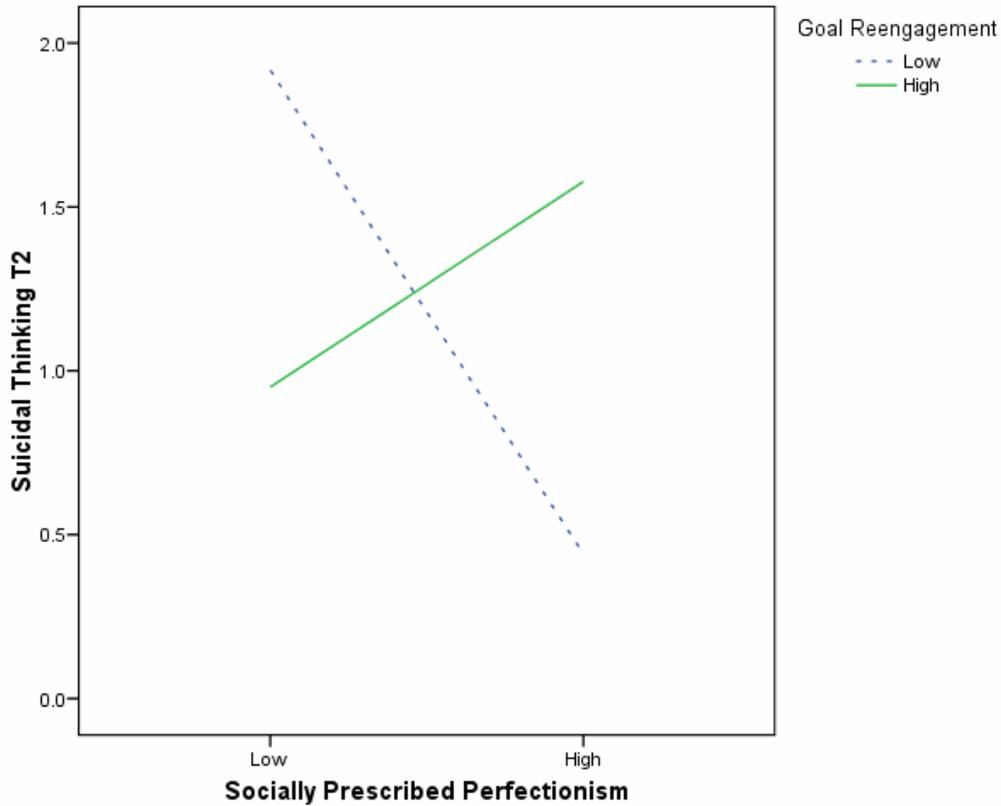
Figure 5.16. Socially prescribed perfectionism x goal reengagement to predict change in suicidal thinking

5.4.8.3 Rumination as a moderator in the perfectionism-distress relationship

5.4.8.3.1 Self-oriented perfectionism-distress relationship

No main or interaction effects of rumination or self-oriented perfectionism were significantly predictive of change in distress.

5.4.8.3.2 Socially prescribed perfectionism-distress relationship

No main or interaction effects of rumination or socially prescribed perfectionism were significantly predictive of change in distress.

5.4.8.4 Attentional bias as a moderator in the perfectionism-distress relationship

5.4.8.4.1 Self-oriented perfectionism-distress relationship

As a main effect, negative attentional bias just failed to meet statistical significance to predict change in anxiety ($\beta = .19$, t (82) = 2.26, p =.027). No interaction effects were significantly predictive of change in distress.

5.4.8.4.2   Socially prescribed perfectionism-distress relationship

As a main effect, negative attentional bias just failed to meet statistical significance to predict change in anxiety ($\beta = .17$, t (82) = 2.12, p = .037). No interaction effects were significantly predictive of change in distress.

5.4.9   Effect of moderation in the rumination-distress relationship in the prospective data

5.4.9.1 Stress as a moderator of the rumination-distress relationship

As a main effect, stress was predictive of hopelessness ($\beta = .49$, t (82) = 4.55, p <.0001), anxiety ($\beta = .55$, t (82) = 5.20, p <.0001), depression ($\beta = .60$, t (82) = 5.94, p <.0001) and dysphoria ($\beta = .63$, t (82) = 6.30, p <.0001). Also as a main effect, rumination was predictive of suicidal thinking at T2 ($\beta = .27$, t (82) = 2.49, p <.025). The interaction between rumination and stress was predictive of suicidal thinking ($\beta = .30$, t (82) = 3.16, p <.01) and showed a trend towards significance to predict depression ($\beta = .16$, t (82) = 1.78, p = .08). Plots of the lines of best fit for the interaction between rumination and stress to predict suicidal thinking at T2 can be seen in Figure 5.17. Post-hoc examination revealed that the high slope significantly differed from zero ($\beta = .51$, t (82) = 3.92, p <.001). This illustrates that there was a trend for the negative consequences of rumination in relation to suicidal thinking, to be amplified by high stress levels. A similar (albeit non-significant) trend was also observed for depression.
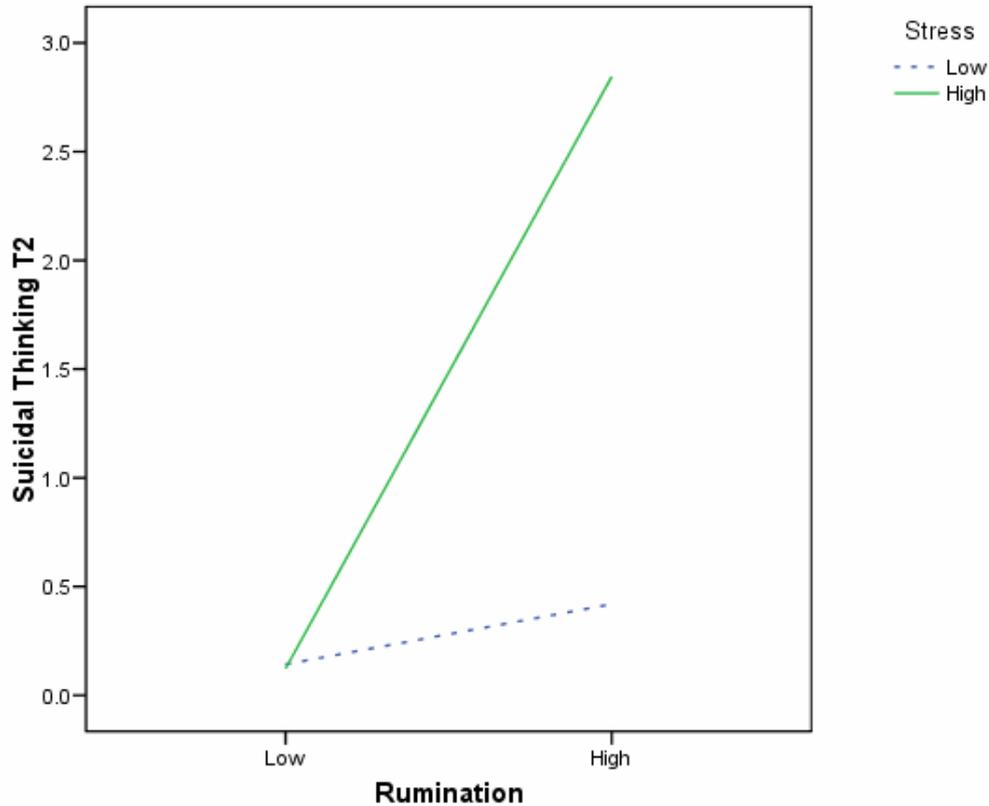
Figure 5.17. Rumination x stress to predict suicidal thinking at T2 (not controlling for T1 distress)

5.4.9.2 Goal adjustment as a moderator of the rumination-distress relationship

As a main effect, rumination was predictive of each type of distress. Also as a main effect goal reengagement was predictive of hopelessness ($\beta = -.29$, t (82) = -3.02, p <.01) and showed a trend towards significance to predict suicidal thinking ($\beta = -.19$, t (82) = -1.20, p = .053).

The interaction between rumination and goal disengagement was predictive of hopelessness ($\beta = -.23$, t (82) = -2.41, p <.025) and suicidal thinking ($\beta = -.42$, t (82) = -4.38, p <.001) and showed a trend towards significance to predict anxiety ($\beta = -.19$, t (82) = -1.86, p = .067). Graphs of the lines of best fit for these interactions can be seen in Figure 5.18 and Figure 5.19 respectively. Post hoc analyses of these interactions revealed: (i) for hopelessness the low slope significantly differed from zero ($\beta = .63$, t (82) = 5.33, p <.001) whilst the high slope showed a trend towards

92

significance (β = .23, t (82) = 1.89, p = .063) and; (ii) for suicidal thinking the low slope significantly differed from zero (β = .83, t (82) = 6.92, p <.001). Overall, low goal disengagement was predictive of increased hopelessness and suicidal thinking when combined with high, as opposed to low, rumination.
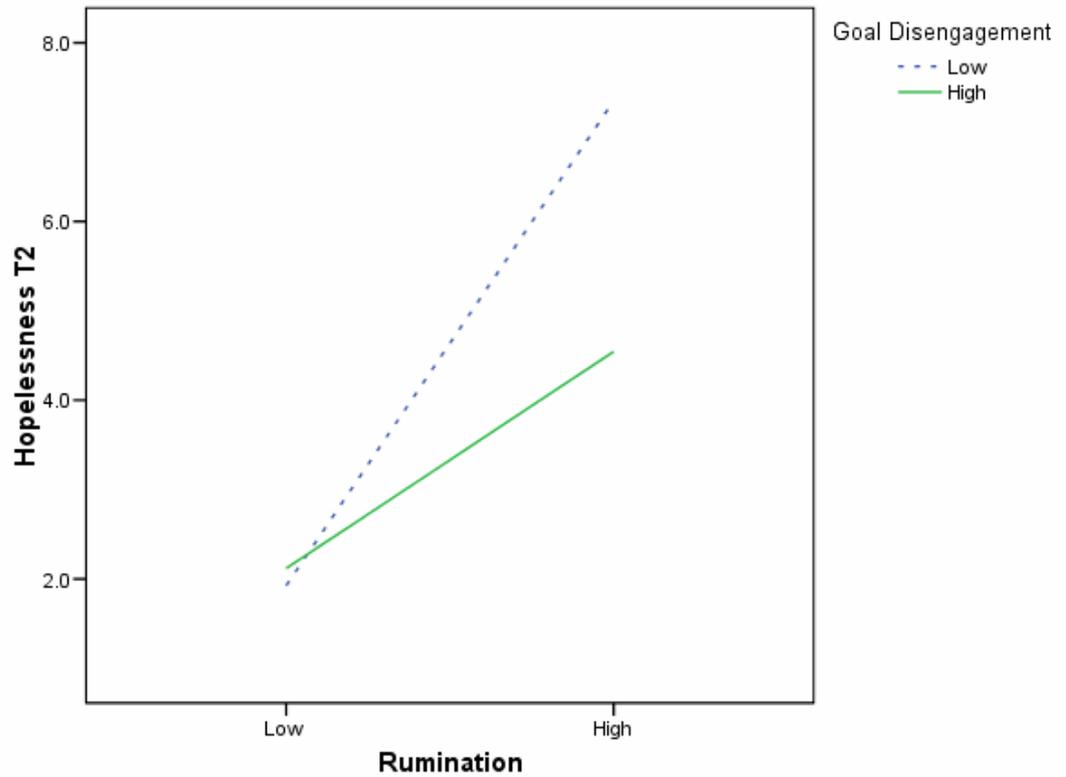
Figure 5.18. Rumination x goal disengagement to predict hopelessness at T2 (not controlling for T1 distress)
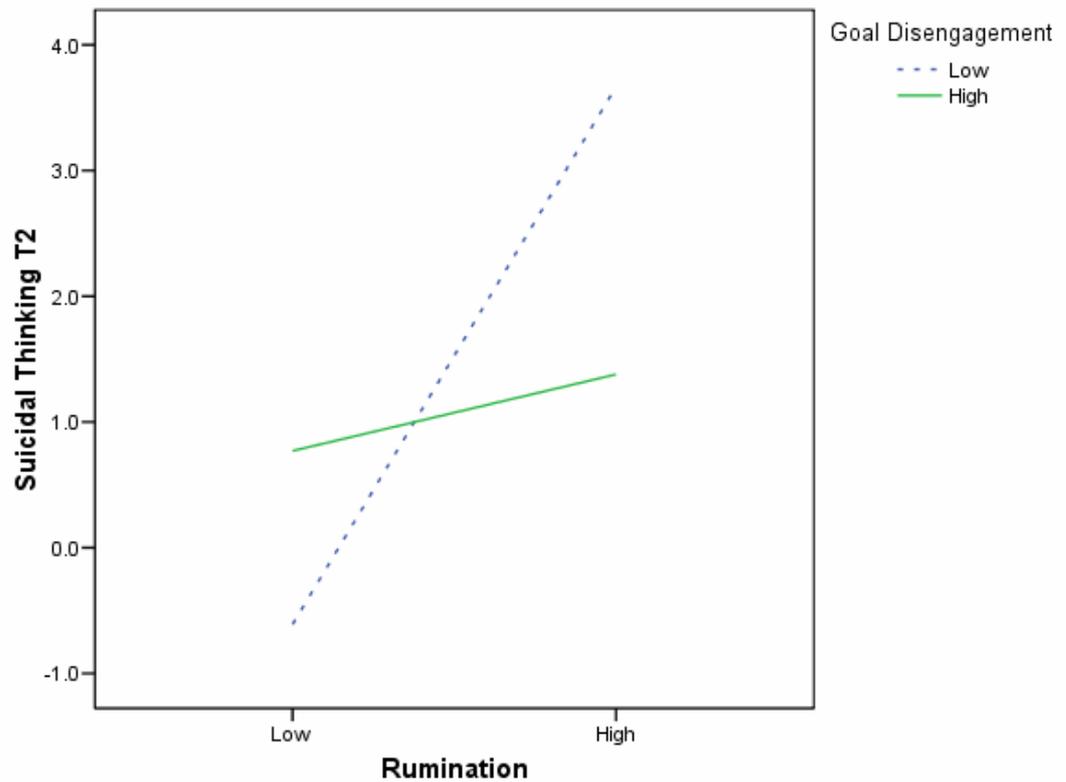
Figure 5.19. Rumination x goal disengagement to predict suicidal thinking (not controlling for T1 distress)

5.4.9.3 Attentional bias as a moderator of the rumination-distress relationship

As a main effect, rumination was predictive of hopelessness (β = .41, t (82) = 3.85, p <.0001), anxiety (β = .39, t (82) = 3.70, p <.0001), depression (β = .33, t (82) = 2.97, p <.01), dysphoria (β = .36, t (82) = 3.39, p <.0001) and suicidal thinking (β = .41, t (82) = 4.00, p <.0001). Also as a main effect, negative attentional bias showed a trend towards significance to predict both suicidal thinking (β = -.22, t (82) = -2.12, p = .037) and anxiety at T2 (β = .20, t (82) = 1.88, p = .064). However, no interaction effects were observed to predict any measure of distress at T2.

5.4.10 The effect of moderation in the rumination-distress relationship when

   predicting change in distress

   5.4.10.1 Stress as a moderator of the rumination-distress relationship

   The interaction between rumination and stress showed a trend towards

significance to predict change in suicidal thinking ($\beta = .14$, t (82) = 2.03, p = .045).

However, no significant interactions were observed.

   5.4.10.2 Goal adjustment as a moderator of the rumination-distress relationship

   As a main effect, rumination was predictive of change in hopelessness ($\beta =$

.18, t (82) = 3.21, p <.01), whilst goal disengagement showed a similar trend ($\beta = -$

.12, t (82) = -2.01, p = .048). The interaction between rumination and goal

disengagement was predictive of change in both hopelessness ($\beta = -.20$, t (82) = -

3.66, p <.001) and suicidal thinking ($\beta = -.22$, t (82) = -2.98, p < .01). Plots of the

lines of best fit for these interactions can be seen in Figure 5.20 and Figure 5.21.

Post hoc analysis of this interaction revealed: (i) for hopelessness only the low

slope significantly differed from zero ($\beta = .36$, t (82) = 4.87, p <.001); (ii) similarly,

for suicidal thinking the low slope also significantly differed from zero ($\beta = .33$, t

(82) = 3.13, p <.01). This shows that, whilst for high goal disengagement there was

no difference in hopelessness or suicidal thinking between low and high ruminators,

low disengagement combined with high rumination was predictive of increased

hopelessness and suicidal thinking.

   The interaction between rumination and goal reengagement showed a trend

towards significance to predict change in suicidal thinking ($\beta = .15$, t (82) = 2.11, p

= .038). However, no other significant interactions were observed.
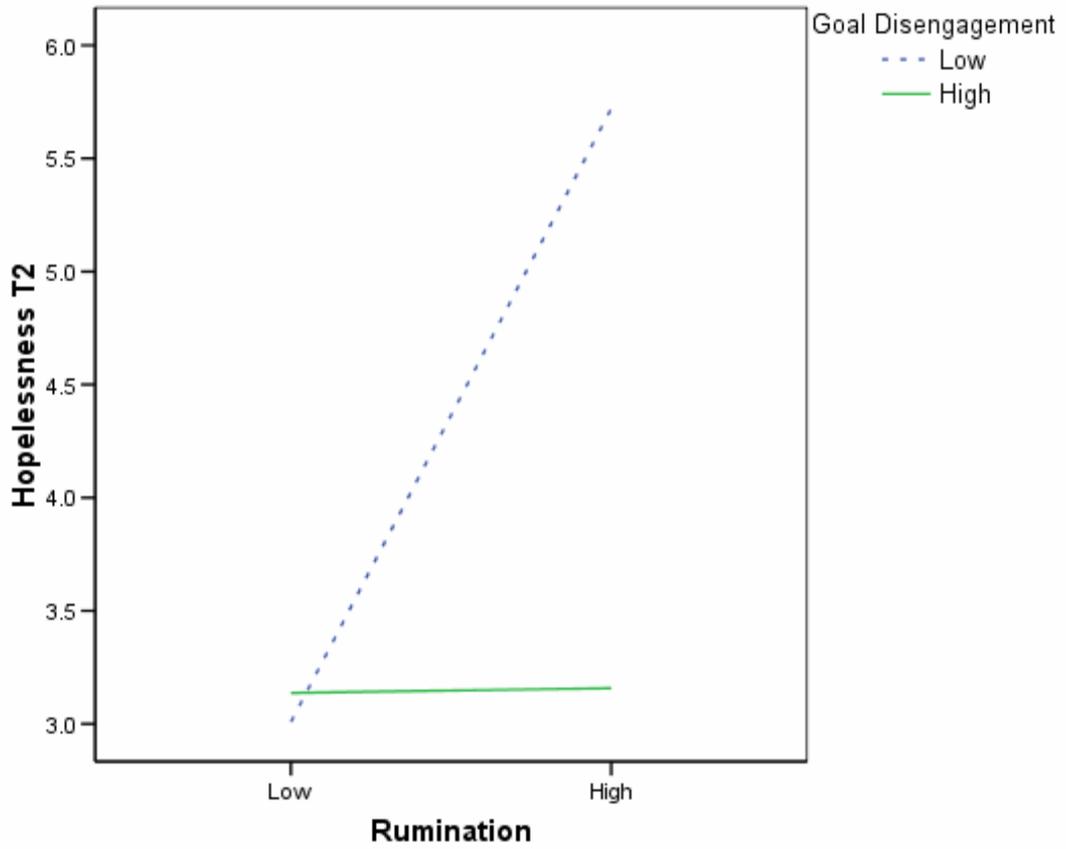
Figure 5.20. Rumination x goal disengagement to predict change in hopelessness
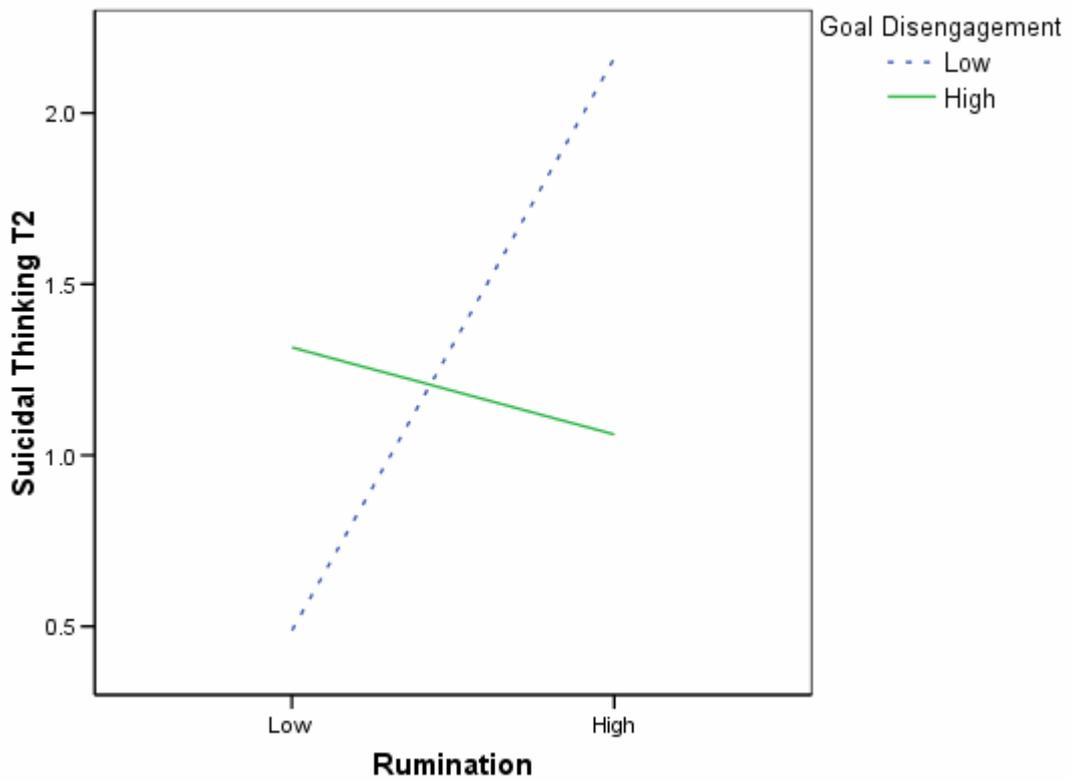
Figure 5.21. Rumination x goal disengagement to predict change in suicidal thinking

5.4.10.3 Attentional bias as a moderator of the rumination-distress relationship

As a main effect rumination showed a trend towards significance to predict change in hopelessness ($\beta = .12$, t (82) = 1.85, p = .068). Also as main effect, negative attentional bias showed a trend towards significance to predict change in both anxiety ($\beta = .16$, t (82) = 2.00, p = .049) and suicidal thinking at T2 ($\beta = -.14$, t (82) = -1.88, p = .064). However, no interaction effects were observed to predict change in distress.

5.4.11 Moderation Summary

In the prospective data, self-oriented perfectionism interacted with stress to predict suicidal thinking and interacted with goal disengagement to predict hopelessness, dysphoria and suicidal thinking. Socially prescribed perfectionism interacted with stress to predict depression. In addition, socially prescribed perfectionism interacted with goal disengagement to predict suicidal thinking and showed a trend towards significance to interact with goal reengagement to predict hopelessness. Socially prescribed perfectionism also interacted with rumination to predict suicidal thinking and showed a trend towards significance to predict depression. Finally, socially prescribed perfectionism demonstrated a trend towards significance to interact with positive attentional bias to predict hopelessness.

With regards predicting change in distress between T1 and T2, self-oriented perfectionism again interacted with stress to predict change in suicidal thinking and interacted with both goal disengagement and goal reengagement to predict change in suicidal thinking. Socially prescribed perfectionism interacted with both goal disengagement and goal reengagement to predict change in suicidal thinking.

Neither rumination nor positive attentional bias were found to interact with perfectionism to predict change in distress.

In the prospective data, rumination interacted with stress to predict suicidal thinking at T2. The interaction between rumination and goal disengagement was predictive of hopelessness and suicidal thinking. A similar pattern was observed when predicting change in distress, as rumination again interacted with goal disengagement to predict change in both hopelessness and suicidal thinking.

5.4.12 Mediation Analyses

Mediation effects were examined through a series of regression analyses following the procedure outlined by Baron & Kenny (1986) and Kenny, Kashy and Bolger (1998). Kenny et al. (1998) define four conditions which must be met for mediation: (1) the independent variable must affect the mediator; (2) the independent variable must affect the dependant variable; (3) the mediator must affect the dependant variable when the independent variable is controlled for; (4) for full mediation to occur, the relationship between the independent variable and the dependent variable must be reduced to non-significance after the effect of the mediator is controlled for. Partial mediation occurs when conditions 1-3 are met without condition 4.

Similar to the analyses examining moderation, we conducted two separate sets of analyses to examine: (i) the prediction of distress prospectively (i.e. whether our predictors measured at time one were associated with distress at time two) and; (ii) the prediction of change in distress from T1 to T2 (i.e. whether our predictors measured at T1 were associated with distress at T2, after controlling for initial levels of distress). Again, we also set the level of statistical significance at .025 (i.e.

.05/2). In the interests of brevity, diagrams illustrating significant mediating

relationships are only presented for a sample of results.

5.4.13 The effect of mediation in the perfectionism-distress relationship in the prospective data.

5.4.13.1 Stress as a mediator in the perfectionism-distress relationship

5.4.13.1.1   Self-oriented perfectionism-distress relationship

As stress was not predictive of self-oriented perfectionism (condition 1),

stress not mediate the self-oriented perfectionism distress relationship for any

measure of distress.

5.4.13.1.2   Socially prescribed perfectionism-distress relationship

Socially prescribed perfectionism was predictive of hopelessness at T2 (β =

.44, t (82) = 4.38, p <.0001). The addition of stress in the next step of the model

explained an additional 16.8% of variance (β = .48, t (82) = 4.65, p <.0001) and

reduced beta weight of socially prescribed perfectionism to non-significance (β =

.20, t (82) = 1.98, n.s.). A Sobel test confirmed that the reduction in beta weight

was significant (Z = 3.43, p<.001), indicating full mediation.

Socially prescribed perfectionism was predictive of anxiety at T2 (β =.34, t

(82) = 3.20, p <.01). The addition of stress in the third step accounted for an

additional 25.1% of variance (β = .58, t (82) = 5.67, p <.0001) and reduced the beta

weight of socially prescribed perfectionism to non-significance (β = .05, t (82) =

.48, n.s.). A Sobel test confirmed that the reduction in beta weight was significant

(Z = 3.77, p<.001), indicating full mediation.

Socially prescribed perfectionism was also predictive of depression at T2 (β =.42, t (82) = 4.24, p <.0001). The addition of stress in the third step accounted for an additional 23.2% of variance (β = .55, t (82) = 5.70, p < .0001) and reduced the beta weight of socially prescribed perfectionism to non-significance (β = .15, t (82) = 1.55, n.s.). A Sobel test confirmed that the reduction in beta weight was significant (Z = 3.79, p<.001), indicating full mediation.

In addition, socially prescribed perfectionism was predictive of dysphoria at T2 (β =.42, t (82) = 4.11, p <.0001). The addition of stress in the third step accounted for an additional 26.9% of variance (β = .60, t (82) = 6.24, p <.0001) and reduced the beta weight of socially prescribed perfectionism to non-significance (β = .12, t (82) = 1.26, n.s.). A Sobel test confirmed that the reduction in beta weight was significant (Z = 3.95, p <.0001), indicating full mediation.

Finally, socially prescribed perfectionism was predictive of suicidal thinking at T2 (β =.28, t (82) = 2.65, p <.01). The addition of stress in the third step accounted for an additional 11.8% of variance (β = .41, t (82) = 3.52, p <.001) and reduced the beta weight of socially prescribed perfectionism to non-significance (β = .08, t (82) = .72, n.s.). A Sobel test confirmed that the reduction in beta weight was significant (Z = 2.87, p<.01), indicating full mediation (see Figure 5.22).

This illustrates that stress fully mediated the relationship between socially prescribed perfectionism and each measure of distress at T2.
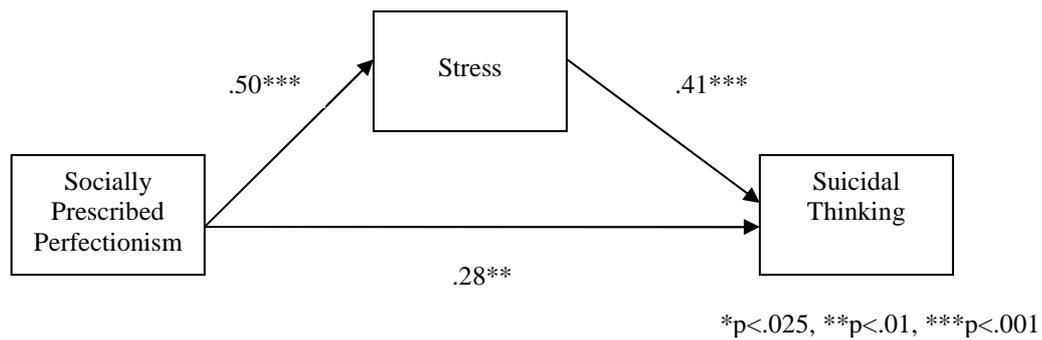
Figure 5.22. The mediating effect of stress on the relationship between socially prescribed perfectionism and suicidal thinking

5.4.13.2 Goal adjustment as a mediator in the perfectionism-distress relationship

5.4.13.2.1   Self-oriented perfectionism-distress relationship

Goal adjustment did not mediate the self-oriented perfectionism-distress relationship at T2, for any measure of distress.

5.4.13.2.2   Socially prescribed perfectionism-distress relationship

Socially prescribed perfectionism was predictive of hopelessness at T2 (β = .44, t (82) = 4.38, p <.0001). The addition of goal reengagement in the third step of the analysis explained an additional 6.8% of variance (β = -.28, t (82) = -2.87, p <.005) and reduced the beta weight of social perfectionism (β = .37, t (82) = 3.78, p <.0001). However, a Sobel test illustrated that this reduction in beta weight was non-significant (Z=1.68, p = .093), indicating partial mediation had not occurred.

5.4.13.3 Rumination as a mediator in the perfectionism-distress relationship

5.4.13.3.1   Self-oriented perfectionism-distress relationship

No mediating relationships were observed for rumination and self-oriented perfectionism to predict any measure of distress.

5.4.13.3.2   Socially prescribed perfectionism-distress relationship

101

After controlling for gender, socially prescribed perfectionism was predictive of hopelessness at T2 ($\beta = .44$, t (82) = 4.38, p <.0001). The addition of rumination in the next step of the analysis explained a further 5.3% of variance ($\beta = .27$, t (82) = 2.56, p <.025) and reduced the beta weight of socially prescribed perfectionism ($\beta = .34$, t (82) = 3.32, p <.001). A Sobel test indicated that this reduction in beta weight just failed to reach levels of significance (Z = 2.16, p = .028).

After controlling for gender, socially prescribed perfectionism was predictive of anxiety ($\beta = .34$, t (82) = 3.20, p <.01). The inclusion of rumination in the next step of the analysis accounted for an additional 7.2% of variance ($\beta = .31$, t (82) = 2.83, p <.01) and reduced the beta weight of social perfectionism to non-significance ($\beta = .23$, t (82) = 2.11, n.s.). A Sobel test confirmed this reduction in beta weight was significant (Z = 2.33, p <.025), indicating full mediation.

After controlling for gender, socially prescribed perfectionism was predictive of dysphoria at T2 ($\beta = .42$, t (82) = 4.11, p <.0001). The addition of rumination in the next step of the analysis accounted for a further 5.5% of variance ($\beta = .27$, t (82) = 2.58, p <.025) and reduced the beta weight of social perfectionism ($\beta = .32$, t (82) = 3.02, p <.01). A Sobel test indicated that this reduction in beta weight just failed to reach significance (Z = 2.18, p = .027).

After controlling for gender, socially prescribed perfectionism was predictive of suicidal thinking at T2 ($\beta = .28$, t (82) = 2.65, p <.01). The inclusion of rumination in the final step of the analysis accounted for an additional 11.9% of variance ($\beta = .38$, t (82) = 3.55, p <.001) and reduced the beta weight of social perfectionism to non-significance ($\beta = .15$, t (82) = 1.38, n.s.). A Sobel test

confirmed this reduction in beta weight was significant (Z = 2.68, p<.01), indicating

full mediation (see Figure 5.23).
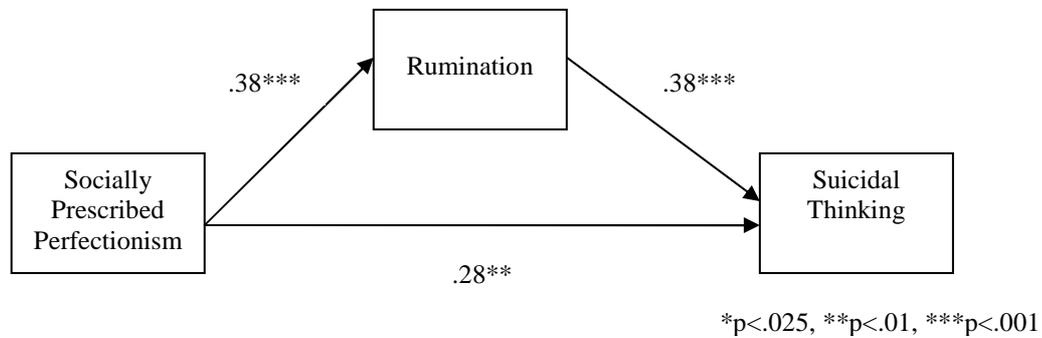
Figure 5.23. The mediating effect of rumination in the relationship between socially prescribed perfectionism and suicidal thinking

5.4.13.4 Attentional bias as a mediator in the perfectionism-distress relationship

5.4.13.4.1   Self-oriented perfectionism-distress relationship

No mediation relationships were observed with regards to positive or

negative attentional bias and the self-oriented perfectionism-distress relationship.

5.4.13.4.2   Socially prescribed perfectionism-distress relationship

No mediation relationships were observed with regards to positive or

negative attentional bias and the socially prescribed perfectionism-distress

relationship.

5.4.14 The effect of mediation in the perfectionism-distress relationship when

predicting change in distress

5.4.14.1 Self-oriented perfectionism-distress relationship

After controlling for T1 distress, no mediators were observed in the self-

oriented perfectionism-distress relationship.

5.4.14.2 Socially prescribed perfectionism-distress relationship

After controlling for T1 distress, no mediators were observed in the socially prescribed perfectionism-distress relationship.

5.4.15 The effect of mediation in the rumination-distress relationship in the prospective data

5.4.15.1 Stress as a mediator of the rumination-distress relationship

After controlling for gender, rumination was a significant predictor of hopelessness at T2 ($\beta = .39$, t (82) = 3.78. p <.0001). The addition of stress in the final step accounted for an extra 19% of variance ($\beta = .51$, t (82) = 4.86, p <.0001) and reduced the beta weight of rumination to non-significance ($\beta = .12$, t (82) = 1.17, n.s.). A Sobel test confirmed this reduction in beta weight was significant (Z = 3.61, p <.001), indicating full mediation.

After controlling for gender, rumination was a significant predictor of anxiety at T2 ($\beta = .39$, t (82) = 3.76, p <.0001). The inclusion of stress in the final step of the analysis accounted for an additional 22.1% of variance ($\beta = .55$, t (82) = 5.34, p < .0001) and reduced the beta weight of rumination to non-significance ($\beta = .101$, t (82) = .981, n.s.). A Sobel test confirmed this reduction in beta weight was significant (Z = 3.79, p <.001), indicating full mediation.

After controlling for gender, rumination was a significant predictor of depression at T2 ($\beta = .32$, t (82) = 3.05, p <.01). The addition of stress in the final step of the analysis accounted for a further 29.4% of variance ($\beta = .63$, t (82) = 6.31, p <.0001) and reduced the beta weight of rumination to non-significance ($\beta = -.01$, t

(79) = -.06, n.s.). A Sobel test confirmed this reduction in beta weight was

significant (Z = 4.08, p <.0001), indicating full mediation.

After controlling for gender, rumination was a significant predictor of

dysphoria at T2 (β = .39, t (82) = 3.74, p <.0001). The addition of stress in the final

step of the analysis accounted for a further 28.7% of the variance (β = .63, t (82) =

6.39, p <.0001) and reduced the beta weight of rumination to non-significance (β =

.06, t (82) = .63, n.s.). A Sobel test (Z = 4.10, p <.0001) confirmed this reduction in

beta weight was significant, indicating full mediation.

After controlling for gender, rumination was a significant predictor of

suicidal thinking at T2 (β = .43, t (82) = 4.30, p <.0001). The addition of stress at

the final step of the analyses accounted for a further 6.1% of the variance (β = .31, t

(82) = 2.70, p <.01) and reduced the beta weight of rumination, although not to a

non-significant level (β = .28, t (82) = 2.44, p <.025). A Sobel test confirmed this

reduction in beta weight was significant (Z = 2.41, p = .02), indicating partial

mediation.

*p<.025, **p<.01, ***p<.001
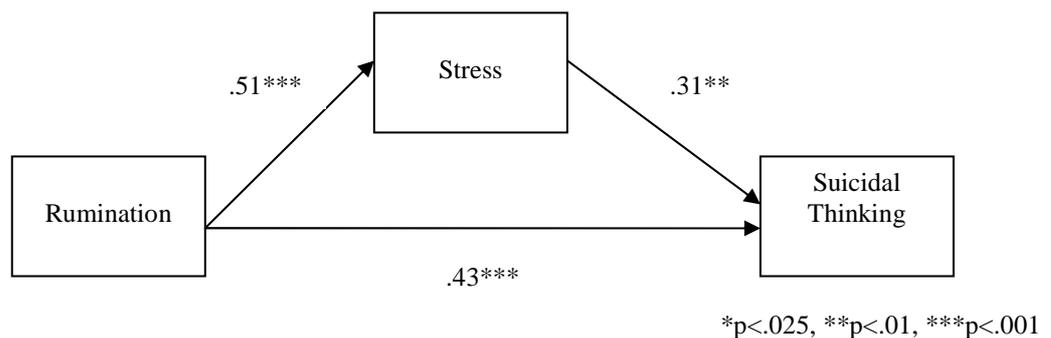
Figure 5.24. The mediating effect of stress on the relationship between rumination and suicidal thinking

5.4.15.2 Goal adjustment as a mediator of the rumination-distress relationship

Goal adjustment was not found to mediate the rumination-distress relationship.

5.4.15.3 Attentional bias as a mediator of the rumination-distress relationship

Attentional bias was not found to mediate the rumination-distress relationship

5.4.16 The effect of mediation in the rumination-distress relationship when predicting change in distress

5.4.16.1 Stress as a mediator of the rumination-distress relationship

After controlling for gender and initial distress stress did not mediate the effects of rumination on any measure of distress at T2.

5.4.16.2 Goal adjustment as a mediator of the rumination-distress relationship

Goal adjustment was not found to mediate the rumination-distress relationship.

5.4.16.3 Attentional bias as a mediator of the rumination-distress relationship

Attentional bias was not found to mediate the rumination-distress relationship.

5.4.17 Mediation Summary

In the prospective data, stress fully mediated the relationship between socially prescribed perfectionism and each measure of distress at T2. Rumination

was found to fully mediate the relationship between socially prescribed perfectionism and both anxiety and suicidal thinking. However, a similar pattern was not observed in the analyses examining change in distress between time one and time two, as no mediating relationships were found between perfectionism and change in any measure of distress.

In the prospective data, stress fully mediated the relationship between rumination and hopelessness, anxiety, depression and dysphoria, in addition to partially mediating the relationship with suicidal thinking. However, these relationships did not hold to predict change in any measure of distress.

5.5   Discussion

The two main aims of this study were: (i) to examine the effect of manipulating rumination on levels of both positive and negative attentional bias and; (ii) to examine the moderating and mediating effects of a series of cognitive and personality variable on both the established perfectionism-distress and rumination-distress relationships. The extent to which our hypothesis are supported, and how our results fit with previous work in this area, are discussed below.

5.5.1   *Effect of manipulating rumination on attentional bias*

We hypothesised that inducing rumination would decrease positive attentional bias and increase negative attentional bias. Our findings do not support this hypothesis; indeed our results indicate almost the exact opposite, as inducing rumination had no impact on negative attentional bias and appeared to increase positive attentional bias. Inducing distraction again made no impact on negative attentional bias, but appeared to decrease positive attentional bias.

107

There are a number of possible explanations for our findings. First, although previous research has suggested a possible relationship between rumination and negative attentional bias, the two previous studies (Morrison & O'Connor, 2008a; Donaldson et al., 2007) which have attempted to alter negative attentional bias, through manipulating rumination, have both failed. Donaldson et al. (2007) argued that the failure of the rumination induction to influence negative attentional bias may have resulted from difficulties inherent to induction procedures, such as the impact an induction can make in only eight minutes, or difficulties in overriding trait ruminative tendencies. In the current study we attempted to address these issues by employing a larger sample than Donaldson et al., resulting in increased power to detect any effects and through the use of general population, as opposed to a clinical sample, who should have less intense ruminative pathways to override. Despite this, and although we observed differential impacts on mood for the rumination versus the distraction inductions, it is possible that the impact of the manipulations was not sufficient to produce a change in negative attentional bias. Future research attempting to increase the effect of a rumination induction is warranted.

Second, our research suggested that inducing rumination increased positive attentional bias, whilst inducing distraction decreased positive attentional bias. This is contrary to the findings of Morrison & O'Connor (2008a) who found the opposite – that inducing rumination in decreased positive attentional bias and inducing distraction decreased positive attentional bias. Methodological differences between Morrison & O'Connor (2008a) may partly explain the differences in findings. In particular the differences in word pairing may have impacted on the findings, as Morrison & O'Connor use positive-negative word pairings, compared to the

negative-neutral and positive-neutral word pairing adopted in the current study (see section 2.3.3 for a more detailed explanation). There is some evidence to support the present findings, from the future thinking literature on suicidality (e.g. MacLeod, Pankhania, Lee, & Mitchell, 1997; O'Connor et al., 2007, 2008) where it is apparent that the absence of positive thoughts about the future is most associated with suicidal thinking, as opposed to the presence of negative thoughts about the future. It is possible that in our findings the increased attention towards positive stimuli, by those induced to ruminate, represents increased focus on something which an individual is currently lacking (e.g. an individual selectively attends to the word happy, because they currently do not feel happy). Unfortunately one of the weaknesses of the dot-probe methodology is that although it can identify patterns in an individual's attention, it cannot explain why individuals selectively attend in a particular manner. Future research could examine this issue further, possibly through the use of qualitative interviews with participants.

A further possible explanation for our findings relates to the use of positive attentional biases as an emotional regulation strategy. Gross (1998) argued that the selective allocation of attentional resources provides a mechanism for emotional regulation. Evidence from an emotional Stroop task (Segerstrom, 2001) supports this assertion, where optimistic individuals took longer to process positive words, than pessimists (and vice versa for negative words), indicating increased positive attentional bias in optimists. Further evidence to support this position comes from Isaacowitz, Wadlinger, Goren and Wilson (2006a, 2006b) who found that older adults, who tend to regulate their emotions better than younger adults (Gross et al., 1997), have a tendency to direct their gaze toward positive stimuli and away from negative stimuli. In the present research, the increase in positive attentional bias

observed in the rumination induction group may represent a self-regulatory strategy to reduce negative mood, in our general population sample. Whilst the opposite trend observed in the distraction group, may reflect the utility of distraction to reduce negative mood, resulting in less need to use positive attentional bias as self-regulatory strategy. This explanation of our findings could account for the differences between our research and Donaldson et al. (2007) – as positive attentional bias as a self-regulatory strategy in response to mood challenge, may not be as evident in a clinically depressed sample. Although Donaldson et al (2007) also examined a control sample, they did not administer a mood induction procedure prior to the rumination/distraction manipulations, which may explain why, unlike the present study, no increase in positive attentional bias of the ruminators was observed.

Finally, it is important to note that in the present study, we only observed a trend approaching significance therefore it is possible that this trend was spurious. There is a need for more research to fully establish the causal nature of the relationship between rumination and attentional bias.

5.5.2   *The effect of stress in the perfectionism-distress relationship*

We hypothesised that stress would moderate the relationship between both self and social perfectionism and distress, in addition to mediating the effects of socially prescribed perfectionism on distress. Consistent with this, we found that socially prescribed perfectionism interacted with stress to predict depression at T2, whilst self-oriented perfectionism interacted with stress to predict change in suicidal thinking at T2. In each instance, higher levels of perfectionism, combined with higher stress were predictive of increased distress. Thus, consistent with previous

research, we found further prospective evidence to support a diathesis-stress conceptualisation of the relationship between both self-oriented and socially prescribed perfectionism and distress. By examining diathesis-stress models to predict suicidal thinking, our results extend previous findings. Chang & Rand (2000) found evidence that stress mediated the relationship between socially prescribed perfectionism and both hopelessness and psychological symptoms, however Chang & Rand did not examine whether their proposed diathesis-stress models were predictive of change in distress, nor whether they were specifically predictive of suicidal thinking.

With regards mediation, stress was found to mediate the relationship between socially prescribed perfectionism and each measure of distress at T2. However, stress was not found to mediate any of these relationships to predict change in distress between T1 and T2. This indicates that socially prescribed perfectionism may in itself generate stress, which in turn increases levels of distress. This extends work by Chang (2000) and Hewitt and colleagues (2001), indicating that the mediating impact of stress on the socially prescribed perfectionism-distress relationship can be observed prospectively for a range of measures of distress.

5.5.3   *The effect of rumination on the perfectionism-distress relationship*

Our third hypothesis related to the role of rumination on the perfectionism-distress relationship. We hypothesised that rumination would mediate the effects of both social and self perfectionism on distress. As predicted, rumination fully mediated the effect of socially prescribed perfectionism on both anxiety and suicidal thinking at T2. However neither of these mediating relationships held to predict change in distress between T1 and T2. In addition, we found no mediating effect of

111

rumination on the self-oriented perfectionism-distress relationship. These findings are in line with previous research which has identified the mediating effects of rumination on the perfectionism-distress relationship (e.g. Flett et al., 2002; O'Connor et al., 2007; Harris et al., 2008) and illustrated that socially prescribed perfectionism is more consistently associated with distress (e.g. Flett et al., 2002; O'Connor et al., 2007).

The failure of rumination to mediate the effect of perfectionism on change in distress between time one and time two, contrasts with existing research findings. This may have been due to a number of factors. First, previous research, which has found rumination mediated the effects of perfectionism on change in distress, has focussed specifically on brooding rumination (O'Connor et al., 2007). In the present study, however, we focus on the mediating effects of rumination as a whole. Unfortunately the brief measure of rumination used in the present study does not allow the components of rumination (brooding and reflection) be considered separately. To examine this possibility further, we conducted a separate study which is presented in Chapter 7.

A further explanation relates to the lack of change in distress between T1 and T2 in our study. We selected a five week follow up as this has previously been shown to provide enough time to provide variability in distress (e.g. Morrison & O'Connor, 2008a). However, in the present study we found no significant differences in distress between T1 and T2, meaning there was little variance in the data for our analyses examining change in distress to predict. Within the confines of a multi-study PhD it was difficult to expand the follow up period.

In the present research, rumination also moderated the impact of socially prescribed perfectionism on suicidal thinking at T2 (in addition to showing a trend

towards significance to predict depression), such that high rumination combined with high social perfectionism was predictive of increased distress at T1. However, again the effect did not hold to predict change in depression from T1 to T2. Thus, in addition to the mediating effects noted above, a tendency to ruminate amplified the negative consequences of socially prescribed perfectionism such that it was associated with increased suicidal thinking. This further highlights the links between rumination and perfectionism and the tendency for socially prescribed perfectionism to have stronger links with distress.

5.5.4   *The effect of goal adjustment in the perfectionism-distress relationship*

Our fourth hypothesis predicted that goal reengagement would both moderate and mediate the relationship between socially prescribed perfectionism and distress. Our results partially supported this hypothesis, as goal reengagement moderated the effects of social perfectionism on change in suicidal thinking from T1 to T2, whilst no mediating relationships were observed. Our failure to find any mediating effects of goal adjustment on the perfectionism-distress relationship, unlike O'Connor and Forgan (2007), may have been a result of our prospective design – suggesting that goal reengagement does not mediate the impact of socially prescribed perfectionism on distress over time.

Goal disengagement was also found to interact with self-oriented perfectionism to predict suicidal thinking at T2, such that for self-oriented perfectionists, high goal disengagement was predictive of lower levels of suicidal thinking compared to low levels of goal disengagement. As self-oriented perfectionism is characterised by setting high (sometimes unachievable) goals it is

113

perhaps unsurprising that those self-oriented perfectionists who are better able to disengage from these unattainable goals experience less suicidal thinking.

Similarly, goal disengagement also interacted with socially prescribed perfectionism to predict change in suicidal thinking, such that for high social perfectionists the ability to disengage from goals was associated with less suicidal thinking. This again highlights the beneficial effects of goal disengagement in the presence of unattainable high standards and suggests that goal disengagement is beneficial for perfectionists whether or not the goal pursuit relates to a self imposed target or a target which is perceived to be externally imposed on an individual.

It is possible to reconcile our findings with Wrosch and colleagues' assertion that goal disengagement is associated with positive aspects of wellbeing and goal reengagement is associated with negative aspects of wellbeing. It may be that our measure of suicidal thinking was tapping into both positive and negative aspects of wellbeing. Although negative aspects are captured though the majority of items (e.g. 'I think of things too bad to share with others' or 'I feel the need to punish myself for things that I have done and thought'), some items could be considered to reflect positive aspects of suicidal thinking (e.g. 'I feel it would be less painful to die than to keep on living the way that things are' or 'I feel people would be better off if I were dead'). If our measure of suicidal thinking tapped into both positive and negative aspects of wellbeing then this could explain why both goal disengagement and goal reengagement were associated with suicidal thinking.

5.5.5   *The effect of attentional bias on the perfectionism-distress relationship*

Socially prescribed perfectionism interacted with positive attentional bias to predict hopelessness, such that high levels of social perfectionism, combined with

high positive attentional bias, was predictive of increased hopelessness. This indicates that social perfectionists who selectively attended to positive over neutral words had increased levels of hopelessness five weeks later. This finding was somewhat surprising, as previous research has suggested the beneficial nature of positive attentional biases (e.g. McCabe & Gotlib, 1995; Suslow, Junghanns & Arolt, 2001). The present findings suggest it may be something inherent to social perfectionism which results in positive attentional bias being associated with hopelessness. Possibly this relates to the general tendency of social perfectionists to evaluate themselves as constant under achievers with regards to standards set by others, meaning they interpret positive words as something which they are also lacking or failing to achieve (e.g. the word 'happy' is interpreted as something which they have failed to achieve). However, this explanation is purely speculative and more research is required to attempt to replicate and explain this finding to ensure it is not an anomaly.

5.5.6   *The impact of stress on the rumination-distress relationship*

Our sixth hypothesis focussed on the role of stress in the rumination-distress relationship. As hypothesised, we found that stress interacted with rumination to predict suicidal thinking at T2, as well as showing a trend towards significance to predict change in suicidal thinking from T1 to T2, such that under high stress, rumination was associated with increased suicidal thinking. This confirms the role of stress as a moderator in the rumination-suicidality relationship, indicating a diathesis-stress relationship, in line with previous findings (Morrison & O'Connor, 2005; Morrison & O'Connor, 2008a). However, the interaction between rumination and stress was not predictive of any other measure of distress. Previous research

had found that stress prospectively moderated the relationship between rumination and suicidal thinking, hopelessness, dysphoria and social dysfunction (Morrison & O'Connor, 2005; Morrison & O'Connor, 2008a). However, this relationship only held for suicidal thinking in our study.

Stress was also found to fully mediate the relationship between rumination and hopelessness, anxiety, depression and dysphoria (all at T2), in addition to partially mediating the relationship with suicidal thinking at T2. However, these effects did not hold to predict change in distress from T1 to T2. To our knowledge, this is the first time that the mediating effect of stress on the rumination-distress relationship has been examined. These results highlight that the process of ruminating can increase the experience of stress, which in turn increases levels of each measure of distress. As our measure of stress recorded levels of perceived stress, it is perhaps unsurprising that individuals who ruminated reported higher levels of stress, as repetitive thinking about negative thoughts and feelings is likely to amplify one's perceptions regarding experience of life stress. Nonetheless, this illustrates an important pathway by which rumination may take effect on distress and highlights an opportunity for intervention with high risk individuals.

5.5.7   The impact of goal adjustment on the rumination-distress relationship

Rumination interacted with goal disengagement to predict both hopelessness and suicidal thinking at T2 in addition to change in hopelessness and suicidal thinking from T1 to T2. In each instance, ruminators who were poorer at goal disengagement reported higher hopelessness and suicidal thinking than those better at goal disengagement.   This is perhaps unsurprising as failing to disengage from

an unattainable goal would seem likely to be amplified by a ruminative response style.

No mediating relationships involving goal adjustment were observed. To our knowledge, this is the first empirical examination of the relationship between rumination and goal adjustment.

5.5.8 *The impact of attentional bias on the rumination-distress relationship*

Attentional bias was not found to mediate or moderate the impact of rumination on any measure of distress at T2 or change in distress from T1 to T2. Thus, initial levels of attentional bias, in our sample of healthy young adults, did not impact on the rumination-distress relationship.

5.5.9 *Limitations*

Four main limitations in the current study should be noted. First, as participants in this study were healthy young adults, the extent to which the findings can be generalised to a clinical population is unknown. However, the high levels of distress reported by university students in recent years (Furr, Westefeld, McConnell & Jenkins, 2001) suggests a need for research specifically focusing on this population in order to examine the relationship between distress and potentially modifiable cognitive variables to facilitate the development of methods for intervention. In addition, study four in this thesis aims to address this potential limitation through the use of a clinical sample of parasuicide patients.

Second, we rely on a series of self-report measures of stress and distress which may have been subject to response biases. However, given that interaction

effects emerged from the data, it is unlikely that social desirability confounded our results.

Third, as noted above, despite setting the five week time gap between T1 and T2 in accordance with previous research, there was little variance in our data between T1 and T2. Obviously this limited the ability of our analyses predicting change in distress, however we attempted to deal with this limitation by conducting two sets of analyses predicting both distress at T2 and change in distress from T1 to T2 and adjusting our level of statistical significance accordingly.

Finally, the measurement of attentional bias may also be a limitation in the current research. As the dot-probe task comprised a measure of reaction time, attentional bias was measured on a different scale to the other self-report measures used in the study. These differences in scaling reduced the likelihood of finding statistical associations between attentional bias and any of the other measures in the study and this may contribute to the many null results associated with attentional bias. However, this is a difficulty inherent to all attentional bias measures and despite this limitation, some significant relationships still emerged from the data.

5.5.10 *Implications and future directions*

Despite the limitations noted above this research has a number of implications. First, we provide evidence of a link between rumination and attentional bias, albeit in the opposite direction to that previously reported. This highlights the need for more research in this area using the same measures of attentional bias, to further clarify the causal role of rumination in positive attentional bias. Second, we highlight a number of variables which may impact on the relationships between both perfectionism and distress and rumination and

distress. By focussing on potentially modifiable cognitive variables, we highlight opportunities to identify and intervene with individuals at risk of distress.

Future research should aim to test whether there is a causal relationship between attentional bias and rumination, through the manipulation of attentional bias. Hence study two of this thesis aims to manipulate attentional bias to test this possibility. Research should also aim to clarify whether the impact of stress and goal adjustment on the rumination-distress relationship, observed in the current research, applies to the different components of rumination: brooding and reflection. Thus, study three of this thesis goes on to examine whether stress and goal adjustment differentially impact on brooding and reflection. In addition, subsequent research should aim to test the relationships observed here in a clinical population, consequently study four in this thesis employs the same measures in a clinical sample of parasuicide patients

6 Study 2: Modifying attentional bias

6.1 Abstract

Objectives. This study aimed to examine the effect of manipulating attentional bias on rumination.

Design. An experimental design was used, where we attempted to manipulate attentional bias.

Method. Two tasks aimed at manipulating attentional biases were piloted. In the first pilot, 44 students were randomly allocated to either an attend positive or an attend negative manipulation group. Participants completed baseline measures of attentional bias followed by the manipulation procedure and a final measure of attentional bias. In the second pilot, 72 students were randomly allocated to one of four manipulation groups (attend negative, attend neutral (not negative), attend positive, attend neutral (not positive)). Similar to the first pilot, participants completed baseline measures of attentional bias before completing the manipulation procedure and re-completing a measure of attentional bias.

Results. Differences between groups in attentional bias from pre to post manipulations were examined using repeated measures analysis of variance. No significant group x time interaction was found in either of the tasks piloted.

Conclusions. Neither of the tasks piloted in this study were able to successfully manipulate attentional bias. Possible reasons for this failure are discussed.

6.2   Introduction

As noted in section 2.3.3, there are a number of theoretical similarities between attentional bias and rumination. Previous research has found a correlational relationship between rumination and attentional bias (Williams & Broadbent, 1986; Joorman et al., 2006). However, in order to examine the possibility of a causal relationship between attentional bias and rumination it is necessary to manipulate either rumination or attentional bias and examine the effect that this has on the other variable. Previous research (Donaldson et al., 2007; Morrison & O'Connor, 2008a) and study one in this thesis (Chapter 3) has examined the impact of manipulating rumination on attentional bias. However, it is possible that a causal relationship between attentional bias and rumination may work in the opposite direction; therefore it is necessary to manipulate attentional bias to observe the impact this has on rumination.

In recent years, researchers have developed an attentional training technique based on the dot-probe task, which can induce attentional biases (MacLeod Rutherford, Campbell, Ebsworthy & Holker, 2002; MacLeod, Soong, Rutherford & Campbell, 2007). However, this training technique has been mainly focussed on training attention towards or away from negative stimuli. To date, only one study has attempted to manipulate positive attentional bias using this technique (Wadlinger & Isaacowitz, 2008). However, the direct effect of attentional training was not reported in Wadlinger and Isaacowitz's study, therefore it remains unclear whether this method of attentional training can successfully manipulate positive attentional bias.

Consequently, this research aimed to use a version of the dot-probe attentional training task to induce both negative and positive attentional biases to

examine the effect on rumination. In order to do so, it was necessary to pilot our attentional training task to ensure that it would successfully induce attentional biases.

6.3   Pilot 1

6.3.1   Aims, research questions and hypotheses

This pilot aimed to address the research question of whether attentional training, based on dot-probe methods could differentially manipulate attentional bias between two training groups – 'attend negative' and 'attend positive'. Following previous research, we hypothesised that the 'attend negative' group would increase in negative attentional bias, compared to the 'attend positive' group. In contrast we hypothesised that the 'attend positive' group would increase in positive attentional bias compared to the 'attend negative' group.

6.3.2   Method

6.3.2.1 Participants

Forty-four healthy young adults were recruited from a Scottish University. Participants were volunteers recruited via an online experiment management system and they were offered course credit in return for participation. All participants were first informed that participation was voluntary and confidential and even after giving initial consent, they were free to withdraw at any stage. Participants were randomly allocated to one of two groups: attend negative or attend positive. The sample was predominantly female (77.3%) and aged between 18 and 68 years with a mean age of 27.3 (SD = 11.3).

Dot-Probe Task. One hundred and twenty word pairs were created for the

dot-probe attentional training task, 60 of which were negative-neutral word pairs

and the remainder positive-neutral word pairs (see Appendix 15). The negative-

neutral word pairings were taken from MacLeod and colleagues (2002) and were

matched with regard to word length and frequency of usage, but differed in

emotional valence. The positive-neutral word pairings were created from the

Affective Norms for English Words (ANEW) list (Bradley & Lang, 1999). There

were no differences in length (F (1, 119) = 0.0, n.s.) or frequency (F (1, 119) = .08,

n.s.) of the positive and neutral words, the means and standard deviations are

illustrated in Table 6.1. As expected, the positive and neutral words significantly

differed in terms of valence (F (1, 119) = 75.4, p<.001), as can be seen in Table 6.1.

The 120 word pairs were split into two separate sets, each with 30 negative-

neutral and 30 positive-neutral word pairs. The negative-neutral word pairs were

split following MacLeod and colleagues (2002). The positive-neutral word pairings

did not differ between sets with regards to word length (F (1, 119) = 0.0, n.s.),

frequency of usage (F (1,119) = .334, n.s.) or valence (F (1,119) = .893, n.s.) as can

be seen in Table 6.1.

Table 6.1. Mean length, frequency of usage and emotionality by word type and set

Word Type	Word Set	Mean Length (SD)	Mean Frequency (SD)	Mean Valence (SD)
Positive	Set One	6.3 (1.8)	40.6 (48.7)	6.9 (1.5)
	Set Two	6.3 (1.7)	33.6 (41.9)	6.3 (2.1)
	Total	6.3 (1.7)	37.1 (45.2)	6.6 (1.8)
Neutral	Set One	6.3 (1.8)	36.0 (39.6)	3.9 (1.6)
	Set Two	6.3 (1.7)	33.8 (46.3)	3.7 (1.8)
	Total	6.3 (1.7)	34.9 (42.7)	3.8 (1.7)
Total	Set One	6.3 (1.8)	38.3 (44.1)	5.4 (2.1)
	Set Two	6.3 (1.7)	33.7 (43.8)	5.0 (2.3)
	Total	6.3 (1.7)	36.0 (43.8)	5.2 (2.2)

The dot-probe attentional training task consisted of 540 trials. In each trial a fixation cross was presented in the centre of the screen for 500ms. This was immediately followed by the simultaneous presentation of two words, one above and one below centre, 3.5cm apart. The words remained on the screen for 750ms before a probe appeared in the location of one of the previous words. Participants pressed a response box button to indicate whether this probe was above or below centre and reaction times were recorded. Immediately following the participants' response the screen was blank for 500ms before the procedure repeated again. The first 60 trials were 'test trials', using the stimuli from set one, in which the probe appears in the same location as the valenced or the neutral word with equal probability. The next 420 trials were training trials, again using the stimuli from set one, in which the probe always appeared in the same location as the word type to be trained towards. Thus, in the attend negative condition the probe always appeared in the position of the negative word, however for the positive-neutral word pairs the probe appeared in the location of either word type with equal probability. Conversely in the attend positive condition, the probe always appeared in the location of the positive word, however for the negative-neutral word pairs the probe appeared equally in the location of either word type. Within these training trials, each word pair was presented seven times. The final 60 trials were test trials using previously unseen word pairs from set two, where the probe appeared in the location of either word with equal probability.

6.3.3.1 Procedure

Prior to the collection of any data, ethical approval was obtained from the University Psychology Department ethics committee. Participants were randomly

allocated to either the attend negative or the attend positive condition. Participants were told that they would be presented with a fixation cross in the centre of the screen and that they should look at this cross. Participants were then told that the cross would disappear and two words would briefly appear on the screen, one above and one below centre. It was explained to participants that these words would also disappear and a small dot would appear on the screen. Participants were told that their task was to indicate the position of the dot relative to the centre of the screen using the response box. It was emphasised that participants should try to respond as quickly and as accurately as possible. Participants then completed all 540 dot-probe trials, taking approximately 23 minutes before being fully debriefed.

6.3.3.2 Power, sample and analytic strategy

Differences between manipulation groups were examined using repeated measures analysis of variance. Our sample of 44 participants afforded detection of a medium to large sized effect ($f = 0.30$) with 95% power and a 5% level of statistical significance.

6.3.4   Results

6.3.4.1 Attentional Bias Scores

Prior to calculating attentional bias, consistent with other studies in the field (e.g. Beevers & Carver, 2003; Bradley et al., 1997), all incorrect responses along with very fast (less than 200 ms) and very slow (over 2000 ms) responses were identified and together with outlying responses (more than 2 standard deviations above an individual's mean score) were excluded from all analyses. This excluded data accounted for 6.0% of total responses.

Following Mogg et al. (1995) attentional bias scores were calculated by subtracting the mean response times from trials where the probe was in the same location as the valenced word from the mean response times in those trials where the probe was in a different location from the valenced word. This can be calculated in using the following equation:

[(Valenced word upper, probe lower + Valenced word lower, probe upper) – (Valences word upper, probe upper + Valenced word lower, probe lower)] / 2

Attentional bias scores were calculated separately for positive and negative conditions at both pre and post attentional training. Positive attentional bias values indicate increased attention towards the valenced stimuli in comparison to the neutral stimuli, whilst negative values reflect "avoidance" of the valenced stimuli.

6.3.4.2 Baseline differences between groups

One way ANOVA was used to examine whether the attend negative and the attend positive groups differed in attentional bias prior to attentional training. No differences were found between groups for initial levels of negative attentional bias ($F_{(1, 43)} = .702$, n.s.). However, despite random allocation, the manipulation groups differed on initial levels of positive attentional bias ($F_{(1, 43)} = 5.45$, $p < .05$), with participants in the attend negative condition having significantly higher positive attentional bias than participants in the attend positive condition. The means and standard deviations of the initial attentional bias scores between groups can be seen in Table 6.2.

126

Table 6.2. Attentional bias mean scores and standard deviations (SD) pre and post attentional training by group

	Manipulation Group	Pre-Training Mean (SD)		Post-Training Mean (SD)	
Negative Attentional Bias	Attend Negative	-0.18	(27.43)	9.25	(31.48)
	Attend Positive	-7.37	(29.41)	-10.53	(34.59)
Positive Attentional Bias	Attend Negative	8.26	(23.20)	2.62	(29.17)
	Attend Positive	-7.60	(21.86)	-8.49	(25.08)

6.3.4.3 Differences between groups following attentional training

Table 6.2 illustrates the means and standard deviations of each group both pre and post attentional training. As can be seen from Table 6.2, the attend negative group increased in negative attentional bias, as expected, and decreased in positive attentional bias. However, the attend positive group decreased in both positive and negative attentional bias following training. Repeated measures ANOVA was used to examine differences between the attend negative and attend positive groups from pre-to-post attentional training. There was no significant main effect of time for either negative ($F (1, 42) = .18$, n.s.) or positive attentional bias ($F (1, 42) = .36$, n.s.), meaning there was no difference in attentional bias from pre to post attentional training, regardless of group. However, there a significant main effect of manipulation group for both positive ($F (1, 42) = .6.67$, p<.05) and negative ($F (1, 42) = 5.48$, p<.05) attentional bias, illustrating the higher levels of both negative and positive attentional bias for the attend negative group overall. Nonetheless, the interaction between manipulation group and time was not significant for either positive ($F (1, 42) = .19$, n.s.) or negative ($F (1, 42) = .75$, n.s.) attentional bias indicating that the attentional training procedure did not have a differential impact between manipulation groups.

6.3.5   Discussion

This pilot aimed to examine whether a dot-probe attentional training task could be used to manipulate attentional bias. The results of the current pilot failed to support our initial hypotheses, as the attentional training task failed to differentially manipulate attentional bias between training groups. There are a number of reasons which may explain why this attentional training was unsuccessful and these are discussed below.

First, despite random allocation to manipulation groups, there was a difference in initial levels of positive attentional bias between groups, with the attend positive group having significantly lower levels of positive attentional bias. This illustrates that the two groups were not comparable prior to receiving the attentional training, making it more difficult to detect a differential effect of attentional bias. However visual inspection of the data indicates that the attend positive group actually decreased in positive attentional bias following attentional training, which suggests that this initial difference between groups cannot fully explain the failure of the manipulation task.

A second possible explanation of the failure of the attentional training task relates to the methodology employed. The attentional training task used in the current pilot had fewer trials than previously successful versions of this task. MacLeod and colleagues (2002) had 768 trials, 576 of which were attentional training trials, in their version of this task which successfully manipulated attentional bias. MacLeod and colleagues (2007) have also successfully manipulated attentional bias using a shorter version of the task with only 288 attentional training trials. In the present study, in an attempt to limit time demands on participants only 540 trials were included, of which 420 were attentional training

trials. However, due to the inclusion of both negative-neutral and positive-neutral word pairings, participants were only trained on 210 of the 420 trials. It may be that the reduction in length of the training could explain our failure to manipulate attentional bias, therefore a replication of this pilot using the same number of trials as MacLeod and colleagues is required.

A further difference between the current pilot and MacLeod and colleagues study is the discriminatory task given to participants. In the present study, participants were asked to indicate, via a response box, whether a dot-probe on the screen was in the upper or lower position. This meant that the attentional training task would be comparable with the previous measures of attentional bias used in this thesis. However, MacLeod and colleagues have used discriminatory tasks which do not involve a judgement relating to the spatial location of the probe (e.g. whether the probe consists of one or two dots or whether the probe is a '<' or a '>'). It is possible that the different focus of the discriminatory task may account for the differences observed between the current pilot and MacLeod and colleagues results. In order to further examine this possibility it is necessary to replicate the current pilot using the same discriminatory task as MacLeod and colleagues.

Another difference between the present pilot and MacLeod et al.'s task was the length of time that the word pairs stayed on the screen. In our version of the attentional training task word-pairs remained on screen for 750 milliseconds. However, in MacLeod and colleagues versions of the task, words remained on the screen for only 500 milliseconds. As noted in section 2.3.2, previous research has found attentional biases are more frequently associated with depression when presented for longer durations; hence our initial desire to use a 750 millisecond exposure, meaning the attentional training procedure was consistent with the other

measures of attentional bias employed through out this thesis. However, it is possible that this different exposure time may explain why we were unsuccessful at manipulating attentional bias. Consequently, it is necessary to replicate this attentional training procedure using a 500 millisecond duration, following MacLeod and colleagues.

A final difference between the current task and that of MacLeod and colleagues is that the current pilot also included a positive training condition. MacLeod and colleagues were able to manipulate attentional bias such that participants were trained to attend towards or away from negative words in comparison to neutral words. However, it is possible that the inclusion of positive-neutral word pairings in the current pilot may have impeded the attentional training task, particularly as attentional training only applied to half of the presented trials (i.e. for participants in the attend negative group, attentional training only applied to the trials containing negative-neutral word pairs and vice versa for the attend positive group). Indeed, the extent to which the effects of training will generalise to differently valenced words is difficult to predict. As noted earlier, the only study which has attempted to manipulate positive attentional biases did not report the direct effects of their attentional training (Wadlinger & Isaacowitz, 2008). Additionally, Wadlinger and Isaacowitz (2008) only used positive-neutral word pairs, in contrast to the current study which used both positive-neutral and negative-neutral word pairings.

In the present study we directly compared the effects of training towards negative words with training towards positive words. However, these comparisons may have affected our results, as the impact of training towards one type of stimuli may have had a number of consequences on other word types. For example the

attend negative group completed training which aimed to teach them to attend to negative (in comparison to neutral) words, however the effect of this training on positive-neutral word pairs may take a number of forms, including: (i) no impact on positive-neutral word pairings; (ii) a decrease in attention towards any words which are not negative, including both positive and neutral words, meaning positive attentional bias decreases or; (iii) an increase in attention towards valenced as opposed to neutral words, meaning attention towards both positive and negative words would increase. Thus, it would be possible for both training conditions to have the same impact on attentional bias scores (i.e. to increase both positive and negative attentional bias). Initially we aimed to include both negative-neutral and positive-neutral words pairs to control for the possible mood effects of exposure to positive compared to negative words, however it appears that an attentional training task which separates negative-neutral and positive-neutral word pairs may provide better controlled conditions for comparison between training groups.

In summary, a number of differences between the current pilot and the previous successful attentional training tasks developed by MacLeod and colleagues (2002, 2007) may explain our failure to manipulate attentional bias. In order to examine this further it is necessary to replicate the current pilot using an attentional training task which aims includes a greater number of trials, using stimuli presented for the same length of time and using the same discrimination judgement as MacLeod and colleagues. In addition it is necessary to separate the positive and negative conditions so that participants are presented with only negative-neutral or positive-neutral word pairs.

6.4   Pilot 2

6.4.1   Aims, research questions and hypotheses

Pilot two aimed to test an updated measure of a dot-probe attentional training task, which had been modified to include the necessary components highlighted through the failure of pilot one. This pilot aimed to address the research question of whether this modified attentional training task could differentially manipulate attentional bias between training groups. We hypothesised that the 'attend negative' group would increase in negative attentional bias following training, in contrast to the 'attend neutral (not negative)'group who would decrease in negative attentional bias. Similarly, we hypothesised that the 'attend positive' group would increase in positive attentional bias following training, whilst the 'attend neutral (not positive)' group would decrease in positive attentional bias following training.

6.4.2   Method

  6.4.2.1 Participants

Participants were 72 young adults from a Scottish University. Participants were volunteers recruited via an online experiment management system and they were offered course credit in return for participation. All participants were first informed that participation was voluntary and confidential and even after giving initial consent, they were free to withdraw at any stage. Participants were aged between 18 and 62, with a mean age of 21.2 years (SD= 6.7). 53 participants (73.6%) were female. Participants were randomly allocated to one of four conditions: attend negative; attend neutral (not negative); attend positive; attend neutral (not positive).

6.4.2.2 Materials

   Dot-Probe Task. Two separate sets of stimuli were compiled for the dot-probe attentional training task, one for the negative conditions and one for the positive conditions. Ninety six negative-neutral and 96 positive-neutral word pairs were created from words on the ANEW list (Bradley & Lang, 1999) (see Appendix 16). There was no difference in word length or frequency of usage for either the positive-neutral or negative-neutral word pairs (see Table 6.3.). Again these word pairs were split into two sets to allow the effects training to be examined using word-pairs which had not previously been seen by participants and there were no differences in word length, frequency of usage or valence between these sets for either the negative-neutral pairs or the positive-neutral pairs. Means and standard deviations of the word length, frequency of usage and valance for both the negative-neutral and the positive-neutral pairs, divided by set can be seen in Table 6.3 alongside the F values for differences between sets.

   Following MacLeod and colleagues (2002), the dot-probe attentional training task consisted of 768 trials. Each trial started with the words 'Next Trial' in the centre of the screen for 500ms. This was immediately followed by the simultaneous presentation of two words, one above and one below centre. The words were presented 3.5cm apart and remained on screen for 500ms. Immediately following the words one or two dots appeared on the screen in the position of one of the two previous words. Participants used a response box to indicate the number of dots displayed on the screen. Reaction times were recorded and quicker reaction times were taken to indicate that participants were attending to the word previously in the same location as the dot-probe.

133

The first 96 trials were 'test' trials where the probe appeared in the location of either word type with equal probability. Each of the 48 word pairs from the first set were presented twice in this testing session with the order of presentation being randomised, with the constraint that each of the pairs must be presented once before being repeated. The proceeding 576 trials were 'training' trials where the probe always appeared in the same location as the word type to be trained towards (e.g. in the attend negative condition, the probe always appeared in the same location as the negative word). These training trials used the same word pairs which were presented in the first test trials, with each pair being presented 12 times. The final 96 trials were test trials using new word pairs not previously seen by participants. Similar to the first test session, each of the 48 word pairs were presented twice to participants again with the constraint that each pair must be presented once prior to repetition.

Table 6.3. Mean scores and standard deviations (SD) of word length, frequency of usage and valence score for each word type and F value for the difference between sets

		Mean Word Length (SD)	F value	Mean Frequency of Usage (SD)	F value	Mean Valence Score (SD)	F value
Negative Words	Set 1	6.63 (1.78)	.00	27.20 (49.66)	.02	1.94 (0.24)	.02
	Set 2	6.65 (1.79)		29.11 (69.12)		1.94 (0.24)	
	Total	6.64 (1.78)		28.14 (59.75)		1.94 (0.24)	
Neutral (Not Negative) Words	Set 1	6.63 (1.78)	.00	29.71 (52.85)	.64	5.58 (0.58)	.00
	Set 2	6.65 (1.79)		22.70 (23.12)		5.58 (0.61)	
	Total	6.64 (1.78)		26.54 (41.19)		5.58 (0.59)	
Positive Words	Set 1	6.23 (1.81)	.22	61.75 (95.46)	.01	8.03 (0.25)	.08
	Set 2	6.40 (1.71)		60.30 (81.82)		8.05 (0.30)	
	Total	6.31 (1.76)		61.04 (88.58)		8.04 (0.27)	
Neutral (Not Positive) Words	Set 1	6.23 (1.81)	.22	60.36 (93.41)	.00	5.46 (0.68)	2.71
	Set 2	6.40 (1.71)		60.43 (83.07)		5.68 (0.59)	
	Total	6.31 (1.76)		60.40 (88.07)		5.57 (0.65)	

6.4.2.3 Procedure

Prior to the collection of any data, ethical approval was obtained from the University Psychology Department's ethics committee. Participants were randomly allocated to one of the four conditions: attend negative; attend neutral (not negative); attend positive; attend neutral (not positive). Participants were given the same instructions as in the first pilot, with necessary adaptations regarding the slight changes in methodology so that participants were informed that the words 'next trial' would appear on the screen (as opposed to the fixation cross in Pilot 1) and that their task was to identify whether there was one or two dots on the screen using the response box (as opposed to the location of the dot in Pilot 1). Participants then completed all 768 dot-probe trials, taking approximately 28 minutes. Finally, participants were fully debriefed.

6.4.2.4 Power, sample and analytic strategy

Following the methods used in the first pilot, repeated measures analysis of variance was used to examine the impact of the manipulation task. The two positive and two negative manipulation groups were analysed separately, meaning that our sample of 77 participants provided 95% power to detect a medium to large effect size (f = 0.31) with a significance level of 5%.

6.4.3   Results

6.4.3.1 Attentional bias scores

Similar to the first pilot, prior to calculating attentional bias, consistent with other studies in the field (e.g. Beevers & Carver, 2003; Bradley et al., 1997), all incorrect responses along with very fast (less than 200 ms) and very slow (over

2000 ms) responses were identified and along with outlying responses (more than 2 standard deviations above an individual's mean score) were excluded from all analyses. This excluded data accounted for 6.83% of total responses.

Attentional bias scores were calculated using the same equation as in the first pilot, again following Mogg and colleagues (1995):

[(Valenced word upper, probe lower + Valenced word lower, probe upper) – (Valences word upper, probe upper + Valenced word lower, probe lower)] / 2

The attentional training procedures used in this pilot task were such that participants were presented with either positive-neutral pairs or negative-neutral pairs, not both. Consequently, the data for the negative stimuli and the positive stimuli were analysed separately.

6.4.3.2 Baseline differences between groups

ANOVA was used to check for any differences between the manipulation groups prior to attentional training. Table 6.4 illustrates the mean scores and standard deviations for pre-training attentional bias in each manipulation group. No significant differences in attentional bias prior to attentional training were found between either the attend negative/attend neutral (not negative) groups (F (1, 35) = 3.56, n.s.) or the attend positive/attend neutral (not positive) groups (F (1, 35) = .07, n.s.).

Table 6.4. Means scores and standard deviations (SD) of attentional bias pre and post attentional training by group

Manipulation Group	Mean Attentional Bias Pre-Training (SD)	Mean Attentional Bias Post-Training (SD)
Attend Negative	-3.73 (10.73)	1.98 (16.28)
Attend Neutral (Not Negative)	5.66 (18.16)	0.39 (15.22)
Attend Positive	-1.96 (16.65)	-2.52 (14.68)
Attend Neutral (Not Positive)	-0.57 (14.03)	0.16 (23.86)

6.4.3.3 Differences between groups following attentional training

As can be seen in Table 6.4, the attend negative group increased in negative attentional bias from pre-to-post attentional training, whilst the attend neutral (not negative) group decreased in negative attentional bias. The attend positive group decreased in positive attentional bias from pre-to-post attentional training, whilst the attend neutral (not positive) group increased in positive attentional bias. There was no overall main effect of time for either the positive ($F (1, 34) = .001$, n.s.) or the negative ($F (1, 34) = .003$, n.s) conditions. There was also no main effect of manipulation group in either the positive ($F (1, 34) = .23$, n.s.) or the negative ($F (1, 34) = 1.24$, n.s.) conditions. The interaction between time and manipulation group was also not significant for either the positive ($F (1, 34) = .03$, n.s.) or the negative ($F (1, 34) = 2.17$, n.s.) conditions, indicating that there was no differential impact of the attentional training procedure between manipulation groups.

6.4.4   Discussion

This second pilot aimed to examine whether our modified version of the dot-probe attentional training task could successfully manipulate attentional bias either towards or away from positive and negative stimuli. We found that the attentional training task did not have significantly differential effects on attentional bias between the different training groups in either the positive or the negative conditions, meaning our hypotheses were not supported.

6.5   General Discussion

This study piloted two tasks aimed at manipulating attentional bias using a dot-probe attentional training task. However, neither of these methods was successful meaning we were unable to consistently manipulate attentional bias in the desired direction.   As a consequence we are unable to examine the causal impact of attentional bias on rumination.

One possibility which may account for our failure to replicate the findings of previous authors who have manipulated attentional bias was the inclusion of positive attentional bias in our manipulation tasks. Previous work has mainly focussed on manipulating attention towards either negative or neutral stimuli (e.g. MacLeod et al., 2002, 2007). Indeed, we are aware of only one study which has attempted to manipulate positive attentional bias and this study failed to report whether the manipulations had any direct effect on a dot-probe measure of attentional bias (Wadlinger & Isaacowitz, 2008). However, the second task we piloted separated the negative and positive stimuli into different conditions completed by different participants, yet we were still unable to differential manipulate attentional bias between training groups, even in the negative conditions, suggesting that the failure of our manipulations was not simply due to the inclusion of a positive component.

MacLeod and colleagues have previously manipulated attentional bias using a similar population of healthy young adults, suggesting that the participant population in the present research is unlikely to explain the difference in our findings. In addition, the methodology employed in our second pilot attempt replicated that of MacLeod and colleagues (2002) with regards to the timing, the

138

number of trials and the task presented to participants, yet we still failed to find an effect.

In summary, we were unable to reliably manipulate attentional bias meaning we were unable to examine the causal impact of positive or negative attentional bias on rumination. The ability to manipulate both positive and negative attentional biases was crucial to the aims of the study we had hoped to conduct to examine the causal impact of attentional bias on rumination. The inclusion of a positive attentional bias manipulation was particularly pertinent given that previous research has demonstrated the effects of manipulating rumination on positive attentional bias (e.g. Chapter 3, Morrison & O'Connor, 2008a). Given that both positive and negative attentional bias were not differentially manipulated in either pilot study and this may have been particularly linked to the inclusion of a positive manipulation condition, in combination with the time constraints associated with PhD research, we were unable to manipulate attentional bias to examine the impact on rumination.

7 Study 3: A self-report study examining moderating and mediating influences in the relationships between both rumination and distress and perfectionism and distress

7.1　Abstract

Objectives. This study aimed to clarify the findings of study one by examining whether the observed effects could be replicated for the two components of rumination and differing measures of stress.

Design. A test-retest design was utilised. The prospective nature of this study allowed for the prediction of distress over time, after controlling for initial levels of distress.

Method. At time one, 250 students completed initial self-report measures of perfectionism, rumination, goal adjustment, perceived stress, life events stress and psychological distress. At time two, 205 participants re-completed self-report measures of stress and psychological distress.

Results. A series of multiple hierarchical regression analyses were used to investigate moderating and mediating effects and a number of moderating and mediating relationships were apparent.

Conclusions. Perceived stress and stressful life events were found to have a differential impact on the relationship between both perfectionism and distress and rumination and distress, indicating differences between these two measures of stress. The two components of rumination were also found to have varying roles in the relationship with distress.

7.2   Introduction

7.2.1   *Influences on the perfectionism-distress relationship*

As outlined in section 2.4.2, perfectionism has consistently been linked with distress (although this relationship varies as a function of the dimension of perfectionism under study). A number of variables have been suggested to have an impact on the perfectionism-distress relationship, including: stress, brooding and reflective rumination and goal adjustment.

7.2.1.1 Stress

Sections 4.2.5 and 4.2.6 outlined some of the different ways in which stress can be measured. Two broad categories of measures can be distinguished: (i) checklist life events measures and (ii) cognitively focussed measures of stress-appraisal. There is considerable debate over the relative merits of each type of measure and whether they are tapping into the same construct. Thus, although research has suggested that stress may moderate (e.g. Flett et al., 1995; Chang & Rand, 2000) and/or mediate (e.g. Chang, 2000; Hewitt et al., 2001) the relationship between perfectionism and distress (see section 2.4.3 for more details), it is unclear whether these relationships hold for different measures of stress. This indicates a clear need for comparative research where stress is measured through varying methodologies.

7.2.1.2 Rumination

Treynor and colleagues (2003) recently identified two components of rumination: brooding and reflection.   Brooding refers to ruminative thoughts in which one compares one's current situation with an unachieved benchmark, whilst

refection refers to self-focus aimed at problem solving in response to depressed mood. Recent research has examined the possibility that rumination may be a mechanism by which perfectionism impacts on distress (e.g. Flett et al., 2002; O'Connor et al., 2007; Harris et al., 2008). However, following the identification of two different components of rumination, it is important to consider which, if either, of these components provides a mechanism for perfectionism to impact on distress. O'Connor and colleagues (2007) found that brooding rumination either fully or partially mediated the effects of both socially prescribed and self-oriented perfectionism on a range of measures including depression, hopelessness, suicidal thinking and psychological distress. However, this research did not include a measure of reflective rumination. Harris and colleagues (2008) examined the mediating role of both brooding and reflection in the perfectionism-distress relationship in a cross-sectional study. They found that brooding fully mediated the maladaptive perfectionism-depression relationship, whilst reflection partially mediated this relationship. However, Harris and colleagues measured specific ruminations about failure in a test, as opposed to the more general tendency to ruminate in response to negative mood, usually measured by Response Styles theory.

It is also possible that rumination may have a moderating role in the relationship between perfectionism and distress, such that rumination enhances the negative consequences associated with perfectionism. However, this possibility has generated little research to date. Study one of this thesis (Chapter 5) found that rumination moderated the relationship between socially prescribed perfectionism and suicidal thinking. However, the extent to which this moderating relationship holds for the two components of rumination remains unexplored. Thus, there is a

need for further research examining the impact of brooding and reflection on the perfectionism-distress relationship prospectively.

7.2.1.3 Goal adjustment

As outlined in section 2.5.3, we are aware of only one published study which has examined the role of goal adjustment in the perfectionism-distress relationship. O'Connor and Forgan (2007) found goal reengagement moderated and mediated the effects of socially prescribed perfectionism on suicidal thinking in a cross-sectional study. This relationship was also examined prospectively in study one of this thesis, where we found that both goal disengagement and goal reengagement moderated the effects of socially prescribed perfectionism on change in suicidal thinking. In addition, goal disengagement also moderated the relationship between self-oriented perfectionism and change in suicidal thinking. However, goal adjustment did not mediate the relationship between perfectionism and distress. The difference between our findings and those of O'Connor and Forgan (2007) may reflect the differences in the relationships when examined cross-sectionally as opposed to prospectively. However, given these varying findings there seems a need for replication to further examine the impact of goal adjustment on the perfectionism-distress relationship.

7.2.2 Influences on the rumination-distress relationship

Similar to perfectionism, rumination has persistently been implicated in various types of distress (see section 2.2.3 for more details). A number of factors have been proposed to influence the relationship between rumination and distress, including stress and goal adjustment. However, as noted earlier, recent research by

Treynor and colleagues (2003) has identified two components of rumination: brooding and reflection. Treynor and colleagues argue that brooding is the component of rumination most associated with distress and as such this may represent the maladaptive properties of rumination. In contrast, reflection may represent the adaptive properties of rumination. Consequently, research examining influences in the relationship between rumination and distress must consider these influences separately for the relationships between brooding rumination and distress and reflective rumination and distress.

7.2.2.1 Stress

The notion of stress-reactive rumination - where ruminations occur in response to stressful situations – has recently been proposed (Robinson & Alloy, 2003). However, the moderating effects of stress on the relationship between rumination and distress are not routinely reported. Nonetheless, there is some evidence to suggest that a ruminative response style interacts with levels of stress to predict social dysfunction, dysphoria, hopelessness and suicidal thinking (Morrison & O'Connor, 2005, Morrison & O'Connor, 2008a). However, to date, the moderating effect of stress on the relationship between rumination and distress has not been examined separately for brooding and reflection. In addition, previous research has not examined the impact of stressful life events, as measured by a checklist, on the relationship between rumination and distress. Finally, the possibility of stress as a mediator in the relationship between rumination and distress (i.e. the extent to which rumination results in increased stress, which in turn increases distress) has generated little research to date. Study one of this thesis found limited prospective evidence of perceived stress as a mediator in the

144

relationship between rumination and a number of measures of distress, however it is unclear whether this relationship will hold for both brooding and reflective rumination or for a different conceptualisation of stress.

7.2.2.2 Goal adjustment

Indirect evidence has implicated goal adjustment as a potential influence on the relationship between rumination and distress: goal adjustment has been associated with increased intrusive thinking (Wrosch et al., 2003) and ruminations regarding goal pursuit have been suggested as a mechanism by which goal adjustment affects immune functioning (Miller & Wrosch, 2007). Goal adjustment as an influence on the relationship between rumination and distress, was directly explored in study one of this thesis where we found that goal disengagement moderated the impact of rumination on hopelessness and suicidal thinking. However, it remains unclear whether this relationship will hold for brooding and/or reflection.

7.2.3   Aims

The two main objectives of this study were: first, to examine whether the relationships between rumination, perfectionism, goal adjustment and stress, observed in study one, would hold for the two components of rumination: brooding and reflection. Second, we aimed to determine whether the impact of stress on the relationship between both perfectionism and rumination and distress varied according to the measure of stress. An additional aim was to further examine the impact of goal adjustment on the relationship between perfectionism and distress in an attempt to clarify previous conflicting findings.

7.2.4   Research Questions and hypotheses

1) Does perceived stress or stressful life events impact on the perfectionism-distress relationship? Given that measures of perceived stress and stressful life events claim to be measuring a similar construct, we hypothesised that both would moderate the relationship between self-oriented and socially prescribed perfectionism and distress, in line with previous diathesis-stress conceptualisations. It was also hypothesised that both perceived stress and stressful life events would mediate the relationship between socially prescribed perfectionism and distress, again consistent with previous research.

2) Does brooding or reflective rumination impact on the perfectionism-distress relationship? Following previous research in this area, we hypothesised that brooding would fully mediate the relationship between both self-oriented and socially prescribed perfectionism and distress. We also hypothesised that reflection would partially mediate the relationship between both self-oriented and socially prescribed perfectionism and distress. With regards moderation, we hypothesised that brooding would moderate the relationship between self-oriented and socially prescribed perfectionism and distress such that increased perfectionism, combined with increased brooding, would be predictive of higher levels of distress.

3) Does goal adjustment impact on the perfectionism-distress relationship? Following our previous prospective findings we hypothesised that both goal disengagement and goal reengagement would moderate the effects of socially prescribed perfectionism on distress, such that an inability to disengage from goals, or a difficulty in reengaging with new goals when combined with socially prescribed perfectionism would be predictive of increased distress.   We also

hypothesised that goal disengagement would moderate the relationship between self-oriented perfectionism and distress, such that an inability to disengage from goals, when combined with self-oriented perfectionism, would be predictive of increased distress. In addition, we hypothesised that goal adjustment would not mediate the perfectionism-distress relationship.

4) Does perceived stress or stressful life events impact on either the brooding-distress relationship or the reflection-distress relationship? Given the lack of research in this area we made no specific hypotheses regarding the impact of either perceived stress or stressful life events on the relationship between brooding and reflective rumination and distress.

5) Does goal adjustment impact on either the brooding-distress relationship or the reflection-distress relationship? We hypothesised that goal disengagement would moderate the relationship between both brooding and reflection rumination and hopelessness and suicidal thinking, in line with previous findings for rumination as a whole. With regards to mediation, we hypothesised that goal adjustment would not mediate the relationship between either brooding or reflection and distress.

7.3 Method

7.3.1 Participants

Two hundred and fifty students were recruited from a Scottish University. Participants were volunteers recruited via an online experiment management system and they were offered course credit in return for participation. All participants were first informed that participation was voluntary and confidential and even after giving initial consent, they were free to withdraw at any stage. Participants were

aged between 16 and 62 with a mean age of 21.36 years (SD = 6.88). One hundred and ninety one females and 59 males participated in the study. The majority of participants were not married (96.8%). 205 of the original participants went on to re-complete measures at time two, between 39 and 204 days later (mean gap = 81 days) representing an 82% response rate at time two. Participants who did not complete time two did not significantly differ from those who completed time two on any of the time one measures (range of F-values .02-2.63, range of Chi-square values .93-2.88).

7.3.2   Measures

Rumination. The original 22-item Response Style Questionnaire provided a measure of participants' ruminative tendencies in negative situations.   Two subscales representing brooding and reflective rumination can be drawn from this measure, following Treynor et al (2003) (see section 4.2.1 for a more detailed description). Internal consistency for both the brooding and reflection subscales was satisfactory in this sample (α = .77 and .76 respectively).

Hopelessness. The Beck Hopelessness Scale (BHS; Beck et al., 1974) measured pessimism towards the future (e.g. 'It's very unlikely that I will get any real satisfaction in the future') (see section 4.3.1 for more a more detailed description). Satisfactory internal consistency was achieved in this sample (α > .87 at both administrations).

Anxiety and Depression. The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) measured both depression and anxiety (e.g. 'I feel as if I am slowed down' and 'Worrying thoughts go through my mind') (see section 4.3.2 for more a more detailed description). Cronbach's alpha in this sample

ranged from .79 - .82 across administrations, indicating adequate internal consistency.

Dysphoria. The Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) provided a measure of dysphoria (e.g. 'I felt that I was just as good as other people') (see section 4.3.3 for more a more detailed description). Internal consistency in this sample was good across each time point (range of α = .91 - .93).

Suicidal Thinking. The Suicide Ideation Subscale of the Suicide Probability Scale (SPS; Cull & Gill, 1988) provided a measure of suicide ideation (e.g. 'In order to punish others, I think of suicide') (see section 4.3.4 for more a more detailed description). Internal consistency in this sample was good (range α = .89 - .91).

Perfectionism. The Multidimensional Perfectionism Scale (MPS) (Hewitt & Flett, 1991) provided a measure of perfectionism (see section 4.2.2 for more a more detailed description). Cronbach's alpha in this sample was good (range α = .78-.91).

Goal Adjustment. The Goal Adjustment Scale (Wrosch, et al, 2003) provided a measure of both goal disengagement and goal reengagement (see section 4.2.3 for more a more detailed description). Internal consistency in this sample was confirmed (Cronbach's α range = .82-.89).

Stress. The Perceived Stress Scale (PSS; Cohen et al., 1983) measured global stress in the two weeks prior to time one and the weeks between time one and time two (e.g. 'How often have you felt nervous and stressed?') (see section 4.2.5 for more a more detailed description). Internal consistency in this sample was satisfactory at both time points (Cronbach's α range = .79-.83).

Life Events. The Life Events Scale for Students (LESS; Linden, 1984) provided a checklist measure of stressful life events both in the year preceding time one and the weeks between time one and time two (see section 4.2.6 for a more detailed description).

7.3.3   Procedure

Prior to the collection of any data, ethical approval was obtained from the University Psychology Department's ethics committee. At time one (T1), participants completed all self-report measures. At time two (T2), approximately 11 weeks later, participants re-completed measures of hopelessness, depression, anxiety, dysphoria and suicidal thinking in addition to measures of both perceived stress and stressful life events experienced in the period between T1 and T2. A flow chart of the procedure followed in this study can be seen in Figure 7.1.
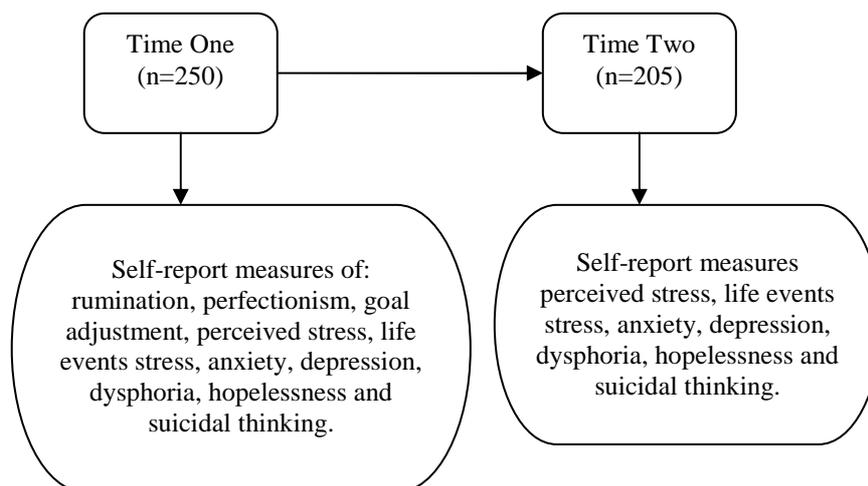
Figure 7.1. Flow chart of study three procedure

Power, sample and analytic strategy

Multiple hierarchical regression analyses were used to predict the dependent

variables at T2. Our sample of 205 participants at T2 provided 95% power to detect

a small to medium sized effect ($f^2 = 0.10$) with a 5% significance level in a

regression with 5 predictors.

7.4 Results

7.4.1 Correlations between variables

A table of the mean scores and correlations between all variables can be seen

in Table 7.1. Brooding was significantly negatively correlated with goal

disengagement (r = -.139) and goal reengagement (r = -.170) and significantly

positive correlated with every other measure (range of r = .162 - .665) with the

exception of self and other oriented perfectionism (no relationship was evident).

Reflection significantly negatively correlated with goal reengagement (r = -.145)

and positively correlated with every other measure (range of r = .184 - .449) with

the exception of self and other oriented perfectionism and stressful life events at

both time points. Goal disengagement was significantly positively correlated with

goal reengagement (r = .247) and negatively correlated with each dimension of

perfectionism, perceived stress, anxiety and dysphoria (range of r = -.142 - .322).

Goal reengagement was significantly negatively correlated with each measure of

distress at both time points, in addition to perceived stress at T2 (range of r = -.147 -

-.269). Self-oriented perfectionism significantly positively correlated with both

other oriented (r = .489) and socially prescribed perfectionism (r = .409) in addition

to anxiety at T1 (r = .147). Other oriented perfectionism was significantly

positively correlated with socially prescribed perfectionism (r = .288) in addition to

151

being negatively correlated with hopelessness at both time points and suicidal thinking at T2 (range of r = -.148 - -.224). Socially prescribed perfectionism was positively correlated with each measure of stress and distress at both time points (range of r = .201-.385). Perceived stress at both time points significantly positively correlated with stressful life events and each measure of distress (range of r = .177 - .767). In contrast, stressful life events at T1 positively correlated with depression, dysphoria and suicidal thinking at both time points in addition to hopelessness at T1 and anxiety at T2 (range of r = .145 - .239), whilst stressful life events at T2 positively correlated with each measure of distress at both time points (range of r = .256 - .344). Finally, each of the measures of distress were significantly positively inter-correlated at both time points (range of r = .423 - .783).

Table 7.1. Mean scores, standard deviations and correlations between all variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Brood	-																				
2. Reflect	.510**	-																			
3. Goal Dis	-.139*	-.093	-																		
4. Goal Re	-.170**	-.145*	.247**	-																	
5. Self	-.014	.077	-.322**	.099	-																
6. Other	-.008	.050	-.235**	.028	.489**	-															
7. Social	.285**	.184**	-.277**	-.090	.409**	.288**	-														
8. PSS 1	.665**	.448**	-.193**	-.221	.034	-.010	.385**	-													
9. Life 1	.162*	.115	-.068	-.020	.066	-.022	.201**	.177*	-												
10. BHS 1	.439**	.404**	-.123	-.269**	-.076	-.155*	.305**	.587**	.145*	-											
11. Anx 1	.491**	.385**	-.244**	-.241**	.147*	.052	.323**	.652**	.113	.532**	-										
12. Dep 1	.469**	.449**	-.119	-.230**	.046	-.013	.286**	.538**	.216**	.554**	.625**	-									
13. CESD 1	.588**	.510**	-.142*	-.248**	-.043	-.033	.337**	.726**	.190**	.678**	.679**	.749**	-								
14. SPS 1	.500**	.463**	-.117	-.164**	.045	.001	.292**	.500**	.203**	.613**	.491**	.544**	.606**	-							
15. BHS 2	.379**	.377**	-.050	-.268**	-.090	-.224**	.245**	.555**	.115	.783**	.447**	.423**	.565**	.525**	-						
16. Anx 2	.396**	.307**	-.202**	-.172*	.087	-.032	.261**	.475**	.151*	.425**	.644**	.501**	.533**	.412**	.537**	-					
17. Dep 2	.417**	.396**	-.071	-.188**	-.009	-.123	.232**	.468**	.202**	.483**	.480**	.638**	.614**	.442**	.572**	.667**	-				
18. CESD 2	.435**	.405**	-.170*	-.217**	.076	-.097	.334**	.556**	.239**	.547**	.515**	.539**	.664**	.481**	.666**	.727**	.772**	-			
19. SPS 2	.497**	.389**	-.128	-.147*	.019	-.148*	.242**	.495**	.179*	.550**	.444**	.427**	.530**	.755**	.611**	.516**	.541**	.612**	-		
20. PSS 2	.481**	.343**	-.210**	-.214**	.010	-.090	.275**	.676**	.182*	.523**	.500**	.486**	.637**	.464**	.622**	.670**	.655**	.767**	.512**	-	
21. Life 2	.177*	.070	-.088	-.025	.030	-.003	.205**	.219**	.412**	.289**	.277**	.344**	.256**	.283**	.259**	.299**	.340**	.305**	.281**	.325**	
Mean	4.60	3.61	2.95	3.73	63.08	54.65	53.87	26.07	429.27	4.15	6.91	3.50	14.47	1.70	4.01	6.45	3.33	13.27	1.24	24.79	202.13
SD	2.87	3.08	0.82	0.66	16.66	11.49	12.77	6.17	220.86	3.96	3.68	3.21	10.03	3.19	4.13	3.91	3.27	11.04	2.92	7.04	179.4

Note: Brood=Brooding Rumination; Refect=Reflective rumination; Goal Dis=Goal Disengagement; Goal Re=Goal Reengagement; Self=Self-oriented perfectionism; Other = Other oriented perfectionism; Social=Socially prescribed perfectionism; PSS 1=Perceived Stress T1; Life 1=Stressful Life Events T1; BHS 1 = Hopelessness T1; Anx 1= HADS Anxiety T1; Dep 1= HADS Depression T1; CESD 1 = Dysphoria T1; SPS 1 = Suicide Probability Scale T1; BHS 2 = Hopelessness T2; Anx 2=HADS Anxiety T2; Dep 2=HADS Depression T2; CESD 2=Dysphoria T2; SPS 2=Suicide Probability Scale T2; PSS 2=Perceived Stress T2; Life 2=Stressful Life Events T2

* Significant at the .05 level (two tailed), ** Significant at the .01 level (two tailed)

7.4.2 Differences in distress between T1 and T2

As can be seen in Table 7.1, levels of each type of distress decreased between T1 and T2. However, paired samples t-tests indicated that these decreases were only significant for suicidal thinking (t (204) =3.85, p<.0001) and dysphoria (t (204) = 2.05, p<.05). In addition, anxiety showed a trend towards significantly decreasing between T1 and T2 (t (204) = 1.82, p=.07). Table 7.2 illustrates the effect sizes for these differences in distress between T1 and T2.

Table 7.2. Effect size *r* for the differences in distress between T1 and T2

Measure of distress	Effect size r for change between T1 and T2
Hopelessness	0.02
Depression	0.03
Anxiety	0.06
Dysphoria	0.06
Suicidal Thinking	0.07

7.4.3 Moderation Analyses

A series of regression analyses were used to test for moderating relationships between variables, as outlined in the research questions for this study (see section 7.2.4). Prior to analysis, predictor variables were centred, as recommended by Aiken and West (1991). In each regression analysis the dependant variable was the measure of distress at time two. Time one distress was controlled for in the first step of each analysis[2]. In addition, gender was also entered in the first step of each analysis involving rumination (to control for the gender differences associated with rumination). The second step of the analysis contained the appropriate main effect variables (for example: self-oriented perfectionism and perceived stress), whilst the

---

[2] Thus, any reference to predicting change in distress refers to the prediction of distress at T2 after controlling for distress at T1 (e.g. the variance remaining in T2 after the variance associated with T1 has been removed).

final step contained the appropriate multiplicative terms for these main effect variables (for example: self-oriented perfectionism x perceived stress).

Significant interactions were plotted at high and low levels of each of the interaction terms, consonant with Aiken & West (1991). These interactions were then probed post-hoc using simple slope analysis to determine whether either slope significantly differed from zero, again consonant with Aiken and West (1991).

7.4.4 The effect of moderation in the perfectionism-distress relationship when predicting change in distress

7.4.4.1 Perceived stress as a moderator in the perfectionism-distress relationship

7.4.4.1.1 Self-oriented perfectionism-distress relationship

After controlling for initial levels of distress, as a main effect perceived stress was predictive of change in hopelessness (β = .29, t (204) = 6.03, p =.0001), anxiety (β = .46, t (204) = 8.56, p =.0001), depression (β = .45, t (204) = 8.31, p = .0001), dysphoria (β = .57, t (204) = 10.29, p =.0001) and suicidal thinking (β = .20, t (204) = 4.02, p = .0001). However, as a main effect, self-oriented perfectionism was not significantly predictive of change in any measure of distress, nor was the interaction between self-oriented perfectionism and perceived stress.

7.4.4.1.2 Socially prescribed perfectionism-distress relationship

After controlling for initial levels of distress, as a main effect perceived stress was predictive of change in hopelessness (β = .29, t (204) = 5.90, p = .0001), anxiety (β = .44, t (204) = 7.97, p = .0001), depression (β = .43, t (204) = 7.68, p = .0001), dysphoria (β = .55, t (204) = 9.86, p = .0001) and suicidal thinking (β = .18, t (204) = 3.56, p = .0001). Also as a main effect, socially prescribed perfectionism was

155

predictive of change in dysphoria ($\beta = .09$, t (204) = 2.06, p = .041). The interaction between socially prescribed perfectionism and perceived stress was predictive of change in suicidal thinking ($\beta = .15$, t (204) = 3.13, p = .002).   A plot of the lines of best fit for this interaction can be seen in Figure 7.2.   Post hoc examination of this interaction revealed that the low slope significantly differed from zero ($\beta = -.15$, t (204) = -2.40, p = .018) and the high slope showed a trend towards significantly differing from zero ($\beta = .12$, t (204) = 1.86, p = .064). Thus for high social perfectionists, high levels of perceived stress were associated with an increase in suicidal thinking from T1 to T2, whilst low levels of perceived stress were associated with a decrease in suicidal thinking.
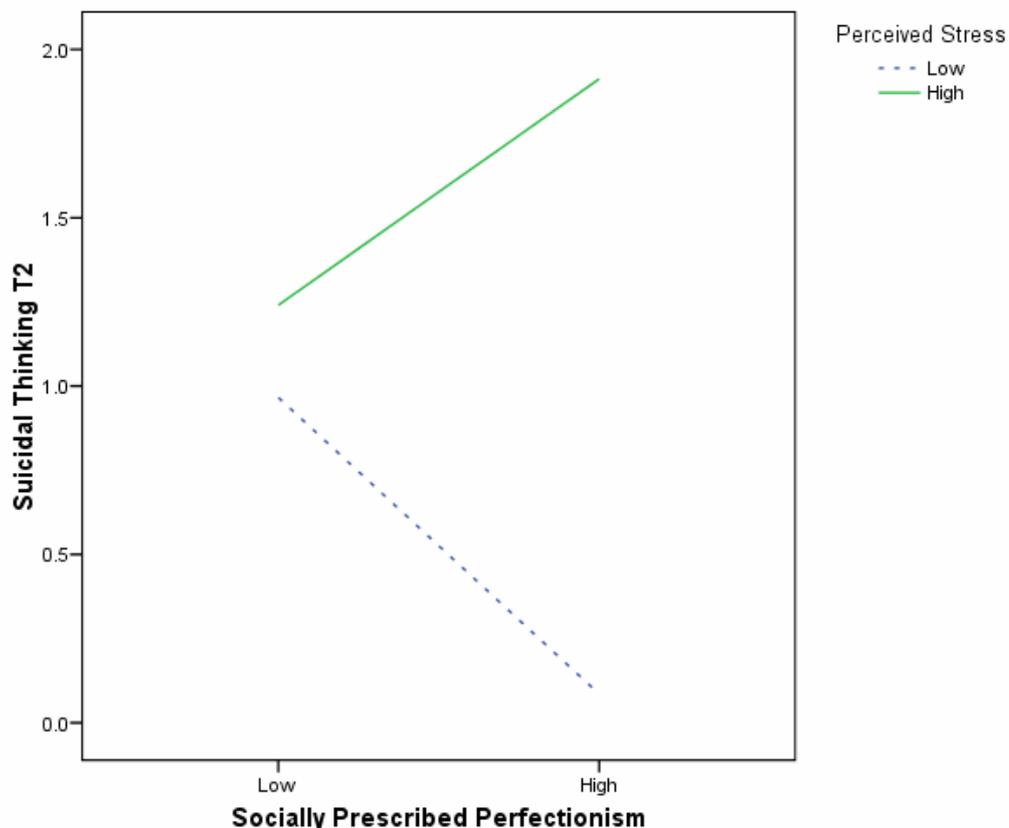
Figure 7.2. Socially prescribed perfectionism x perceived stress to predict change in suicidal thinking

7.4.4.2 Stressful life events as a moderator on the perfectionism-distress

relationship

7.4.4.2.1   Self-oriented perfectionism-distress relationship

After controlling for initial levels of distress, stressful life events as a main effect, were predictive of anxiety (β = .13, t (204) = 2.26, p = .025), depression (β = .14, t (204) = 2.51, p = .013) and dysphoria (β = .15, t (204) = 2.86, p = .005). The interaction between self-oriented perfectionism and stressful life events was predictive of change in hopelessness (β = .10, t (204) = 2.40, p = .017) and dysphoria (β = .11, t (204) = 2.17, p = .031). A plot of the lines of best fit for these interactions can be seen in Figure 7.3 and Figure 7.4, respectively. Post hoc examination of these interactions revealed that for hopelessness the low slope significantly differed from zero (β = -.15, t (204) = -2.38, p = .018). Whilst for dysphoria, the high slope significantly differed from zero (β = .18, t (204) = 2.57, p = .011). Thus, under low levels of stressful life events, low self-oriented perfectionists experienced a greater increase in hopelessness between T1 and T2 compared to high self-oriented perfectionists. Whilst under high levels of stressful life events, high self-oriented perfectionists experienced a greater increase in dysphoria compared to low self-oriented perfectionists. It is worth noting that under low stress, both low and high self-oriented perfectionists report lower levels of dysphoria compared to under high stress.
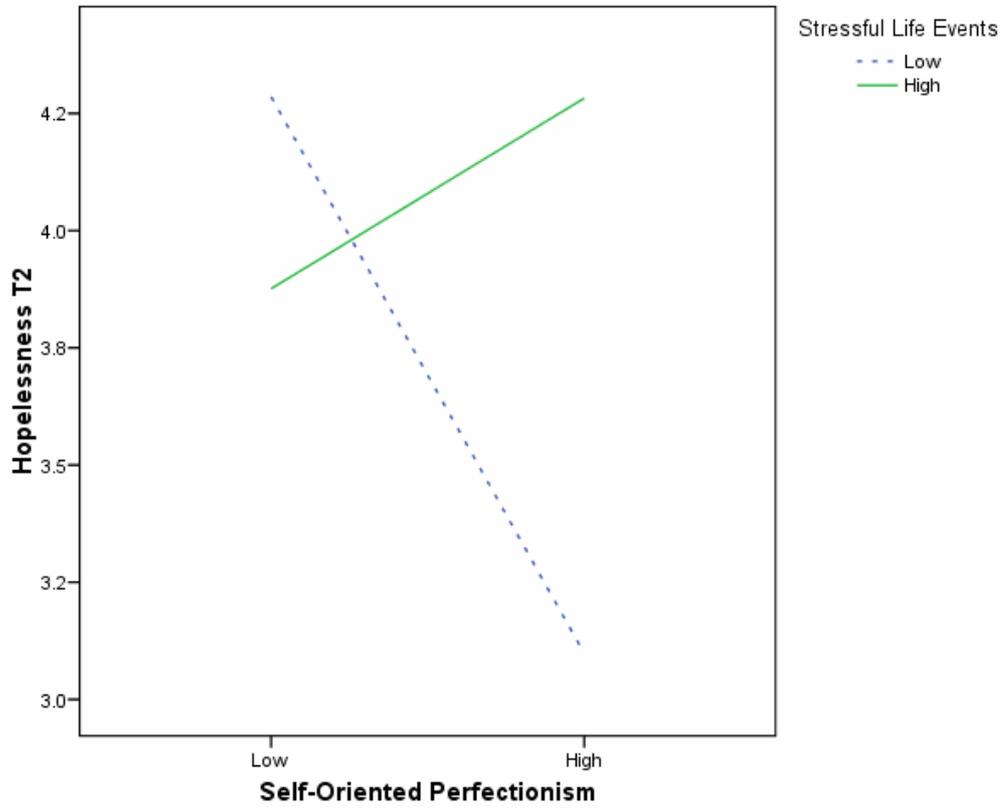
Figure 7.3. Self-oriented perfectionism x stressful life events to predict change in hopelessness T2
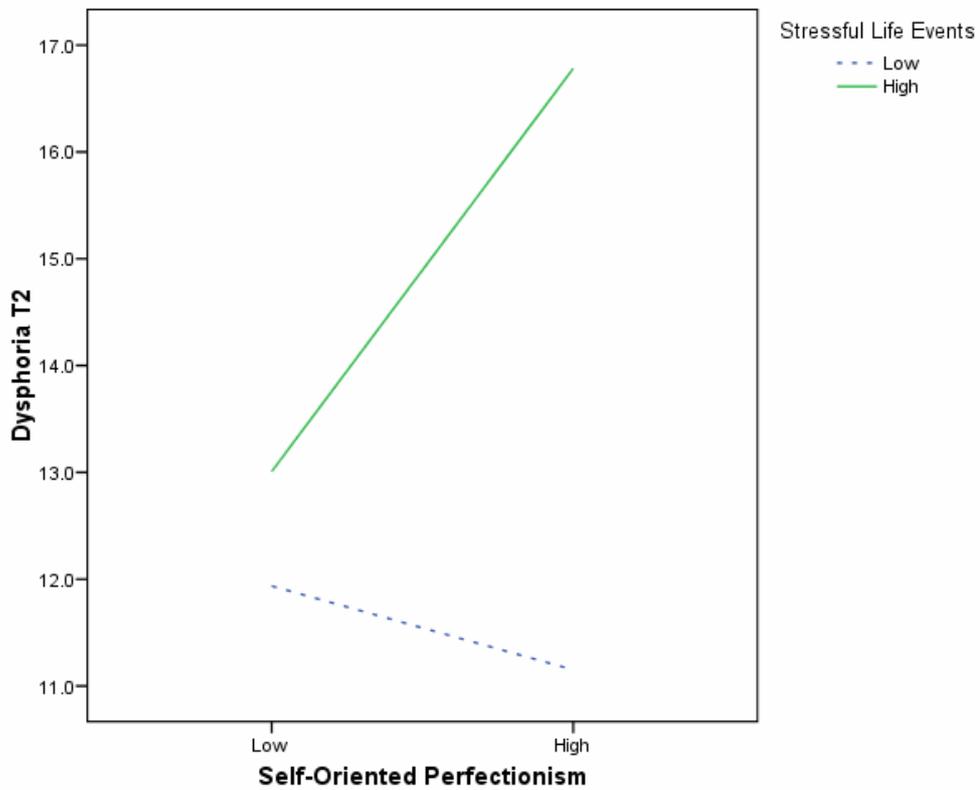
Figure 7.4. Self-oriented perfectionism x stressful life events to predict change in dysphoria

158

7.4.4.2.2   Socially prescribed perfectionism-distress relationship

After controlling for initial levels of distress, stressful life events as a main effect were predictive of change in anxiety (β = .13, t (204) = 2.32, p = .021) and dysphoria (β = .11, t (204) = 2.03, p = .043) and showed a trend approaching significance to predict depression (β = .11, t (204) = 1.83, p = .068). Also as a main effect, socially prescribed perfectionism was predictive of dysphoria (β = .13, t (204) = 2.50, p = .013). The interaction between socially prescribed perfectionism and stressful life events showed a trend approaching significance to predict change in depression (β = .11, t (204) = 1.96, p = .052) and dysphoria (β = .100, t (204) = 1.93, p = .055).

7.4.4.3 Brooding rumination as a moderator in the perfectionism-distress relationship

7.4.4.3.1   Self-oriented perfectionism-distress relationship

After controlling for initial levels of distress and gender, as a main effect brooding rumination was predictive of change in suicidal thinking (β = .13, t (204) = 2.48, p = .014) and depression (β = .13, t (204) = 2.17, p = .031). No interaction effects between self-oriented perfectionism and brooding rumination were predictive of change in any measure of distress.

7.4.4.3.2   Socially prescribed perfectionism-distress relationship

After controlling for initial levels of distress and gender, as a main effect socially prescribed perfectionism was predictive of change in dysphoria (β = .13, t (204) = 2.42, p = .016). The interaction between socially prescribed perfectionism

159

and brooding was predictive of change in anxiety (β =.16, t (204) = 2.78, p = .006), dysphoria (β = .13, t (208) = 2.32, p = .022) and suicidal thinking (β = .17, t (204) = 3.42, p = .001).   Plots of the lines of best fit for these interactions can be seen in Figure 7.5, Figure 7.6 and Figure 7.7, respectively.   Post hoc examination revealed that in the interactions predicting anxiety (β = .18, t (204) = 2.40, p = .017) and dysphoria (β = .25, t (204) = 3.46, p = .001) the high slopes significantly differed from zero. In the interaction to predict suicidal thinking, both the high (β = .15, t (204) = 2.37, p = .019) and the low slopes (β = -.15, t (204) = -2.34, p = .021) significantly differed from zero. Thus, high brooding was associated with increased anxiety, dysphoria and suicidal thinking in high social perfectionists, compared to low social perfectionists. In addition, low brooding was associated with increased suicidal thinking for low social perfectionists compared to high social perfectionists.
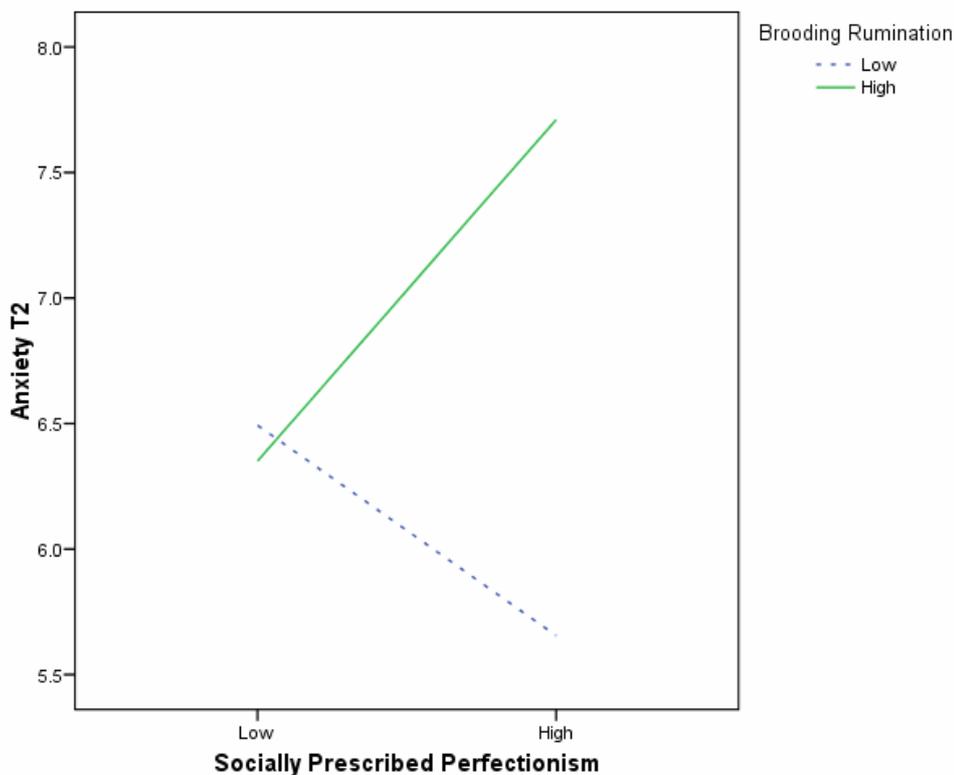
Figure 7.5. Socially prescribed perfectionism x brooding rumination to predict change in anxiety
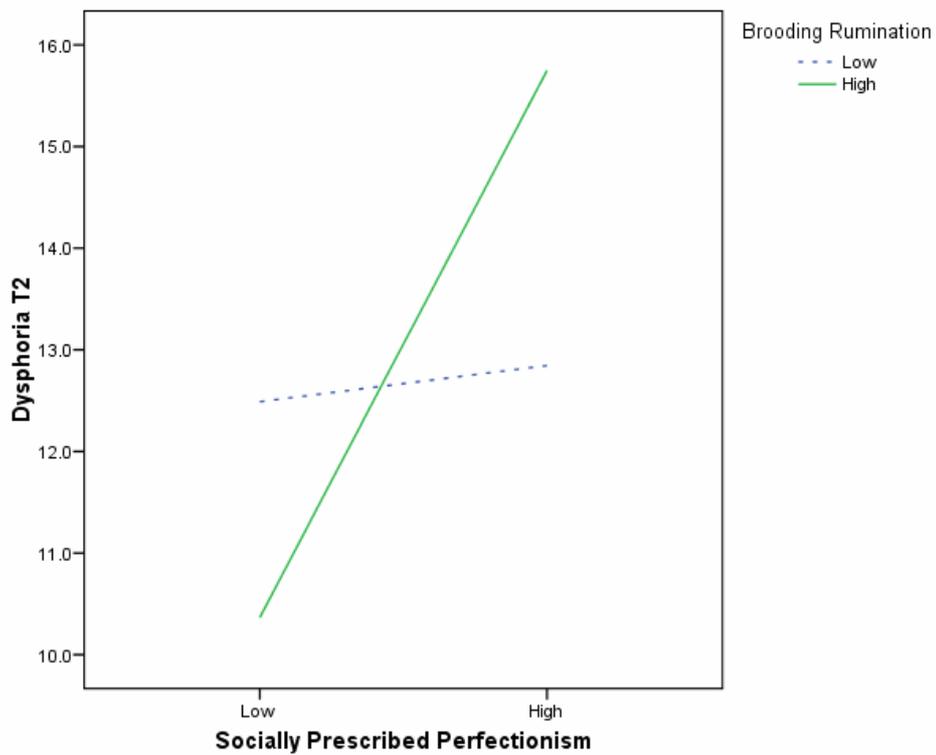
Figure 7.6. Socially prescribed perfectionism x brooding rumination to predict change in dysphoria
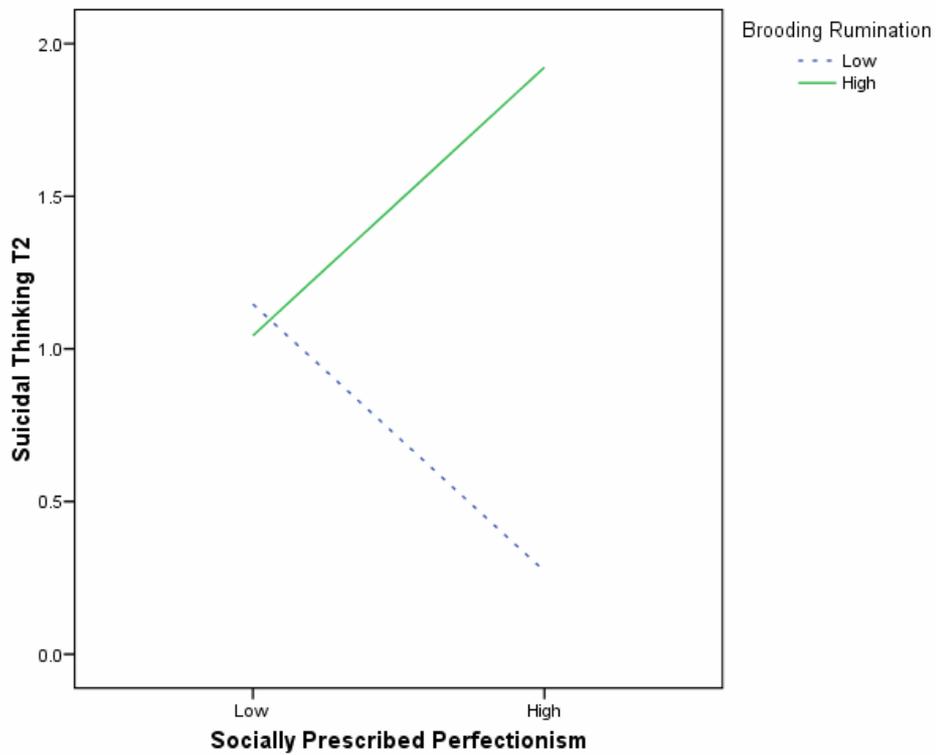
Figure 7.7. Socially prescribed perfectionism x brooding rumination to predict change in suicidal thinking

7.4.4.4 Reflection as a moderator in the perfectionism-distress relationship

7.4.4.4.1   Self-oriented perfectionism-distress relationship

No main or interaction effects of self-oriented perfectionism or reflection were observed to predict change in any measure of distress.

7.4.4.4.2   Socially prescribed perfectionism-distress relationship

After controlling for initial levels of distress and gender, as a main effect, socially prescribed perfectionism was predictive of change in dysphoria ($\beta = .14$, t (204) = 2.48, p = .014). The interaction between socially prescribed perfectionism and reflection was predictive of anxiety ($\beta = .16$, t (204) = 2.89, p = .004). A plot of the lines of best fit for this interaction can be seen in Figure 7.8. Post hoc analyses of this interaction revealed that the high slope significantly differed from zero ($\beta = .18$, t (204) = 2.52, p = .013). In other words, high reflection in combination with high social perfectionism was associated with increasing levels of anxiety between T1 and T2.
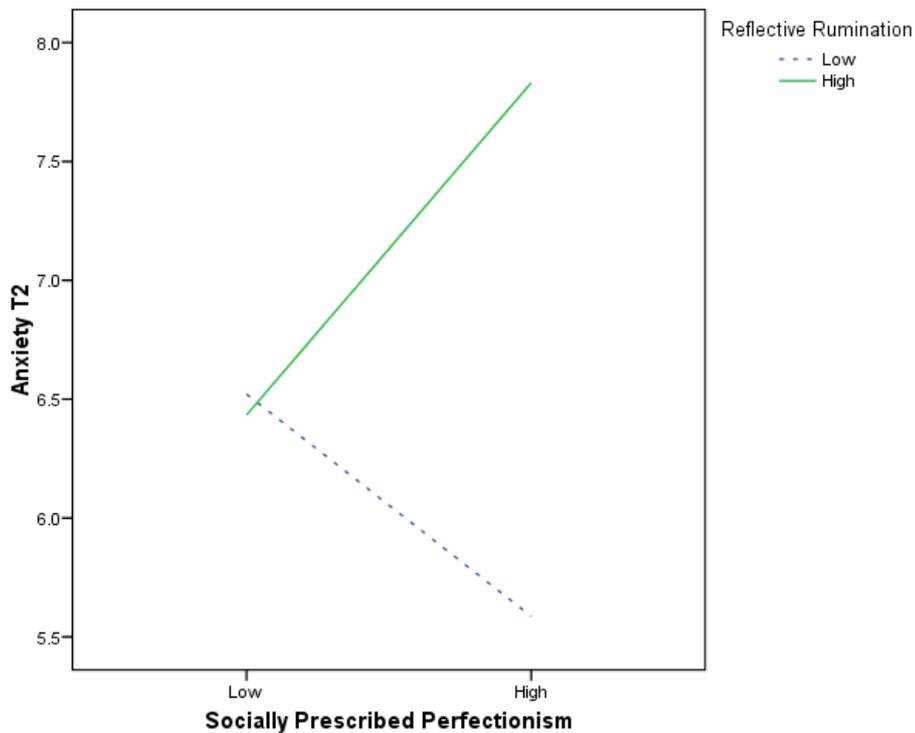
Figure 7.8. Socially prescribed perfectionism x reflective rumination to predict change in anxiety

7.4.4.5 Goal adjustment as a moderator of the perfectionism-distress relationship

7.4.4.5.1   Self-oriented perfectionism

After controlling for initial levels of distress, the interaction between goal disengagement and self-oriented perfectionism was predictive of change in hopelessness (β = -.10, t (204) = -2.19, p = .03) and showed a trend towards significance to predict change in dysphoria (β = -.01, t (204) = -1.86, p = .065) and suicidal thinking (β = -.09, t (204) = -1.93, p = .056). A plot of the lines of best fit for the significant interaction between goal disengagement and self-oriented perfectionism to predict hopelessness can be seen in Figure 7.9. Post hoc analysis of this interaction revealed that the high slope showed a trend towards significantly differing from zero (β = -.12, t (204) = -1.95, p = .052). In other words, high self-oriented perfectionists who tended to disengage from goals showed a trend towards lower hopelessness compared to low self-oriented perfectionists who were also high

on goal disengagement. The interaction between goal reengagement and self-oriented perfectionism also showed a trend approaching significance ($\beta = .10$, t (204) = 1.90, p = .059) to predict change in anxiety.
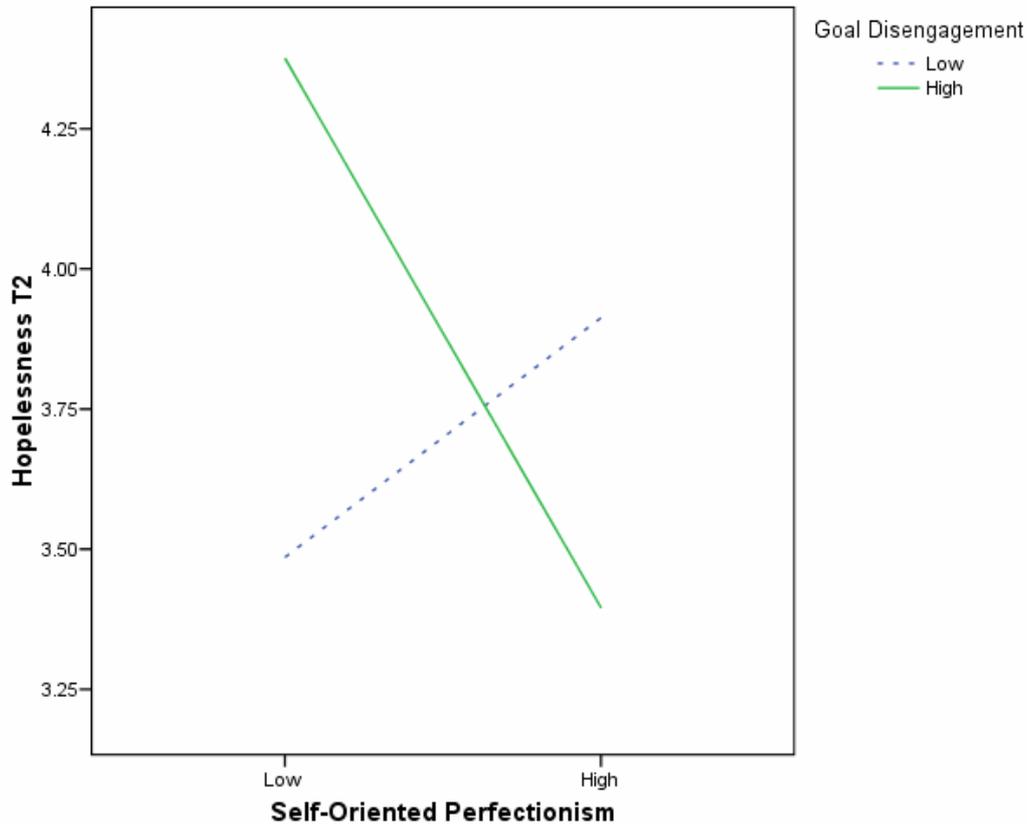
Figure 7.9. Self-oriented perfectionism x goal disengagement to predict change in hopelessness

7.4.4.5.2 *Socially prescribed perfectionism*

After controlling for initial levels of distress, as a main effect socially oriented perfectionism was predictive of change in dysphoria ($\beta = .13$, t (204) = 2.38, p = .018). Also as a main effect, goal reengagement showed a trend approaching significance to predict change in hopelessness ($\beta = -.09$, t (204) = -1.92, p = .056). The interaction between goal disengagement and socially prescribed perfectionism was predictive of change in anxiety ($\beta = -.11$, t (204) = -1.98, p = .050), depression (β

= -.13, t (204) = -2.29, p = .023) and dysphoria (β = -12, t (204) = -2.32, p = .021).

Plots of the lines of best fit for this interaction can be seen in Figure 7.10, Figure 7.11

and Figure 7.12. Post hoc examination of these interactions revealed that for

depression (β = .20, t (204) = 2.39, p = .018) and dysphoria (β = .25, t (204) = 3.16, p

= .002) the low slopes significantly differed from zero and for anxiety (β = .17, t (204)

= 1.97, p = .051) the low slope showed a trend towards significantly differing from

zero. Thus, for high social perfectionists, an inability to disengage from goals was

associated with increased anxiety, depression and dysphoria.
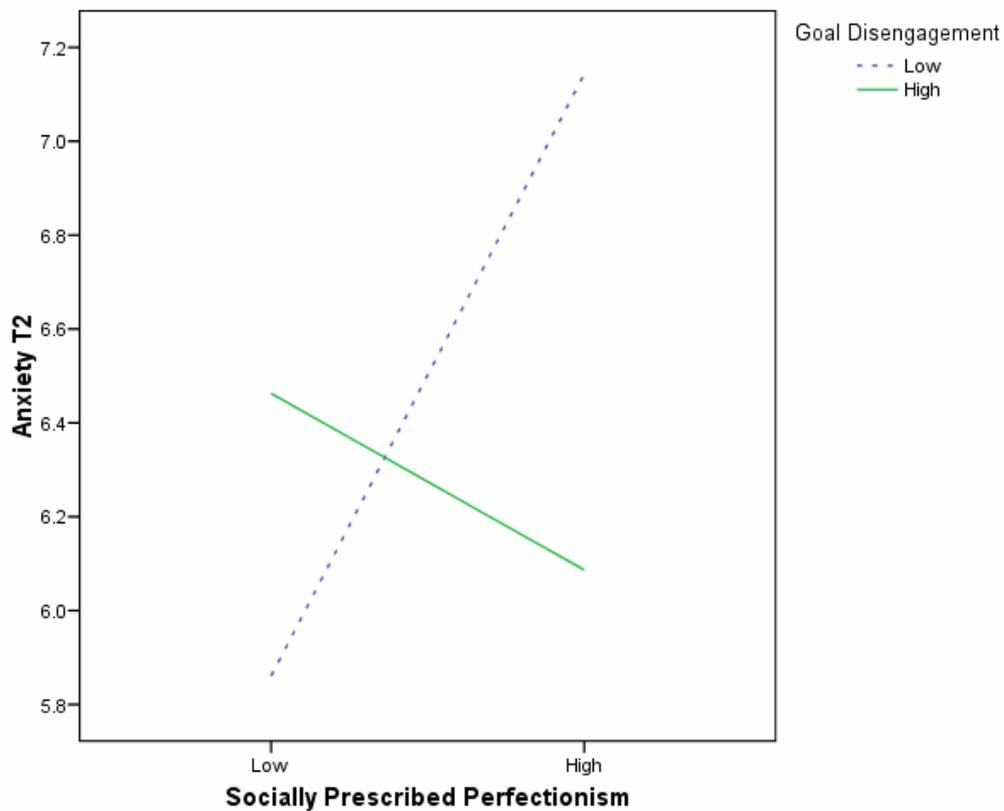
Figure 7.10. Socially prescribed perfection x goal disengagement to predict change in anxiety.

165
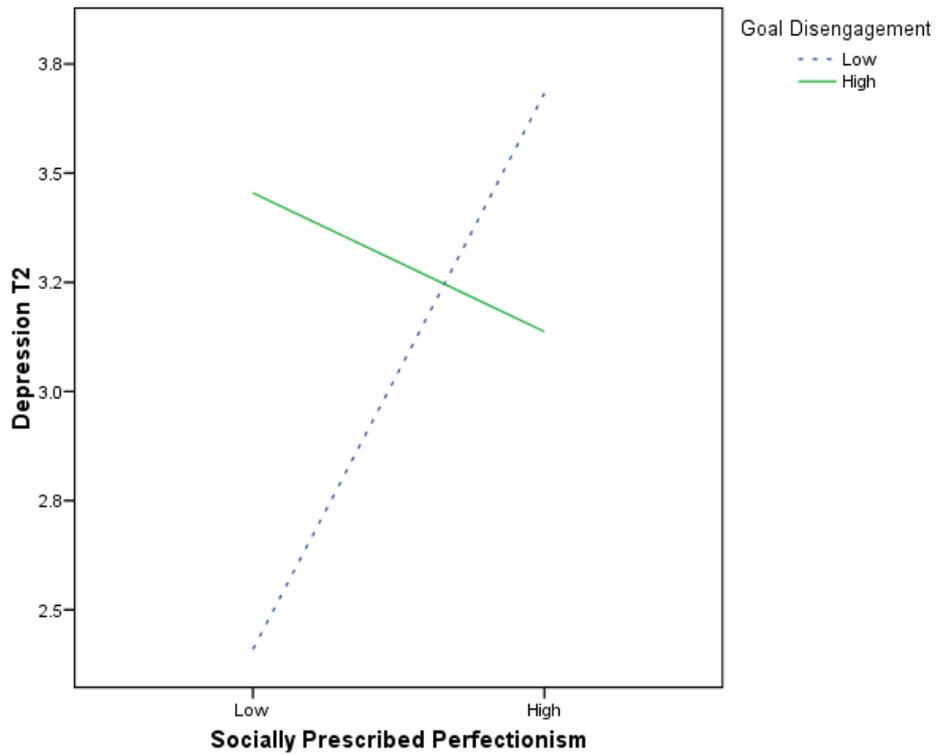
Figure 7.11. Socially prescribed perfectionism x goal disengagement to predict change in depression.
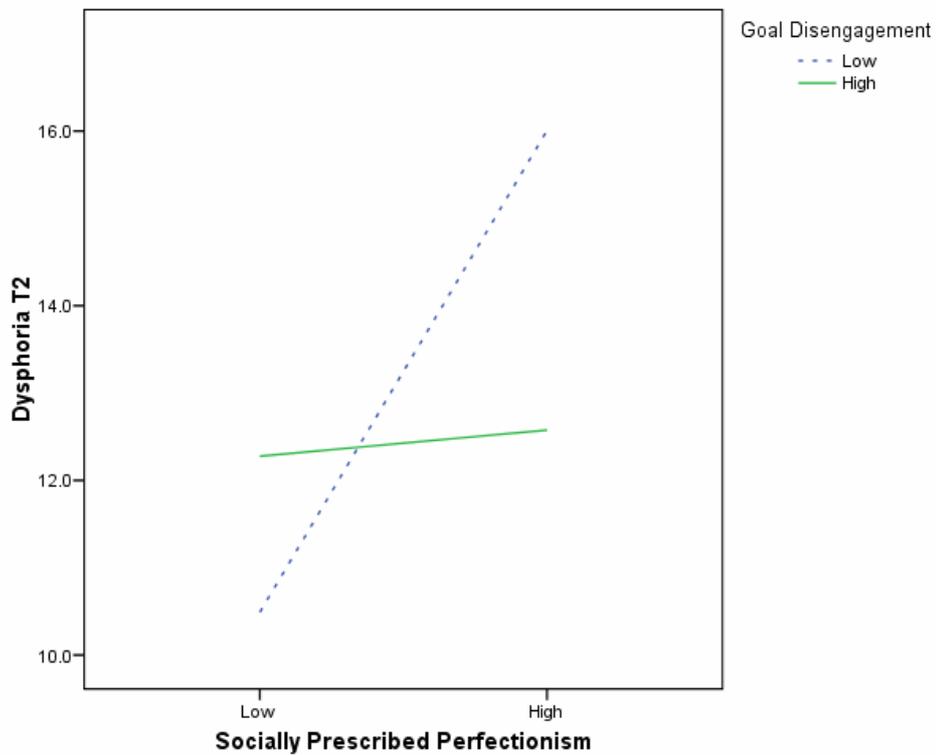
Figure 7.12. Socially prescribed perfectionism x goal disengagement to predict change in dysphoria.

166

7.4.5   The effect of moderation in the rumination-distress relationship when

predicting change in distress

7.4.5.1 Perceived stress as a moderator of the rumination-distress relationship

7.4.5.1.1   Brooding rumination-distress relationship

After controlling for initial levels of distress and gender, as a main effect,

perceived stress was predictive of change in hopelessness (β = .33, t (204) = 7.04, p =

.0001), anxiety (β = .47, t (204) = 8.55, p = .0001), depression (β = .45, t (204) = 8.10,

p = .0001), dysphoria (β = .58, t (204) = 10.56, p = .0001) and suicidal thinking (β =

.21, t (204) = 4.52, p = .0001).   Also as a main effect, brooding rumination was

predictive of change in hopelessness (β = -.12, t (204) = -2.51, p = .013). The

interaction between brooding rumination and perceived stress was predictive of

change in hopelessness (β = .18, t (204) = 4.16, p = .0001), dysphoria (β = .11, t (204)

= 2.49, p = .014) and suicidal thinking (β = .38, t (204) = 8.33, p = .0001) and showed

a trend towards significance to predict anxiety (β = .10, t (204) = 1.96, p = .051).

Plots of the lines of best fit for these significant interactions can be seen in Figure

7.13, Figure 7.14 and Figure 7.15. Post hoc examination revealed, that for the

interaction predicting change in hopelessness, the low slope significantly differed

from zero (β = -.25, t (204) = -4.07, p = .0001) and for the interaction predicting

change in dysphoria, the low slope showed a trend towards significance (β = -.13, t

(204) = -1.90, p = .059).   For the interaction predicting change in suicidal thinking

both the high (β = .32 t (204) = 5.69, p = .001) and the low slopes (β = -.26, t (204) = -

4.23, p = .0001) significantly differed from zero. Thus, under low levels of perceived

stress, high brooding was associated with decreased hopelessness, dysphoria and

suicidal thinking from T1 to T2. Whilst under high levels of perceived stress high

brooding was associated with increased suicidal thinking between T1 and T2.
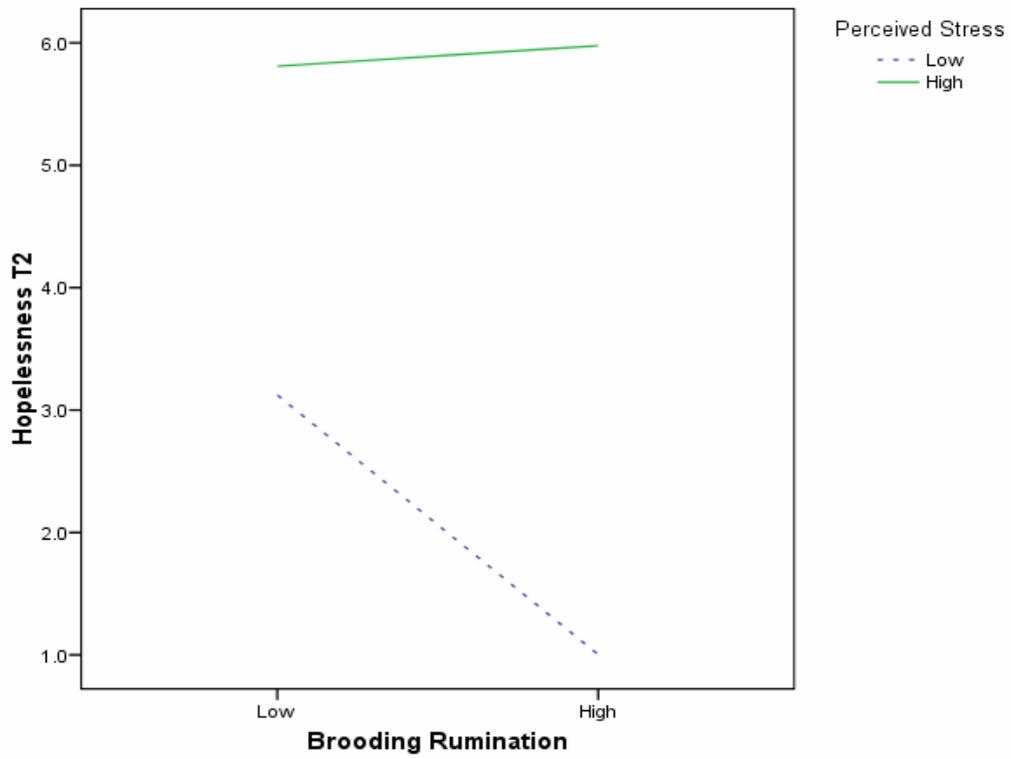
Figure 7.13. Brooding rumination x perceived stress to predict change in hopelessness
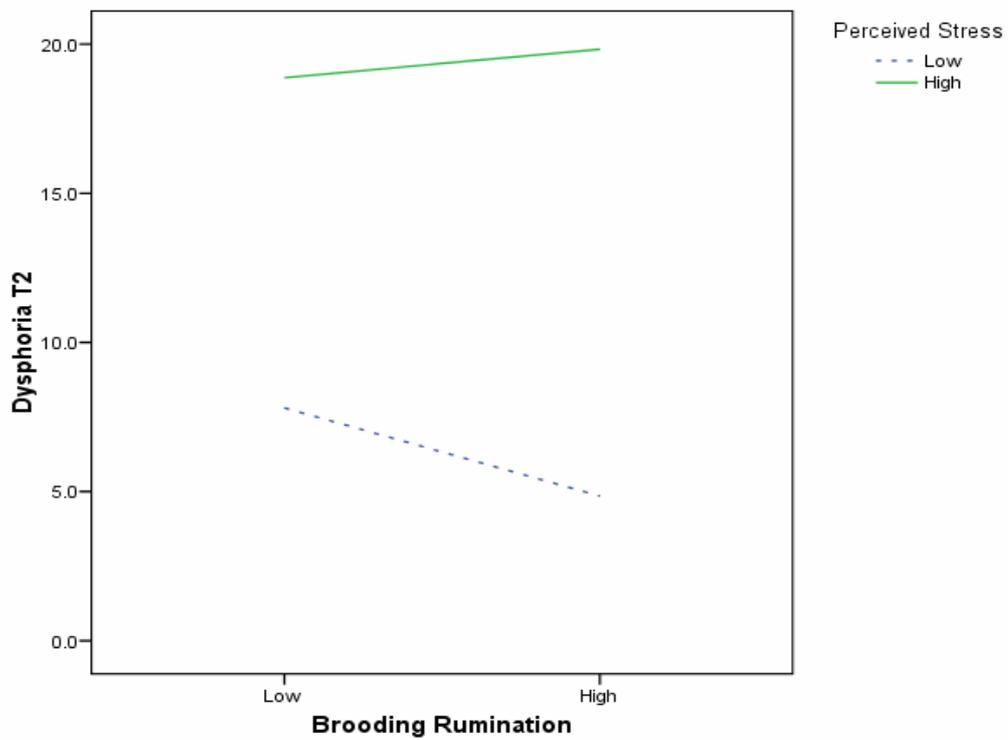
Figure 7.14. Brooding rumination x perceived stress to predict change in dysphoria

168
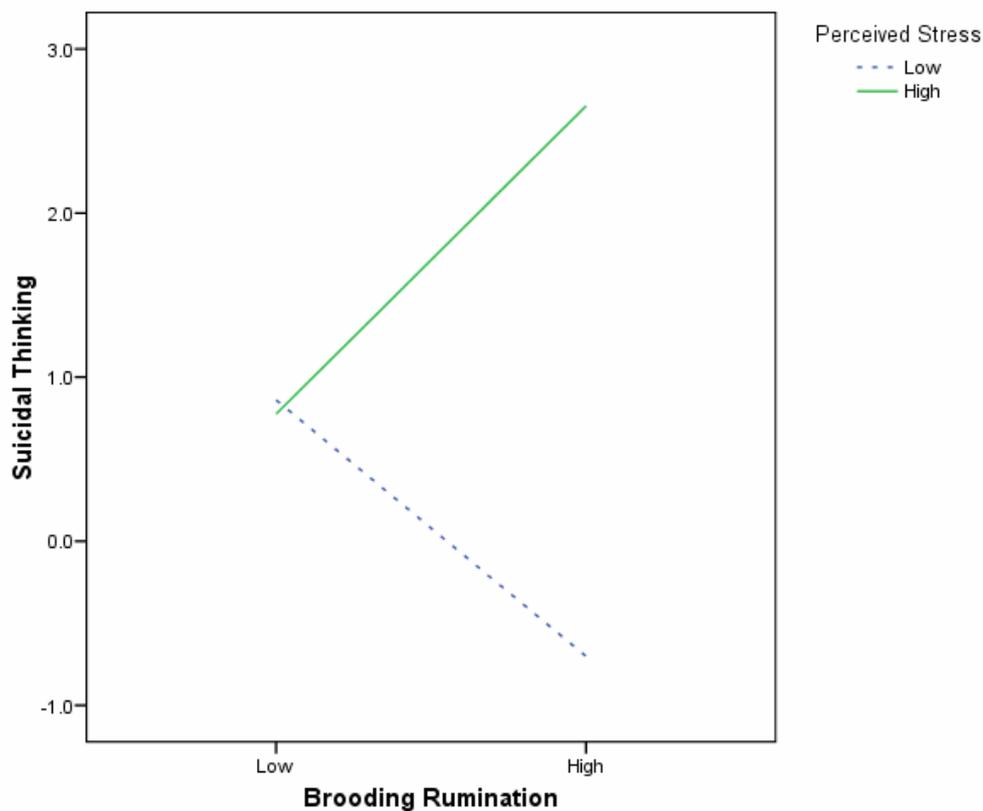
Figure 7.15. Brooding rumination x perceived stress to predict change in suicidal thinking

7.4.5.1.2 *Reflective rumination-distress relationship*

After controlling for initial levels of distress and gender, as a main effect, perceived stress was predictive of change in hopelessness ($\beta = .28$, t (204) = 5.93, p = .0001), anxiety ($\beta = .45$, t (204) = 7.98, p = .0001), depression ($\beta = .46$, t (204) = 8.27, p = .0001), dysphoria ($\beta = .58$, t (204) = 10.32, p = .0001) and suicidal thinking ($\beta = .18$, t (204) = 3.53, p = .001). The interaction between reflection and perceived stress was predictive of change in hopelessness ($\beta = .94$, t (204) = 2.13, p = .034) and suicidal thinking ($\beta = .20$, t (204) = 4.03, p = .0001). A plot of the lines of best fit for these interactions can be seen in Figure 7.16 and Figure 7.17 respectively. Post hoc analysis of these interactions showed that for suicidal thinking both the high ($\beta = .17$, t (204) = 2.59, p = .010) and the low ($\beta = -.14$, t (204) = -2.36, p = .019) slopes

significantly differed from zero. However for hopelessness neither the high ($\beta = .07$, t (204) = 1.31, n.s.) nor the low slope ($\beta = -.07$, t (204) = -1.28, n.s.) significantly differed from zero. In other words, high reflection was associated with increased suicidal thinking when combined with high levels of perceived stress, however the opposite pattern is observed for high reflection combined with low perceived stress, as this is associated with decreasing suicidal thinking. A similar, non-significant, trend was observed for hopelessness.
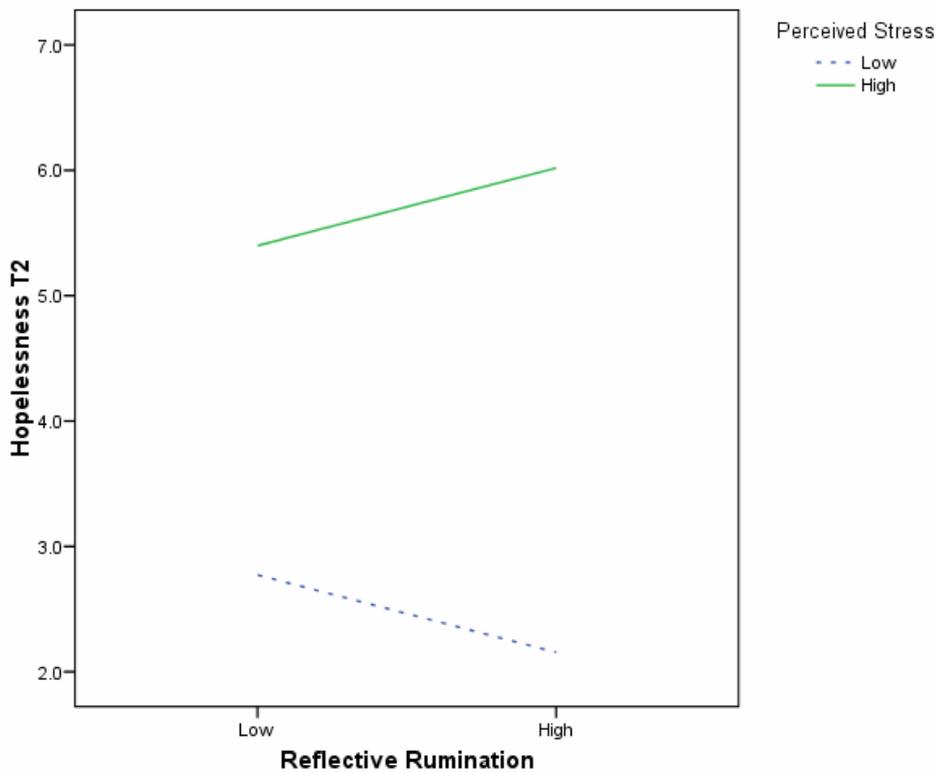
Figure 7.16. Reflective rumination x perceived stress to predict change in hopelessness
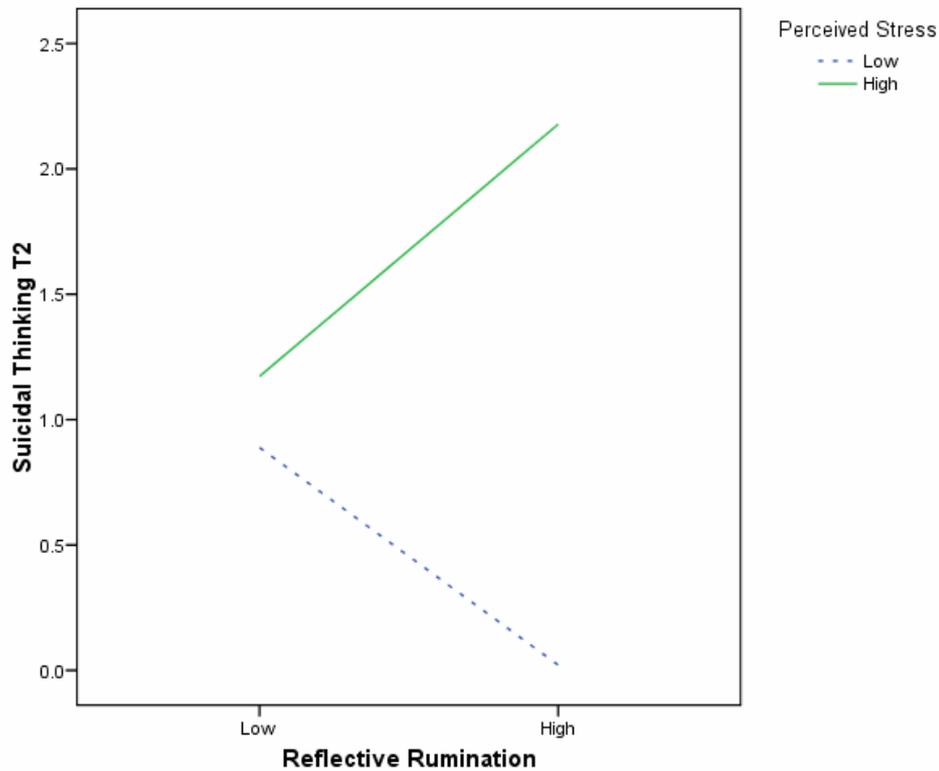
Figure 7.17. Reflective rumination x perceived stress to predict change in suicidal thinking

7.4.5.2 Stressful life events as a moderator in the rumination-distress relationship

7.4.5.2.1   Brooding rumination-distress relationship

After controlling for initial distress and gender, as main effect, stressful life events were predictive of change in depression ($\beta = .14$, t (204) = 2.52, p = .013), dysphoria ($\beta = .14$, t (204) = 2.61, p = .010) and anxiety ($\beta = .12$, t (204) = 2.20, p = .029). Also as a main effect, brooding was predictive of change in suicidal thinking ($\beta = .12$, t (204) = 2.26, p = .025) and showed a trend towards significance to predict change in depression ($\beta = .12$, t (204) = 1.91, p = .057). The interaction between brooding and stressful life events was predictive of change in suicidal thinking ($\beta = .10$, t (204) = 2.05, p = .042) and showed a trend approaching significance to predict change in depression ($\beta = .10$, t (204) = 1.77, p = .078). A plot of the lines of best fit for the interaction between brooding and stressful life events to predict suicidal

171

thinking can be seen in Figure 7.18. Post hoc examination of this interaction revealed that the high slope significantly differed from zero (β = .21, t (204) = 3.20, p = .002). In other words, high brooding was associated with increased suicidal thinking, but only when combined with high levels of stressful life events.
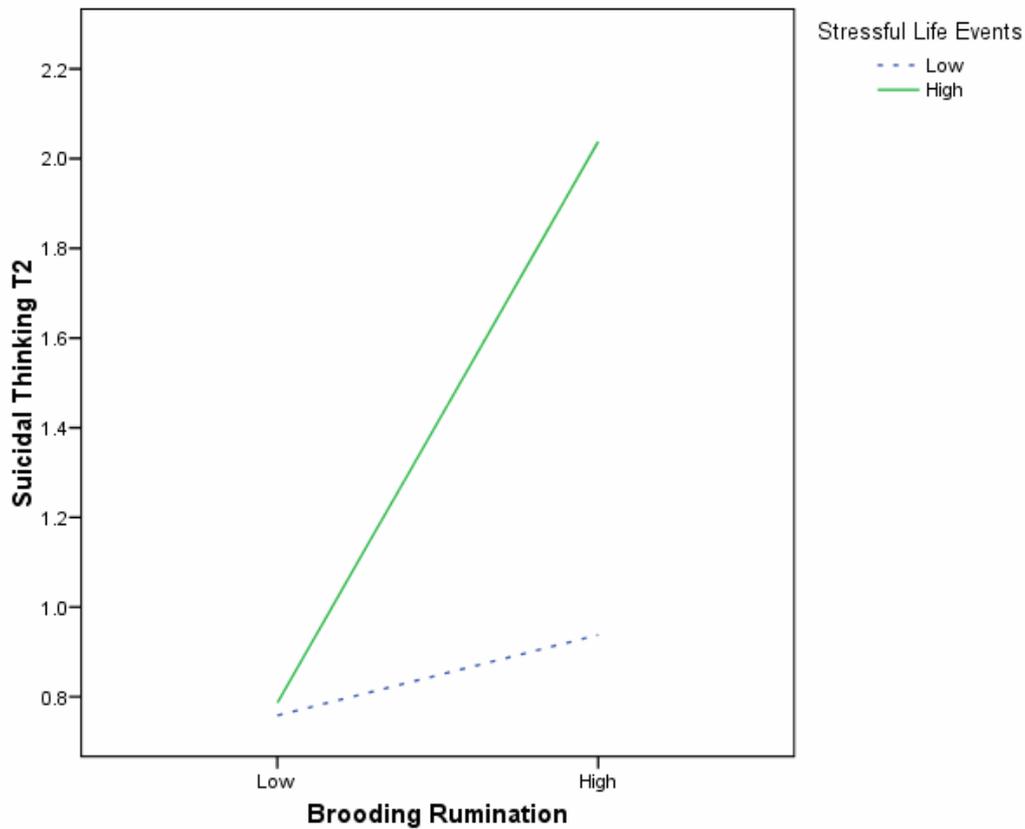
Figure 7.18. Brooding rumination x stressful life events to predict change in suicidal thinking

7.4.5.2.2 *Reflective rumination-distress relationship*

After controlling for initial levels of distress and gender, as a main effect, stressful life events were predictive of change in depression (β = .15, t (204) = 2.58, p = .011), dysphoria (β = .14, t (204) = 2.55, p = .012) and anxiety (β = .11, t (204) = 2.03, p = .044). Also as a main effect, reflection was predictive of depression (β = .13, t (204) = 2.10, p = .037). No significant interaction effects between reflective

rumination and stressful life events were predictive of change in any measure of distress.

7.4.5.3 Goal adjustment as a moderator of the rumination-distress relationship

7.4.5.3.1 Brooding rumination-distress relationship

After controlling for time one distress and gender, as a main effect, brooding rumination was predictive of change in depression ($\beta = .14$, $t (204) = 2.32$, $p = .022$) and suicidal thinking ($\beta = .15$, $t (204) = 2.72$, $p = .007$). However no significant interactions between goal adjustment and brooding were observed.

7.4.5.3.2 Reflective rumination-distress relationship

After controlling for time one distress and gender, the interaction between reflection and goal disengagement was showed a trend towards significance to predict change in suicidal thinking ($\beta = -.09$, $t (204) = -1.82$, $p = .07$). However, no other interactions or main effects were observed.

7.4.6 Moderation Summary

With regards to the effects of moderation in relationship between perfectionism and distress: Perceived stress was found to moderate the relationship between socially prescribed perfectionism and suicidal thinking, whilst stressful life events moderated the relationship between self-oriented perfectionism and both hopelessness and dysphoria. Brooding was shown to moderate the relationship between socially prescribed perfectionism and anxiety, dysphoria and suicidal thinking. In contrast, reflection was found to moderate only the relationship between socially prescribed perfectionism and anxiety. Goal disengagement moderated the

173

relationship between self-oriented perfectionism and hopelessness in addition to the relationship between socially prescribed perfectionism and anxiety, depression and dysphoria.

Perceived stress was found to moderate the relationship between brooding and hopelessness, dysphoria and suicidal thinking. Perceived stress also moderated the relationship between reflection and hopelessness and suicidal thinking. Stressful life events moderated the relationship between brooding and suicidal thinking, but did not moderate the relationship between reflection and any type of distress.

7.4.7 Mediation Analyses

Mediation effects were examined through a series of regression analyses following the procedure outlined by Baron & Kenny (1986) and Kenny and colleagues (1998) (see section 5.4.12 for a more detailed explanation).

Similar to the analyses examining moderation, we conducted analyses to predict distress at T2, after controlling for distress at T1. Again gender was also controlled for in all analyses involving either component of rumination.

7.4.8 The effect of mediation in the perfectionism-distress relationship when predicting change in distress at T2

7.4.8.1 Perceived stress as a mediator of the perfectionism-distress relationship

7.4.8.1.1 Self-oriented perfectionism

Self-oriented perfectionism was not significantly predictive of perceived stress ($\beta = .01$, t (204) = .14, n.s.) meaning the first condition of meditation was not met. Consequently, perceived stress did not mediate the relationship between self-oriented perfectionism and any measure of distress.

7.4.8.1.2   Socially prescribed perfectionism

After controlling for dysphoria at T1, socially prescribed perfectionism was predictive of dysphoria at T2 (β = .15, t (204) = 2.67, p = .008). The addition of perceived stress in the next step of the analysis explained an additional 18.8% of the variance (β = .57, t (204) = 10.26, p = .0001) and reduced the beta weight of socially prescribed perfectionism (β = .10, t (204) = 2.14, p = .033). A Sobel test confirmed this reduction in beta weight was significant (Z = 3.77, p = .0002) indicating partial mediation (see Figure 7.19). However, perceived stress did not mediate the relationship between socially prescribed perfectionism and any other measure of distress.

*p<.05, **p<.01, ***p<.001
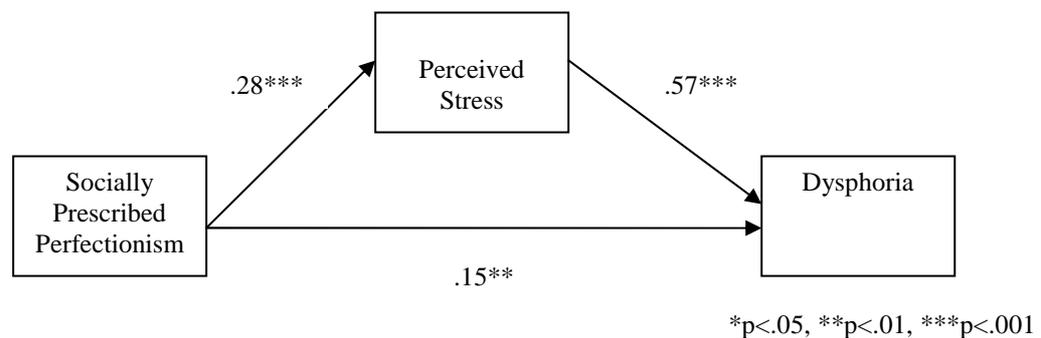
Figure 7.19. The mediating effect of perceived stress on the relationship between socially prescribed perfectionism and dysphoria

7.4.8.2 Stressful life events as a mediator of the perfectionism-distress relationship

7.4.8.2.1   Self-oriented perfectionism

Self-oriented perfectionism was not significantly predictive of stressful life events (β = .03, t (204) = .43, n.s.) thus the first condition of mediation was not

fulfilled. As a result, stressful life events did not mediate the relationship between self-oriented perfectionism and any measure of distress.

7.4.8.2.2 *Socially prescribed perfectionism*

After controlling for initial levels of dysphoria, socially prescribed perfectionism was predictive of dysphoria at T2 ($\beta = .15$, t (204) = 2.67, p = .008). The addition of stressful life events in the next step of the analysis explained an additional 1.2% of variance ($\beta = .13$, t (204) = 2.38, p = .018) and reduced the beta weight of socially prescribed perfectionism ($\beta = .13$, t (204) = 2.35, p = .020). A Sobel test confirmed that this reduction in beta weight was significant (Z = 1.99, p = .05) indicating partial mediation (see Figure 7.20). However, stressful life events did not mediate the relationship between socially prescribed perfectionism and any other measure of distress.

*p<.05, **p<.01, ***p<.001
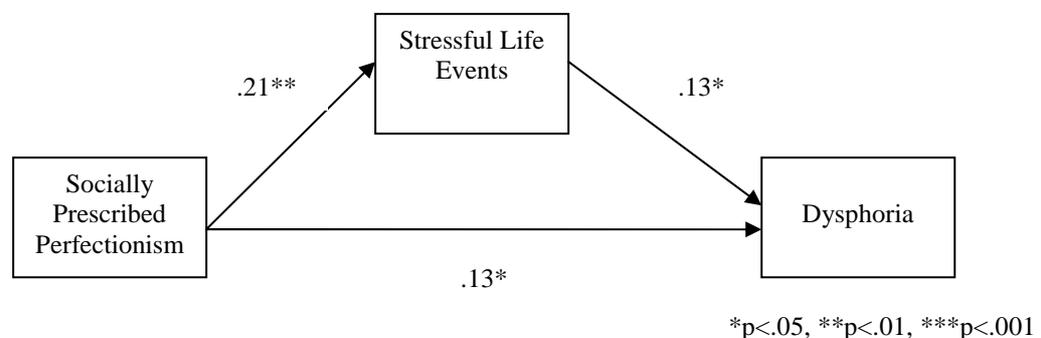
Figure 7.20. The mediating effect of stressful life events on the relationship between socially prescribed perfectionism and dysphoria

7.4.8.3 Brooding rumination as a mediator in the perfectionism-distress relationship

7.4.8.3.1 *Self-oriented perfectionism*

176

Self-oriented perfectionism was not a significant predictor of brooding rumination (β = -.01, t (204) = -.22, n.s.) meaning the first condition of mediation was not met. Consequently, brooding rumination did not mediate the relationship between self-oriented perfectionism and any measure of distress.

7.4.8.3.2   Socially prescribed perfectionism

Brooding rumination was not found to mediate the relationship between socially prescribed perfectionism and any measure of distress.

7.4.8.4 Reflective rumination as a mediator in the perfectionism-distress relationship

7.4.8.4.1   Self-oriented perfectionism

Self-oriented perfectionism was not significantly predictive of reflection (β = .08, t (204) = 1.22, n.s.) meaning the first condition of mediation was not met. Thus, reflection did not mediate the relationship between self-oriented perfectionism and any measure of distress.

7.4.8.4.2   Socially prescribed perfectionism

The full conditions of mediation were not met for reflection with regards the relationship between socially prescribed perfectionism and any measure of distress.

7.4.8.5 Goal adjustment as a mediator of the perfectionism distress relationship

7.4.8.5.1   Self-oriented perfectionism

Neither goal disengagement nor goal reengagement met the criteria to mediate the relationship between self-oriented perfectionism and distress.

7.4.8.5.2   Socially prescribed perfectionism

Neither goal disengagement nor goal reengagement met the criteria to mediate

the relationship between socially prescribed perfectionism and distress.

7.4.9   The effect of mediation in the rumination-distress relationship when predicting

change in distress at T2

7.4.9.1 Perceived stress as a mediator in the rumination-distress relationship

7.4.9.1.1   Brooding rumination

After controlling for gender and initial levels of depression, brooding was

predictive of change in depression (β = .14, t (204) = 2.20, p = .029). The addition of

perceived stress in the next step of the analysis explained an additional 14.3% of

variance (β = .46, t (204) = 8.15, p = .0001) and reduced the beta weight of brooding

to non-significance (β = -.01, t (204) = -.20, n.s.). A Sobel test confirmed this

reduction in beta weight was significant (Z = 5.64, p<.0001) indicating full mediation

(see Figure 7.21).

*p<.05, **p<.01, ***p<.001
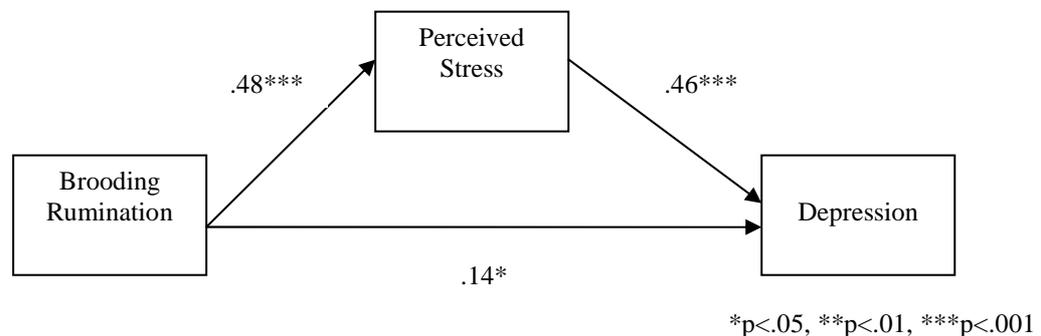
Figure 7.21. The mediating effect of perceived stress on the relationship between brooding rumination and depression

178

After controlling for gender and initial levels of suicidal thinking, brooding was predictive of change in suicidal thinking (β = .13, t (204) = 2.50, p = .013). The addition of perceived stress in the next step of the analysis accounted for a further 2.4% of variance (β = .19, t (204) = 3.52, p = .001) and reduced the beta weight of brooding rumination to non-significance (β = .07, t (204) = 1.33, n.s.). A Sobel test confirmed this reduction in beta weight was significant (Z = 3.19, p = .001) indicating full mediation (see Figure 7.22).
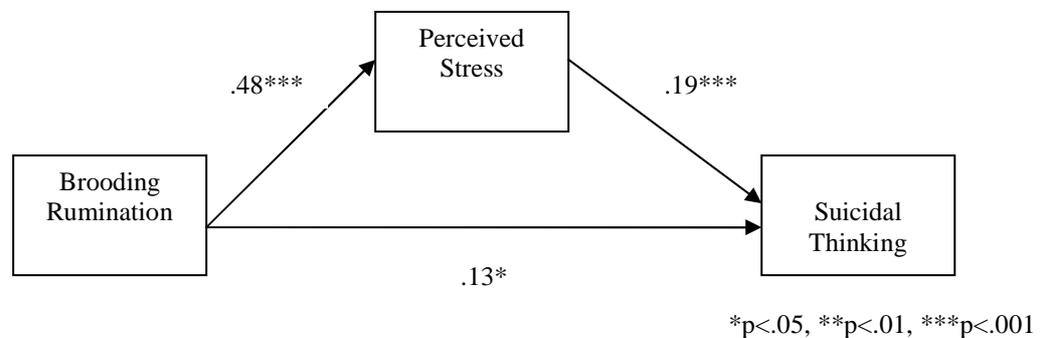
Figure 7.22. The mediating effect of perceived stress on the relationship between brooding rumination and suicidal thinking

7.4.9.1.2 *Reflective rumination*

The conditions of mediation were not met with regards to perceived stress as a possible mediator of the relationship between reflection and any measure of distress.

7.4.9.2 *Stressful life events as a mediator of the rumination-distress relationship*

7.4.9.2.1 *Brooding rumination*

After controlling for gender and initial levels of depression, brooding rumination was predictive of change in depression (β = .14, t (204) = 2.20, p = .029). The addition of stressful life events in the next step of the analysis accounted for an

additional 1.3% of variance ($\beta = .13$, t (204) = 2.36, p = .019) and reduced the beta

weight of brooding rumination ($\beta = .13$, t (204) = 2.21, p = .029). However a Sobel

test revealed that this reduction in beta weight was not significant (Z = 1.58, n.s.)

indicating mediation had not occurred. Stressful life events did not mediate the

relationship between brooding rumination and any other measure of distress.

7.4.9.2.2   Reflective rumination

Reflective rumination was not significantly predictive of stressful life events

($\beta = .07$, t (204) = 1.00, n.s.), meaning the first condition of mediation was not met.

Consequently stressful life events did not mediate the relationship between reflective

rumination and any measure of distress.

7.4.9.3 Goal adjustment as a mediator in the rumination-distress relationship

7.4.9.3.1   Brooding rumination

Neither goal disengagement nor goal reengagement was found to mediate the

relationship between brooding rumination and any measure of distress.

7.4.9.3.2   Reflective rumination

Neither goal disengagement nor goal reengagement was found to mediate the

relationship between reflective rumination and any measure of distress.

7.4.10 Mediation Summary

Perceived stress was found to partially mediate the relationship between

socially prescribed perfectionism and dysphoria. Similarly, stressful live events also

partially mediated the relationship between socially prescribed perfectionism and

180

dysphoria. Neither brooding nor reflection were found to mediate the perfectionism-distress relationship. Likewise, goal adjustment was not found to mediate the perfectionism-distress relationship.

Perceived stress was found to fully mediate the relationship between brooding and both depression and suicidal thinking. However, stressful life events were not found to mediate the relationship between brooding and any measure of distress. Similarly, neither measure of stress was found to mediate the relationship between reflection and distress. Goal adjustment was not found to mediate the relationships between either brooding or reflection and distress.

7.5   Discussion

The three aims of this study were: (i) to examine whether the relationships between rumination, perfectionism, goal adjustment and stress, observed in study one, would hold for the two components of rumination: brooding and reflection; (ii) to determine whether the impact of stress on the relationship between both perfectionism and rumination and distress varied according to the measure of stress and; (iii) to examine the impact of goal adjustment on the relationship between perfectionism and distress in an attempt to clarify previous conflicting findings. The extent to which our hypotheses are supported and how our findings fit in with previous research are detailed below.

7.5.1   *The effect of stress on the perfectionism-distress relationship*

We hypothesised that both perceived stress and stressful life events would moderate the relationship between self-oriented and socially prescribed perfectionism and distress. We found limited support for this hypothesis, as perceived stress

181

moderated the relationship between socially prescribed perfectionism and suicidal thinking, whilst stressful life events moderated the relationship between self-oriented perfectionism and both hopelessness and dysphoria. Previous research has reported a similar variation in the impact of stress on the relationship between the different dimensions of perfectionism and distress, dependant on the type of stress measured. As noted in section 2.4.3, Hewitt & Flett (1993) propose the specific vulnerability hypothesis where socially prescribed perfectionism is posited to interact with interpersonal stressors to predict increased distress, whilst self-oriented perfectionism interacts with attainment related stressors to predict increased distress. The measures of stress in the present study do not appear to map directly onto the stressors cited by the specific vulnerability hypothesis, as our measure of perceived stress is not specific to interpersonal stressors (i.e. the scale included items such as 'How often have you found yourself thinking about things that you have to accomplish?' or 'How often have you found that you could not cope with all the things you had to do?'), nor is our measure of stressful life events restricted to attainment related stressors (i.e. the scale included events such as 'Major argument with parents' or 'Break up with boy/girlfriend'). Nevertheless, it is possible that the predominant focus of each scale reflected this difference, or the way in which participants responded to each measure reflected this difference. However, we had no reason to pre-suppose that this would be the case and it is a purely speculative explanation. Each scale has also been previously used in university student populations (e.g. Clements & Turpin, 1996; Cohen et al., 1983) so this is unlikely to explain the differing findings. Regardless of whether our findings are explained by the specific vulnerability hypothesis, our results certainly suggest differences between the two measures of stress adding further support to the notion that measures of perceived stress and checklist measures of

stressful life events are tapping into varying constructs (see section 4.2.5 for a more detailed discussion).

We also hypothesised that both perceived stress and stressful life events would mediate the relationship between socially prescribed perfectionism and distress. Our findings supported this hypothesis as both perceived stress and stressful life events partially mediated the relationship between socially prescribed perfectionism and dysphoria. This indicates that the differences between the two measures of stress may be observed for moderating relationships as opposed to mediating relationships. A consideration of the differences between mediating and moderating relationships can explain this apparent discrepancy. A mediating effect of stress, on the relationship between perfectionism and distress, implies that perfectionism generates stress and that this, in turn, increases distress. In contrast, a moderating effect of stress, on the relationship between perfectionism and distress, implies that the experience of stress amplifies the negative consequences associated with perfectionism. Thus, our results suggest that socially prescribed perfectionism generates both perceived stress and stressful life events. However, the negative consequences of socially prescribed perfectionism are only further amplified by the experience of perceived stress, whilst the negative consequences of self-oriented perfectionism are only further amplified by stressful life events.

7.5.2 *The effect of brooding and reflective rumination on the perfectionism-distress relationship*

We hypothesised that brooding would fully mediate the relationship between both self-oriented and socially prescribed perfectionism and distress. We also hypothesised that reflection would partially mediate the relationship between both

self-oriented and socially prescribed perfectionism and distress. However, contrary to these hypotheses neither brooding nor reflection was found to mediate the perfectionism-distress relationship. This is in contrast to previous work by O'Connor and colleagues (2007) and Harris and colleagues (2008). O'Connor and colleagues (2007) found that brooding fully or partially mediated the effects of both socially prescribed and self-oriented perfectionism on a number of measures of distress. Harris and colleagues (2008) also found that brooding fully mediated the relationship between maladaptive perfectionism and distress, whilst reflection partially mediated this relationship. Harris and colleagues modified the rumination scale of the Response Style Questionnaire to specifically examine ruminations following a poor test score, as opposed to the more general tendency to ruminate in response to sad or negative mood. It is possible that this modification may explain the conflicting results between the present study and Harris and colleagues. However, it is less obvious why our results vary from those of O'Connor and colleagues (2007). Unlike the present research, O'Connor and colleagues did not control for the effect of gender in their analyses, however they report that there were no differences between males and females on any of their measures, suggesting this is unlikely to explain the differences in findings. Another possibility is that the follow up period in the present research was longer than in O'Connor and colleagues study which may have influenced the findings. However, this difference was fairly minimal, around three weeks on average, so it is debateable whether this can account for the variation between our in findings. Another difference between the current findings and that of O'Connor and colleagues is the age of participants, as participants were on average one year older in the present study. It is possible that this difference in age may have impacted on our results as a reflection of the different adjustment issues experienced by undergraduate

184

students at different stages in their university careers. Certainly, future research in this area could attempt to replicate and clarify this further.

With regards moderation, we hypothesised that brooding rumination would moderate the relationship between both self-oriented and socially prescribed perfectionism and distress.   Our results partially supported this hypothesis, as brooding rumination moderated the relationship between socially prescribed perfectionism and anxiety, dysphoria and suicidal thinking, such that increased brooding combined with increased socially prescribed perfectionism was predictive of higher levels of distress. Similarly, we found that reflective rumination moderated the relationship between socially prescribed perfectionism and anxiety, such that increased reflection combined with increased socially prescribed perfectionism was associated with higher levels of anxiety. This is in line with the findings of study one in this thesis, where rumination as a whole was found to moderate the relationship between socially prescribed perfectionism and suicidal thinking. It has been suggested that brooding may be the maladaptive component of rumination, whilst reflection may be the adaptive component. However, the results of the current study suggest that both brooding and reflection can augment the negative consequences associated with socially prescribed perfectionism to predicted increased levels of distress, albeit that, for brooding, this effect generalised to more measures of distress. Thus, for social perfectionists, both components of rumination appear to be maladaptive.

7.5.3   *The effect of goal adjustment on the perfectionism-distress relationship*

As hypothesised, goal adjustment did not mediate the perfectionism-distress relationship. We hypothesised that both goal disengagement and goal reengagement

would moderate the effects of socially prescribed perfectionism on distress. This was partially supported by our results as goal disengagement moderated the relationship between socially prescribed perfectionism and anxiety, depression and dysphoria. In each instance the inability to disengage from unattainable goals, in conjunction with socially prescribed perfectionism was predictive of increased distress.

We had also hypothesised that goal disengagement would moderate the relationship between self-oriented perfectionism and distress. This was supported by the finding that goal disengagement moderated the relationship between self-oriented perfectionism and hopelessness. In addition, we also found a trend towards significance for goal reengagement to interact with self-oriented perfectionism to predict change in anxiety.

These findings are contrary to previous cross-sectional research by O'Connor and Forgan (2007) who found that goal reengagement both mediated and moderated the relationship between socially prescribed perfectionism and suicidal thinking. Our results however, are consistent with the prospective findings of study one in this thesis (Chapter 5) where goal disengagement was found to moderate the relationship between both socially prescribed and self-oriented perfectionism and distress. The findings of the present study indicate that goal disengagement, as opposed to goal reengagement, is more associated with distress over time.

7.5.4   The effect of stress on the rumination-distress relationship

We made no specific hypotheses regarding the impact of either perceived stress or stressful life events on the relationship between either brooding or reflection and distress. However it was possible that the impact of stress on the relationship between rumination and distress could vary according to either the measure of stress

186

(i.e. perceived stress v. stressful life events), the component of rumination (i.e. brooding v. reflective rumination) or the type of relationship under study (i.e. moderating v. mediating). We consider each of these possibilities in turn below.

First, we consider the differences between our two measures of stress as moderators in the relationship between rumination and distress. We found that perceived stress moderated the relationship between brooding rumination and hopelessness, dysphoria and suicidal thinking, whilst stressful life events moderated the relationship between brooding rumination and suicidal thinking. In each instance, increased brooding combined with increased stress was predictive of higher distress. Thus, for the relationship between brooding rumination and distress, both measures of stress showed a moderating effect, although for our measure of perceived stress this effect generalised to more types of distress. With regards to the impact of different measures of stress as moderators of relationship between reflection and distress, perceived stress moderated the relationship between reflection and both hopelessness and suicidal thinking, however a similar pattern was not observed for stressful life events. This fits with previous research which has found the negative consequences of rumination as a whole are amplified by perceived stress (Morrison & O'Connor, 2005, 2008a) and suggests that both the brooding and the reflective components of rumination can be associated with distress when combined with higher levels of perceived stress. Again the differences between our two measures of stress are highlighted as stressful life events did not interact with reflective rumination to predict distress, unlike perceived stress.

Second, we consider the impact of our two different measures of stress as mediators in the relationship between rumination and distress. Perceived stress fully mediated the relationship between brooding and both depression and suicidal

187

thinking. In contrast, stressful life events did not mediate the relationship between brooding and any measure of distress. Neither measure of stress was found to mediate the relationship between reflective rumination and distress. Thus, for the relationship between brooding and distress, only perceived stress mediated this relationship, again illustrating the differences in our two measures of stress. This finding also highlights some differences between the two components of rumination as perceived stress only mediated the relationship between brooding and distress. Thus, our results illustrate that although both brooding and reflection can result in increased distress when combined with stress, only brooding rumination could potentially generate perceived stress, which in turn may contribute to increased depression and suicidal thinking. This may explain why brooding rumination is the component most often associated with distress and why brooding, not reflection, has been associated with distress over time (e.g. Treynor et al., 2003).

7.5.5   *The effect of goal adjustment on the rumination-distress relationship*

We hypothesised that goal adjustment would not mediate the relationship between brooding or reflection and distress and our results were consistent with this hypothesis. We also hypothesised that goal disengagement would moderate the relationship between both brooding and reflective rumination and hopelessness and suicidal thinking. We found partial support for this hypothesis, as there was a trend towards significance for goal disengagement to moderate the relationship between reflective rumination and suicidal thinking. This fits with the findings of study one in this thesis (see section 5.4.10.2), where goal disengagement was shown to moderate the effect of rumination on hopelessness and suicidal thinking. The results of the present study suggest it is the influence of goal disengagement on the reflective

188

component of rumination which results in an impact on distress. This is perhaps not surprising as reflection is considered to be the component of rumination most associated with problem solving. In situations where goals become unattainable, the best solution to this problem is often to abandon the goal, however a difficulty with goal disengagement will disrupt this process and this in turn, is likely to disrupt the problem solving process of reflection, leading to an increase in distress.

7.5.6   Limitations

Three main limitations of this research should be noted. First, the research used a sample of healthy young adults, thus the extent to which are results are replicable beyond this population is unknown. However, research has identified elevated levels of distress being reported by university students (Furr et al., 2001) suggesting there is a need for research to target this population and to allow the identification of possible areas for intervention. In addition, study four in this thesis will address the possible limitation of focussing on a healthy young adult sample by employing a clinical sample of parasuicide patients.

A second potential limitation of this research is the reliance on self-report measures which may be subject to social desirability biases. However, given that interaction effects emerged from the data, it seems unlikely that social desirability confounded our results.

A final limitation of this research relates to the difference in distress between T1 and T2. Although dysphoria and suicidal thinking significantly decreased from T1 to T2, the effect size of this decrease was very small; this limited the power of the present study and may have increased the likelihood of type II error. Although previous research has detected significant differences with similar effect sizes (e.g.

189

O'Connor et al., (2007) replication of this research using a larger sample could help to negate this potential weakness.

7.5.7   *Implications and future directions*

Despite the limitations noted above, there are a number of implications from this research. First, we highlight the differing findings between measures of perceived stress and a checklist measure of life events. In the current research, perceived stress was more frequently found to mediate and/or moderate the relationships both perfectionism and rumination with distress. This suggests that our measure of perceived stress may provide a more useful measure for future research in this area, as opposed to a checklist measure of stressful life events.

Second, this research also highlights the differences between brooding and reflective rumination. Although for social perfectionists, both brooding and rumination were maladaptive, the present findings show that brooding, but not reflection generated perceived stress which in turn was predictive of increased distress.   In contrast, goal disengagement was found to moderate the relationship between reflective rumination and suicidal thinking, indicating that the reflective component of rumination is more associated with suicidal thinking when combined with a failure to disengage from important goals.   These differential findings highlight the need to consider the two components of rumination separately as this will improve the specificity of our understanding of the predictors of distress, which in turn can be used to aid the development of techniques aimed at reducing distress with at-risk individuals.

Future research should aim to examine whether the relationships observed in this study can be replicated in a clinical sample. Consequently, study four in this thesis employs a clinical sample of participants.

8 Study Four: A clinical study examining moderating and mediating effects in the relationships between both rumination and perfectionism and distress

8.1   Abstract

Objectives. This study aimed to examine the mediating and moderating relationships previously observed in studies one and three in the context of a clinical population.

Design. A test-retest design was used. The prospective nature of this study allowed for the prediction of distress over time after controlling for initial levels of distress.

Method. One hundred and fifty one parasuicide patients were recruited from a general hospital at time one and completed measures of attentional bias, perfectionism, rumination, goal adjustment, stress and psychological distress. At time two, 76 participants re-completed self report measures of stress and psychological distress.

Results. Multiple hierarchical regression analyses were used to examine mediating and moderating relationships. Logistic regression was used to examine those variables associated with self-harming behaviour in the follow up period.

Conclusions. Evidence was found to support a number of relationships observed in studies one and three, extending these findings to a clinical population. Other relationships were not replicated in the present study and possible reasons for this are discussed.

**8.2	Introduction**

Studies one (Chapter 5) and three (Chapter 7) of this thesis have examined the

role of a number of cognitive and personality variables in predicting psychological

distress and suicidal thinking in student populations, with a view to informing theory

as prescribed in the initial 'pre-clinical' phase of the Medical Research Council's

framework for developing complex interventions (MRC, 2000). The logical

progression from these analogue studies is to examine whether these relationships

also hold in a clinical sample of participants, who would be the likely recipients of

any complex intervention based on the theory which is being informed. To this end,

an investigation of the role of the same cognitive and personality variables examined

in studies one and three of this thesis, using a clinical, parasuicide population, is

required.

*8.2.1	Influences on the perfectionism-distress relationship*

As outlined in section 2.4.2, the detrimental role of perfectionism in both

student and clinical populations has been highlighted in previous research, albeit the

evidence is more consistent for the socially prescribed dimension of perfectionism

(e.g. Hunter & O'Connor, 2003) than for self-oriented (e.g. Hewitt et al., 1994) or

other oriented perfectionism (e.g. Hewitt et al., 1998). A number of variables have

been outlined as having a possible impact on the perfectionism-distress relationship

including stress, rumination, goal adjustment and attentional bias (see sections 2.4.3,

2.4.4, 2.5.3 and 2.4.5 for full details).

8.2.1.1 Perceived Stress

As discussed in section 2.4.3, stress may impact on the relationship between perfectionism and distress by either moderating or mediating the relationship. With regards moderation, a diathesis-stress conceptualisation of the relationship between perfectionism and distress has received consistent support in the literature. However this support has frequently come from studies using undergraduate student populations (e.g. Hewitt & Dyke, 1986, Flett et al., 1995; Chang & Rand, 2000), so the extent to which a diathesis-stress model can explain the relationship between perfectionism and distress in a clinical sample remains largely unexplored.

Stress, as mediator of the relationship between perfectionism and distress, has received considerably less research attention (in comparison to research concerning moderation) and again, research using a clinical population is lacking. Consequently, there is a need for prospective research using a clinical population to examine the possible moderating and mediating impacts of stress on the relationship between perfectionism and distress.

8.2.1.2 Rumination

Previous research has indicated a mediating effect of rumination in the relationship between both socially prescribed and self-oriented perfectionism and distress (Flett et al., 2002, O'Connor et al., 2007; Harris et al., 2008). More specifically, the brooding component of rumination has been shown to fully or partially mediate this relationship with a range of measures of distress (O'Connor et al., 2007; Harris et al., 2008), whilst reflection has been shown to partially mediate the relationship with depressive symptoms (Harris et al., 2008) (see section 2.4.4 for a more detailed discussion). Study one in this thesis, provided further support for the

194

notion of rumination as a mediator, with rumination mediating the relationship between socially prescribed perfectionism and both suicidal thinking and anxiety (see section 5.4.13.3.2). However, when the components of rumination were considered separately in Study 3, neither brooding nor reflection mediated the relationship between either self-oriented or socially prescribed perfectionism and distress (see sections 7.4.4.3 and 7.4.4.4). However, to date, research examining the role of rumination as a mediator in the perfectionism-distress relationship has focussed on student or general population samples, thus the extent to which these findings can be replicated in a clinical population remains unknown.

Studies one and three in this thesis also examined the role of rumination as moderator in the relationship between perfectionism and distress. Rumination and both brooding and reflection separately moderated the relationship between socially prescribed perfectionism and distress (see sections 5.4.7.3.2, 7.4.4.3.2 and 7.4.4.4.2). Again, there is a need to replicate these findings in a clinical sample.

8.2.1.3 Goal Adjustment

Previous cross-sectional research has indicated that the reengagement component of goal adjustment both moderated and mediated the relationship between socially prescribed perfectionism and suicidal thinking (O'Connor & Forgan, 2007). Study one of this thesis partially supported these findings as goal reengagement moderated the relationship between socially prescribed perfectionism and suicidal thinking. However, goal disengagement also moderated the relationship between both self-oriented and socially prescribed perfection and suicidal thinking (see section 5.4.7.2). Consistent with this, in study three of this thesis, goal disengagement moderated the relationship between both socially prescribed and self-oriented

perfectionism and distress, but again no mediating effects were observed (see sections 7.4.4.5 and 7.4.8.5). All of the previous research examining the impact of goal adjustment on the relationship between perfectionism and distress has focussed on student populations, thus replication using a clinical sample is required.

8.2.1.4 Attentional Bias

To our knowledge, the only empirical research which has examined the role of attentional bias in the relationship between perfectionism and distress is study one of this thesis. Positive attentional bias was found to moderate the effect of socially prescribed perfectionism on hopelessness, such that high positive attentional bias combined with high socially prescribed perfectionism was associated with increased hopelessness five weeks later (see section 5.4.7.4.2). Again there is a need for research to attempt to replicate this finding in a clinical sample.

8.2.2   Influences on the rumination-distress relationship

As outlined in section 2.2.3, rumination has previously been linked with psychological distress in both student and clinical populations. More recently, research has focussed on the components of rumination, brooding and reflection, and their role in psychological distress. A number of cognitive and personality factors have been suggested which may impact on the relationship between rumination and distress including: stress, goal adjustment and attentional bias (see sections 2.2.3, 2.5.4 and 2.3.3 for a more detailed description)

8.2.2.1 Perceived Stress

Previous research has found perceived stress moderated the relationship between rumination and distress (Morrison & O'Connor, 2005; Morrison & O'Connor, 2008a). This has been further supported by study one in this thesis, where stress moderated the relationship between rumination and suicidal thinking, in addition to mediating the relationship between rumination and distress (see sections 5.4.9.1 and 5.4.15.1). Study three in this thesis found that both perceived stress and stressful life events moderated the relationship between brooding and distress, whilst perceived stress only, moderated the relationship between reflection and distress. In each instance, greater levels of either brooding or reflection, combined with greater stress, were predictive of increased distress (see sections 7.4.5.1 and 7.4.5.2). Perceived stress was also found to mediate the impact of brooding, but not reflection, on distress (see section 7.4.5.1). Again the influence of stress on the relationship between rumination and distress has not been explored in a clinical population.

8.2.2.2 Goal Adjustment

The only research which has examined the role of goal adjustment in the rumination-distress relationship to the author's knowledge is study one and study three of this thesis. In study one, goal disengagement was found to moderate the relationship between rumination and distress (see sections 5.4.9.2 and 5.4.10.2), whilst study three found a non-significant trend for goal disengagement to moderate the relationship between reflection and suicidal thinking (see section 7.4.5.3.2). No mediating effect of goal adjustment on the rumination-distress relationship was found (see sections 5.4.16.2 and 7.4.9.3) in either study one or study three. As this research

was all conducted in a student population, further work is necessary to replicate these findings in a clinical sample.

8.2.2.3 Attentional Bias

As outlined in section 2.3.3, to date, little research has examined the relationship between rumination and attentional bias. In particular the possibility of attentional bias a moderator or a mediator of the relationship between rumination and distress has been under researched. Study one of this thesis examined both these possibilities, however neither positive nor negative attentional bias was found to moderate or mediate the relationship between rumination and distress in a student sample (see sections 5.4.9.3, 5.4.10.3, 5.4.15.3 and 5.4.16.3). However, the extent to which attentional bias impacts on the relationship between the components of rumination, brooding and reflection, and distress remains unexplored. In addition, it is unclear whether the findings of study one would be replicable in a clinical sample.

8.2.3   Predicting behaviour

Previous research examining the role of rumination and perfectionism in suicidality (and the cognitive variables which may moderate or mediate these effects) has focussed on the associations with suicidal thinking, as measured by standardised self-report measures. A logical extension of this work would be to also examine the prospective associations with self-reported accounts of actual self-harming behaviour.

8.2.4   Aims

The two main aims of this study were: First, to examine whether the variables observed as impacting on both the perfectionism-distress relationship and the

198

rumination-distress relationship in studies one and three were replicable in a clinical, parasuicide sample. Second, to examine whether the cognitive and personality variables measured throughout this thesis were predictive of self-harming behaviour, beyond the measures of distress.

8.2.5 Research questions and hypotheses

1) Does perceived stress moderate and/or mediate the relationship between socially prescribed and self-oriented perfectionism and distress in a clinical sample? Based on previous research in this area we hypothesised that perceived stress would moderate the relationship between both self-oriented and socially prescribed perfectionism and distress, such that increased levels of stress, combined with increased perfectionism would be associated with greater levels of distress. We also hypothesised that perceived stress would mediate the relationship between socially prescribed perfectionism and distress.

2) Does rumination mediate and/ or moderate the relationship between both socially prescribed and self-oriented perfectionism and distress in a clinical sample? Given, the previous findings in studies one and three of this thesis, we hypothesised that both brooding and reflection would moderate the relationship between socially prescribed (but not self-oriented) perfectionism and distress, such that higher levels of brooding and/or reflection in conjunction with higher socially prescribed perfectionism would be predictive of increased distress. Given the conflicting previous findings regarding brooding and reflection as mediators of the perfectionism-distress relationship we made no specific hypothesis in this area.

3) Does goal adjustment mediate and/or moderate the relationship between both self-oriented and socially prescribed perfectionism and distress in a clinical

sample? In line with the findings of the previous prospective studies in this thesis, we hypothesised that there would be no mediating effect of goal adjustment in the relationship between either self-oriented or socially prescribed perfectionism and distress. We also hypothesised that, in line with previous studies in this thesis, goal adjustment would moderate the relationship between both self-oriented and socially prescribed perfectionism and distress such that lower levels of goal adjustment combined with high levels of perfection, would be predictive of increased distress.

4) Does attentional bias moderate and/or mediate the relationship between perfectionism and distress in a clinical sample? In line with previous findings in this thesis, we hypothesised that positive attentional bias would moderate the effect of socially prescribed perfectionism on distress, such that increased positive attentional bias, combined with high socially prescribed perfectionism would be predictive of higher levels of distress. Also in line with previous findings, we hypothesised that attentional bias would not mediate the perfectionism-distress relationship.

5) Does perceived stress moderate and/or mediate the relationship between brooding and/or reflection and distress in a clinical sample? Following previous research, we hypothesised that perceived stress would moderate the relationship between both brooding and reflective rumination and distress, such that increased brooding or reflection, when combined with greater levels of perceived stress, would be predictive of increased levels of distress. In addition, we hypothesised that perceived stress would mediate the relationship between brooding and distress.

6) Does goal adjustment moderate and/or mediate the relationship between brooding and/or reflection and distress in a clinical sample? Following previous studies, we hypothesised that goal disengagement would moderate the impact of reflection on distress, such that an inability to disengage from goals combined with

200

increased reflection would be predictive of increased distress. In addition, we hypothesised that goal adjustment would not mediate the impact of either brooding or reflection on distress.

7) Does attentional bias moderate and/or mediate the relationship between brooding and/or rumination and distress in a clinical sample? We made no specific hypotheses due to a lack of research in this area

8) Do any of the cognitive or personality variables under study in this research distinguish those participants who self-harm in the follow up period between T1 and T2, from those who do not?   We hypothesised that, in addition to higher initial levels of distress, our key variables of brooding, reflection, socially prescribed and self-oriented perfectionism would differentiate those who self-harmed from those who did not during the follow up period.

8.3   Method

8.3.1   Participants

One hundred and fifty one participants were recruited at time one. Participants were recruited from the combined assessment ward of a general hospital following acute self-poisoning (88.7%), self-cutting (9.3%) or both (2%). Participants were seen within 24-48 hours of admission depending on their medical circumstances. Exclusion criteria were limited to those: (i) aged under 16 years; (ii) unfit for interview; (iii) non-native English speakers and; (iv) unable to give informed consent. Eleven percent of potential participants declined to take part in the study.

There were 60 males and 91 females in the sample, with a mean age of 34.07 years (SD=13.40). Males and females did not significantly differ in mean age (35.03 years and 33.44 years respectively). 29.8% (n=45) of participants had no history of

self-harm, whilst 19.2% (n=29) had self harmed on one previous occasion, 9.9% (n=15) had self-harmed on two or three occasions previously and 41.1% (n=62) had harmed themselves four or more times in the past. The majority of participants (76.2%) reported suicidal intent at the time of the self harm episode which had resulted in their hospital admission. 30.5% (n=46) of participants were married or living with a partner, whilst 50.3% (n=76) were single, 7.3% (n=11) divorced, 11.3% (n=17) separated and 0.7% (n=1) widowed. The majority of participants (6.1.6%) were given a psychiatric diagnosis at the time of admission. A figure illustrating the primary psychiatric diagnostic categories (according to the International Statistical Classification of Diseases and Health Related Problems 10th Revision (ICD-10; World Health Organisation, 2007)) assigned to participants can be seen in Figure 8.1. As can be seen from the figure, those participants receiving a psychiatric diagnosis were most frequently given a primary diagnosis of a mood (affective) disorder, followed by mental and behavioural disorders due to psychoactive substance use.
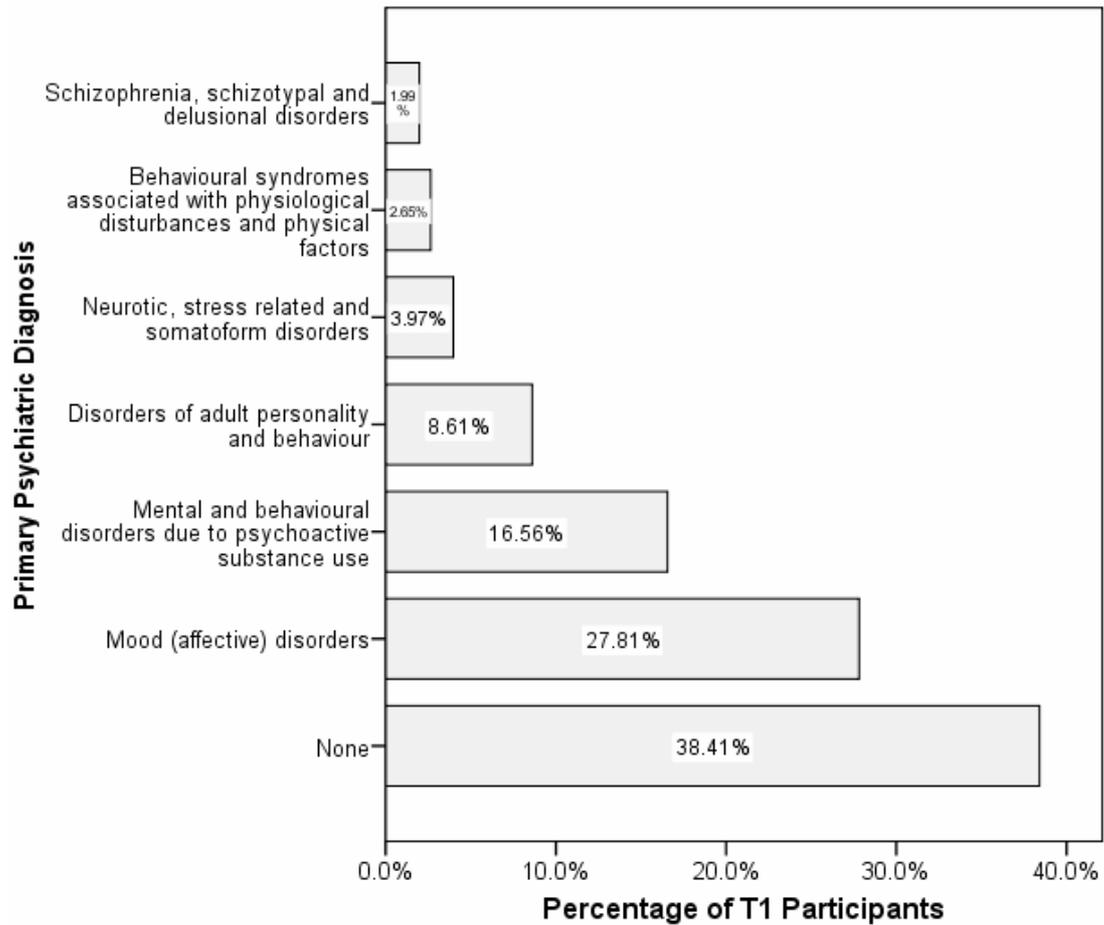
Figure 8.1. Percentage of participants assigned to primary psychiatric diagnostic categories

Seven participants were subsequently excluded from further analyses due to missing data for two or more complete measures. This was mainly a consequence of testing being halted early to allow medical staff to conduct necessary procedures or by the arrival of visitors for the patient. These excluded patients were not included in the follow up sample.

Seventy-six participants completed selected self-report measures at time two (T2), an average of 81 days later (SD = 49.41), reflecting a 52.8% follow up rate at time two. Participants who did not complete T2 measures did not differ from those who did with regards gender (χ^2 = .25 (1), n.s.) marital status (χ^2 = 9.05 (5), n.s.), frequency of previous self-harming behaviour (χ^2 = 1.84 (2), n.s.), suicidal intent at

the time of self-harm ($\chi^2 = 1.02$ (2) n.s.) or psychiatric diagnosis ($\chi^2 = 11.62$ (6), n.s.). However, T2 non-completers were significantly younger (mean age = 28.65 years, SD = 11.45) than those who completed T2 (mean age = 38.17 years, SD = 13.45) (F (1, 143) = 20.69, p<.0001).

8.3.2   Measures

Hopelessness. The Beck Hopelessness Scale (BHS; Beck, Weissman, Lester & Trexler, 1974) measured pessimism towards the future (e.g. 'It's very unlikely that I will get any real satisfaction in the future') (see section 4.3.1 for more a more detailed description). Satisfactory internal consistency was achieved in this sample at both time-points (Cronbach's α = .90-.91).

Anxiety and Depression. The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) measured both depression and anxiety (e.g. 'I feel as if I am slowed down' and 'Worrying thoughts go through my mind') (see section 4.3.2 for more a more detailed description). Cronbach's alpha in this sample was satisfactory, as the anxiety and depression subscales at both time-points ranged from .69 to .89.

Suicidal Thinking. The Suicide Probability Scale (SPS; Cull & Gill, 1988) provided a measure of suicide ideation (e.g. 'In order to punish others, I think of suicide') (see section 4.3.4 for more a more detailed description).   Internal consistency in this sample was acceptable across administrations (range of Cronbach's α = .71-.90).

Rumination. The original 22-item Response Style Questionnaire provided a measure of participants' ruminative tendencies in negative situations. Two subscales representing brooding and reflective rumination can be drawn from this measure,

204

following Treynor et al (2003) (see section 4.2.1 for a more detailed description). Internal consistency was .71 for the brooding subscale and .68 for the reflective subscale.

Perfectionism. A shortened version of Hewitt and Flett's (1991) Multidimensional Perfectionism Scale (Cox et al., 2002) provided a 15-item measure of perfectionism (see section 4.2.2 for a more detailed description). Internal consistency for the self-oriented and the socially prescribed perfectionism subscales in this sample was satisfactory (Cronbach's α = .79 for both), however internal consistency for the other oriented perfectionism subscale was much lower at .47. Following the poor internal consistency of the other-oriented perfectionism subscale, this subscale was excluded from all analyses.

Goal Adjustment. The Goal Adjustment Scale (Wrosch, et al, 2003) provided a measure of both goal disengagement and goal reengagement (see section 4.2.3 for more a more detailed description). Internal consistency in this sample across both subscales was adequate (range of Cronbach's α = .73 - .89).

Stress. The Perceived Stress Scale (Cohen et al., 1983) provided a four item measure of perceived stress in both the two weeks preceding T1 and the weeks between T1 and T2 (see section 4.2.5 for a more detailed description). Internal consistency in this sample was .66 at T1 and .84 at T2.

Attentional Bias. A dot-probe task (MacLeod et al, 1986) was used to provide a measure of attentional bias. This followed the same procedure as in study one of this thesis, consisting of 8 baseline trials and 60 experimental trials. Each trial in this task began with a fixation cross presented in the centre of the screen for 500 ms. This was followed by the simultaneous presentation of two words, one above and one below centre (in the baseline trials strings of the letter X were used instead of words).

205

The words were 3.5cm apart and remained on the screen for 750 ms. Immediately following the word pair presentation, a dot-probe appeared in the location of one of the previous words and participants used a response box to indicate the spatial position of the probe. The participants' response concluded each trial, and after a 1000 ms rest, the next trial began. Participants' reaction times were measured and quicker reaction times were taken to indicate that participants were attending to the word previously in the same location as the probe.

The words used in this task were selected from a standardised list created by John (1988). Each positive and negative word was paired with a neutral word matched for length and frequency of usage. Of the 60 experimental trials, 30 consisted of positive-neutral word pairings and 30 consisted of negative-neutral word pairings. The probe followed the neutral word in half of the trials, and followed the negative/positive word in the remainder of the trials. The presentation order of the word-pairings was randomised.

Demographic/Clinical Measures. In addition to the standardised self report measures a number of demographic and clinical measures were also recorded. Participants were asked to describe the nature of the self-harm which had resulted in their hospital admission and whether they had previously self-harmed (if so, how often and by what method). In addition, participants were asked whether they intended to kill themselves at the time of self harming (and whether they had intended to kill themselves on previous occasions of self-harm, if applicable). We employed the suicidal intent question from Beck's Suicide Intent Scale (Beck et al., 1974a, b). Data from the participants' medical records at the hospital was used to establish both current and previous psychiatric diagnoses. Finally, at T2 participants were asked to report whether they had engaged in any self-harming behaviour since T1 and if so

206

they were asked to provide details regarding how often, how recently and what happened on the most recent occasion.

8.3.3   Procedure

Participants were approached by the researcher in hospital, usually within 24 hours of admission. The researcher briefly outlined the nature of the study and details of the procedure. It was emphasised that participation was voluntary and confidential and that participants were free to withdraw at any time without given any reason, without their treatment protocol being affected in any way. Consenting participants first completed the demographic variables through a semi-structured interview with the experimenter. Next, participants completed the dot-probe task, which was presented on a laptop computer on a tray directly in front of participants at their hospital bedside. This was followed by the completion of all self-report measures. Participants were given the option of the experimenter reading aloud the self-report measures and writing down their responses, with the majority preferring this option to completing the self-report measures themselves.

After completing the first part of the study, participants were contacted again eight weeks later using a combination of letters, emails and telephone calls to maximise follow-up participation. At time two, participants re-completed self-report measures of hopelessness, depression, anxiety, stress, suicidal thinking and self-harming behaviour.   A flow chart of the procedure adopted in study four can be seen in Figure 8.2.

```
┌─────────────┐                      ┌─────────────┐
│  Time One   │ ───────────────────▶ │  Time Two   │
│  (n=151)    │                      │  (n=76)     │
└─────────────┘                      └─────────────┘
       │                                    │
       ▼                                    ▼
╭───────────────────────╮      ╭───────────────────────────╮
│       Dot Probe       │      │ Self-report measures of   │
│ All self-report,      │      │ stress, distress and      │
│ demographic and       │      │ self-harming behaviour    │
│ clinical measures     │      │                           │
╰───────────────────────╯      ╰───────────────────────────╯
```
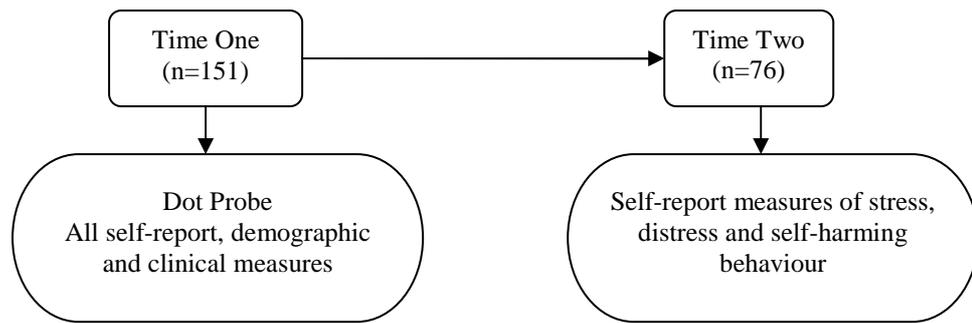
Figure 8.2. Flow chart of study four procedure

8.3.4   Power, sample and analytic strategy

Linear hierarchical multiple regression analyses were used to predict measures of distress at T2, whilst binary logistic regression analyses were used to examine which variables were associated with self-harming during the follow up period. Our sample of 76 participants at follow up allows for the detection of a medium to large sized effect ($f^2 = 0.28$) with 95% power and a 5% level of significance in an analysis with five predictors.

8.4   Results

8.4.1   Differences in distress between T1 and T2

As can be seen in Table 8.2, each measure of distress decreased from T1 to T2. Paired t-tests were used to examine change in distress between T1 and T2 and revealed that hopelessness ($t(75) = 3.12$, $p < .01$), depression ($t(75) = 2.52$, $p < .05$), and suicidal thinking ($t(75) = 3.10$, $p < .01$), but not anxiety ($t(75) = 1.41$, n.s.), all significantly decreased from T1 to T2[3].   Table 8.1 illustrates the effect sizes for those differences in distress between T1 and T2.

---

[3] Additional analyses were also conducted to examine whether there was any effect of gender on changes in distress between T1 and T2. Repeated measures ANOVAs found no interaction between gender and time for any of the measures of distress.

Table 8.1. Effect size *r* for differences in distress between T1 and T2

Measure of distress	Effect size *r* for change between T1 and T2
Hopelessness	0.21
Depression	0.17
Anxiety	0.08
Suicidal Thinking	0.21

8.4.2   Correlations between variables

Table 8.2 illustrates the correlations between all variables in addition to means and standard deviations. Brooding was positively correlated with reflection in addition to socially prescribed perfectionism and each of the measures of distress and stress at T1. Brooding was also negatively correlated with negative attentional bias. Reflection was positively correlated with self-oriented perfectionism and anxiety, suicidal thinking and stress, all at T1. Whilst, self-oriented perfectionism was positively correlated with socially prescribed perfectionism and negative correlated with goal disengagement. Socially prescribed perfectionism was positively correlated with hopelessness, anxiety and depression, all at T1, in addition to being negatively correlated with goal disengagement. Goal disengagement positively correlated with hopelessness at T1 whilst goal reengagement negatively correlated with both hopelessness and suicidal thinking at T1. Positive attentional bias was negatively correlated with suicidal thinking at T1. Each of the measures of distress and stress at T1 were positively intercorrelated as were each of the measures of distress and stress at T2. In addition, hopelessness at both time points was positively intercorrelated as was suicidal thinking at both times and stress at both times.

Table 8.2. Correlations, mean scores and standard deviations (SD) of measures

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. -ve Bias	-																	
2. +ve Bias	-.146	-																
3. Brooding	-.172*	-.121	-															
4. Reflection	-.076	.008	.343**	-														
5. Self	.027	-.011	.098	.213*	-													
6. Social	.084	-.088	.193*	.010	.241**	-												
7. Goal Dis	-.077	.063	.134	-.132	-.549**	-.181*	-											
8. Goal Re	-.069	.069	.010	.123	.124	-.075	-.096	-										
9. BHS T1	.006	-.087	.381**	.063	-.130	.206*	.191*	-.302**	-									
10. Anx T1	-.025	-.091	.525**	.295**	.060	.203*	.001	.027	.477**	-								
11. Dep T1	-.033	-.073	.375**	.112	-.042	.216**	.098	-.159	.654**	.604**	-							
12. SPS T1	-.066	-.191*	.445**	.244**	-.006	.151	.009	-.169*	.549**	.514**	.573**	-						
13. PSS T1	-.075	-.114	.357**	.113**	.121	.160	.074	-.086	.479**	.499**	.554**	.434**	-					
14. BHS T2	.118	-.004	.110	-.015	-.139	.037	-.052	-.181	.244*	.015	.116	.217	.100	-				
15. Anx T2	.137	-.021	.195	.087	.021	.092	-.089	-.047	.112	.207	.065	.173	.012	.684**	-			
16. Dep T2	.180	.010	.096	-.050	-.062	.163	-.187	-.052	.184	.103	.185	.143	.108	.818**	.694**	-		
17. SPS T2	.021	-.062	.174	-.064	-.084	.221	-.198	-.093	.212	.119	.184	.305*	.197	.596**	.508**	.628**	-	
18. PSS T2	.173	-.044	.131	.110	-.028	.134	-.102	-.208	.214	.132	.135	.209	.228*	.768**	.708**	.749**	.607**	-
Mean Score	19.84	8.33	14.65	11.36	21.62	22.45	2.90	3.06	13.67	14.17	11.97	12.53	11.63	11.32	13.46	10.30	9.04	9.91
SD	72.40	91.82	3.17	3.32	6.87	7.16	0.90	0.83	5.20	3.45	4.39	6.77	2.74	5.86	4.84	5.16	9.41	3.28

Note: -ve Bias =Negative attentional bias; +ve Bias =Positive attentional bias; Self=Self-oriented perfectionism; Social=Socially prescribed perfectionism; Goal Dis=Goal Disengagement; Goal Re=Goal Reengagement; BHS T1=Beck Hopelessness Scale T1; Anx T1= HADS Anxiety T1; Dep T1= HADS Depression T1; SPS T1=Suicide Probability Scale T1; PSS T1=Perceived Stress Scale T1; BHS T2=Beck Hopelessness Scale T2; Anx T2=HADS Anxiety T2; Dep T2=HADS Depression T2; SPS T2=Suicide Probability Scale T2; PSS T2=Perceived Stress Scale T2

* Correlation is significant at the .05 level, ** Correlation is significant at the .01 level

8.4.3   Moderation Analyses

A series of multiple hierarchical regression analyses were used to test the moderating relationships outlined in the research questions for this study (see section 8.2.5). These analyses were used to predict distress at T2 after controlling for initial levels of distress (i.e. change in distress between T1 and T2). Analyses were conducted separately to examine moderation in: (i) the self-oriented perfectionism-distress relationship; (ii) the socially prescribed perfectionism-distress relationship; (iii) the brooding-distress relationship and; (iv) the reflection-distress relationship.

Prior to analysis, predictor variables were centred, as recommended by Aiken and West (1991). In each regression analysis the dependant variable was the measure of distress at time two[4]. Initial levels of distress were entered in the first step of each regression. Gender was also entered in the first step of each analysis examining a component of rumination (to control for the gender bias associated with rumination). The second step of each analysis contained the appropriate main effect variables (e.g. self-oriented perfectionism and stress). This was followed by the appropriate multiplicative terms in the final step of each analysis to examine the impact of moderation (e.g. self-oriented perfection x stress).

Significant interactions were plotted at high and low levels of each of the interaction terms, consonant with Aiken & West (1991). These interactions were then probed post-hoc using simple slope analysis to determine whether either slope significantly differed from zero, again consonant with Aiken and West (1991).

---

[4] Missing data mean that the degrees of freedom may differ across analyses.

8.4.4   The effect of moderation in the perfection-distress relationship

8.4.4.1 Stress as a moderator of the perfectionism-distress relationship

8.4.4.1.1   Self-oriented perfectionism-distress relationship

As a main effect, stress was predictive of change in hopelessness (β = .73, t (74) = 9.07, p <.0001), anxiety (β = .65, t (74) = 7.37, p <.0001), depression (β = .72, t (74) = 8.70, p <.0001) and suicidal thinking (β = .57, t (74) = 5.68, p <.0001). However, stress was not found to moderate the relationship between self-oriented perfectionism and any measure of distress.

8.4.4.1.2   Socially prescribed perfectionism-distress relationship

As a main effect, stress was predictive of change in hopelessness (β = .75, t (74) = 9.47, p<.0001), anxiety (β = .70, t (74) = 8.03, p<.0001), depression (β = .72, t (74) = 8.85, p <.0001) and suicidal thinking (β = .52, t (74) = 5.50, p <.0001). However, stress was not found to moderate the relationship between socially prescribed perfectionism and any measure of distress.

8.4.4.2 Brooding as a moderator of the perfectionism-distress relationship

8.4.4.2.1   Self-oriented perfectionism distress relationship

Neither self-oriented perfectionism nor brooding, as a main effect, was predictive of change in any measure of distress. However, the interaction between self-oriented perfectionism and brooding was predictive of change in anxiety (β =.-.39, t (74) = -3.18, p<.01) and showed a trend approaching significance to predict change in hopelessness (β = -.24, t (74) = -1.91, p = .061) and depression (β = -.25, t (74) = -1.96, p = .054).   A plot of the lines of best fit for the interaction between self-oriented perfectionism and brooding to predict anxiety can be seen in Figure 8.3. Post

hoc examination of this interaction revealed that only the high slope significantly differed from zero (β = -.42, t (74) = -2.44, p<.05). Thus, high brooding was associated with increased anxiety for low, compared to high, self-oriented perfectionists.
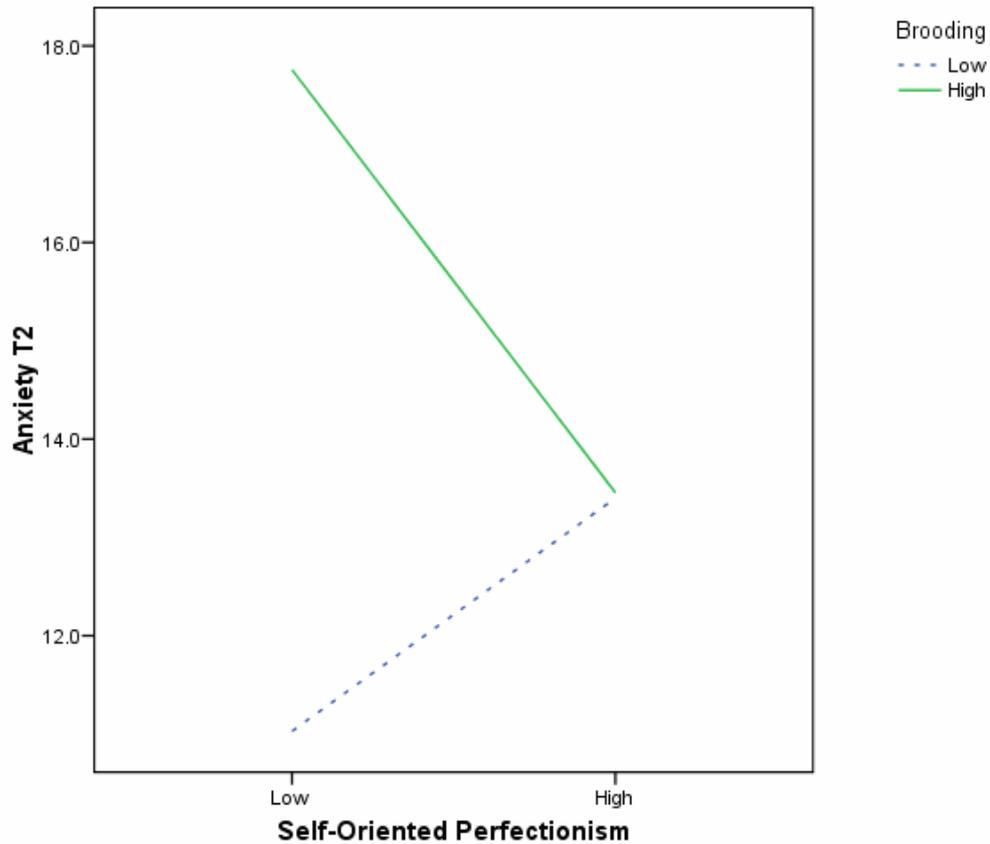

Figure 8.3. Self-oriented perfectionism x brooding to predict change in anxiety

8.4.4.2.2   Socially prescribed perfectionism-distress relationship

As a main effect, neither socially prescribed perfectionism nor brooding was predictive of change in any measure of distress. However, the interaction between socially prescribed perfectionism and brooding was predictive of change in anxiety (β = -.351, t (74) = -.3.08, p <.01). A plot of the lines of best fit for this interaction can be seen in Figure 8.4. Post hoc analysis of the interaction found that only the low

213

slope significantly differed from zero ($\beta = .32$, $t (74) = 2.32$, $p < .05$). Thus, for low

levels of brooding, low social perfectionism was associated with lower levels of
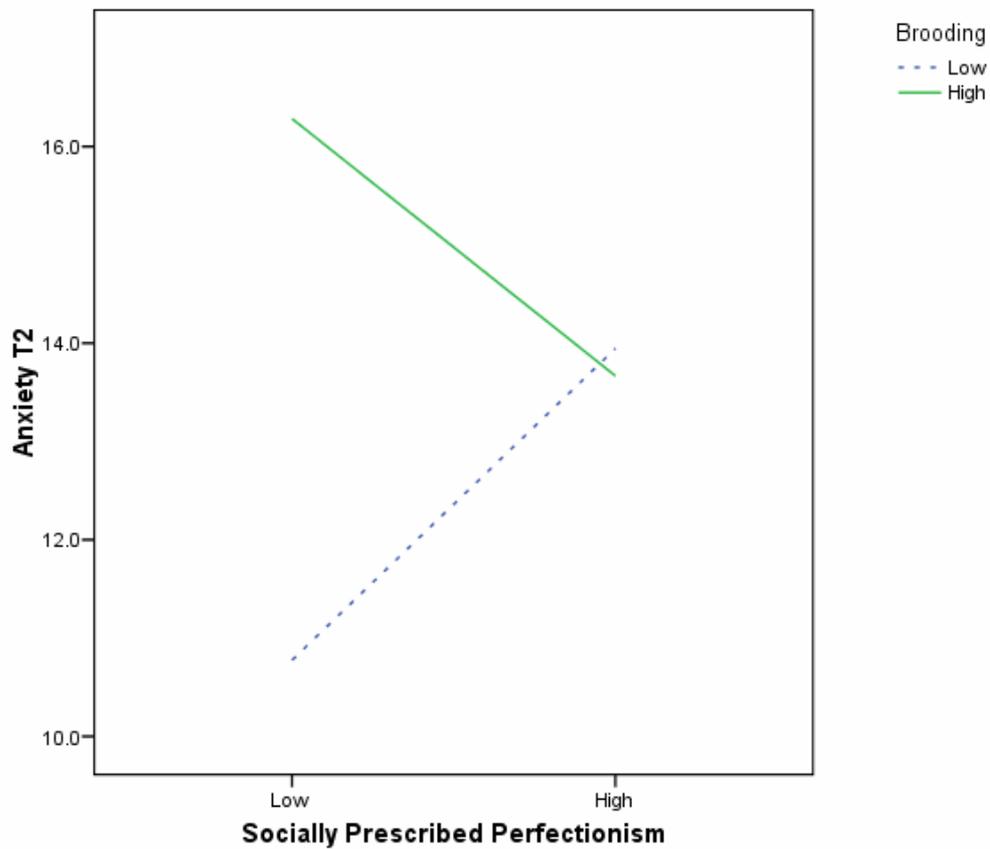
anxiety.

Figure 8.4. Socially prescribed perfectionism x brooding to predict change in anxiety

8.4.4.3 Reflection as a moderator of the perfectionism-distress relationship

8.4.4.3.1   Self-oriented perfectionism-distress relationship

No main or interaction effects of self-oriented perfectionism or reflection were

found to be predictive of change in any measure of distress.

8.4.4.3.2   Socially prescribed perfectionism-distress relationship

As a main effect, neither socially prescribed perfectionism nor reflection was

predictive of change in any measure of distress. However, the interaction between

214

socially prescribed perfectionism and reflection was predictive of change in suicidal

thinking (β =.-.29, t (74) = -2.54, p <.05). A plot of the lines of best fit for this

interaction can be seen in Figure 8.5. Post hoc analysis of this interaction revealed

that the low slope significantly differed from zero (β = .48, t (74) = 3.05, p <.005).

Thus, the low levels of reflection combined with high socially prescribed

perfectionism was associated with the largest increase in suicidal thinking, whilst low

reflection combined with low socially prescribed perfectionism was associated with

the greatest decrease in suicidal thinking.
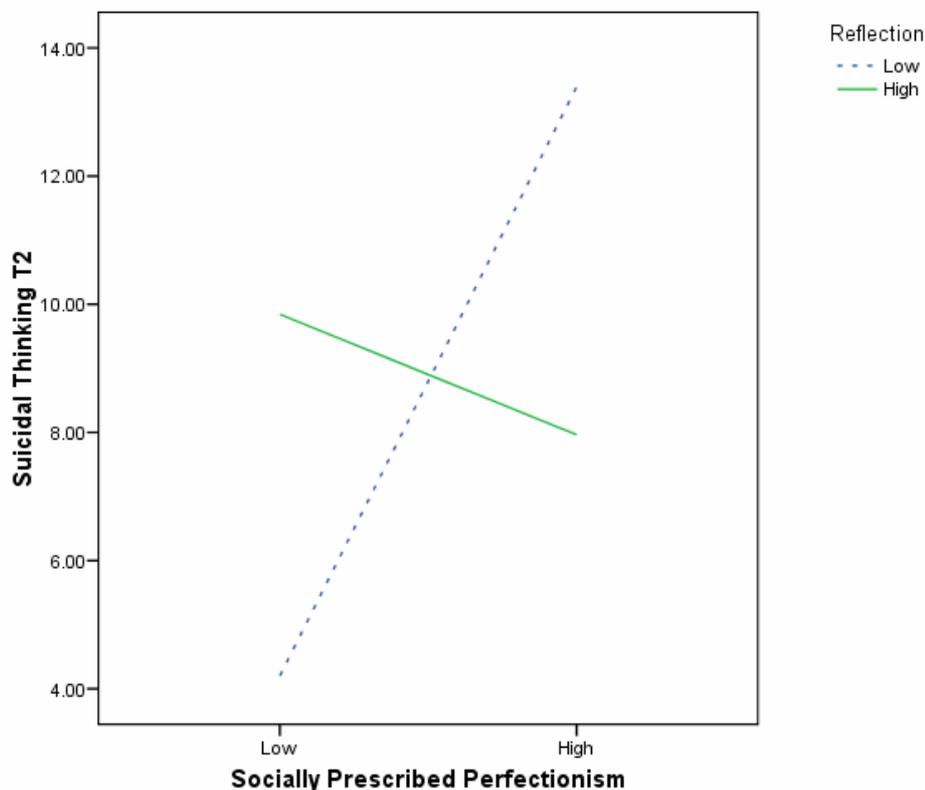
Figure 8.5. Socially prescribed perfectionism x reflection to predict change in suicidal thinking

8.4.4.4 Goal adjustment as a moderator of the perfectionism-distress relationship

    8.4.4.4.1   Self-oriented perfectionism-distress relationship

As a main effect, goal disengagement was predictive of change in depression (β = -.28, t (72) = -2.07, p <.05) and suicidal thinking (β = -.27, t (72) = -2.10, p <.05). However no other main or interaction effects were observed to predict change in other measures of distress.

8.4.4.4.2   Socially prescribed perfectionism-distress relationship

Neither socially prescribed perfectionism nor goal adjustment as a main effect were predictive of change in any measure of distress. However, the interaction between socially prescribed perfectionism and goal disengagement was predictive of hopelessness (β =-.33, t (72) = -2.89, p<.01), anxiety (β = -.30, t (72) = -2.57, p <.05) and depression (β = -.29, t (72) = -.2.50, p<.05).   Plots of the lines of best fit for these interactions can be seen in Figure 8.6, Figure 8.7 and Figure 8.8, respectively. For the interaction to predict hopelessness the high slope significantly differed from zero (β = -.42, t (72) = -2.63, p<.05), whilst the low slope showed a trend towards significance (β = .30, t (72) = 1.89, p = .063). Only the low slope significantly differed from zero in the interactions to predict change in anxiety (β = .37, t (72) = 2.30, p<.05) and depression (β = .40, t (72) = 2.51, p <.05). Thus, low socially prescribed perfectionism combined with high goal disengagement was predictive of the greatest increase in hopelessness, whilst high socially prescribed perfectionism combined with low goal disengagement was predictive of the greatest increase in both anxiety and depression.
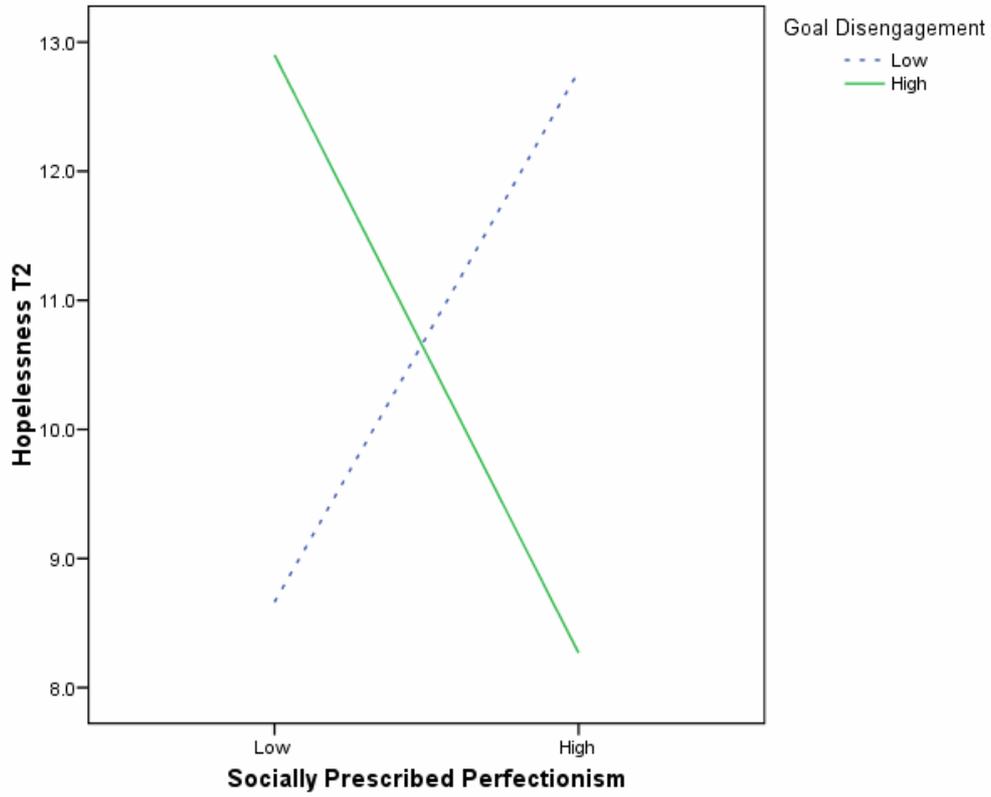
**Figure 8.6. Socially prescribed perfectionism x goal disengagement to predict change in hopelessness**
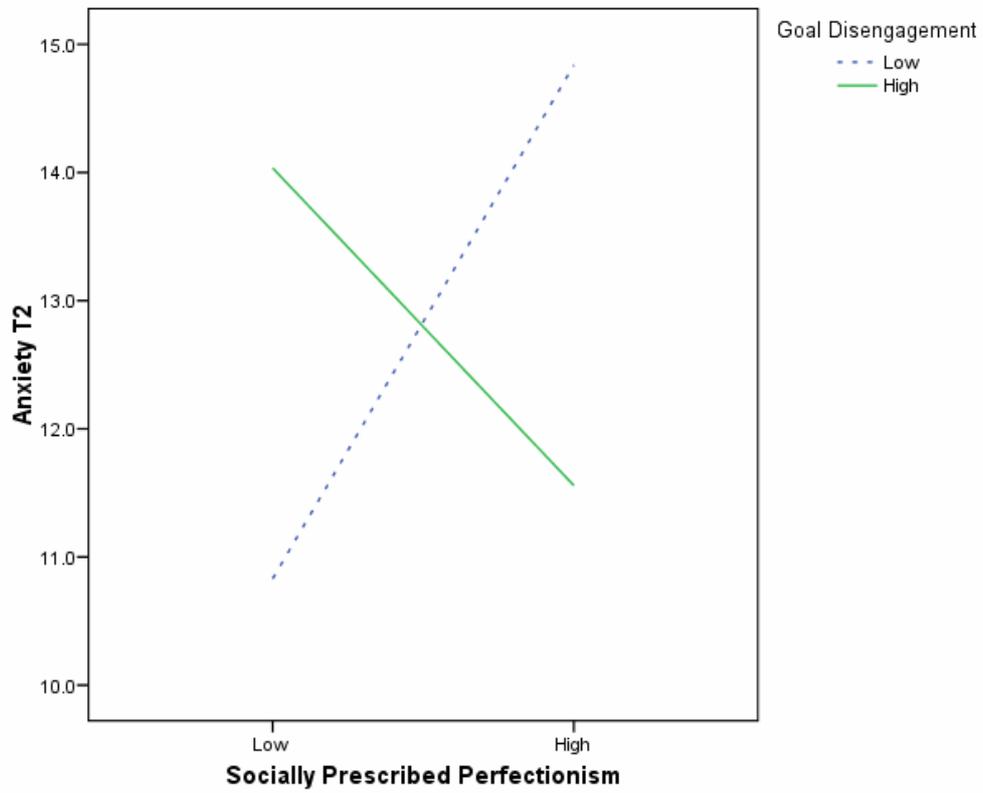
Figure 8.7. Socially prescribed perfectionism x goal disengagement to predict change in anxiety
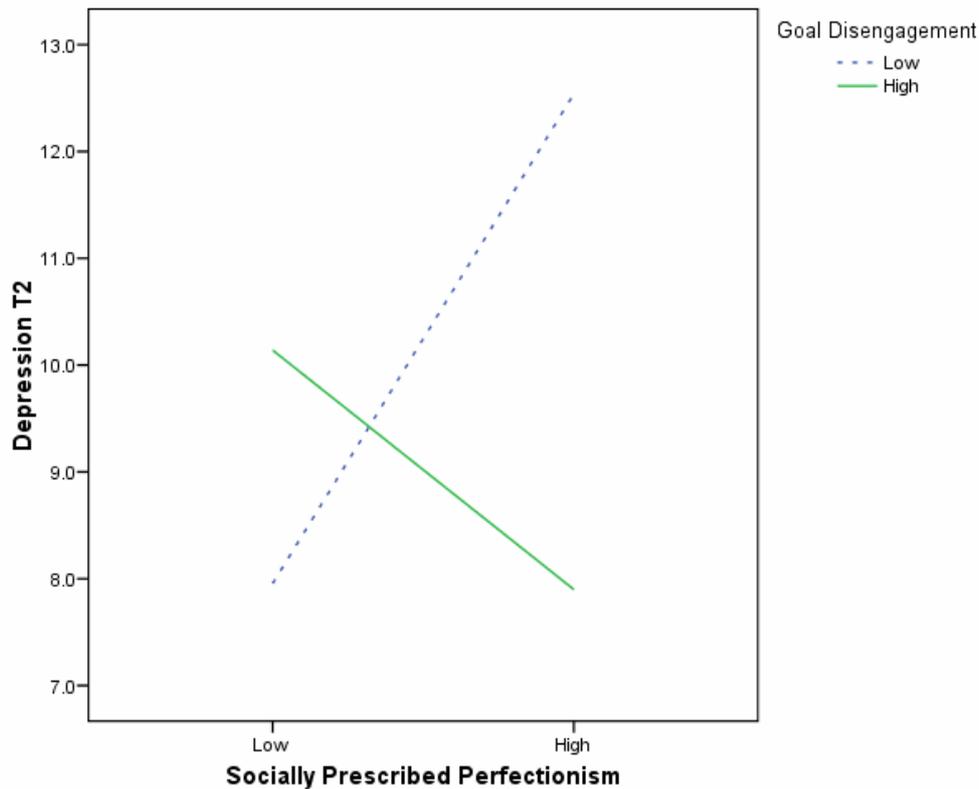
Figure 8.8. Socially prescribed perfectionism x goal disengagement to predict change in depression

8.4.4.5 Attentional bias as a moderator of the perfectionism-distress relationship

8.4.4.5.1   Self-oriented perfectionism-distress relationship

As a main effect, neither self-oriented perfectionism nor positive or negative attentional bias were predictive of change in any measure of distress.   However, the interaction between self-oriented perfectionism and positive attentional bias was predictive of change in suicidal thinking ($\beta =. 28$, t (71) = 2.08, p <.05). Post hoc examination of this interaction found that only the low slope significantly differed from zero ($\beta = -.36$, t (71) = -2.62, p<.05). Thus, in combination with low self-oriented perfectionism, low positive attentional bias was associated with increased suicidal thinking, whilst in combination with high self-oriented perfectionism, low positive attentional bias was associated with decreased suicidal thinking.

218
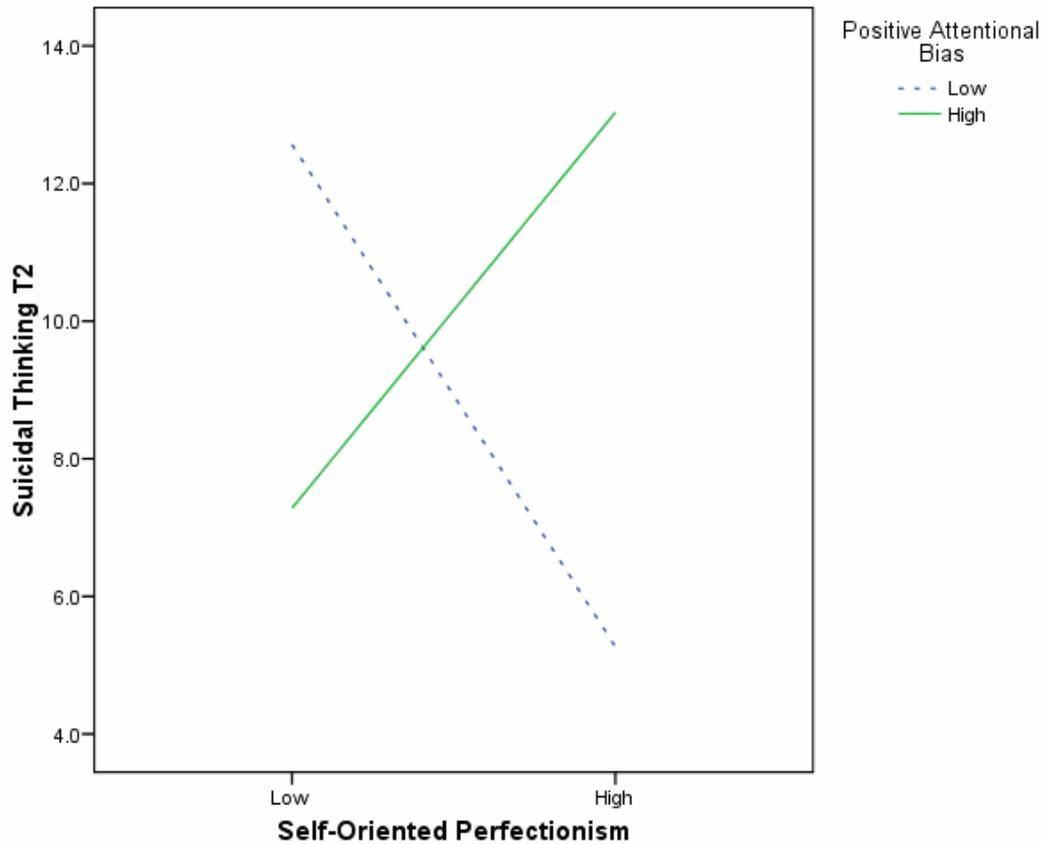
Figure 8.9. Self-oriented perfectionism x positive attentional bias to predict change in suicidal thinking

8.4.4.5.2   Socially prescribed perfectionism-distress relationship

As a main effect, neither socially prescribed perfectionism nor positive or negative attentional bias were predictive of change in any measure of distress. There was a trend towards significance for the interaction between socially prescribed perfectionism and positive attentional bias to predict change in hopelessness ($\beta = -.25$, $t(71) = -1.79$, $p = .079$) in addition to a trend towards significance for the interaction between socially prescribed perfectionism and negative attentional bias to predict change in anxiety ($\beta = .281$, $t(71) = 1.81$, $p = .076$).

8.4.5 The effect of moderation in the rumination-distress relationship

8.4.5.1 Stress as a moderator in the rumination-distress relationship

8.4.5.1.1 Brooding-distress relationship

As a main effect, stress was predictive of change in hopelessness ($\beta = .77$, t $(75) = 10.06$, p $<.0001$), anxiety ($\beta = .69$, t $(75) = 8.30$, p $<.0001$), depression ($\beta = .76$, t $(75) = 9.99$, p $<.0001$) and suicidal thinking ($\beta = .58$, t $(75) = 6.06$, p $<.0001$). However, no other main or interaction effects were observed.

8.4.5.1.2 Reflection-distress relationship

As a main effect, stress was predictive of change in hopelessness ($\beta = .76$, t $(75) = 9.96$, p $<.0001$), anxiety ($\beta = .71$, t $(75) = 8.43$, p $<.0001$), depression ($\beta = .76$, t $(75) = 10.05$, p $<.0001$) and suicidal thinking ($\beta = .53$, t $(75) = 5.91$, p $<.0001$). The interaction between reflection and stress was predictive of change in suicidal thinking ($\beta = -.24$, t $(75) = -2.56$, p $<.05$). A plot of the lines of best fit for this interaction can be seen in Figure 8.10. Post hoc analysis of this interaction revealed that only the low slope significantly differed from zero ($\beta = .88$, t $(75) = 2.05$, p $<.05$). Thus, although there was a general trend for high stress in general to be associated with higher levels of suicidal thinking, under low levels of stress, high reflection was associated with higher suicidal thinking compared to low reflection.
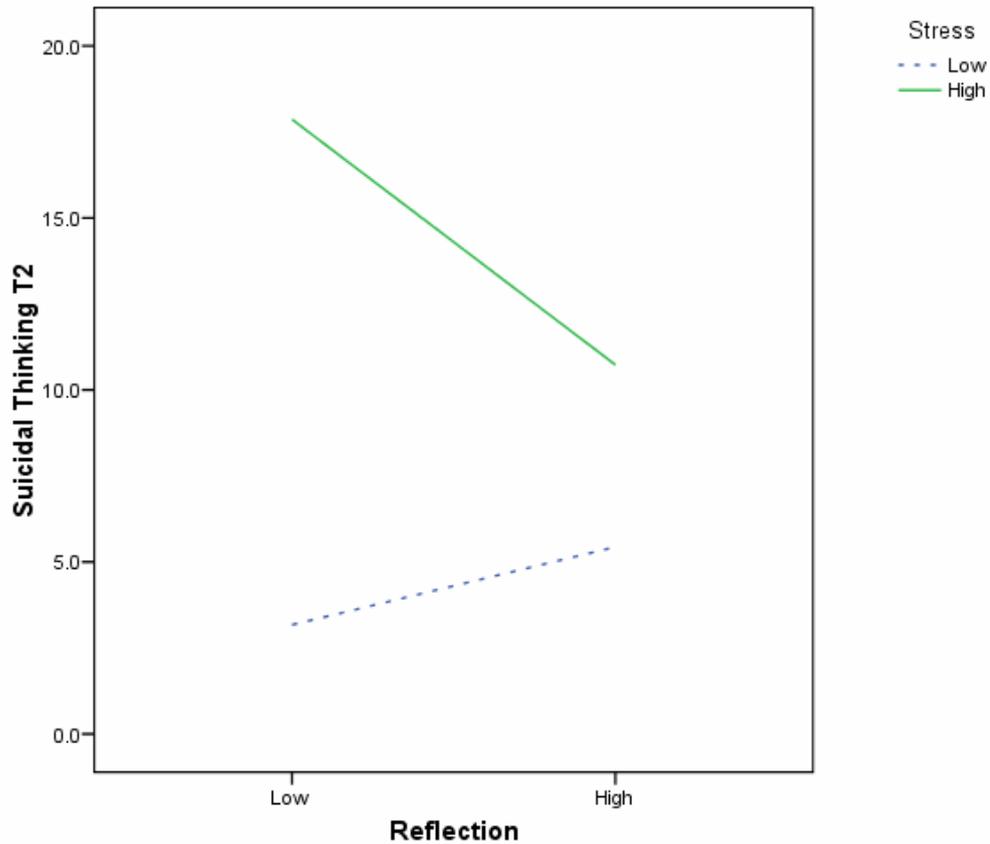
Figure 8.10. Reflection x stress to predict change in suicidal thinking

8.4.5.2 Goal adjustment as a moderator of the rumination-distress relationship

8.4.5.2.1   Brooding-distress relationship

As a main effect, neither brooding nor goal adjustment was predictive of change in any measure of distress. However, the interaction between brooding and goal disengagement was predictive of change in anxiety ($\beta = .31$, t (72) = 2.45, p <.05). Post hoc analysis on this interaction revealed that the high slope significantly differed from zero ($\beta = .53$, t (72) = 2.50, p <.05). In other words, high goal disengagement was associated with higher anxiety when combined with high brooding and was associated with lower anxiety in combination with low brooding.
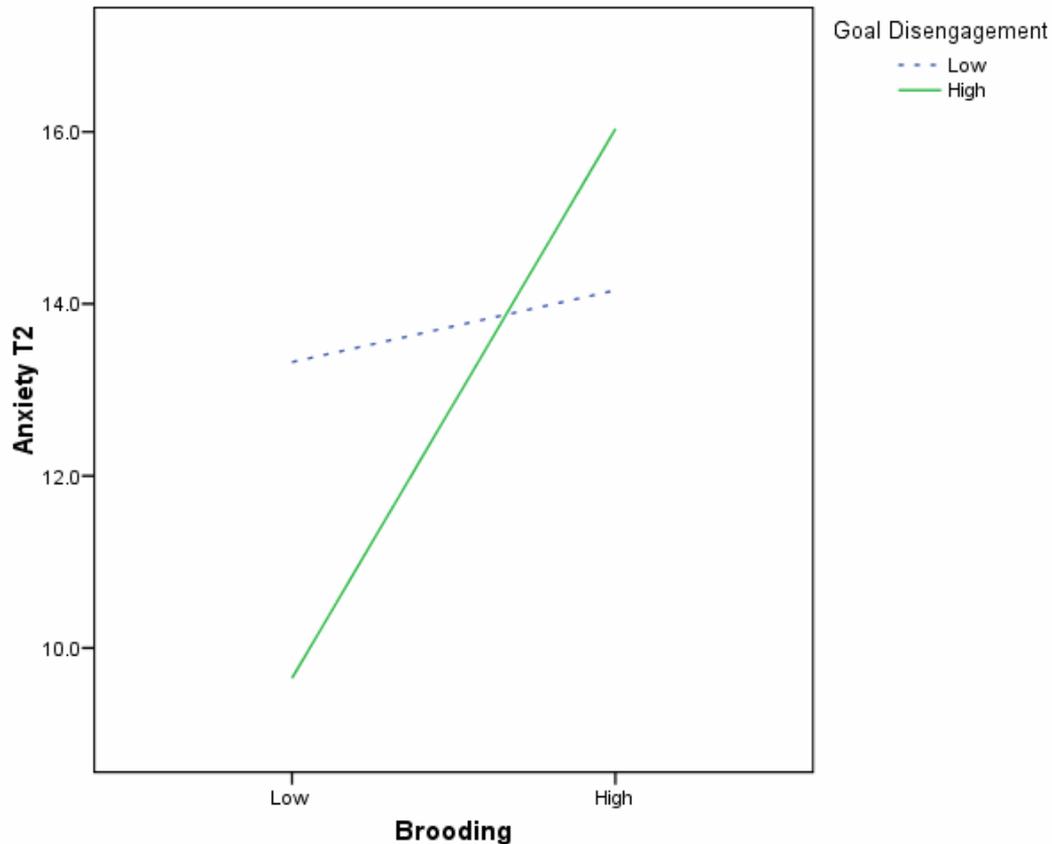
Figure 8.11. Brooding x goal disengagement to predict change in anxiety

8.4.5.2.2   Reflection-distress relationship

No main or interaction effects were observed to predict change in any measure of distress.

8.4.5.3 Attentional bias a moderator of the rumination-distress relationship

8.4.5.3.1   Brooding-distress relationship

As a main effect neither brooding rumination nor positive or negative attentional bias were predictive of change in any measure of distress. However, the interaction between brooding and negative attentional bias was predictive of change in hopelessness (β = -.40, t (72) = -3.03, p <.01), anxiety (β = -.41, t (72) = -3.09, p <.01), depression (β = -.42, t (72) = -3.18, p <.01) and suicidal thinking (β = -.51, t

(72) = -4.12, p <.0001).   Plots of the lines of best fit for these interactions can be seen in Figure 8.12, Figure 8.13, Figure 8.14 and Figure 8.15, respectively. Post hoc analyses revealed that in the interactions to predict hopelessness (β =.51, t (72) = 2.49, p <.05), anxiety (β = .59, t (72) = 2.92, p <.01), depression (β = .50, t (72) = 2.55, p<.05) and suicidal thinking (β = .671, t (72) = 3.45, p <.001) the low slope significantly differed from zero. Thus low negative attentional bias was associated with decreased hopelessness, anxiety, depression and suicidal thinking for individuals low in brooding.   However, for those high in brooding, low negative attentional bias was associated with increased hopelessness, anxiety, depression and suicidal thinking.
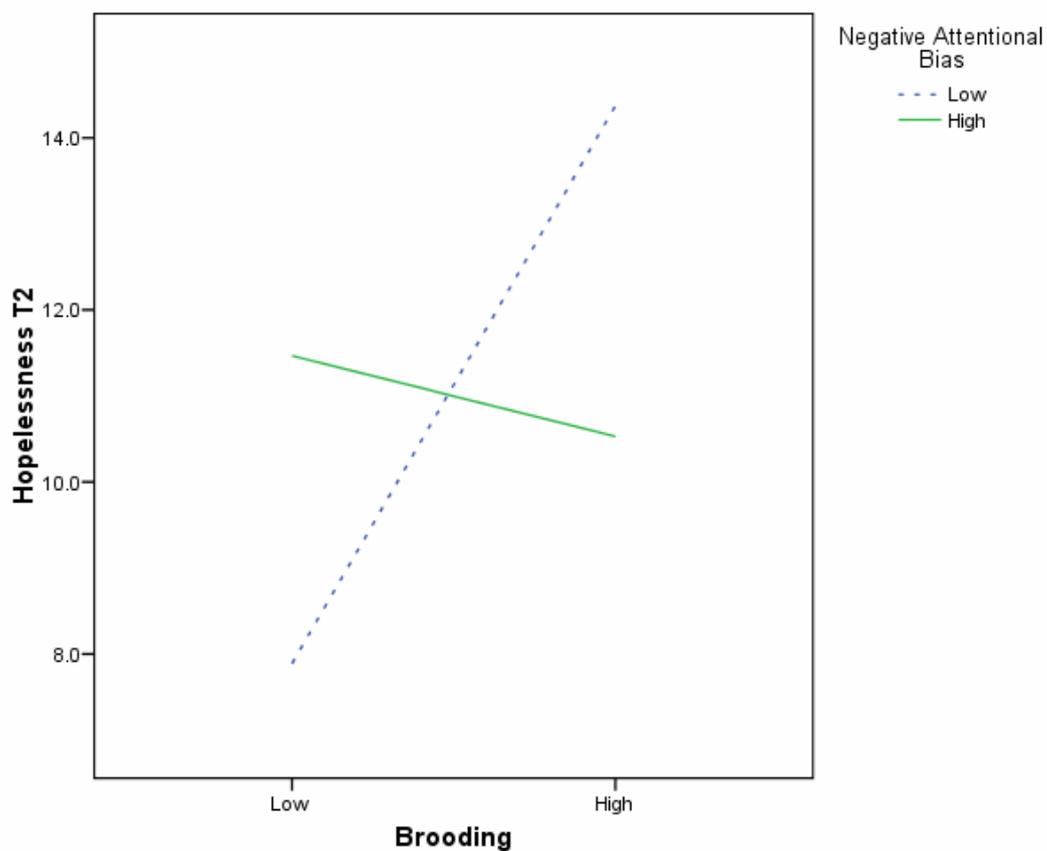

Figure 8.12. Brooding x negative attentional bias to predict change in hopelessness
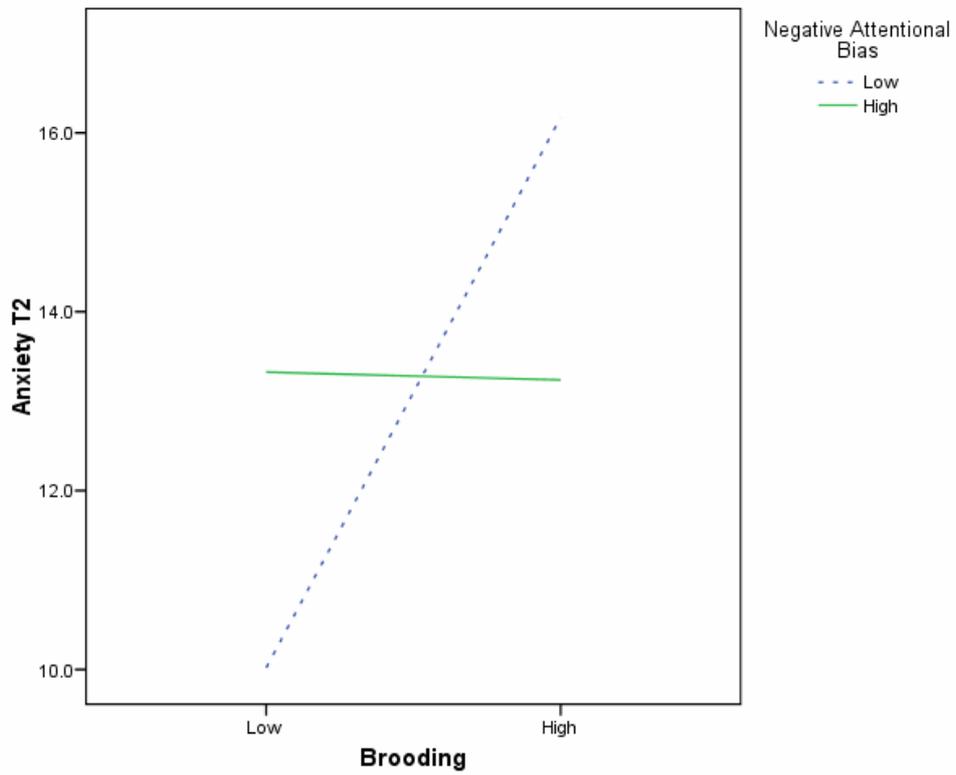
Figure 8.13. Brooding x negative attentional bias to predict change in anxiety
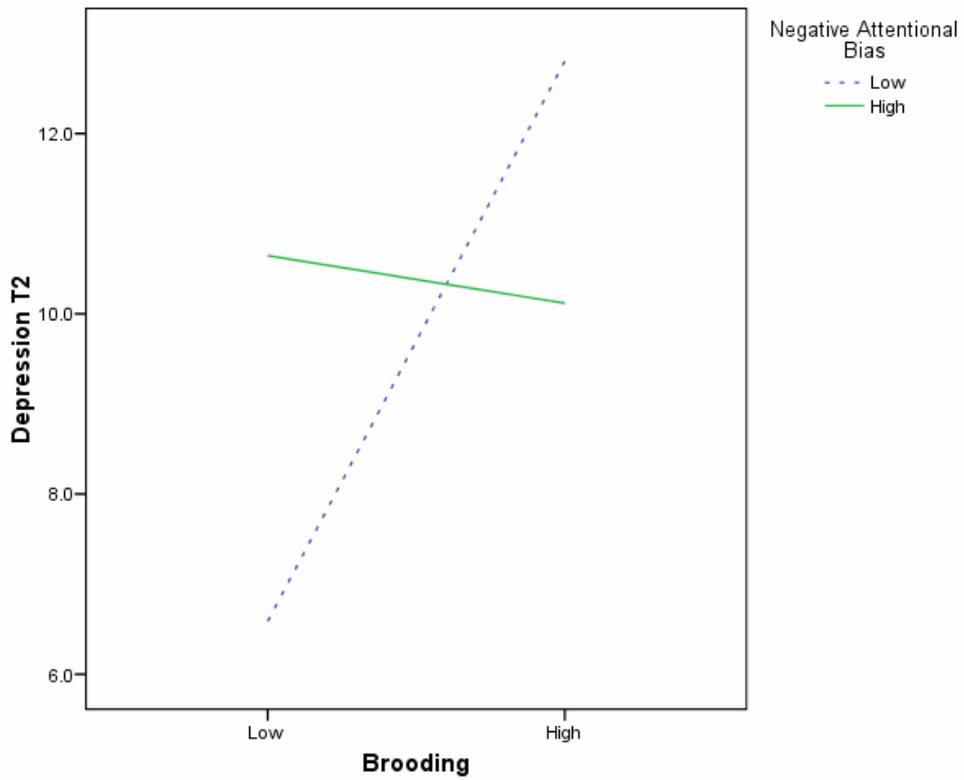

Figure 8.14. Brooding x negative attentional bias to predict change in depression
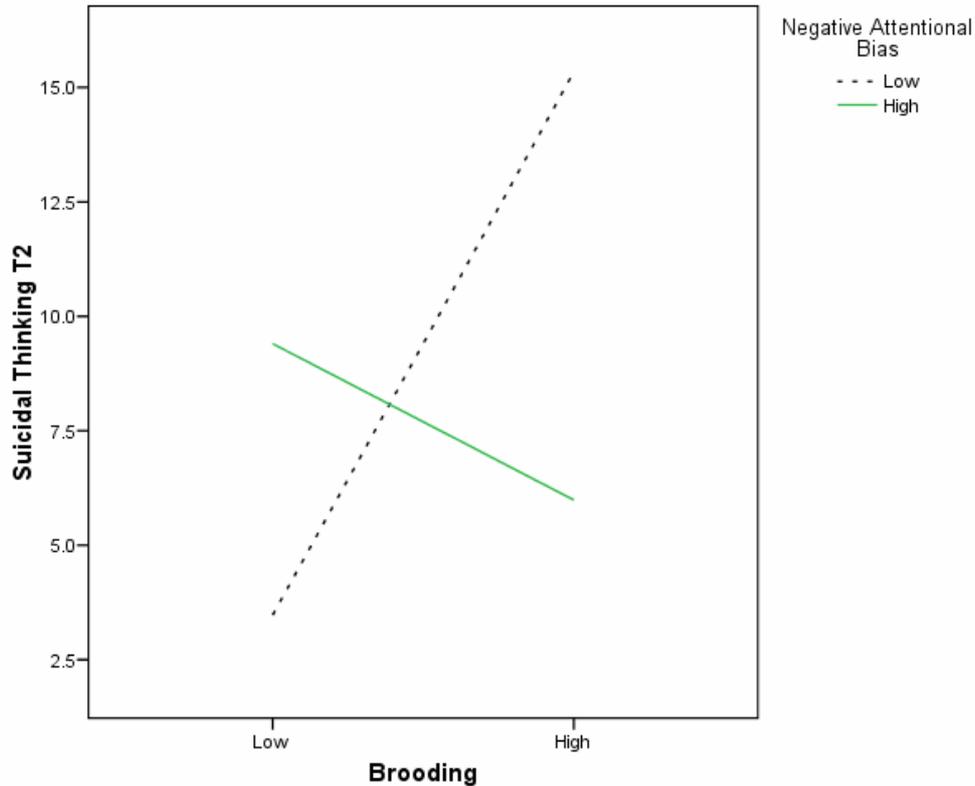
Figure 8.15. Brooding x negative attentional bias to predict change in suicidal thinking

8.4.5.3.2   Reflection-distress relationship

As a main effect, neither reflection nor positive or negative attentional bias were predictive of change in any measure of distress. The interaction between reflection and negative attentional bias showed a trend towards significance to predict change in anxiety (β = -.24, t (72) = -1.81, p = .074).

8.4.6   Mediation Analyses

Mediation effects were examined through a series of regression analyses following the procedure outlined by Baron & Kenny (1986) and Kenny, Kashy and Bolger (1998). Kenny et al. (1998) define four conditions which must be met for mediation: (1) the independent variable must affect the mediator; (2) the independent variable must affect the dependant variable; (3) the mediator must affect the

dependant variable when the independent variable is controlled for; (4) for full mediation to occur, the relationship between the independent variable and the dependent variable must be reduced to non-significance after the effect of the mediator is controlled for. Partial mediation occurs when conditions 1-3 are met without condition 4.

Similar to the moderation analyses, we conducted a series of analyses to test the research questions for this study outlined in section 8.2.5. Again similar to the analyses examining moderation, the dependent variable in each analysis was distress at T2, with initial levels of distress being controlled for in the first step, in order to predict change in distress between T1 and T2. Analyses were conducted separately to examine mediation in: (i) the self-oriented perfectionism-distress relationship; (ii) the socially prescribed perfectionism-distress relationship; (iii) the brooding-distress relationship and; (iv) the reflection-distress relationship.

8.4.7   The effect of mediation in the perfectionism-distress relationship

Neither stress, brooding, reflection, goal adjustment nor attentional bias were found to mediate the relationship between either self-oriented or socially prescribed perfectionism and change in any measure of distress.

8.4.8   The effect of mediation in the rumination-distress relationship

Neither stress, goal adjustment nor attentional bias mediated the relationship between either brooding or reflection and change in any measure of distress.

8.4.9   Factors associated with self-harming behaviour between T1 and T2

Thirty-three participants reported self harming behaviour in the following up period between T1 and T2 (i.e. 43.4% of those who responded at T2 and 21.9% of the initial T1 sample). These behaviours were classified into different methodologies following Hawton, Rodham and Evans (2006), Figure 8.16 illustrates the percentages reported for each classification category. As can be seen from the chart, the most frequent self-harming behaviour reported during the follow-up period was self-poisoning (n=15) followed by self cutting (n=13). In order to examine whether any of the study variables could differentiate those participants who reported self-harming in the follow up period from those who did not, we conducted a series of analyses. First, we present correlations between all variables separately for those who self-harmed during follow up (self harmers, n=33) and those who did not self harm during the follow up period (non self-harmers, n=40). Second, logistic regression analyses examine which of the variables were associated with the occurrence of self-harming behaviour between T1 and T2. Crude odds ratios and confidence intervals were obtained from univariate analyses. Univariate associations were used as a selection criteria for inclusion in multi-variate analyses to determine which of the variables was most important in predicting self-harming behaviour during the follow up period.
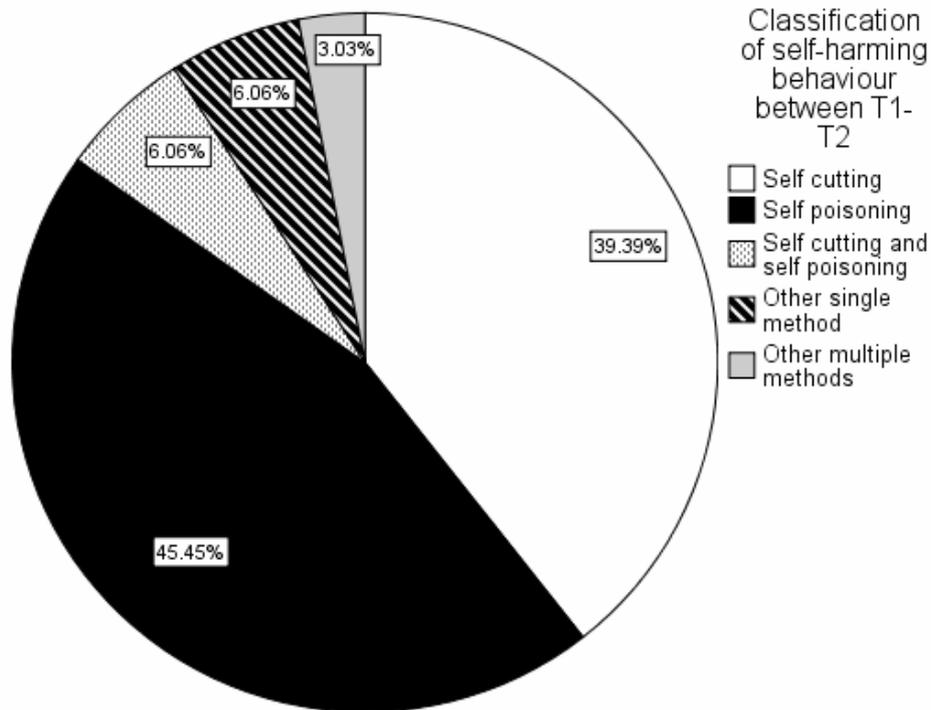
Figure 8.16. Pie chart of self-harming behaviour classification

8.4.9.1 Correlations split by self harming behaviour between T1 and T2

Table 8.3 illustrates the correlations between all variables split according to self harming behaviour between T1 and T2, where those who reported self harming between T1 and T2 (self-harmers; n=33) were compared with those who reported not self-harming between T1 and T2 (non self-harmers; n=40). A number of key differences can be observed in the relationships variables for self-harmers and non self-harmers. For non self-harmers both brooding and reflection were negatively correlated with negative attentional bias, however this relationship was not observed among the self-harmers. For the self-harmers brooding was positively correlated with each measure of distress at both time points, whilst for the non self-harmers brooding was only positively correlated with the measures of distress at T1. For self-harmers negative and positive attentional bias were negatively correlated, however for the non

228

self-harmers no relationship was observed. For non self-harmers negative attentional bias was negatively correlated with brooding and reflection and positively correlated with suicidal thinking and stress at T2; however these associations were not observed for the self harmers.   Stress at T2 was positively correlated with each measure of distress at both times for the self harmers; however for the non self-harmers stress at T2 was only positively correlated with distress at T2.

8.4.9.2 Univariate Analyses

Participants who self-harmed between T1 and T2 were significantly younger than those who did not (see Table 8.4). Participants who self-harmed between T1 and T2 reported higher levels of both brooding and reflection. Those who self-harmed in the follow up period also reported higher initial levels of anxiety, hopelessness and suicidal thinking in addition to greater levels of stress in the period between T1 and T2.

8.4.9.3 Multivariate analyses

The multivariate logistic analyses revealed that only levels of stress for the period between T1 to T2 was independently associated with self harming during the follow up period (see Table 8.5).

Table 8.3. Correlations between variables for participants reporting self-harming between T1 and T2 (lower panel) and participants reporting no self-harm between T1 and T2 (upper panel)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. -ve Bias	-	.141	-.375*	-.419**	-.086	.286	-.209	.187	-.039	-.154	-.235	-.317	-.207	.265	.306	.309	.408*	.327*
2. +ve Bias	-.632**	-	-.086	.111	-.118	.242	.137	-.163	-.026	-.067	.007	-.087	-.068	.026	-.003	.067	-.118	.012
3. Brooding	-.128	.085	-	.383*	-.022	.000	.308	-.023	.392*	.532**	.371*	.394*	.183	-.227	-.019	-.187	-.237	-.215
4. Reflection	.188	.057	.217	-	.114	.012	.138	.046	.102	.312	.220	.344*	.253	-.171	-.196	-.157	-.155	-.201
5. Self	.094	.054	.077	.458**	-	.344*	-.370*	.210	-.276	-.034	-.126	-.037	-.224	-.228	-.013	-.137	-.161	-.066
6. Social	.000	-.136	.110	-.161	.212	-	-.237	.140	.011	-.002	-.084	-.090	.040	-.040	.091	.103	.185	.229
7. Goal Dis	-.159	.106	.072	-.324	-.538**	-.189	-	-.060	.168	.058	.027	.037	.034	-.095	-.201	-.246	-.330*	-.054
8. Goal Re	-.223	.319	-.036	.028	.353*	.061	-.160	-	-.269	.260	-.001	.027	.142	-.031	.052	.144	-.088	-.093
9. BHS T1	.012	-.016	.419*	.018	-.014	.405*	.025	-.361*	-	.549**	.588**	.574**	.450**	-.068	.014	-.025	-.102	.026
10. Anx T1	.185	-.266	.475**	.433*	.269	.390*	-.191	-.015	.485**	-	.729**	.487**	.633**	-.240	.089	-.070	-.199	-.165
11. Dep T1	.103	-.135	.438*	.007	.005	.366*	.050	-.153	.804**	.467**	-	.545**	.603**	-.260	-.048	-.041	-.212	-.127
12. SPS T1	.044	-.173	.492**	.072	-.123	.303	.087	-.312	.641**	.459**	.639**	-	.370*	-.081	.039	-.095	-.086	-.104
13. PSS T1	-.063	-.119	.336	.005	-.290	-.184	.027	-.092	.334	.135	.401*	.377*	-	-.168	-.115	-.028	-.098	.039
14. BHS T2	.098	-.019	.481**	-.048	-.111	.144	.071	-.334	.633**	.211	.600**	.435*	.397*	-	.677**	.825**	.703**	.789**
15. Anx T2	.099	.032	.513**	.293	.053	.067	.078	-.151	.222	.278	.257	.276	.182	.614**	-	.708**	.679**	.721**
16. Dep T2	.207	-.057	.370*	-.152	-.034	.254	-.101	-.235	.394*	.174	.482**	.252	.220	.757**	.593**	-	.694**	.771**
17. SPS T2	-.098	.036	.407*	-.196	-.119	.311	-.075	-.049	.376*	.250	.453**	.438*	.353*	.474**	.353*	.544**	-	.716**
18. PSS T2	.185	-.103	.465**	.294	-.138	-.013	-.106	-.288	.345*	.415*	.464**	.367*	.398*	.660**	.634**	.662**	.480**	-

Note: -ve Bias =Negative attentional bias; +ve Bias =Positive attentional bias; Self=Self-oriented perfectionism; Social=Socially prescribed perfectionism; Goal Dis=Goal Disengagement; Goal Re=Goal Reengagement; BHS T1=Beck Hopelessness Scale T1; Anx T1= HADS Anxiety T1; Dep T1= HADS Depression T1; SPS T1=Suicide Probability Scale T1; PSS T1=Perceived Stress Scale T1; BHS T2=Beck Hopelessness Scale T2; Anx T2=HADS Anxiety T2; Dep T2=HADS Depression T2; SPS T2=Suicide Probability Scale T2; PSS T2=Perceived Stress Scale T2

* Correlation is significant at the .05 level, ** Correlation is significant at the .01 level

Table 8.4. Univariate binary logistic regression to predict self harming behaviour between T1 and T2 (i.e. participants who self harmed between T1 and T2 (n=33) v. participants who did not self harm between T1 and T2 (n=40))

	N	% (N) who self-harmed	Odds ratio	95% CI	P Value
Sex:					
Male	26	42.31 (11)	1.00		
Female	47	46.81 (22)	.833	.317-2.190	.712
Age:		Mean (SD)			
No DSH between T1 and T2	40	41.80 (13.87)	1.00		
DSH between T1 and T2	33	33.61 (11.39)	.950	.913-.989	.012
Brooding:		Mean (SD)			
No DSH between T1 and T2	40	13.48 (3.12)	1.00		
DSH between T1 and T2	33	15.06 (2.75)	1.206	1.018-1.429	.031
Reflection:		Mean (SD)			
No DSH between T1 and T2	40	10.65 (3.23)	1.00		
DSH between T1 and T2	33	12.24 (3.38)	1.160	1.001-1.344	.048
Negative Bias:		Mean (SD)			
No DSH between T1 and T2	40	28.58 (76.48)	1.00		
DSH between T1 and T2	33	8.21 (98.66)	.997	.991-1.003	.340
Positive Bias:		Mean (SD)			
No DSH between T1 and T2	40	27.92 (136.91)	1.00		
DSH between T1 and T2	33	8.25 (73.84)	.998	.994-1.003	.475
Self-oriented perfectionism:		Mean (SD)			
No DSH between T1 and T2	33	22.49 (6.65)	1.00		
DSH between T1 and T2	39	24.39 (6.27)	1.047	.973-1.127	.216
Social Perfectionism:		Mean (SD)			
No DSH between T1 and T2	39	23.28 (7.28)	1.00		
DSH between T1 and T2	33	23.03 (6.92)	.995	.931-1.063	.995
Goal Disengagement:		Mean (SD)			
No DSH between T1 and T2	37	2.82 (0.94)	1.00		
DSH between T1 and T2	33	2.59 (0.84)	.749	.439-1.279	.290
Goal Reengagement:		Mean (SD)			
No DSH between T1 and T2	37	3.16 (0.85)	1.00		
DSH between T1 and T2	33	2.93 (0.84)	.717	.406-1.267	.253
Depression T1:		Mean (SD)			
No DSH between T1 and T2	40	11.35 (4.66)	1.00		
DSH between T1 and T2	33	12.55 (4.56)	1.059	.956-1.174	.271
Anxiety T1:		Mean (SD)			
No DSH between T1 and T2	40	13.40 (4.04)	1.00		
DSH between T1 and T2	33	15.30 (3.15)	1.165	1.010-1.344	.036
Hopelessness T1:		Mean (SD)			
No DSH between T1 and T2	40	12.40 (5.18)	1.00		
DSH between T1 and T2	33	14.94 (4.29)	1.120	1.010-1.243	.032
Suicidal Thinking T1:		Mean (SD)			
No DSH between T1 and T2	40	9.80 (6.70)	1.00		
DSH between T1 and T2	33	15.42 (6.73)	1.127	1.047-1.213	.002
Stress T2:		Mean (SD)			
No DSH between T1 and T2	40	8.75 (3.42)	1.00		
DSH between T1 and T2	33	11.21 (2.58)	1.317	1.099-1.578	.003

Table 8.5. Multivariate binary logistic regression to predict self harming behaviour between T1 and T2

	Odds ratio	95% CI	P Value
Age:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	.959	.908-1.013	.135
Anxiety T1:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	1.066	.857-1.325	.565
Hopelessness T1:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	.975	.825-1.152	.763
Suicidal Thinking T1:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	1.062	.943-1.197	.320
Stress T2:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	1.435	1.097-1.876	.008
Brooding:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	1.079	.837-1.391	.559
Reflection:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	.975	.791-1.202	.810
Brooding x Stress:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	1.038	.966-1.115	.312
Reflection x Stress:			
No DSH between T1 and T2	1.00		
DSH between T1 and T2	1.051	.963-1.148	.267

8.5   Discussion

This research aimed to examine whether the variables observed as influencing both the perfectionism-distress relationship and the rumination-distress relationship, in studies one and three, were replicable in a clinical, parasuicide sample. A further aim was to establish whether the individual difference variables measured throughout this thesis were predictive of self-harming behaviour. The extent to which our hypotheses are supported and how our findings can be usefully integrated with previous research in this field, are discussed below.

8.5.1 *The effect of stress on the perfectionism-distress relationship*

Contrary to our initial hypotheses, perceived stress did not mediate or moderate the relationship between self-oriented or socially prescribed perfectionism and any measure of distress. Thus, in our clinical, parasuicide sample, perceived stress did not amplify the negative consequences of either socially prescribed or self-oriented perfectionism, nor did socially prescribed perfectionism generate increased levels of perceived stress. These findings are in contrast to similar research conducted using student populations (e.g. Hewitt & Dyke, 1986, Flett et al., 1995; Chang & Rand, 2000, studies one and three in this thesis). This suggests that the discrepancy may be explained by differing characteristics between the student and the clinical populations. One possible explanation is that the average levels of perceived stress in the clinical population were so great, that the distinction between high and low levels of stress (calculated at one standard deviation above and below the mean), no longer had any additional influence on the experience of distress. Unfortunately, in the present study we used a brief 4-item version of the Perceived Stress Scale, whilst in the student population studies we used the longer 14-item version of the same scale. This prevents us from accurately comparing average perceived stress levels between the clinical and student populations to test this explanation further.

8.5.2 *The effect of rumination on the perfectionism-distress relationship*

As predicted, brooding moderated the relationship between socially prescribed perfectionism and anxiety, such that for individuals low on brooding, low socially prescribed perfectionism was associated with lower levels of anxiety, whilst high socially prescribed perfectionism was associated with higher levels of

233

anxiety. However, for individuals high on brooding there was no difference in anxiety between high and low social perfectionists. This highlights the powerful effect of brooding, as socially prescribed perfectionism only had an impact on distress for those with low levels of brooding. High brooders experienced increased anxiety regardless of whether they were high in socially prescribed perfectionism. To the author's knowledge, the only other research which has previously examined the moderating effect of brooding on the perfectionism-distress relationship is study three in this thesis, where high brooding amplified the negative consequences of socially prescribed perfectionism on anxiety, dysphoria and suicidal thinking. Thus, in a student sample the combination of high brooding and high socially prescribed perfectionism was associated with the largest increase in distress. As high and low levels of brooding are calculated at one standard deviation above and below the mean for an individual sample, the difference between the student and clinical samples may be a consequence of the lower brooding scores overall in the student sample – meaning that high brooding in the students, was lower than high brooding in the clinical patients. The present results indicate that in a clinical sample, although socially prescribed perfectionism amplifies the experience of anxiety, this effect is only significant in individuals with low levels of brooding and generalises to fewer measures of distress than in a student population.

Brooding also moderated the relationship between self-oriented perfectionism and anxiety (and showed a non-significant trend to do the same for hopelessness and depression), such that for individuals who were high brooders, high self-oriented perfectionism was beneficial in reducing distress. Previous research using student populations did not find rumination, nor brooding or reflection separately, to moderate the self-oriented perfectionism-distress

234

relationship. However, the previous research examining the self-oriented perfectionism-distress relationship in general has produced less consistent findings than the socially prescribed perfectionism-distress relationship (e.g. Hewitt & Flett, 1991; Hunter & O'Connor, 2003) and this may account for the failure of the previous studies in this thesis to find a moderating effect of rumination (or specifically brooding) on the self-oriented perfectionism-distress relationship. The current findings indicate that self-oriented perfectionism is beneficial in reducing anxiety, but only for those high in brooding. One explanation for the previous inconsistency of findings regarding the adaptive or maladaptive consequences of self-oriented perfectionism is that much of the research in this area failed to consider the impact of brooding on the self-oriented perfectionism distress relationship.

Consistent with our predictions, reflection moderated the relationship between socially prescribed perfectionism and suicidal thinking. However the direction of this relationship differed from our predictions, with low levels of reflection exacerbating the negative consequences of socially prescribed perfectionism on suicidal thinking. In study three of this thesis, socially prescribed perfectionism interacted with reflection such that reflection increased the negative consequences associated with socially prescribed perfectionism, whilst in the current study the opposite pattern was observed. This differing effect of reflection in the socially prescribed perfectionism-distress relationship may be attributable to the differing relationship observed between reflection and distress in general within our clinical study. In line with previous research conducted with populations who have previously engaged in suicidal behaviour (as opposed to suicide ideation only) (Crane et al., 2007), we found a protective effect of reflection (see section 8.5.5 for

235

details). The present finding appears to be consistent with this notion, as high levels of reflection attenuated the negative consequences of socially prescribed perfectionism on distress. This is compatible with the notion that reflection may represent the adaptive component of rumination.

Neither brooding nor reflection mediated the relationship between either self-oriented or socially prescribed perfectionism and distress. Previous research in this area has yielded mixed results with some support for both brooding and reflection to either fully or partially mediate the relationship between perfectionism and distress (O'Connor et al., 2007; Harris et al., 2008). However, study three of this thesis found no mediating effect of brooding or reflection in the relationship between either self-oriented or socially prescribed perfectionism and distress. The present results support the findings of study three in this thesis and extend these to a clinical population. Thus, neither self-oriented nor socially prescribed perfectionism generated reflective or brooding thinking within our clinical sample.

8.5.3   *The effect of goal adjustment on the perfectionism-distress relationship*

We hypothesised that goal adjustment would moderate the relationship between both self-oriented and socially prescribed perfectionism and distress. Consistent with this, goal disengagement moderated the relationship between socially prescribed perfectionism and hopelessness, anxiety and depression. Thus, for individuals with high levels of socially prescribed perfectionism, the ability to disengage from unattainable goals was associated with less distress.   This finding is in support of the previous findings of both study one and study three in this thesis (see sections 5.4.7.2.2, 5.4.8.2.2 and 7.4.4.5.2) and further extends these findings to a clinical, parasuicide population.

236

However, contrary to our hypotheses, goal disengagement did not moderate the self-oriented perfectionism-distress relationship. We previously found that goal disengagement moderated the relationship between self-oriented perfectionism and distress (see sections 5.4.7.2.1, 5.4.8.2.1 and 7.4.4.5.1), where an inability to disengage from unattainable goals, combined with high self-oriented perfectionism was associated with increased distress, in student population samples. The relationship was not replicated in the present clinical sample. This finding further serves to highlight the critical role of socially prescribed perfectionism in a clinical, parasuicide sample, as the ability to disengage from unachievable goals was not differentially associated with distress for self-oriented perfectionists, only socially prescribed perfectionists. Thus, the ability to disengage from unattainable goals which are perceived to be set for an individual by others may be more valuable than the ability to disengage with unattainable self-set goals, in a clinical population.

As hypothesised, goal adjustment was not found to mediate the relationship between either self-oriented or socially prescribed perfectionism and distress. This indicates that perfectionistic thinking did not result in changes to goal adjustment, which could then, in turn, alter levels of distress.

8.5.4   *The effect of attentional bias on the perfectionism-distress relationship*

We hypothesised that positive attentional bias would moderate the effect of socially prescribed perfectionism on distress, such that increased positive attentional bias, combined with high socially prescribed perfectionism would be predictive of higher levels of distress. This hypothesis was partially supported by a non-significant trend for positive attentional bias to moderate the relationship between socially prescribed perfectionism and hopelessness. Although positive attentional

237

biases are often considered to be beneficial (e.g. McCabe & Gotlib, 1995; Suslow et al., 2001), the current findings are in line with the results of study one of this thesis. Consequently our data extend our previous findings to a clinical, parasuicide sample and lend support to the idea that there is something inherent to social perfectionists which results in positive attentional bias being associated with increased hopelessness. As social perfectionists consistently evaluate themselves as failing to achieve standards set for them by others, it may be that positive stimuli are viewed in the context of something which they are also lacking or failing to achieve (e.g. the word 'happy' is interpreted as something which they have failed to achieve) and this in turn, increases their feelings of hopelessness.

In addition, we also found that positive attentional bias moderated the relationship between self-oriented perfection and suicidal thinking such that higher levels of positive attentional bias were associated with increased suicidal thinking in high self-oriented perfectionists, whilst the opposite trend was observed for low self-oriented perfectionists, with lower levels of positive attentional bias being associated with increased suicidal thinking. Again, this may be explained by the excessive concern with standards and failure which is characteristic of perfectionism in general. Self-oriented perfectionists are overly concerned with failing to achieve goals and targets which they have set themselves, so again they may interpret positive stimuli as something which they have also failed to achieve.

There was also a non-significant trend for negative attentional bias to moderate the relationship between socially prescribed perfectionism and anxiety, where high negative attentional bias combined with high socially prescribed perfectionism was associated with increased anxiety. Thus, for social perfectionists – whom by definition are excessively concerned with failing to meet the high

expectations of others – a tendency to selectively attend to negative as opposed to neutral stimuli exacerbates their experience of distress.

Consistent with the findings of study one in this thesis, attentional bias did not mediate the relationship between perfectionism and distress, suggesting that perfectionism in itself does not alter an individuals pattern of attention, resulting in altered levels of positive or negative attentional bias.

8.5.5   *The effect of stress in the rumination-distress relationship*

We hypothesised that perceived stress would moderate the relationship between both brooding and reflective rumination and distress. This hypothesis was partly supported, in that perceived stress moderated the relationship between reflection and suicidal thinking. However the direction of this relationship was the opposite to that which was hypothesised, with higher stress, combined with higher reflection being predictive of lower suicidal thinking. Study three in this thesis found that high perceived stress, combined with high reflection was predictive of increased suicidal thinking in a student sample. However the current findings suggest a beneficial effect of reflection under the experience of stress, in a sample of clinical participants. The present results would fit with the notion that reflection is the more adaptive component of rumination (as highlighted by only concurrent associations with distress in Treynor et al.'s (2003) initial study – see section 2.2.1.1 for a more detailed explanation). Previous evidence regarding the nature of any association between reflection and suicidality has been mixed with some researchers finding a positive association with suicidal thinking (Miranda et al., 2007), whilst others found no association (O'Connor & Noyce, 2008). However, to our knowledge, the only other study to examine reflection and suicidality in the context

of persons who had actually engaged in suicidal behaviour (as opposed to suicidal thinking only), used a case control design and found that never suicidal individuals had higher levels of reflection than individuals who had previously engaged in suicidal behaviour (Crane et al., 2007). Thus, the previous clinical evidence lends support to the current findings of a protective effect of reflection – albeit in the present research this protective effect is only observed in the context of increased levels of perceived stress.

Contrary to our initial hypotheses, perceived stress did not moderate the relationship between brooding and any measure of distress. This indicates that the impact of brooding on distress was not further exacerbated by the experience of perceived stress. Previous research has found that perceived stress amplifies the effect of rumination as a whole on distress (Morrison & O'Connor, 2005, 2008a). In addition, study three of this thesis examined brooding specifically and found that both perceived stress and stressful life events moderated the relationship between brooding and distress. However, these previous findings have all used student populations, which indicates that the discrepancy with the current results may reflect a difference between the characteristics of the populations under study. Certainly the clinical population report higher mean levels of both brooding and rumination than the student samples – possibly the effects of brooding are only amplified by stress until brooding reaches a critical level above which the effects are no longer amplified. Another potential explanation, as noted above, is that levels of perceived stress in the clinical sample may be so high that the distinction between high and low stress (at one standard deviation above and one standard deviation below the mean) may not have a differential impact on the effects of brooding on distress. More research is required to examine both of these possibilities further.

240

In addition, contrary to our initial hypotheses, perceived stress did not mediate the relationship between brooding and any measure of distress. Previous research in study three of this thesis found that perceived stress mediated the relationship between brooding and both depression and suicidal thinking. However, we were unable to replicate this result in the current study. It is possible that our failure to find a mediating effect of stress is a consequence of a ceiling effect in our data, where engaging in brooding did not generate more stress, as participants were already experiencing a high level of perceived stress.

8.5.6   The effect of goal adjustment in the rumination-distress relationship

We hypothesised that goal adjustment would not mediate the impact of either brooding or reflection on distress and this was confirmed. In addition, we hypothesised that goal disengagement would moderate the relationship between reflection and distress. However, whilst we found that goal disengagement moderated the relationship between brooding and anxiety; no moderating effect of goal disengagement on relationship between reflection and any measure of distress was observed. In study one of this thesis, we found goal disengagement moderated the relationship between rumination as a whole with hopelessness and suicidal thinking (see sections 5.4.9.2 and 5.4.10.2). This was complemented by the findings of study three of this thesis, where we found a trend approaching significance for goal disengagement to moderate the relationship between reflection and suicidal thinking (see section 7.4.5.3.2). These findings led us to conclude that goal disengagement affected the reflective, as opposed to the brooding, component of rumination. Given reflection involves thoughts about problem solving, then this interpretation seemed plausible. However, the present findings contrast with our

241

earlier conclusions, as for individuals with high goal disengagement (e.g. individuals who were able to disengage from unattainable goals), increased anxiety was reported by those who also had higher levels of brooding. In contrast, for individuals with low goal disengagement, no difference in anxiety was observed between high and low brooding. Thus, the ability to disengage from unattainable goals, combined with a tendency to compare one's current situation with another unachieved benchmark, resulted in increased anxiety. Intuitively, this finding makes sense, as a high tendency to disengage from unachievable goals combined with a tendency to repetitively think about how one's present situation compares unfavourably with an ideal standard, could amplify the experience of distress by increasing focus on failure to achieve another goal. Therefore, it seems possible that goal disengagement may impact on the relationship between both reflection and brooding and distress.

Our failure to find an impact of goal disengagement in the reflection-distress relationship in the current clinical sample may reflect the difference in the impact of reflection on distress in the clinical sample, compared with student samples. As noted above, the adaptive or maladaptive qualities of reflection have been previously debated in the literature; however previous research using individuals who have engaged in suicidal behaviour suggests a protective effect of reflection (however, this has not been noted in general population or student samples). If reflection does have a protective effect in a parasuicide sample, then this could explain why its effects were not moderated by goal disengagement in the current study, but they were previously in our non-clinical sample.

8.5.7   *The effect of attentional bias in the rumination-distress relationship*

We made no specific directional hypotheses regarding the effect of attentional bias in the rumination-distress relationship due to a lack of research in this area. Negative attentional bias was found to moderate the relationship between brooding and each measure of distress, such that for individuals high on negative attentional bias, there were no differences in distress between high and low brooders. However, for individuals low in negative attentional bias, high brooding was associated with increased distress. Thus, the absence of both brooding and negative attentional bias was associated with the lowest levels of each measure of distress. In addition, high brooding had the greatest detrimental impact on distress for individuals with lower levels of negative attentional bias.   This illustrates the powerful effect of negative attentional bias, as brooding only further amplified the experience of distress in those individuals with low negative attentional bias.

A similar non-significant trend was observed for negative attentional bias to moderate the relationship between reflection and anxiety, where although there was an overall trend for high negative attentional bias to be associated with increased anxiety, for individuals with low negative attentional bias, low reflection was associated with less anxiety. The other findings relating to reflection, in this clinical study, have suggested a possible protective effect of reflection. However, the current finding indicates that this protective effect of reflection may not generalise to individuals with low levels of negative attentional bias. One possible explanation for this finding relates to the content of self-focussed thinking. Reflection can be thought of as self-focussed thinking with a problem solving orientation; therefore it is possible that for individuals who focus more on negative stimuli, reflection can result in increased problem solving which, in turn, decreases distress. However, by

not attending to negative stimuli, individuals are less likely to engage reflective problem solving, meaning distress may increase.

8.5.8   *Predicting self-harming behaviour between T1 and T2*

Much of the previous work examining the role of cognitive and personality variables in psychological distress has focussed on their role in predicting concurrent or prospective levels of distress reported through standardised questionnaire measures. In the present research, our prospective design allowed us to examine whether these individual difference variables were also associated with participants' reports of self harming behaviours during the follow up period. As hypothesised, higher initial levels of anxiety, hopelessness and suicidal thinking, were univariately associate with self-harming behaviour in the follow up period. In addition, again consistent with our hypotheses, increased levels of brooding, reflection and perceived stress (for the period between T1 and T2) were univariately associated with self-harming behaviour in the follow up period. However, multivariate analysis revealed that perceived stress during the follow up period was the factor most associated with self-harming between T1 and T2. This indicates that although both brooding and reflection were univariately associated with self-harming behaviour, the effect of perceived stress was stronger. This finding illustrates that brooding and reflection were associated with both changes in distress over time (as measured by standardised self-report measures) and self reported self-harming behaviour. However, socially prescribed and self-oriented perfectionism were only associated with changes in distress over time. This highlights the importance of ruminative thinking in the context of suicidal behaviour.

8.5.9   Limitations

A number of limitations in the current study need to be highlighted. First our use of the brief (4-item) Perceived Stress Scale, differed from the other non-clinical studies in this thesis where the 14-item measure was employed. We initially selected the shorted version of the scale to use in a clinical sample in an attempt to reduce the burden of participation for our hospital patient sample and to reduce overall participation time to enable the study to better fit in with routine hospital care. Although the 14-item and the 4-item versions are well correlated, they do not allow a direct comparison between levels of perceived stress between the clinical and student populations. Future research in this area should use comparable measures of perceived stress in both clinical and student populations.

Second, there was a high rate of attrition between T1 and T2 (47.2% of the sample did not complete T2 measures). There are numerous difficulties associated with following up a clinical population of this nature and the follow-up rate in the present research is favourable in comparison to other research in this area (e.g. O'Connor, Armitage and Grey, 2006). In addition, although participants who completed T2 measures were significantly older than those who did not, they did not differ on any other demographic variable.

Third, it could be argued that three of our measures do not meet Nunnally's (1978) criteria for internal validity (measures of reflection, other-oriented perfectionism and perceived stress (at T1)). Arguably, however, this reduced reliability decreases the likelihood of detecting relationships between variables; hence those relationships which are observed are likely to be more robust. In addition, previous research has indicated each of these measures to be valid and reliable (e.g. Treynor et al., 2003; Enns, Cox & Clara, 2002; Cohen et al., 1983).

Fourth, the reliance on self-report measures could mean that social desirability influenced our findings. However, in the standardised self-report measures of distress, given interaction effects emerged from the data, it is unlikely that social desirability confounded these results. However, no interaction effects emerged in the self-report measure of self-harming behaviour during the follow up period, therefore it is possible that these findings could have been influenced by social desirability. Future research should aim to replicate these findings using an objective measure of self-harming behaviour during the follow-up period – such as patient medical records.

8.5.10 Conclusions and implications

Despite the limitations noted above, there are a number of conclusions which can be drawn from this research and these lead to a number of implications. First, this research highlights the interactive nature of individual difference variables in the prediction of distress and suicidal thinking. In particular, we found a series of moderating effects in the relationship between both perfectionism and rumination and a number of forms of distress. Thus, future research must consider these interactive possibilities as opposed to examining variables in isolation.

Second, the nature of the relationships between the individual difference variables studied throughout this thesis has varied between student participant samples and a clinical parasuicide sample. This may be a consequence of clinical populations experiencing higher levels of distress and having higher levels of the individual difference variables under study (i.e. the clinical sample may have been further along a continuum than the students). Nonetheless, these differences raise the obvious implication that future research should ensure that relationships are

tested in the appropriate population for a particular intervention, as any effects may not always be generalised beyond the population under study.

Third, by focussing on potentially modifiable cognitive individual difference variables, we highlight a number of key areas for interventions aimed at reducing psychological distress and suicidal thinking to target. This is timely given recent developments in cognitive behavioural therapy targeting the reduction of ruminative thinking (Watkins et al., 2007).

9   General Discussion

9.1   Overview

This final chapter aims to summarise the findings of the four studies that comprise this thesis and usefully integrate them into theoretical frameworks. In addition, the findings are also discussed in relation to their relevance for the development of therapeutic interventions. Limitations of this thesis overall are then highlighted before a discussion of directions for future research. Finally, a brief summary of what this thesis adds to the literature is provided.

9.2   Summary of Findings

The four studies that comprise this thesis had three main aims: First, to examine the role of stress, rumination, goal adjustment and attentional bias in the relationship between perfectionism and distress; Second, to examine the role of stress, goal adjustment and attentional bias in the relationship between rumination and distress and; Third, to examine the possibility of causal relationship between rumination and attentional bias.   The findings of this research with regards each of these aims is summarised below.

9.2.1   *The role of stress, rumination, goal adjustment and attentional bias in the relationship between perfectionism and distress.*

The results of the present thesis indicated that stress (both perceived stress and stressful life events) mediated the relationship between socially prescribed perfectionism and distress (Studies 1 and 3, sections 5.4.13.1.2 and 7.4.8.1.2). Perceived stress also moderated the relationship between socially prescribed

perfectionism and distress (Studies 1 and 3, sections 5.4.8.1.2, 5.4.7.1.2 and 7.4.4.1.2), whilst both perceived stress and stressful life events moderated the relationship between self-oriented perfectionism and distress (Studies 1 and 3, sections 5.4.7.1.1, 5.4.8.1.1, 7.4.4.1.1 and 7.4.4.2.1). These findings were not replicated in a clinical population (Study 4), possibly due to a ceiling effect in the measure of stress (see section 8.5.1 for a more detailed discussion).

Rumination was found to both mediate and moderate the effects of socially prescribed perfectionism on psychological distress and suicidal thinking (Study 1, sections 5.4.7.3.2 and 5.4.8.3.2). The brooding component of rumination was found to moderate the relationship between socially prescribed perfectionism and a range of measures of distress (Study 3, section 7.4.4.3.2, Study 4, section 8.4.4.2.2). The reflective component of rumination was found to moderate the relationship between socially prescribed perfectionism and anxiety (Study 3, section 7.4.4.4.2) and suicidal thinking (Study 4, section 8.4.4.3.2). However, the moderating effect of reflection in the clinical sample in Study 4, was in the opposite direction to the findings from the analogue studies, consistent with the notion of a protective effect of reflection in a population who have engaged in suicidal behaviour (Crane et al., 2007) (see sections 8.5.2 and 8.5.5 for a more detailed discussion).

No mediating effect of goal adjustment in the perfectionism-distress relationship was observed in any of the studies in this thesis. Goal reengagement moderated the relationship between socially prescribed perfectionism and suicidal thinking (Study 1, section 5.4.8.2.25.4.8.2.2). Whilst goal disengagement moderated the relationship between socially prescribed perfectionism and a range of measures of distress (Studies 1, 3 and 4, sections 5.4.7.2.2, 5.4.8.2.2, 7.4.4.5.2 and 8.4.4.4.2). Goal disengagement also moderated the self-oriented perfectionism-

distress relationship in the analogue studies only (Studies 1 and 3, sections 5.4.7.2.1, 5.4.8.2.1 and 7.4.4.5.1).

Positive attentional bias moderated the relationship between socially prescribed perfectionism and hopelessness (Studies 1 and 4, sections 5.4.7.4.2 and 8.4.4.5.2). Positive attentional bias also moderated the relationship between self-oriented perfectionism and suicidal thinking, in the clinical sample only (Study 4, section 8.4.4.5.1). Additionally, again in the clinical sample only, there was a non-significant trend for negative attentional bias to moderate the relationship between socially prescribed perfectionism and anxiety (Study 4, section 8.4.4.5.2).

9.2.2 *The role of stress, goal adjustment and attentional bias in the rumination-distress relationship*

Perceived stress moderated the relationship between rumination and suicidal thinking (Study 1, sections 5.4.9.1 and 5.4.10.1). In addition, perceived stress also fully or partially mediated the relationship between rumination and a range of measures of distress (Study 1, section 5.4.16.1). With regards to the components of rumination, perceived stress and stressful life events moderated the relationship between brooding and distress (Study 3, section 7.4.5.1.1 and 7.4.5.2.1). In addition, perceived stress also mediated the relationship between brooding and distress (Study 3, section 7.4.9.1.1). Perceived stress was found to moderate, but not mediate, the relationship between reflection and distress in both the analogue and clinical studies (Studies 3 and 4, sections 7.4.5.1.2 and 8.4.5.1.2). However, again the direction of this relationship differed between samples, as the protective effect of reflection was only apparent in the clinical population.

Goal adjustment did not mediate the rumination-distress relationship in any of the studies in this thesis. However, goal disengagement moderated the relationship between rumination and hopelessness and suicidal thinking (Study 1, sections 5.4.9.2 and 5.4.10.2). Goal disengagement also showed a non-significant trend to moderate the relationship between reflection and suicidal thinking (Study 3, section 7.4.5.3.2).   Goal disengagement also moderated the relationship between brooding and anxiety in the clinical sample only (Study 4, section 8.4.5.2.1).

Finally, neither positive nor negative attentional bias moderated or mediated the rumination-distress relationship in the analogue samples. However, in the clinical participants, negative attentional bias moderated the relationship between brooding and each measure of distress (Study 4, section 8.4.5.3.1). A non-significant trend for negative attentional bias to moderate the relationship between reflection and anxiety was also observed in the clinical sample (Study 4, section 8.4.5.3.2)

9.2.3   *Causal relations between rumination and attentional bias*

Study one found that inducing rumination increased positive attentional bias, whilst inducing distraction decreased positive attentional bias – indicating a causal relationship between rumination and positive attentional bias (section 5.4.4). Study two aimed to examine the possibility of causation in the relationship between rumination and attentional bias in the opposite direction, by attempting to manipulate positive and negative attentional biases through a modified version of the dot-probe. However, we were unable to successfully manipulate attentional biases (sections 6.3.4.3 and 6.4.3.3), meaning the possibility of a causal relationship between attentional biases and rumination could not be directly tested.

251

9.3   Theoretical Context

Having summarised the key findings of this research, discussion now moves to place these findings within a wider theoretical context. This thesis provided evidence of a number of individual difference risk factors for suicidal behaviour and psychological distress. Thus, our results sit best within a biopsychosocial conceptualisation of suicidal behaviour, where suicide is viewed as a behaviour resulting from a number of risk factors, as opposed to the consequence of mental illness alone. What is apparent from the findings of this thesis is the interactive nature of the individual difference variables under study.   This section will attempt to explain these interactions with the theoretical context of four interactive models of suicidal behaviour: diathesis-stress models, Escape Theory, the Interpersonal Model and the Cry of Pain hypothesis.

9.3.1   Diathesis-stress models

The results of the present thesis provide some support for a diathesis-stress conceptualisation of suicidal behaviour – that is, that given the presence of a particular vulnerability (or diathesis); the experience of stress will increase suicidality. Evidence from the analogue studies in this thesis (Studies 1 and 3, Chapters 5 and 7) lend support to diathesis-stress conceptualisations of the relationship between both self-oriented and socially prescribed perfectionism and suicidal thinking, indicating that the experience of perceived stress in individuals high in socially prescribed or self-oriented perfectionism was associated with increased suicidal thinking. However, evidence from the clinical study (Study 4, Chapter 8) was not consistent with these findings, as no moderating effect of stress

was found. It is possible that failure of the clinical study to detect a moderating effect of stress may have been a consequence of a ceiling effect in the stress measure. Unfortunately, as a shorter measure of perceived stress was used in the clinical studies, we were unable to directly compare whether clinical participants were reporting higher perceived stress levels.

This thesis also provides some evidence to support a diathesis-stress conceptualisation of the relationship between rumination and both suicidal thinking and psychological distress. The results of the analogue studies revealed that the negative consequences of rumination on suicidal thinking were amplified by the experience of perceived stress, as were both brooding and reflection separately. However, again these findings were not confirmed in the clinical sample. The results of the clinical study suggest that under stress, reflection may indeed have a protective effect and be associated with lower levels of suicidal thinking. This notion of a protective effect of reflection has previously been demonstrated in a population which included individuals who had previously engaged in suicidal behaviour (Crane et al., 2007) and sits well with the idea that reflection, as an attempt to engage in problem-solving, may represent the adaptive component of rumination. However, the present findings raise the obvious question of why reflection in combination with stress appears to be associated with increased suicidal thinking in student populations and decreased suicidal thinking in a clinical population. As noted above, it is unfortunate that the measure of perceived stress differed between the clinical and analogue studies as it would be useful to compare the levels of stress reported by the two differing populations to help explain the difference in findings. An examination of the mean scores for reflection and brooding across the two populations reveals that the clinical sample have higher

mean scores for both brooding and reflection so one possibility is that reflective thinking does not have a beneficial impact on suicidal thinking until it reaches a particular levels. After reviewing the evidence in this area, Nolen-Hoeksema and colleagues (2008) suggest that reflection may have distressing short term effects, but adaptive consequences over the long term. It is possible that our results are related to this temporal difference where participants in the clinical study have been experiencing the effects of reflection for a longer period and are now encountering the longer term adaptive consequences, in contrast to the analogue populations. However, these explanations are purely speculative at present and future research is necessary to try to elucidate why there appear to be differences between the clinical and analogue samples.

Nonetheless, this thesis provides evidence from analogue studies in support of a diathesis-stress conceptualisation of the relationship between both perfectionism and rumination and suicidal thinking. This indicates that the presence of perfectionism or rumination per se is not necessarily associated with suicidal thinking, rather the combination of these individual difference vulnerabilities when an individual experiences what they perceive to be a stressful situation, which is associated with increased suicidal thinking. These findings also raise implications for Response Styles theory, as the present results lend support to the notion of 'stress reactive rumination' (Robinson & Alloy, 2003), suggesting that Response Styles theory may need to incorporate the role of stress in the relationship between rumination and distress. At present Response Styles theorists argue that, rather than rumination increasing in response to stress, the opposite effect occurs whereby rumination increases the experience of stressful situations by altering instrumental behaviours (Nolen-Hoeksema et al., 2008). Some evidence of this mediating impact

254

of stress in the relationship between rumination and distress was found across the analogue studies in this thesis. However, the diathesis-stress models of the relationship between rumination and distress, also observed in the current thesis illustrate that stress can also have a moderating effect on the relationship between rumination and distress, which is not currently accounted for by Response Style theory. In order to further examine this issue it would be interesting for future research to employ experimental methods to determine the direction of causation between rumination and stress.

9.3.2   *Escape Theory*

Escape Theory (Baumeister, 1990) posits that suicidal behaviour is often a means to escaping painful self-awareness. Escape Theory also proposes that this negative self-awareness in the first place, results from falling short of expectations in a stressful situation and then attributing the blame for this internally. A key component of perfectionism is that an individual consistently feels they have failed to achieve necessary goals or standards, thus perfectionists are consistently falling short of their own (or their perception of others') unrealistically high standards, for which they blame themselves. Throughout this thesis we found that both socially prescribed and self-oriented perfectionism were associated with increased suicidal thinking, lending support to Escape Theory. We also found that these negative consequences of perfectionism were often enhanced in combination with high stress, providing further support for Escape Theory.

Our findings with regard to rumination are also consistent with Escape Theory. Ruminative thinking results in increased focus on one's thoughts and feelings and this negative self-focus is associated with increased levels of suicidal

255

thinking. Thus, rumination may be analogous to Baumeister's notion of painful self-awareness. Our findings that rumination can enhance the negative consequences of perfectionism on distress, also lends support to Escape Theory, as the theory argues that negative self awareness results from stressful situations in which an individual falls short of expectations and attributes the blame for this shortfall internally.

9.3.3 Interpersonal Model

Our results may also provide some support for Joiner's Interpersonal Model, which identifies three factors necessary for suicide to occur. One such factor is the notion of 'thwarted belongingness' where an individual feels somewhat isolated or disconnected from society. It seems likely that as ruminative thinking results in increased focus on the self, an individual is likely to feel more isolated and alone. Socially prescribed perfectionism may also impact on 'thwarted belongingness' as social perfectionists consistently feel they have failed to achieve the standards which others hold for them and this may result in an increased perception of being isolated.

Socially prescribed perfectionism may also contribute to the second component of the Interpersonal Model, 'perceived burdensomeness'. It seems plausible that persistent feelings of failure to achieve the high standards of others', is likely to make an individual feel more and more of a burden to others, which can result in the eventual thought that other people would be better off without them.

Finally, it is also possible that some of the variables examined in this thesis may also impact on the final component of Interpersonal Model, 'acquired capability'. Joiner and colleagues have suggested that 'acquired capability' is

desensitisation to pain, which is usually a consequence of repeated self-injury. However, they acknowledge that this 'acquired capability' may not always require repeated physical injury, instead it may also result indirectly as a consequence of repeated exposure to pain or provocation (Stellrecht et al, 2006). It is probable that the repetitive nature of ruminative thinking, in response to negative mood, will result in increased exposure to cognitive pain. In addition, biases in attention towards negative stimuli in the environment are also likely to enhance an individual's perception of pain. Thus, both rumination and negative attentional bias may serve to enhance the 'acquired capacity' component of the Interpersonal Model.

The interactive nature of our findings provide further support for the Interpersonal Model, as our results indicated that the experience of more than once of the individual difference variables often amplified the experience of suicidal thinking. This is consistent with the notion that each of the components of the Interpersonal Model must be present to result in death by suicide.

9.3.4   Cry of Pain hypothesis

The findings of the present thesis can also be considered in relation to the Cry of Pain hypothesis, which is another diathesis-stress perspective, explaining suicidality in terms of a situation which an individual perceives to be defeating, inescapable and with no opportunity for rescue (see Figure 1.1). According to this hypothesis, when an individual encounters such a scenario a psychobiological helplessness is activated, which results in the impulse to escape the situation through engaging in suicidal behaviour. However, the model also acknowledges the role that individual difference variables may play at each of the stages, as the

257

interpretation of a situation as defeating, inescapable and without rescue can be influenced by a number of individual difference factors.

Perfectionism, in particular socially prescribed perfectionism, can influence an individual's feelings regarding defeat and inescapability of a particular situation. Perfectionists, by definition, are excessively concerned with failing to achieve standards (whether set by themselves or others). This concern with failure can result in enhanced perceptions of defeat (as perfectionists often feel they have failed to achieve a particular standard). Socially prescribed perfectionism may also influence perceptions regarding the escapability of a situation, as socially prescribed perfectionists are used to feeling that goals and targets are set for them by others, meaning they are less in control of particular situations. Perfectionism is also likely to influence perceptions of rescue, as perfectionism is associated with poorer social relationships (e.g. Shahar, 2001) and lower levels of perceived social support (Mongrain, 1998; Priel & Shahar, 2000).

Rumination, particularly brooding rumination, can also enhance perceptions of defeat and inescapability. Brooding thoughts involve comparing a current situation with an unachieved benchmark, without moving into active problem solving. Consequently, brooders are likely to repeatedly focus on a situation which they are unhappy with, without generating possible solutions to resolve the situation – meaning they are at increased risk of perceiving a situation as defeating with no opportunity for escape.

Attentional biases affect the way an individual views the world and as such are likely to influence perceptions of defeat, escape and rescue. Attentional bias can be thought of as a change in the orientation of one's attention to a particular feature or class of features in the environment. Thus negative attentional bias results in an

258

increasing tendency to focus on negative stimuli in the environment, which is likely to increase perceptions of defeat and feelings that a situation is inescapable and that rescue will not be forthcoming.

Goal adjustment is also likely to influence perceptions of defeat. Goal adjustment occurs in situations where an individual encounters an unachievable goal – hence they are likely to feel defeated. Goal disengagement refers to the ability to disengage from that unattainable goal (i.e. disengage from the defeating situation), whilst goal reengagement refers to the ability to reengage with a new goal following a threat to goal pursuit (i.e. being able to reengage with a new goal following a defeating situation). Thus, both goal disengagement and goal reengagement are individual difference variables which may be beneficial when defeating situations are encountered.

Thus, each of the individual difference variables studied in this thesis could influence perceptions of at least one component of the Cry of Pain hypothesis. Crucially, what the results of this thesis emphasise, is that these individual difference variables are interactive and that in combination, they may further enhance perceptions of defeat, inescapability and no prospect of rescue. For example, in addition to the interactive nature of the diathesis-stress relationships noted above, the combination of socially prescribed perfectionism and low levels of goal disengagement was associated with increased suicidal thinking and psychological distress in both the analogue and clinical studies in this thesis (Study 1, Study 3 and Study 4). This illustrates that the ability to disengage from unattainable goals was able to attenuate some of the negative consequences normally associated with socially prescribed perfectionism. Other interactive combinations were more detrimental, for example, brooding exacerbated the

negative consequences of socially prescribed perfectionism (Study 3, section 7.4.4.3.2). These interactive findings illustrate that in combination, individual difference factors, may have differing impacts on suicidal thinking and psychological distress, thus it is important that these possible interactive effects are examined in the Cry of Pain hypothesis, as it is likely that whilst one factor may influence perceptions of defeat, escape or rescue – this relationship could be altered (either exacerbated or attenuated) in the presence of another individual difference factor.

9.4   Therapeutic Interventions

As noted earlier, suicide is a complex problem associated with numerous risk factors (see Chapter 1), therefore any intervention aimed at dealing with the problem, will necessarily be a complex intervention with numerous components (for a review of available psychosocial and pharmacological interventions see Hawton, Townsend, Arensman, Gunnell, Hazell, House & van Heeringen, 1999). The present research highlights the interactive nature of the individual difference risk factors for suicide, further supporting the notion of a complex intervention. The present results indicated a number of possible components to be included in any complex intervention.

First, interventions aimed at reducing ruminative thinking, particularly brooding could be beneficial in reducing distress. Recent work has provided preliminary evidence that rumination focussed cognitive behavioural therapy can be used to reduce ruminative thinking and promote more helpful styles of thinking (Watkins et al., 2007).

A second component in an intervention aimed at reducing suicidal thinking would be one which aimed to reduce perfectionism, particularly socially prescribed perfectionism. Limited research has examined therapeutic interventions to reduce perfectionism. However this has mainly focussed on 'clinical perfectionism' which does not directly map on to any the dimensions of perfectionism outlined by Hewitt and Flett (1991), but involves dysfunctional, self set, high standards which are pursued regardless of the adverse consequences (Shafran, Cooper & Fairburn, 2002). Evidence from a single case study (Shafran, Lee & Fairburn, 2004) and a preliminary randomised controlled trial (Riley, Lee, Cooper, Fairburn & Shafran, 2007) suggests that cognitive behavioural therapy can reduce levels of clinical perfectionism. To date, interventions to reduce socially prescribed perfectionism are less readily available; however the findings from the present thesis indicate that this may be an important component to any complex intervention for individuals at risk of suicidal behaviour.

An additional factor highlighted by this research as a desirable component of a complex intervention to target suicidal thinking and psychological distress is attentional bias. The present results indicate it would be desirable to modify both positive and negative attentional biases. Some success in modifying negative attentional biases has been reported both in and outside the laboratory (e.g. MacLeod et al., 2002; MacLeod et al., 2007). Although these effects were not replicated in the present thesis (Study 2), attentional bias training remains a possible method for altering attentional biases in at risk individuals.

The present research also illustrated an additional aim of any complex intervention designed to reduce suicidal thinking and psychological distress would be to address goal adjustment. At present, the author is not aware of any therapy

261

which is explicitly focused on modifying goal adjustment; however the findings of this thesis indicate that improving goal adjustment, particularly the ability to disengage from unattainable goals, would be beneficial.

This thesis highlights the reduction of stress as final component which would be beneficial to include in any complex intervention aimed at tackling suicidal behaviour and psychological distress. The diathesis-stress findings in this thesis indicate that the inclusion of stress management techniques would be beneficial to any complex intervention.

9.5   Limitations

The use of a number of self-report measures in studies through out this thesis is one possible limitation of this research. Self-report measures have previously been criticised as being susceptible to the influence of social desirability, where participants respond in a manner which they believe is expected of them, rather than providing an accurate representation of their experiences or feelings. Although indexes of social desirability are available, we did not include one in any of the studies in this thesis, in an attempt to reduce the burden on participants. Instead, attempts to minimise the effects of social desirability were made through emphasising the confidentiality and anonymity of the research and highlighting that there were no right or wrong answers to any of the questions. Given that interaction effects emerged from the data, it seems unlikely that social desirability confounded our results.

A further limitation of the repeated use of self-report measures is the issue of shared method variance. Shared method variance refers to the possibility of finding an association between two variables simply because of similarities in the way in

which they were measured. Self-report measures were necessary in this research to allow us to include a large number of participants, within a limited timescale, however unfortunately this does leave our findings open to the criticism of shared method variance.

A number of findings in this research were correlational in nature, meaning that causation cannot be directly inferred. Nonetheless, we attempted to strengthen these correlational findings through a prospective design where associations with distress were examined across time points, after controlling for initial levels of distress. It was possible to examine causation in studies one and two where the impact of manipulating rumination on attentional bias (and vice versa) was examined. However, it was not possible to employ this experimental procedure to examine the causal nature of every relationship, as not all of the individual difference variables could be readily manipulated.

9.6   Future Directions for Research

The numerous interactive effects observed in this thesis highlight the importance of not considering sole individual risk factors in isolation. It is acknowledged that there are potentially many more interactive effects; however it was beyond the scope of this thesis to consider every individual difference. Indeed, it has previously been argued that it would be impossible to develop a model of suicidal behaviour which encompassed all possible risk factors (O'Connor, 2003). However, future research in this area should aim to bear in mind the possible effects that one variable may have on another and, where possible, this should be examined.

In addition, the results of the clinical study in the present thesis indicate that although some of the relationships observed in the research using an undergraduate population were replicable, this was not the case for all relationships. Although undergraduate populations are reporting increasing levels of distress (Furr et al., 2001), meaning there can be merit in examining this population in its own right, it is also important that future research ensures that the population under study is the appropriate population for the particular research (i.e. for the development of an intervention for use with individuals presenting to hospital with self-harm, it is important that the population includes individuals who have presented to hospital with self-harm).

In the present thesis, attempts to manipulate both positive and negative attentional biases were unsuccessful; however previous research by MacLeod and colleagues has successfully manipulated negative attentional bias (e.g. MacLeod et al., 2002; MacLeod et al., 2007). The present research highlights the potential benefits of a computer based task capable of modifying both positive and negative attentional biases. Thus, this would seem an important direction for future research to focus, with the aim of developing a methodology which can consistently manipulate attentional biases.

9.7   What did this thesis add: A brief summary

This thesis aimed to examine the impact of individual difference variables in suicidal thinking and psychological distress. In particular, focussing on the mediating or moderating role of a number of cognitive and personality variables in the established relationships with distress previously observed for both perfectionism (socially prescribed and self-oriented) and rumination. The results of

this thesis confirmed the mediating and moderating influences in both the perfectionism-distress relationship and the rumination-distress relationship, highlighting the interactive nature of these variables. This thesis, examined a number of relationships for the first time, including the role of attentional biases in the relationships between both perfectionism and distress and rumination and distress and the role of goal adjustment in the relationship between rumination and distress.   By examining these relationships in series of studies, using both analogue and clinical samples this thesis provides a strong evidence base for future research to build on. Additionally, this thesis empirically examined the causal role of rumination in attentional biases and provides tentative evidence of a causal link between rumination and positive attentional bias.

10 References

Agerbo, E., Nordentoft, M. & Bo Mortenson, P. (2002). Familial, psychiatric, and socioeconomic risk factors for suicide in young people: nested case control study. *British Medical Journal, 325*, 74.

Aiken, L.S. & West, S.G. (1991). *Multiple regression: testing and interpreting interactions.* Newbury Park, CA: Sage.

Aitken, R.C.B. (1969). Measurement of feelings using visual analogue scales. *Proceedings of the Royal Society of Medicine, 62*, 989-993.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman

Baron, R.A., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Baumeister, R. (1990). Suicide as escape from self. *Psychological Review, 99*, 90–113.

Beck, A.T., Rush, A.J., Shaw, B.F., Emery, G. (1979). *Cognitive therapy of depression.* New York: Guilford.

Beck, A.T., Steer, R.A., Kovacs, M., Garrison, B. (1985). Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalised with suicidal ideation. *American Journal of Psychiatry, 142*, 559-563.

Beck, A.T., Schuyler, D. & Herman, I., (1974a). Development of suicidal intent scales. In: Beck, A.T., Resnik, H.L.P. & Lettieri, D.J. (Eds.). *The Prediction of Suicide.* Philadelphia: Charles Press.

Beck, A.T., Weissman, A., Lester, D. & Trexler, L. (1974b). The measurement of pessimism: The Hopelessness Scale. *Journal of Consulting and Clinical Psychology, 42,* 861-865.

Becker, E., Strohbach, D. & Rinck, M. (1999). A specific attentional bias in suicide attempters. *The Journal of Nervous and Mental Disease, 187*, 730-735.

Beevers, C.G. & Carver, C.S. (2003). Attentional bias and mood persistence as prospective predictors of dysphoria. *Cognitive Therapy and Research, 27*, 619-637.

Bjelland, I., Dahl, A.A., Haug, T.T. & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *Journal of Psychosomatic Research, 52,* 69-77.

Bonner, R. L., & Rich, A. (1988). Negative life stress, social problem-solving self-appraisal, and hopelessness: Implications for suicide research. *Cognitive Therapy and Research, 12,* 549-556.

Borkovec, T., Robinson, E., Pruzinsky, T. & DePree, J. (1983). Preliminary exploration of worry: Some characteristics and processes. *Behaviour Research and Therapy, 21*, 9-16.

Borkovec, T.D., Ray, W.J. & Stober, J. (1998). Worry: A cognitive phenomenon intimately linked to affective, physiological, and interpersonal behavioral processes. *Cognitive Therapy and Research, 22*, 561-576.

Boyle, P., Exeter, D., Feng, Z. & Flowerdew, R. (2005). Suicide gap amongst young adults in Scotland. *British Medical Journal, 330*, 175-176.

Bradley, M.M., & Lang, P.J. (1999). *Affective norms for English words (ANEW): Stimuli, instruction manual and affective ratings.* Technical report C-1, Gainesville, FL. The Center for Research in Psychophysiology, University of Florida.

Bradley, B.P., Mogg, K., Lee, S.C. (1997). Attentional biases for negative information in induced and naturally occurring dysphoria. *Behavior Research and Therapy, 35*, 911-927.

Brock, A., Baker, A., Griffiths, C., Jackson, G., Fegan, G. & Marshall, D. (2006). Suicide trends and geographical variations in the United Kingdom, 1991-2004. *Health Statistics Quarterly, 31*, 6-22.

Carver, C.S. & Scheier, M.F. (1981). *Attention and self regulation: A control theory approach to human behavior.* New York: Springer-Verlag.

Carver, C.S. & Scheier, M.F. (1982). Control Theory – A useful conceptual-framework for personality-social, clinical and health psychology. *Psychological Bulletin, 92*, 111-135.

Carver, C.S. & Scheier, M.F. (1990). Origins and functions of positive and negative affect – A control process view. *Psychological Review, 97*, 19-35.

Carver, C.S. & Scheier, M.F. (1998). *On the self-regulation of behaviour.* Cambridge: Cambridge University Press.

Caseras, X., Garner, M., Bradley, B.P. & Mogg, K. (2007). Biases in visual orientating to negative and positive scenes in dysphoria: An eye movement study. *Journal of Abnormal Psychology, 116*, 491-497.

Chang, E.C. (1998). Cultural differences, perfectionism and suicidal risk in a college population: Does social problem solving still matter? *Cognitive Therapy and Research, 22*, 237-254.

Chang, E.C. (2000). Perfectionism as a predictor of positive and negative psychological outcomes: a mediation model in younger and older adults. *Journal of Counseling Psychology, 47*, 18-26.

Chang, E.C. & Rand, K.L. (2000). Perfectionism as a predictor of subsequent adjustment: evidence of a specific diathesis-stress mechanism among college students. *Journal of Counseling Psychology, 47*, 129-137.

Clements, K. & Turpin, G. (1996). The Life Events Scale for Students: Validation for use with British samples. *Personality and Individual Differences, 20*, 747-751.

Cohen, S., Kamarck, T. & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behaviour, 24,* 385-396.

Conway, M., Csank, P.A.R., Holm, S.L. & Blake, C.K. (2000). On assessing individual differences in rumination on sadness. *Journal of Personality Assessment, 75,* 404-425.

Cox, B. J., Enns, M. W., & Clara, I. P. (2002). The multidimensional structure of perfectionism in clinically distressed and college student samples. *Psychological Assessment, 14,* 365–373.

Crane, C., Barnhofer, T. & Williams, J.M.G. (2007). Reflection, brooding and suicidality: A preliminary study of different types of rumination in individuals with a history of major depression. *British Journal of Clinical Psychology*, *46*, 497-504.

Cull, J.G. & Gill, W.S. (1988). *Suicide Probability Scale*. Los Angeles: Western Psychological Services.

Davies, S., Naik, P.C. & Lee, A.S. (2001). Depression, suicide and the national service framework. *British Medical Journal, 322*, 1501-1502.

Davis, R.N. & Nolen-Hoeksema, S. (2000). Cognitive inflexibility among ruminators and nonruminators. *Cognitive Therapy and Research, 24,* 699-711.

de Ruiter, C. & Brosschot, J.F. (1994). The emotional Stroop interference in anxiety: attentional bias or cognitive avoidance. *Behaviour Research and Therapy, 32,* 315-319.

Department of Health (2002). *National Suicide Prevention Strategy for England*. HMSO: London

Dixon, W. A., Heppner, P. P., & Anderson, W. P. (1991). Problemsolving appraisal, stress, hopelessness, and suicide ideation in a college population. *Journal of Counseling Psychology, 38,* 51-56.

Donaldson, C., Lam, D. & Andrews, M. (2007). Rumination and attention in major depression. *Behaviour Research and Therapy, 45*, 2664-2678.

Enns, M.W. & Cox, B.J. (2005). Perfectionism, stressful life events, and the 1-year outcome of depression. *Cognitive Therapy and Research, 29*, 541–553

Enns, M.W., Cox, B.J. & Clara, I.P. (2005). Perfectionism and neuroticism: A longitudinal study of specific vulnerability and diathesis-stress models. *Cognitive Therapy and Research, 29*, 463–478

Eshun, S. (2000). Role of gender and rumination in suicide ideation: A comparison of college samples from Ghana and the U.S. *Cross Cultural Research, 34*, 250-263.

Flett, G.L., Hewitt, P.L., Blankstein K.R. & Mosher, S.W. (1995). Perfectionism, life events and depressive symptoms: a test of a diathesis-stress model. *Current Psychology, 14,* 112-137.

Flett, G.L., Hewitt, P.L., Dyck, D.G. (1989). Self-orientated perfectionism, neuroticism and anxiety. *Personality and Individual Differences, 10,* 731-735.

Flett, G. L., Madorsky, D., Hewitt, P. L., & Heisel, M. J. (2002). Perfectionism cognitions, rumination, and psychological distress. *Journal of Rational-Emotive and Cognitive-Behavior Therapy, 20*, 33–47.

Foster,T., Gillespie, K. & McClelland, R. (1997). Mental disorders and suicide in Northern Ireland. *British Journal of Psychiatry, 170*, 447-452.

Frost, R. O., Heimberg, R. G., Holt, C. S., Mattia, J. I., & Neubauer, A. L. (1993).A comparison of two measures of perfectionism. *Personality and Individual Differences*, *14*, 119–126.

Frost, R., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14,* 449-468.

Furr, S. R.,Westefeld, J. S., McConnell, G. N., & Jenkins, J. M. (2001). Suicide and depression among college students: A decade later. *Professional Psychology: Research and Practice, 32*, 97–100.

General Registrar Office for Scotland (2007). *Scotland's Population 2006. The Registrar General's Annual Review of Demographic Trends: 152nd Edition.* Edinburgh: General Registrar's Office for Scotland.

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

Gross, J. J., Carstensen, L. L., Pasupathi, M., Tsai, J., Götestam, S. C., & Hsu, A. Y. C. (1997). Emotion and aging: Experience, expression, and control. *Psychology and Aging, 12,* 590–599.

Guze, S.B. & Robins, E. (1970). Suicide and primary affective disorders. *British Journal of Psychiatry, 117*, 437-438.

269

Harris, P.W., Pepper, C.M. & Maack, D.J. (2008). The relationship between maladaptive perfectionism and depressive symptoms: The mediating role of rumination. *Personality and Individual Differences, 44,* 150–160

Harvey, A., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment.* Oxford: Oxford University Press.

Hawton, K., Fagg, J. (1988). Suicide, and other causes of death, following attempted suicide. *British Journal of Psychiatry, 152*, 359–366.

Hawton, K., Haigh, R., Simkin, S. & Fagg, J. (1995). Attempted suicide in Oxford University students, 1976-1990. *Psychological Medicine, 25*, 179-188.

Hawton, K., Harriss, L. & Zahl, D. (2006). Deaths from all causes in a long-term follow-up study of 11 583 deliberate self-harm patients. *Psychological Medicine, 36,* 397-405.

Hawton, K., Houston, K., Haw, C., Townsend, E., Harriss, L. (2003). Comorbidity of Axis I and Axis II disorders in patients who attempt suicide. *American Journal of Psychiatry, 160*, 1494-1500.

Hawton, K., Rodham, K. & Evans, E. (2006). *By their own young hand.* London: Jessica Kingsley.

Hawton, K., Townsend, E., Arensman, E., Gunnell, D., Hazell, P., House, A. & van Heeringen, K. (1999). Psychosocial and pharmacological treatments for deliberate self-harm. *Cochrane Database of Systematic Reviews,* 4.

Hawton, K., Zahl, D. & Weatherall, R. (2003). Suicide following deliberate self-harm: long-term follow-up of patients who presented to a general hospital. *British Journal of Psychiatry, 182*, 537-542.

Herbert, T. B., & Cohen, S. (1996). Measurement issues in research on psychosocial stress. In H. B. Kaplan (Ed.), *Psychosocial stress: Perspectives on structure, theory, life course, and methods.* New York: Academic Press.

Herrmann C. (1997). International experiences with the Hospital Anxiety and Depression Scale - a review of validation data and clinical results. *Journal of Psychosomatic Research, 42,* 17–41.

Hewitt, P. L., Caelian, C. F., Flett, G. L., Sherry, S. B., Collins, L., & Flynn, C. A. (2002). Perfectionism in children: Associations with depression, anxiety and anger. *Personality and Individual Differences*, *32,* 1049–1061.

Hewitt, P. L., & Dyck, D. G. (1986). Perfectionism, stress and vulnerability to depression. *Cognitive Therapy and Research, 10*, 137–142.

Hewitt, P.L., & Flett, G.L. (1991). Perfectionism in the self and social contexts:

Conceptualization, assessment and association with psychopathology. *Journal of Personality and Social Psychology, 60,* 456-470.

Hewitt, P. L., & Flett, G. L. (1993). Dimensions of perfectionism, daily stress and depression: A test of the specific vulnerability hypothesis. *Journal of Abnormal Psychology*, *102,* 58–65.

Hewitt, P.L. & Flett, G.L. (2002). Perfectionism and stress process in psychopathology. In Flett, G.L. & Hewitt, P.L. (Eds.) *Perfectionism: Theory, research and treatment.* Washington DC: American Psychological Society

Hewitt, P. L., Flett, G. L., & Ediger, E. (1996). Perfectionism and depression: Longitudinal assessment of a specific vulnerability hypothesis. *Journal of Abnormal Psychology*, *105,* 276–280.

Hewitt, P.L., Flett, G.L., & Turnbull-Donovan, W. (1992). Perfectionism and suicide potential. *British Journal of Clinical Psychology, 31*, 181-190.

Hewitt, P.L., Flett, G.L. & Weber, C. (1994). Dimensions of perfectionism and suicide ideation. *Cognitive Therapy and Research, 18*, 439-460.

Hewitt, P.L., Flynn, C.A., Mikail, S.F. & Flett, G.L. (2001). Perfectionism, interpersonal stress problems and depression in psychodynamic/interpersonal group treatment. *Canadian Psychology, 42,* 141.

Hewitt, P. L., Newton, J., Flett, G. L., & Callander, L. (1997). Perfectionism and suicide ideation in adolescent psychiatric patients. *Journal of Abnormal Child Psychology, 25*, 95–101.

Hewitt, P.L., Norton, R., Flett, G.L., Callander, L. & Cowan, T. (1998). Dimensions of perfectionism, hopelessness and attempted suicide in a sample of alcoholics. *Suicide and Life Threatening Behavior, 28,* 395-406.

Hunter, E., & O'Connor, R.C. (2003). Hopelessness and future thinking in parasuicide: the role of perfectionism. *British Journal of Clinical Psychology, 42*, 355-365.

Inskip, H.M., Harris, E.C. & Barraclough, B. (1998). Lifetime risk of suicide for affective disorder, alcoholism and schizophrenia. *British Journal of Psychiatry, 172*, 35-37.

Isaacowitz, D. M., Wadlinger, H. A., Goren, D., & Wilson, H. (2006a). Is there an age-related positivity effect in visual attention? A comparison of two methodologies. *Emotion, 6,* 511–516.

Isaacowitz, D. M., Wadlinger, H. A., Goren, D., & Wilson, H. (2006b). Selective bias in visual fixation to negative images in old age: An eye tracking study. *Psychology and Aging, 21,* 40–48.

John, C.H. (1988). Emotionality ratings and free association norms of 240 emotional and non-emotional words. *Cognition and Emotion, 2*, 49-70.

Joiner, T. E. (2002). The trajectory of suicidal behavior over time. *Suicide and Life-Threatening Behavior, 32*, 33–41.

Joiner, T.E., (2005). *Why people die by suicide.* Cambridge, MA: Harvard University Press.

Joiner, T.E., Pettit, J.W., Walker, R.L., Voelz, Z.R., Cruz, J., Rudd, M.D. & Lester, D. (2002). Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. *Journal of Social and Clinical Psychology, 21*, 531-545.

Joiner, T. E., & Rudd, M. D. (2000) Intensity and duration of suicidal crises vary as a function of previous suicide attempts and negative life events. *Journal of Consulting and Clinical Psychology, 68,* 909–916.

Joiner, T. E., & Schmidt, N. B. (1995). Dimensions of perfectionism, life stress, and depressed and anxious symptoms: Prospective support for diathesis-stress but not specific vulnerability among male undergraduates. *Journal of Social and Clinical Psychology*, *14,* 165–183.

Joorman, J., Dkane, M., Gotlib, I. (2006). Adaptive and Maladaptive Components of Rumination? Diagnostic Specificity and Relation to Depressive Biases. *Behavior Therapy, 37*, 269-280.

Judd, C.M. & Kenny, D.A. (1981). *Estimating the effects of social interventions.* Cambridge: Cambridge University.

Just, N., Abramson, L.Y. & Alloy, L.B. (2001). Remitted depression studies as tests of the cognitive vulnerability hypotheses of depression onset: A critique and conceptual analysis. *Clinical Psychology Review, 21*, 63-83.

Just, N., & Alloy, L.B. (1997). The responses style theory of depression: Tests and an extension of the theory. *Journal of Abnormal Psychology, 106*, 221–229.

Kenny, D.A., Kashy, D.A., & Bolger, N. (1998). Data analysis in social psychology. In D.T. Gilbert, S.T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology*. McGraw-Hill Companies. Boston: Massachusetts.

Kreitman, N. (1976). The coal gas story: UK suicide rates 1960-1971. *British Journal of Preventative and Social Medicine, 30*, 86-93.

Kreitman, N. (1977). *Parasuicide.* Chichester: Wiley.

Lam, D., Schuck, N., Smith, N., Farmer, A. & Checkley, S. (2003). Response style, interpersonal difficulties and social functioning in major depressive disorder. *Journal of Affective Disorders, 75,* 279-283.

Larzelere, R.E., Smith, G.L., Batenhorst, L.M. & Kelly, D.B. (1996). Predictive validity of the suicide probability scale among adolescents in group home treatment. *Journal of the American Academy of Child and Adolescent Psychiatry, 5*, 166-172.

Lavender, A. & Watkins, E. (2004). Rumination and future thinking in depression. *British Journal of Clinical Psychology, 43*, 129-142.

Lazarus, R.S. (1966). *Psychological stress and the coping process*. New York: McGraw Hill.

Lazarus, R. S. (1999). *Stress and emotion: A new synthesis*. New York: Springer.

Linden, W. (1984). Development and initial validation of a life event scale for students. *Canadian Counsellor, 18*, 106-l 10.

Litinsky, A.M. & Haslam, N. (1998). Dichotomous thinking as a sign of suicide risk on the TAT. *Journal of Personality Assessment, 71*, 368-378.

Lyubomirsky, S., Caldwell, N.D. & Nolen-Hoeksema, S. (1998). Effects of ruminative and distracting responses to depressed mood on retrieval of autobiographical memories. *Journal of Personality and Social Psychology, 75*, 166-177.

Lyubomirsky, S. & Nolen-Hoeksema, S. (1995). Effects of self-focused rumination on negative thinking and interpersonal problem solving. *Journal of Personality and Social Psychology, 65*, 339-349.

Lyubomirsky, S., Tucker, K., Caldwell, N.D. & Berg, K. (1999). Why ruminators are poor problem solvers: Clues from the phenomenology of dysphoric rumination. *Journal of Personality and Social Psychology, 77*, 1041-1060.

MacLeod, A. K., Pankhania, B., Lee, M., & Mitchell, D. (1997). Parasuicide, depression, and the anticipation of positive and negative future experiences. *Psychological Medicine, 27*, 973–977.

MacLeod, A. K., Rose, G. S. & Williams, J. M. G. (1993). Components of hopelessness about the future in parasuicide. *Cognitive Therapy and Research, 17*, 441–455.

MacLeod, C. (2005). The Stroop task in clinical research. In A. Wenzel, & D. C. Rubin (Eds.), *Cognitive methods and their application to clinical research*. Washington, DC, USA: American Psychological Association.

MacLeod, C., Mathews, A. & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology, 96*, 25-20.

MacLeod, C., Rutherford, E. M., Campbell, L., Ebsworthy, G., & Holker, L. (2002). Selective attention and emotional vulnerability: Assessing the causal basis of their

association through the experimental manipulation of attentional bias. *Journal of Abnormal Psychology*, *111*, 107-123.

MacLeod, C., Soong, L.Y., Rutherford, E.M. & Campbell, L.W. (2007). Internet-delivered assessment and manipulation of anxiety-linked attentional bias: Validation of a free-access attentional probe software package. *Behavior Research Methods, 39,* 533-538.

Makosky, V.P. (1980). Stress and the mental health of women: A discussion of research and issues. In M. Guttentag, S. Salasin & D. Belle (Eds.). *The mental health of women*. New York: Academic Press.

Martin, L. L. & Tesser, A. (1996). Some ruminative thoughts. In R.Wyer Jr. (Ed.), *Ruminative thoughts: Vol. 11. Advances in social cognition* (p. 1–47). Hillsdale, NJ: Erlbaum.

Martin, M. (1990). On the induction of mood. *Clinical Psychology Review*, *10*, 669–697.

McCabe, S.B. & Gotlib, I.H. (1995). Selective attention and clinical depression: Performance on a deployment of attention task. *Journal of Abnormal Psychology, 104*, 241-245.

McLoone, P. (1996). Suicide and deprivation in Scotland. *British Medical Journal, 312*, 543-544.

McNair, D., Lorr, M., & Droppleman, L. (1971). *Profile of Mood States*. San Diego: Education and Industrial Testing Service

Meltzer, H., Lader, D., Corbin, T., Singleton, N., Jenkins, R. & Brugha, T. (2002). *Non-fatal suicidal behaviour among adults aged between 16-74 in Great Britain.* London: The Stationary Office

Miller, G.E. & Blackwell, E. (2006). Turning up the heat: Inflammation as a mechanism linking chronic stress, depression and heart disease. *Current Directions in Psychological Science, 15*, 269-272.

Miller, G.E. & Wrosch, C. (2007). You've gotta know when to fold 'em. *Psychological Science, 18,* 773-777.

Miranda, R. & Nolen-Hoeksema, S. (2007). Brooding and reflection: Rumination predicts suicidal ideation at 1-year follow up in a community sample. *Behaviour Research and Therapy, 45*, 3088-3095.

Mogg, K., Bradley, B.P. & Williams, R. (1995). Attentional bias in anxiety and depression: the role of awareness. *British Journal of Clinical Psychology, 34*, 17-36.

Mogg, K. & Bradley, B.P. (2005). Attentional bias in generalised anxiety disorder versus depressive disorder. *Cognitive Therapy and Research, 29*, 29-45.

Mongrain, M. (1998). Parental representations and support-seeking behaviors related to dependency and self-criticism. *Journal of Personality, 66*, 151-173.

Moore, S.C. & Oaksford, M. (2002). Some long-term effects of emotion on cognition. *British Journal of Psychology, 93*, 383-395

Morrison, R. & O'Connor, R.C. (2005). Predicting psychological distress: The role of rumination and stress. *Journal of Clinical Psychology*, *61*, 447-460.

Morrison, R. & O'Connor, R.C. (2008a). The role of rumination, attentional biases and stress in psychological distress. *British Journal of Psychology, 99*, 191-209.

Morrison, R. & O'Connor, R.C. (2008b). A systematic review of the relationship between rumination and suicidality. *Suicide and Life Threatening Behavior, 38,* 523-538.

MRC (2000). Framework for the development and evaluation of randomised RCTs for complex interventions to improve health.

Munroe, S.M. (1982). Assessment of life events: Retrospective versus concurrent strategies. *Archives of General Psychiatry, 39,* 606-610.

Murali, V. & Oyebode, F. (2004). Poverty, social inequality and mental health. *Advances in Psychiatric Treatment, 10,* 216-224.

Nolen-Hoeksema, S. (1991). Response to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*, 569-582.

Nolen-Hoeksema, S. (2000). The Role of Rumination in Depressive Disorders and Mixed Anxiety/Depressive Symptoms. *Journal of Abnormal Psychology, 109*, 504-511.

Nolen-Hoeksema, S. (2004). The Response Styles Theory. In Papageorgiou, C. & Wells, A. (Eds.) *Depressive Rumination: Nature, theory and treatment*. Chichester: John Wiley & Sons

Nolen-Hoeksema, S. & Davis, C.G. (1999). "Thanks for sharing that": Ruminators and their social support networks. *Journal of Personality and Social Psychology, 77*, 801-814.

Nolen-Hoeksema, S., McBride, A. & Larson, J. (1997). Rumination and psychological distress among bereaved partners. *Journal of Personality and Social Psychology, 72,* 855-862.

Nolen-Hoeksema, S. & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology*, 61, 115-121.

Nolen-Hoeksema, S. & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressive mood. *Cognition and Emotion, 7*, 561-570.

Nolen-Hoeksema, S., Wisco, B.E. & Lyubomirsky, S. (2008). Rethinking Rumination. *Perspectives on Psychological Science, 3*, 400-424.

Nunnally, J.C. (1978). *Psychometric Theory*. New York: McGraw Hill

O'Connor, D.B., O'Connor, R.C. & Marshall, R. (2007). Perfectionism and Psychological Distress: Evidence of the Mediating Effects of Rumination. *European Journal of Personality, 21*, 429-452.

O'Connor R.C. (2003). Suicidal behavior as a cry of pain: Test of a psychological model. *Archives of Suicidal Research, 7*, 297-308.

O'Connor, R.C. (2007). The relations between perfectionism and suicidality: A systematic review. *Suicide and Life Threatening Behavior, 37*, 698-714.

O'Connor R.C., Armitage, C. J. & Gray, L. (2006). The role of clinical and social cognitive variables in parasuicide. *British Journal of Clinical Psychology, 45*, 465-481.

O'Connor, R.C. & Forgan, G. (2007) Suicidal Thinking and Perfectionism: The Role of Goal Adjustment and Behavioral Inhibition/Activation Systems (BIS/BAS). *Journal of Rational-Emotive & Cognitive Behavior Therapy, 25*, 321-341

O'Connor, R.C. & Noyce, R. (2008). Personality and cognitive processes: Self criticism and different types of rumination as predictors of suicidal ideation. *Behaviour Research and Therapy, 46*, 392-401.

O'Connor, R.C. & O'Connor, D.B. (2003). Predicting Hopelessness and Psychological Distress: The role of Perfectionism and Coping. *Journal of Counseling Psychology*, 50, 362-372.

O'Connor, R.C., O'Connor, D.B, O'Connor, S.M., Smallwood, J & Miles, J. (2004). Hopelessness, stress and perfectionism: the moderating effects of future thinking. *Cognition and Emotion, 18,* 1099-1120.

O'Connor, R.C., Rasmussen, S. & Hawton, K. (in press). Predicting deliberate self-harm in adolescents: a six month prospective study. *Suicide and Life Threatening Behaviour.*

O'Connor, R.C. & Sheehy, N.P. (2000). *Understanding Suicidal Behaviour.* Leicester: BPS Blackwell.

O'Connor, R.C., Sheehy, N.P., O'Connor, D.B. (1999). The classification of completed suicide into sub-types. *Journal of Mental Health, 8,* 629-637.

O'Connor, R.C., Sheehy, N.P., O'Connor, D.B. (2000). Fifty cases of general hospital parasuicide. *British Journal of Health Psychology*, 5, 83-95.

Office for National Statistics (2007). *Mortality Statistics: Series DH2.* London: Office for National Statistics.

Papageorgiou, C. & Wells, A. (2004). Nature, functions and beliefs about depressive rumination. In Papageorgiou, C. & Wells, A. (Eds.) *Depressive Rumination: Nature, theory and treatment.* Chichester: John Wiley & Sons

Plant, R.R., Hammond, N. & Whitehouse, T. (2003). How choice of mouse may affect response timing in psychological studies. *Behavior Research Methods, Instruments and Computers, 35*, 276-284.

Pollock, L. & Williams, J.M.G. (2004). Problem solving in suicide attempters. *Psychological Medicine, 34*, 163-167.

Priel, B. & Shahar, G. (2000). Dependency, self-criticism, social context and distress: Comparing moderating and mediating models. *Personality and Individual Differences*, *28*, 515-525.

Rabkin, J.G. & Struening, E.L. (1976). Life events, stress and illness. *Science, 194*, 1013-1020.

Radloff, L.S. (1977). The CES-D Depression Inventory. *Applied Psychological Measurement, 1,* 385-401.

Radloff, L.S. (1989). The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence, 20*, 149-166.

Riley, C., Lee, M., Cooper, Z., Fairburn, C.G. & Shafran, R. (2007). A randomised controlled trial of cognitive behavioural therapy for clinical perfectionism: A preliminary study. *Behaviour Research and Therapy, 45*, 2221-2231.

Rippere, V. (1977). "What's the thing to do when you're feeling depressed?": A pilot study. *Behavior Research and Therapy, 15*, 185-191.

Robinson, S.M. & Alloy, L.B. (2003). Negative inferential style and stress-reactive rumination: Interactive risk factors in the aetiology of depression. *Cognitive Therapy and Research, 27*, 275-291.

Rosario, M., Schrimshaw, E.W. & Hunter, J. (2005). Psychological distress following suicidality among Gay, Lesbian and bisexual youths: Role of social relationships. *Journal of Youth and Adolescence, 34*, 149-161.

Roy, A., Segal, N.L., Centerwall, B.S. & Robinette, C.D. (1991). Suicide in twins. *Archives of General Psychiatry, 48*, 29-32.

Rudd, M.D., Rajab, M.H., Orman, D.T., Stulman, D.A., Joiner, T. & Dixon, W. (1996). Effectiveness of an outpatient intervention targeting suicidal young adults: Preliminary results. *Journal of Consulting and Clinical Psychology, 64*, 179-190.

Rygnestad,T. (1988). A prospective 5-year follow-up study of self-poisoned patients. *Acta Psychiatrica Scandinavica, 77*, 328-333.

Schmidtke, A., Bille-Brahe, U., Deleo, D. et al. (1996). Attempted suicide in Europe: rates, trend.S and sociodemographic characteristics of suicide attempters during the period 1989-1992. Results of the WHO/EURO Multicentre Study on Parasuicide. *Acta Psychiatrica Scandinavica, 93*, 327–338

Schulsinger, F., Kety, S. S., Rosenthal, D. & Wender, P. H. (1979). A family study of suicide. In M Schou and E. Stomgren (Eds.), *Origin, Prevention and Treatment of Affective Disorders*. London: Academic Press.

Scottish Executive (2003). *National Programme for Improving Mental Health and Wellbeing*. Edinburgh: Scottish Executive.

Segerstrom, S. C. (2001). Optimism and attentional bias for negative and positive information. *Personality and Social Psychology Bulletin, 27,* 1334-1343.

Shafran, R., Cooper, Z. & Fairburn, C.G. (2002). Clinical perfectionism: A cognitive behavioural analysis. *Behaviour Research and Therapy, 40*, 773-791.

Shafran, R., Lee, M. & Fairburn, C.G. (2004). Clinical perfectionism: A case report. *Behavioural and Cognitive Psychotherapy, 32*, 353-358.

Shahar, G. (2001). Personality, shame, and the breakdown of social ties: The voice of quantitative depression research. *Psychiatry: Interpersonal and Biological Processes*, *64*, 228-239.

Simon, G.E. & VonKruff, M. (1998). Suicide mortality among patients treated for depression in an insured population. *American Journal of Epidemiology, 147*, 155-160.

Spasojević, J., Alloy, L.B., Abramson, L.Y., Maccoon, D. & Robinson, M.S. (2004). Reactive rumination: Outcomes, mechanisms, and developmental antecedents. In Papageorgiou, C. & Wells, A. (Eds.). *Depressive Rumination: Nature, theory and treatment*. Chichester: John Wiley & Sons.

Stellrecht, N.E., Gordon, K.H., Van Orden, K., Witte, T.K., Wingate, L.R., Cukrowicz, K.C., Butler, M, Schmidt, N.B., Fitzpatrick, K.K. & Joiner T.E. (2006). Clinical Applications of the Interpersonal-Psychological Theory of Attempted and Completed Suicide. *Journal of Clinical Psychology, 62*, 211-222.

Stroop, J.R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18*, 643-662.

Suokas, J. & Lonnqvist, J. (1991) Outcome of attempted suicide and psychiatric consultation: risk factors and suicide mortality during a five-year follow up. *Acta Psychiatrica Scandinavica, 84*, 545-549.

Suslow, T., Junghanns, K. & Arolt, V. (2001). Detection of facial expressions of emotions in depression. *Perceptual and Motor Skills, 92*, 857-868.

Tomassini, C., Juel, K., Holm, N.V., Skytthe, A. & Christensen, K. (2003). Risk of suicide in twins: 51 year follow up study. *British Medical Journal, 327*, 373-374.

Townsend, E., Hawton, K., Altman, D.G., Arensman, E., Gunnell, D., Hazell, P., House, A. & Van Heeringgen, K. (2001). The efficacy of problem solving treatments after deliberate self-harm: meta analysis of randomized controlled trials with respect to depression, hopelessness and improvement in problems. *Psychological Medicine, 31*, 979-988.

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research, 27*, 247–259.

van Heeringen, K. (2001). The suicidal process and related concepts. In K. van Heeringen (Ed.). *Understanding suicidal behaviour: The suicidal process approach to research, treatment and prevention.* Chichester: Wiley.

Velten, E. (1968). A laboratory task for the induction of mood states. *Behaviour Research and Therapy*, *6*, 473–482.

Vlachos, I., Bouras, N., Watson., J. & Rosen, B. (1994). Deliberate self-harm referrals. *European Journal of Psychiatry, 8*, 25-28.

Wadlinger, H.A. & Isaacowitz, D.M. (2008). Looking happy: The experimental manipulation of a positive visual attentional bias. *Emotion, 8*, 121-126.

Watkins, E.R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134*, 163-206.

Watkins, E., Scott, J., Wingrove, J., Rimes, K., Bathurst, N., Steiner, H., Kennell–Webb, S., Moulds, M. & Malliaris, Y. (2007). Rumination-focused cognitive behaviour therapy for residual depression: A case series. *Behaviour Research and Therapy, 45,* 2144-2154.

Watt, G.C.M. (1996). All together now: why social deprivation matters to everyone. *British Medical Journal, 312*, 1026-1029.

Wells, A. & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. Hove: Lawrence Erlbaum.

Wender, P. H., Kety, S. S., Rosenthal, D., Schulsinger, F., Ortmann, J. & Lunde, I. (1986). Psychiatric disorders in the biological and adoptive families of adopted individuals with affective disorders. *Archives of General Psychiatry 42*, 923-929.

World Health Organisation (2007). *International Statistical Classification of Diseases and Health Related Problems 10th Revision*. Geneva: World Health Organisation

Wilkinson, R. G. (1996) *Unhealthy Societies: The Afflictions of Inequality*. London: Routledge

Williams, J.M.G. (1997). *Cry of Pain: Understanding Suicide and Self Harm.* London: Penguin.

Williams, J. M. G., Barnhofer, T., Crane, C., & Beck, A. T. (2005). Problem solving deteriorates following mood challenge in formerly depressed patients with a history of suicidal ideation. *Journal of Abnormal Psychology, 114*, 421–431.

Williams, J.M.G. & Broadbent, K. (1986). Distraction by emotional stimuli: Use of a Stroop task with suicide attempters. *British Journal of Clinical Psychology, 25,* 101-110.

Williams, J.M.G., Van der Does, A.J.W., Barnhofer, T., Crane, C. & Segal, Z.S. (2008). Cognitive reactivity, suicidal ideation and future fluency: Preliminary investigation of a differential activation theory of hopelessness/suicidality. *Cognitive Therapy and Research, 32*, 83-104.

Williams, J.M.G., Watts, F.N., MacLeod, C. & Mathews, A. (1988). *Cognitive Psychology and Emotional Disorders*. Chichester: John Wiley & Sons.

Witte, T.K., Fitzpatrick, K.K., Joiner, T.E., & Bradley Schmidt, N. (2005). Variability in suicide ideation: A better predictor of suicide attempts than intensity or duration of ideation? *Journal of Affective Disorders, 88,* 131-136.

Wrosch, C., Miller, G.E., Scheier, M.F. & Brun de Pontet, S. (2007). Giving up on unattainable goals: Benefits for health? *Personality and Social Psychology Bulletin, 33*, 251-265.

Wrosch, C., Scheier, M., F., Miller, G.E., Schulz, R., & Carver, C.S. (2003). Adaptive self regulation of unattainable goals: Goal disengagement, goal reengagement and subjective well-being. *Personality and Social Psychology Bulletin, 29*, 1494-1508.

Zigmond, A.S. & Snaith, R.P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica, 67*, 361-3

APPENDICES

Appendix 1 Systematic review of the relationship between rumination and suicidality

A systematic review of the relationship between rumination and suicidality

Rebecca Morrison* BA MSc and Rory C. O'Connor BSc PhD

Suicidal Behavior Research Group

University of Stirling, UK

* Send all correspondence regarding this manuscript to Rebecca Morrison, Department of Psychology, University of Stirling, Stirling, FK9 4LA, UK. Telephone: +44 (0) 1786 466845. Fax: +44 (0) 1786 467641. Email: rebecca.morrison@stir.ac.uk

ABSTRACT

Rumination has been persistently implicated in the etiology of hopelessness and depression: proximal predictors of suicidality. As a result, research has started to examine the role of rumination in suicidality. This systematic review aims to: (i) provide a concise synopsis of the current progress in examining the relationship between rumination and suicidality; and (ii) highlight areas for future research. To this end, a search of the international literature was conducted using the three main psychological and medical databases (Psych Info [1887-October 2007], Medline [1966-October 2007] and Web of Knowledge [1981-October 2007]). Eleven studies were identified providing evidence, with one exception, of a relationship between rumination and suicidality. This systematic review has highlighted a considerable dearth of studies, specifically of case-control and prospective, clinical studies, in the worldwide literature. Key areas for future research are discussed.

KEYWORDS: Rumination; response style; suicide; systematic review

The reduction of suicide is a public health priority for both the UK and US governments (Dept. of Health, 2002; US Public Health Service, 1999) and past suicidal behavior is the best predictor of completed suicide (e.g. O'Connor & Sheehy, 2000). Consequently, research aimed at reducing the incidence of suicide often focuses on individuals who engage in suicidal ideation or suicidal behavior to help identify predictors of completed suicide.

Research into the predictors of suicide often utilizes psychological diathesis-stress models to explain the suicidal mind (e.g. O'Connor & O'Connor, 2003). Diathesis-stress models are founded on the premise that predisposing (cognitive) vulnerabilities, when activated by stress, predict suicidal behavior. To this end, a number of vulnerabilities have been identified in the psychopathology literature, including hopelessness (Beck, Steer, Kovacs & Garrison, 1985), dichotomous thinking (Litinsky & Haslam, 1998), impaired problem solving (Pollock & Williams, 2004), overgeneral autobiographical memory (Williams, 1996), impaired positive future thinking (O'Connor et al., 2004) and perceived burdensomeness (Joiner et al., 2002). However, this review will focus on one such vulnerability factor: rumination.

Rumination, broadly defined as enduring, repetitive, self-focused thinking which is a frequent reaction to depressed mood (Rippere, 1977), has been frequently associated with the proximal predictors of suicidality: depression and hopelessness. Rumination has been persistently linked with depression. For example, rumination has been implicated in the onset of depression (Robinson & Alloy, 2003) and has been shown to be predictive of the maintenance of depression, even after twelve months (Nolen-Hoeksema, McBride & Larson, 1997). Recent research has also linked rumination to hopelessness (Lam, Schuck, Smith, Farmer, & Checkley, 2003). Furthermore, experimental research has highlighted the association between rumination

and impaired problem solving ability (Lyubomirsky & Nolen-Hoeksema, 1995; Watkins & Baracaia, 2002; Watkins & Moulds, 2005), a characteristic also observed in suicidal individuals (Pollock & Williams, 2004). It is therefore unsurprising that, during the last decade, the relationship between rumination and suicidality has generated research attention. This review, therefore, examines those studies which investigate the relationship between rumination and suicidality.

Rumination

Although various definitions of rumination have been suggested (Papageorgiou & Wells, 2004), a prominent theory has been proposed by Nolen-Hoeksema and colleagues: The Response Styles Theory (Nolen-Hoeksema, 1991). In short, Nolen-Hoeksema argues that rumination is the tendency to respond to distress by focusing on the causes and consequences of one's problems without moving into active problem solving. Indeed, the Response Styles Questionnaire (RSQ: Nolen-Hoeksema & Morrow, 1991) has been developed to measure ruminative response style. When the scale was first developed, the ruminative component was usually operationalized on its own as a 22-item measure. However, in recent years, there have been concerns that the RSQ may be contaminated by items which are, in effect, assessing depressive symptoms rather than rumination (Treynor, Gonzalez & Nolen-Hoeksema, 2003). This led to re-analysis of the RSQ and (i) the subsequent removal of those items most closely associated with depression and (ii) the proposal that two components of rumination can be distinguished: reflection and brooding (Treynor et al., 2003). Reflection refers to self-focus aimed at problem solving in response to depressed mood. In contrast, brooding refers to ruminations comparing one's present situation with another unachieved benchmark.

Aside from Nolen-Hoeksema's work, a number of other definitions of rumination have emerged recently. For example, Conway and colleagues (2000) proposed a definition of rumination which describes sadness focused rumination. According to this perspective, rumination reflects repetitive thinking about one's current feelings of sadness and the situation(s) which led these feelings to arise. These ruminative thoughts do not stimulate individuals to change their present circumstances and, unlike Nolen-Hoeksema's theory, these ruminations are not disclosed to others (Conway, Csank, Holm & Blake, 2000). Rumination on sadness is measured by the Rumination on Sadness Scale (RSS).

Another definition of rumination focuses on stress-reactive rumination (Robinson & Alloy, 2003). Stress-reactive rumination refers to ruminations *following* a stressful event, as opposed to rumination *in response* to depressed mood, as proposed by Nolen-Hoeksema. The content of stress-reactive ruminations focuses on negative inferences about a stressful event (Spasojević, Alloy, Abramson, Maccoon & Robinson, 2004). Stress-reactive rumination is highly correlated with Nolen-Hoeksema's response styles rumination (or depressive rumination); however, despite this overlap, there are a number of distinctions between the two conceptualizations (Robinson & Alloy, 2003). The main point of contention is that Nolen-Hoeksema posits that depressive rumination contributes to the maintenance of depressive symptoms *after onset*, whilst Robinson and Alloy argue that stress-reactive rumination *influences the onset* of depressive symptoms. The notion of stress-reactive rumination fits with diathesis-stress conceptualizations of the relationship between rumination and distress (e.g. Morrison & O'Connor, 2005). Stress-reactive rumination is measured by the Stress-Reactive Rumination Scale (Alloy, Abramson, Hogan, Whitehouse, Rose et al., 2000).

Beyond the theoretical and conceptual developments, the present article is important in establishing the clinical implications of a rumination-suicidality relationship. These would be particularly timely given the recent development of therapeutic techniques to modify rumination, thereby reducing suicidal risk (Watkins, Scott, Wingrove et al., in press). To summarize, we conducted a systematic review of the international literature to determine the nature of the relationship between rumination and suicidality.

METHOD

The three main psychological and medical databases, Psych Info (1887-October 2007), Medline (1966-October 2007) and Web of Knowledge (1981-October 2007) were reviewed to determine appropriate papers for selection, consistent with O'Connor (in press). Key word searches using the following terms were employed: (i) suicid* and rumin*; (ii) self-harm and rumin*; self injur* and rumin*; (iv) parasuicid* and rumin*. The abstracts of all studies generated by these searches were read by the first author to select appropriate studies which met the inclusion criteria. These criteria were: (i) Only original and published journal articles were included in the review; (ii) the research must include a measure of rumination; (iii) the suicidal ideation and/or behavior of participants must have been chronicled for participants; (iv) the relationship between rumination and suicidal ideation and/or behavior had to be detailed in the study and; (v) the study must have been written in English. To ensure that other relevant studies were not missed, the reference sections of all studies were hand searched and followed up.

The search processes yielded eleven papers which met the eligibility criteria for inclusion in the review. These papers are presented in the proceeding sections using a framework similar to Speckens and Hawton (2005): (i) Cross-sectional studies

287

examining the role of rumination in suicidal ideation / behavior; (ii) case-control studies comparing groups of individuals with suicidal behavior/ideation with control groups of clinical patients or non-clinical controls; (iii) longitudinal/prospective studies of rumination as a prospective predictor of suicidal ideation / behavior.

RESULTS

Cross-sectional Studies

[Insert Table 1 about here]

Around half of the studies (n=5) were cross-sectional (see Table 1) and three of these studies (Lyness, Conwell, King, Cox & Caine, 1997; Simon, Pollack et al., 2007; Ahrens & Linden, 1996) were conducted with adult psychiatric patients presenting with a range of clinical diagnoses (major depression; bipolar depression and; schizophrenia and affective disorders, respectively). The remaining cross-sectional studies sampled from the general population (Fairweather, Anstey, Rodgers, Jorm & Christensen, 2007) and college students (Eshun, 2000).

Although three of the cross-sectional studies (Simon et al., 2007; Eshun, 2000; Fairweather et al., 2007) measured rumination via the rumination subscale of the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991), they used different versions of the scale. Simon and colleagues (2007) used the 22-item measure and Eshun (2000) used the 36-item measure, whilst Fairweather and colleagues do not report the number of items they used. Nonetheless, all three studies found ruminative response style significantly predicted suicidal ideation, despite employing different measures of ideation. First, Simon and colleagues used the Suicide Behaviors Questionnaire (SBQ; Addis & Linehan, 1989; Linehan & Addis, 1990) which is a self-report measure of past suicide ideation, future suicide ideation, past suicide threats, future suicide attempts and the likelihood of dying in a future suicide attempt. In Simon

288

et al.'s sample of 98 outpatients diagnosed with bipolar depression, ruminative response style was predictive of total SBQ score, as well as those SBQ scores pertaining to present (as opposed to previously experienced) levels of suicidality, after controlling for age, gender, bipolar subtype and current bipolar status. Simon et al. also found the same pattern of results when the analyses were conducted separately for males and females. In contrast, Eshun (2000) utilized the Adult Suicide Ideation Questionnaire (ASIQ; Reynolds, 1991) which assesses suicide ideation and behaviors in the preceding month. Ruminative response style was predictive of ASIQ scores in both the American (n=105) and Ghanaian (n=89) college students sampled in this study, after controlling for sex. Finally, Fairweather and colleagues (2007) assessed suicide ideation through response to one item "In the last year, have you ever thought about taking your own life?" (p.131.) (Lindelow, Hardy & Rogers, 1997), from which general population participants were dichotomized as suicide ideators or non-ideators. Rumination was found to be predictive of suicide ideation in the sample as a whole (n=7485) and in each of the three age cohorts in this study.

The two remaining cross-sectional studies each employed different measures of rumination. Ahrens and Linden (1996) defined rumination as 'an endless preoccupation or incessant concern with unpleasant thoughts' (p.84) and measured it using the Association for Methodology and Documentation in Psychiatry (AMDP) system (Guy & Ban, 1982; Helmchen, 1985) which provides a dichotomous psychopathological assessment of 100 symptoms and 31 somatic signs. The AMDP system was also used to provide dichotomous ratings of suicidality which comprised 'severe suicidal intention, plans, preparations and/or attempts' (p.80) (Ahrens & Linden, 1996). Inter-rater reliability of the suicidality rating was not directly reported in this study, however the authors stated that inter-rater reliability training was conducted on a monthly basis.

289

Nonetheless, rumination was found to be predictive of suicidality in both inpatient samples: those diagnosed with affective disorders (n=1920) and those diagnosed with schizophrenia (n=2383).

In the final cross-sectional study, Lyness and co-workers (1997) used a much broader definition of rumination in their sample of 124 older adult inpatients diagnosed with major depression. Rumination was defined, consistent with Nelson and Mazure (1985), as a propensity to 'dwell on one idea to the exclusion of other thoughts' (p.274). Observed ruminative thinking was then rated by researchers using a dichotomous scale. Reliability of these ratings was reported for observations of 7 patient interviews, with mean (SD) agreement at 89.5% (13.8%). Semi-structured interviews determined suicide ideation using one item from the Hamilton Rating Scale for Depression (Williams, 1988). Chi-square was used to examine differences between the proportion of ruminators and non-ruminators reporting suicidal ideation. No significant difference was found (however the different proportions were not reported).

Case-Control Studies

Only one case-control study met the criteria for inclusion (Crane, Barnhofer & Williams, 2007) (see Table 1). Crane and colleagues recruited community volunteers who had previously experienced depression. Participants were divided into three groups: (i) those who had never been suicidal (n=11); (ii) previous suicide ideators (n=11) and; (iii) previous suicide attempters (n=10).

Crane and colleagues measured rumination through Nolen-Hoeksema's 22-item Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1990), examining the brooding and reflective components separately. Suicidality was determined through the Mini International Neuropsychiatric Interview (Sheehan et al., 1998) which assessed

prior depression and suicidality. Eight of these interviews were reviewed by a separate

clinical psychologist and diagnoses were consistent for each case across raters.

Initial analyses found that no difference between groups on total RRS

score. However, the never suicidal group had significantly higher levels of reflection

than the suicide attempters and a similar (although non-significant) trend was observed

between the never suicidal and the suicide ideators. No difference was observed on

brooding ratings between the groups. Crane and colleagues also examined the balance

of brooding compared to reflection scores within each group and found that suicide

attempters had significantly higher scores for brooding items compared to reflective

items. In contrast there was a trend approaching significance for the never suicidal

group to have higher scores for reflective as opposed to brooding items. No difference

between average scores for brooding compared to reflective items was observed for the

suicide ideator group.

Longitudinal/Prospective Studies

[Insert Table 2 about here]

Five longitudinal/prospective studies met the criteria for inclusion (Smith, Alloy

& Abramson, 2006; O'Connor, O'Connor & Marshall, 2007; O'Connor & Noyce, 2007;

Morrison & O'Connor, 2007; Miranda & Nolen-Hoeksema, 2007) (see Table 2). Three

of the studies employed samples of college students. Miranda and Nolen-Hoeksema

(2007) and O'Connor and Noyce (2007) recruited (i) an adult community sample and

(ii) a mixed community and college student sample, respectively. Smith and colleagues

(2006) tracked 138 college students over a 2.5 year period with information on

suicidality and hopelessness being collected approximately every six weeks. O'Connor

and colleagues (2007) followed up 151 participants over an eight week period with

measures of rumination collected at the start of the study and measures of suicidality

291

and hopelessness being collected at time two. O'Connor and Noyce (2007) recruited 153 participants who completed measures of rumination and suicidal ideation at time one and a measure of suicidal ideation at time two, approximately three months later. Morrison and O'Connor (2007) measured rumination, hopelessness and suicidal ideation at time one, followed by hopelessness and suicidal ideation at time two, approximately three weeks later in a sample of 73 participants. Miranda and Nolen-Hoeksema (2007) included 1134 participants in their study in which measures of rumination and suicidal ideation were taken at baseline and again at a one year follow up.

All studies conceptualized rumination in accordance with Response Styles Theory, however, a variety of different measures were employed. Both Miranda and Nolen-Hoeksema (2007) and O'Connor and Noyce (2007) used the 22-item Ruminative Response Scale (RRS). Smith and co-workers (2006) also employed the RRS, however they only used 21-items. Morrison and O'Connor (2007) used the short form 10-item measure of the RRS. Whilst O'Connor et al. (2007) only focused on the brooding component of rumination, using a 5-item measure derived from Treynor et al. (2003).

A variety of measures of suicidality were also utilized across the studies. In Smith et al.'s (2006) study, suicidal ideation and behavior were measured in two ways. First, a composite score of the suicide item from the Beck Depression Inventory (Beck, Rush, Shaw & Emery, 1979) and the two suicide related items from the Symptom Check-List-90 (Derogatis, 1977) was calculated. Participants completed this measure every six weeks, retrospectively for each two-week period in the 2.5 year follow up and the average score for each individual across this period was used. Second, diagnostic interviews using the suicide items from the Schedule for Affective Disorders and Schizophrenia – Change (Endicott & Spitzer, 1978) were conducted every 6 weeks.

This clinical interview was modified to provide a measure of the presence and duration of suicidal thoughts as well as any suicide attempts (Smith et al., 2006). Participants reporting any clinically significant suicide ideation across the 2.5 years of the project were dichotomized as suicide ideators – yes or no. The number of days, during which participants reported suicidal feelings in diagnostic interviews, were summed to provide an index of the duration of suicidal ideation. Similarly, Miranda and Nolen-Hoeksema also employed a composite measure of suicide ideation: The Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon & Williams, 1997) and the suicide item of the Beck Depression Inventory (BDI; Beck & Beck, 1972) were used to measure suicide ideation in the past month at both baseline and follow-up. Again this information was used to dichotomize participants as suicide ideators or non-ideators. In contrast, the remaining three studies (O'Connor et al., 2007; O'Connor & Noyce, 2007) and Morrison & O'Connor, 2007) all measured suicidal ideation via the 8-item subscale of the Suicide Probability Scale (Cull & Gill, 1982). This assesses suicidal cognitions, negative affect and plans of suicide in the preceding week.

Smith and colleagues (2006) found that rumination, after controlling for sex, age, ethnicity and cognitive risk for depression (determined by negative inferential style and dysfunctional attitudes), was not significantly associated with the presence or absence of suicidal thinking rated from the diagnostic interview. However, again after controlling for sex, age, ethnicity and cognitive risk, rumination was significantly associated with both the composite self-report score of suicide ideation and the duration of suicide ideation. Of particular interest, formal mediation analyses showed that rumination mediated the relationship between cognitive risk and suicide ideation. Furthermore, hopelessness partially mediated the relationship between rumination and

suicide ideation (composite measure) and fully mediated the link between rumination and the duration of suicide ideation.

Miranda and Nolen-Hoeksema (2007) found that after controlling for demographic variables and initial distress, both brooding and reflective rumination were significant predictors of suicide ideation one year later. Additional analyses, also controlling for depression at follow-up, examined whether the relationship between rumination and suicide ideation resulted from the impact of brooding or reflection on future experiences of depressive symptoms. This was found to be the case for brooding, but not reflective rumination, thus the relationship between brooding and suicidal ideation was mediated by the effect of brooding on future depression.

O'Connor and colleagues (2007) found brooding rumination predicted suicidal ideation eight weeks later. In addition, they also found that brooding rumination partially mediated the relationship between socially prescribed perfectionism and suicidal ideation and fully mediated the relationship between self-oriented perfectionism and suicidal ideation.

O'Connor and Noyce (2007) found brooding, but not reflection, significantly predicted suicide ideation at time two, after controlling for demographic variables and initial suicidal ideation. In addition, brooding was also found to fully mediate the relationship between self-criticism and suicidality.

Morrison & O'Connor (2007) found that the interaction between rumination and stress significantly predicted suicide ideation at time two after controlling for initial levels of distress.

DISCUSSION

With one exception, all of the studies reported herein found rumination to be associated with suicidal ideation and/or behavior. Significantly, each of the studies

which defined rumination according to response styles theory found that rumination was associated with suicidality despite different methodologies, samples and measures of suicidal ideation and/or behavior.

Measuring rumination

In addition to the fact that there were only a small number of studies eligible for inclusion in this review, it is unfortunate that most of the studies employed different measures of rumination. What is more, although the majority of the studies (O'Connor et al., 2007; Smith et al., 2003; Eshun, 2000; Simon et al., 2007; Fairweather et al., 2007; Morrison & O'Connor, 2007; O'Connor & Noyce, 2007; Miranda & Nolen-Hoeksema, 2007; Crane et al., 2007) measured rumination via the Response Styles Questionnaire, five different versions of this scale were employed. Consequently, this hinders comparison between studies as the longer version of the questionnaire contained more items which may be interpreted as "automatic negative thoughts" as opposed to the key features of a ruminative response style (Nolen-Hoeksema, personal communication).

Indeed, the RSQ has recently been criticized, with some authors arguing that it is contaminated with items reflecting depression as opposed to rumination (e.g. Conway, Csank, Holm, & Blake, 2000). Four studies in this review address this potential criticism by examining the sub-components of rumination (brooding and reflection) not contaminated by depressive content (see Treynor et al., 2003), with varying results. O'Connor and colleagues (2007), Miranda and Nolen-Hoeksema (2007) and O'Connor and Noyce (2007) all found brooding rumination to be associated with suicidality. O'Connor and colleagues (2007) did not measure reflective rumination, so can offer no insight into any relationship between the two. Whilst Miranda and Nolen-Hoeksema found reflective rumination was predictive of suicidality, O'Connor and Noyce did not

295

find this relationship. Nonetheless, the latter authors' data were not incompatible with Miranda and Nolen-Hoeksema's findings and it may be that the large sample size employed by Miranda and Nolen-Hoeksema allowed the detection of a small effect which O'Connor and Noyce did not have the power to detect (O'Connor & Noyce, 2007).

The only case-control study in this review (Crane et al., 2007) provides interesting and unique data on reflection. These authors found significantly higher levels of reflection reported by never suicidal individuals compared to those who had previously attempted suicide. This suggests a protective effect of reflective rumination, not observed in any of the other research. One possible explanation for this finding is that in Crane and colleagues' research, the protective effect is found in the comparison between the never suicidal and the previous attempters groups. None of the other studies in the review examined the components of rumination in relation to suicidal behavior, instead focusing on ideation only. A further explanation concerns the measurement of suicidality, whilst Crane et al.'s research centers on previously experienced suicidal ideation and behavior, Miranda and Nolen-Hoeksema's and O'Connor and Noyce's research both focus on prospective and current suicide ideation. It may be that any relationship between rumination and suicidality varies as a function of current suicide status (O'Connor & Noyce, 2007), this would be an interesting area for future research to address.

The two studies which did not use the Ruminative Response Scale to determine rumination (Ahrens & Linden, 1996; Lyness et al., 1997) failed to provide a detailed theoretical rationale for their definition of rumination. Furthermore, they each dichotomized participants into either 'ruminators' or 'non-ruminators' which may be a somewhat artificial distinction and, at the very least, reduces the sensitivity of the

measures. In addition, Ahrens & Linden's (1996) definition of rumination as an 'endless preoccupation or incessant concern with unpleasant thoughts' (p.84), suggests that ruminative thinking need not focus on the self to be included in this definition. As a result, we believe that such a definition is inherently problematic. Lyness and colleagues' definition is broader still: a propensity to 'dwell on one idea to the exclusion of other thoughts' (p.274). This latter definition suggests again that the ruminations need not be self-focused. In addition, thoughts focusing on a positive or happy thought or idea would also be coded as ruminative thinking in Lyness et al.'s study. Unfortunately, neither Ahrens & Linden nor Lyness and colleagues gave examples of ruminative thinking, nor specific details of how rumination was determined within their psychiatric assessment. Consequently, it is difficult to make a judgment about the validity of these methods of assessment. Finally, given that the all-encompassing definition of rumination used by Lyness and colleagues does not exclude people who ruminate over positive thoughts or ideas, it is perhaps unsurprising that this is the only study in the review which found no relationship between rumination and suicidality.

In short, this review highlights the paucity of research employing conceptualizations of rumination apart from Nolen-Hoeksema's. For example, none of the studies examined the relationship between the Rumination on Sadness Scale or the Stress-Reactive Rumination Scale and suicidality; clearly there is an urgent need for future research to address this dearth.

Measuring suicidality

Eight out of the eleven studies in this review employed different measures of suicidality, and with only two exceptions, all employed only one index of suicidality. Smith et al. (2006) and Miranda and Nolen-Hoeksema (2007), were the only studies to supplement their self-report measure with a clinician rating of suicidal ideation. Ahrens

and Linden (1996), Lyness and colleagues (1997), Miranda and Nolen-Hoeksema, (2007) and Fairweather and colleagues (2007) all dichotomized participants as 'suicidal' or 'non-suicidal' according to psychiatric assessment, interview or self-report. This dichotomy results in an artificial distinction, for example Ahrens and Linden only classified participants as 'suicidal' if they displayed 'severe suicidal intention, plans, preparations and/or attempts' (p.80). However, this implies that individual's displaying 'moderate' suicide intention would have been classified as non-suicidal. No working definition is given to explain how 'severe' suicide intentions were distinguished from lesser intentions. Indeed, for the most part, the assessment of suicidality in the papers reviewed would not have met the standards outlined in O'Carroll et al.'s (1996) classic 'Tower of Babel' paper. In short, lethality and intent should be routinely assessed.

Disappointingly, only one case-control study, where levels of rumination were compared in suicidal individuals versus matched controls, was identified in this review (Crane et al., 2007). However, as noted previously, Crane et al's study relied on recall of previously experienced suicidal ideation and behavior as opposed to current ideation or behavior meaning their results may have been affected by memory biases or distortions. More research using case-control methodology with actively suicidal participants would help to address the weaknesses associated with the correlational designs employed by the majority of studies under review. Furthermore, none of the longitudinal studies employed a clinical participant group – therefore caution is required until the rumination-suicidality relationship is demonstrated prospectively with a clinical population.

Sex Differences

Previous research has highlighted sex differences in rumination, with females being more likely to have a ruminative response style (Nolen-Hoeksema, 1987; Nolen-

Hoeksema, Larson & Grayson, 1999). Nonetheless, there was no evidence of a sex difference in any of the studies under review. However, Ahrens and Linden (1996), Lyness et al. (1997) and Morrison and O'Connor (2007) did not report the effect of sex on their analyses, nor did they report the proportion of persons classified as ruminators by sex. Although O'Connor and colleagues (2007) found no sex differences in brooding rumination scores, they did not run the analyses separately for males and females nor did they control for sex in their analyses (Study 2). Fairweather and colleagues (2007) found no interaction between sex and rumination, so they did not conduct their analyses separately for males and females. Simon and colleagues (2007) were the only study to run analyses separately for males and females and they found no sex differences in the rumination-suicidality relationship. Crane et al. matched groups with regards to sex , whilst Eshun (2000), Smith et al. (2006), Miranda and Nolen-Hoeksema (2007) and O'Connor and Noyce (2007) all controlled for sex in their regression analyses; however none of these studies reported analyses separately for males and females. Given previous research suggests that sex differences in rumination may explain differences in the prevalence of depression (Nolen-Hoeksema et al., 1999), future work should examine whether any observed relationships between rumination and suicidality hold for both males and females.

Theoretical Context

Much of the research in this review was atheoretical in focus and made no attempt to map findings onto theoretical accounts of suicidal behavior. Only Smith et al. (2006) and O'Connor and colleagues placed their research in a theoretical framework. Smith and colleagues examined rumination in the context of Attention Mediated Hopelessness Theory (AMHT: MacCoon, Abramson, Mezulis, Hankin & Alloy, 2005). This theory posits that the difference between sought after outcome and

299

actual outcome, following a negative life event, triggers attention towards this discrepancy, in an attempt to decrease or resolve it. However, cognitive vulnerabilities can hinder this process of resolving or decreasing discrepancies and in these instances, a repetitive cycle of focusing on the discrepancy occurs – analogous to rumination. This cycle is predicted to increase hopelessness which in turn, increases suicidal ideation. Smith and colleagues found that, as predicted by AMHT, hopelessness mediated the relationship between rumination and the duration of suicidal ideation, in addition to partially mediating the relationship between rumination and self-reported suicidal ideation.

O'Connor et al. (2007) examined rumination as a mediator between perfectionism and suicidality. Despite the current debate as to the specific dimensional nature of perfectionism (see O'Connor, in press), accumulating evidence suggests a relationship between perfectionism and suicidality (e.g. Hunter & O'Connor, 2003). As a result, O'Connor et al. (2007) examined rumination as a potential mechanism to explain the deleterious effects of perfectionism in suicidality. Their results supported this interpretation, as brooding rumination partially mediated the relationship between socially prescribed perfectionism and suicidal ideation and fully mediated the relationship between self-oriented perfectionism and suicidal ideation. In a similar vein, O'Connor and Noyce examined rumination as a mechanism explaining the role of self-criticism in suicidality. Again their results support this interpretation with brooding fully mediating the link between self-criticism and suicide ideation. The relevance of these findings is discussed in relation to the Cry of Pain model (Williams, 2001) which posits that feelings of both defeat and entrapment are precipitants to suicidal behavior. These authors suggest that self-criticism, or perfectionism may result in heightened

perceptions of defeat, whilst brooding amplifies the feeling that a particular situation is inescapable.

Finally, Morrison & O'Connor (2007) place their data in the context of diathesis-stress conceptualizations of cognitive theory, which posit that cognitive vulnerabilities remain dormant until activated by stress. This diathesis-stress hypothesis is supported by their data where the *interaction* between rumination and stress was predictive of suicidal ideation, as opposed to the *direct effect* of rumination.

Conclusions

With one exception, all of the studies reported herein found that increased rumination was associated with increased suicidality. The one exception (Lyness et al., 1997) employed an all-encompassing definition of rumination, which may have included individuals with ruminations focused on a positive theme, and this may account for the failure to find a relationship between rumination and suicidal thinking.

Future research should attempt to test the relationship between rumination and suicidality using consistent measures of both constructs to facilitate study comparison. More longitudinal research in clinical populations is required to examine whether initial levels of rumination are predictive of changes in suicidal thinking and behavior over time. Finally, it is of paramount importance that the rumination-suicidality studies are placed within a theoretical context as this will facilitate the development of rumination-based clinical interventions.

REFERENCES

(*Indicates those studies which were included in the systematic review)

Addis, M., & Linehan, M. (1989). Predicting suicidal behavior: Psychometric properties of the Suicidal Behaviors Questionnaire. Presented at conference 'Association for the Advancement of Behavior Therapy.' Washington, D.C.

*Ahrens, B. & Linden, M. (1996). Is there a suicidality syndrome independent of specific major psychiatric disorder? Results of a split half multiple regression analysis. *Acta Psychiatrica Scandinavica, 94*, 79-86.

Alloy, L.B., Abramson, L.Y., Hogan, M.E., Whitehouse, W.G., Rose, D.T., Robinson, M.S. et al. (2000). The Temple-Wisconsin Cognitive Vulnerability to Depression (CVD) Project: Conceptual background, design and methods. *Journal of Cognitive Psychotherapy: An International Quarterly, 13*, 227-262.

Beck, A.T. & Beck, R.W. (1972). Screening depressed patients in family practice: A rapid technique. *Postgraduate Medicine, 52,* 81-85.

Beck, A.T., Rush, A.J., Shaw, B.F. & Emery, G. (1979). *Cognitive therapy of depression.* New York: Guilford Press.

Beck, A.T., Steer, R.A., Kovacs, M. & Garrison, B. (1985). Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalised with suicidal ideation. *American Journal of Psychiatry*, *142*, 559-563.

Conway, M., Csank, P.A.R., Holm, S.L. & Blake, C.K. (2000). On assessing individual differences in rumination on sadness. *Journal of Personality Assessment, 75,* 404-425.

*Crane, C., Barnhofer, T. & Williams, J.M.G. (2007). Reflection, brooding and suicidality: A preliminary study of different types of rumination in individuals with a history of major depression. *British Journal of Clinical Psychology*, in press.

Cull, J.G. & Gill, W.S. (1982). *Manual for the suicide probability scale (SPS).* Los Angeles: Western Psychological Services.

Dept. of Health (2002). National Suicide Prevention Strategy for England. HMSO: London

Derogatis, L.R. (1977). *The SCL-90 Manual I: Scoring, administration and procedures for SCL-90.* Baltimore: Clinical Psychometric Research.

Endicott, J. & Spitzer, R.L. (1978). A diagnostic interview: The Schedule of Affective Disorders and Schizophrenia. *Archives of General Psychiatry, 35,* 837-844.

*Eshun, S. (2000). Role of gender and rumination in suicide ideation: A comparison of college samples from Ghana and the U.S. *Cross Cultural Research, 34*, 250-263.

* Fairweather, A.K., Anstey, K.J., Rodgers, B., Jorm, A.F. & Christensen, H. (2007). Age and gender differences among Australian suicide ideators: Prevalence and correlates. *The Journal of Nervous and Mental Disease, 195*, 130-136.

First, M.B., Spitzer, R.L., Gibbon, M. & Williams, J.B.W. (1997). *Structured clinical interview for DSM-IV Axis 1 Disorders – Non-patient edition (version 2.0).* New York: New York State Psychiatric Institute, Biomedics Research Department.

Guy, W. & Ban, T.A. (Eds.) (1982). *The AMDP system.* Berlin: Springer.

Helmchen, H. (1985). The AMDP. In Pichot, P. et al. Psychiatry. The state of the art. Volume 1. Clinical Psychopathology, nomenclature and classification. New York: Plenum Press.

Hunter, E. & O'Connor, R.C. (2003). Hopelessness and future thinking in parasuicide: the role of perfectionism. *British Journal of Clinical Psychology, 42,* 355-365.

Joiner, T.E., Pettit, J.W., Walker, R.L., Voelz, Z.R., Cruz, J., Rudd, M.D. & Lester, D. (2002). Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. *Journal of Social and Clinical Psychology, 21*, 531-545.

Lam, D., Schuck, N., Smith, N., Farmer, A. & Checkley, S. (2003). Response style, interpersonal difficulties and social functioning in major depressive disorder. *Journal of Affective Disorders, 75,* 279-283.

Lindelow, M., Hardy, R. & Rogers, B. (1997). Development of a scale to measure symptoms of anxiety and depression in the general population: The psychiatric symptom frequency scale. *Journal of Epidemiology and Community Health, 51*, 549-557.

Linehan, M. & Addis, M., (1990). *Screening for suicidal behaviors: The suicidal behaviors questionnaire.* Unpublished Manuscript. University of Washington, Seattle, W.A.

Litinsky, A.M. & Haslam, N. (1998). Dichotomous thinking as a sign of suicide risk on the TAT. *Journal of Personality Assessment, 71*, 368-378.

*Lyness, J.M., Conwell, Y., King, D.A., Cox, C. & Caine, E.D. (1997). Ruminative thinking in older inpatients with major depression. *Journal of Affective Disorders, 46,* 273-277.

Lyubomirsky, S & Nolen-Hoeksema, S. (1995). Effects of self-focused rumination on negative thinking and interpersonal problem solving. *Journal of Personality and Social Psychology, 69*, 176-190.

MacCoon, D.G., Abramson, L.Y., Mezulis, A.H., Hankin, B. & Alloy, L.B. (2005). The Attentional Mediated Hopelessness (AMH) Theory: The role of attention in connecting cognitive vulnerability to rumination in depression. Manuscript under review.

*Miranda, R. & Nolen-Hoeksema, S. (2007). Brooding and reflection: Rumination predicts suicidal ideation at 1-year follow up in a community sample. *Behaviour Research and Therapy,* in press

Morrison, R., & O'Connor, R. C. (2005). Predicting psychological distress in college students: The role of rumination and stress. *Journal of Clinical Psychology, 61*, 447–460.

*Morrison, R. & O'Connor, R.C. (2007). The role of rumination, attentional biases and stress in psychological distress. *British Journal of Psychology*, in press.

Nelson, J.C. & Mazure, C. (1985). Ruminative thinking: A distinctive sign of melancholia. *Journal of Affective Disorders, 9*, 41-46.

Nolen-Hoeksema, S. (1987). Sex differences in unipolar depression: Evidence and theory. *Psychological Bulletin, 101*, 259-282.

Nolen-Hoeksema, S. (1991). Response to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*, 569-582.

Nolen-Hoeksema, S., Larson, J., & Grayson, C. (1999). Explaining the gender difference in depressive symptoms. *Journal of Personality and Social Psychology, 77*, 1061–1072.

Nolen-Hoeksema, S., McBride, A. & Larson, J. (1997). Rumination and psychological distress among bereaved partners. *J. of Personality and Social Psychology, 72,* 855-862.

Nolen-Hoeksema, S. & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology*, 61, 115-121.

O'Carroll, P.W., Berman, A.L., Maris, R.M., Moscicki, E., Silverman, M. & Tanney, B. (1996). Beyond the Tower of Babel: A nomenclature for suicidology. *Suicide and Life-Threatening Behavior, 26,* 237-252.

*O'Connor, D.B., O'Connor, R.C. & Marshall, R. (2007). Perfectionism and psychological distress: Evidence of the mediating effects of rumination. *European Journal of Personality*, *21*, 429-452.

O'Connor, R.C. (in press). The relations between perfectionism and suicide risk: A systematic review. *Suicide and Life Threatening Behavior*.

*O'Connor, R.C. & Noyce, R. (2007). Personality and cognitive processes: Self criticism and different types of rumination as predictors of suicidal ideation., submitted.

O'Connor, R.C., O'Connor, D.B, O'Connor, S.M., Smallwood, J & Miles, J. (2004). Hopelessness, stress and perfectionism: the moderating effects of future thinking. *Cognition and Emotion, 18,* 1099-1120.

O'Connor, R.C. & O'Connor, D.B. (2003). Predicting hopelessness and psychological distress: The role of perfectionism and coping. *Journal of Counseling Psychology, 50*, 362-372.

O'Connor, R., & Sheehy, N. (2000). *Understanding suicidal behaviour.* Leicester: BPS Blackwell

Papageorgiou, C. & Wells, A. (2004). Nature, functions and beliefs about depressive rumination. In Papageorgiou, C. & Wells, A. (Eds.) *Depressive Rumination: Nature, theory and treatment*. Chichester: John Wiley & Sons

Pollock, L. & Williams, J.M.G. (2004). Problem solving in suicide attempters. *Psychological Medicine, 34*, 163-167.

Reynolds, W.M. (1991). *Adult Suicide Ideation Questionnaire professional manual.* Odessa, Florida: Psychological Resource Inc.

Rippere, V. (1977). "What's the thing to do when you're feeling depressed?": A pilot study. *Behavior Research and Therapy, 15*, 185-191.

Robinson, S.M. & Alloy, L.B. (2003). Negative inferential style and stress-reactive rumination: Interactive risk factors in the aetiology of depression. *Cognitive Therapy and Research, 27*, 275-291.

Sheehan, D.V., Lecrubier, Y., Sheehan, K., Harnett, A.P., Janavs, J., Weiller, E. et al. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychology, 59*, 22-33.

*Simon, N.M., Pollack, M.H., Ostacher, M.J., Alyson K.Z., Chow, C.W., Fischmann, D., Demopulos, C.M., Nierenberg, A.A. & Otto, M.W. (2007). Understanding the link between anxiety symptoms and suicidal ideation and behaviors in outpatients with bipolar disorder. *Journal of Affective Disorders, 97*, 91-99.

*Smith, J.M., Alloy, L.B. & Abramson, L.Y. (2006). Cognitive vulnerability to depression, rumination, hopelessness and suicidal ideation: Multiple pathways to self-injurious thinking. *Suicide and Life-Threatening Behavior, 36*, 443-454.

Spasojević, J., Alloy, L.B., Abramson, L.Y., Maccoon, D. & Robinson, M.S. (2004). Reactive rumination: Outcomes, mechanisms, and developmental antecedents. In Papageorgiou, C. & Wells, A. (Eds.). *Depressive Rumination: Nature, theory and treatment*. Chichester: John Wiley & Sons.

Williams, J.M.G. (1996). Depression and the specificity of autobiographical memory. In D.C. Rubin (Ed.), *Remembering Our Past – Studies in Autobiographical Memory*. Cambridge: Cambridge University Press.

Speckens, A.E.M. & Hawton, K. (2005). Social problem solving in adolescents with suicidal behavior: A systematic review. *Suicide and Life Threatening Behavior, 35,* 365-387.

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research, 27*, 247–259.

U.S. Public Health Service, (1999). The Surgeon General's Call To Action To Prevent Suicide. Washington, DC

Watkins, E. & Baracaia, S. (2002). Rumination and social problem solving in depression. *Behaviour Research and Therapy, 40*, 1179-1189.

Watkins, E. & Moulds, M. (2005). Distinct modes of ruminative self-focus: Impact of abstract versus concrete rumination on problem solving in depression. *Emotion, 5*, 319-328

Watkins, E., Scott, J., Wingrove, J., Rimes, K., Bathurst, N., Steiner, H., Kennel-Webb, S., Moulds, M. & Malliaris, Y. (in press). Rumination focused cognitive behaviour therapy for residual depression: A case series. *Behaviour Research and Therapy*.

Williams, J.B.W. (1988). A structured interview guide for the Hamilton depression rating scale. *Archives of General Psychiatry, 45,* 742-747.

Table 1. Cross-sectional and case-control studies included in the systematic review

Study (Country)	Participants	Gender (Mean Age)	Suicidality Measure	Rumination Measure	Design	Results
Ahrens & Linden (1996) (Germany)	4303 Psychiatric Inpatients (2383 schizophrenics & 1920 affective disorder patients)	55.66% female	AMDP assessment (Guy & Ban, 1982; Helmchen, 1985)	AMDP assessment (Guy & Ban, 1982; Helmchen, 1985)	Cross-sectional	Rumination is predictive of suicidality
Eshun (2000) (USA & Ghana)	194 College students	51% female (21.61 years; range 17-24 years)	ASIQ (Reynolds, 1991)	RSQ 36-item (Nolen-Hoeksema & Morrow, 1991)	Cross-sectional	Significant positive correlation between rumination and ideation in both cultures. RSQ was a significant predictor of ideation in both cultures
Lyness, Conwell, King, Cox & Caine (1997) (USA)	124 Depressed psychiatric inpatients	Not reported (≥50 years)	Suicide item from Hamilton D (Williams, 1988)	Dichotomous rating of rumination (Nelson & Mazure, 1985)	Cross-sectional	Chi-square test found no difference in frequency of ruminators between suicide ideators and non-suicide ideators.
Simon, Pollack et al. (2007) (USA)	98 Bipolar patients	57.1% female (44.8 years; SD=13.9)	SBQ (Addis & Linehan, 1989; Linehan & Addis, 1990)	RSQ 22 item (Nolen-Hoeksema & Morrow, 1991)	Cross-sectional	Higher RSQ scores predicted greater SBQ scores. .
Fairweather et al. (2007) (Australia)	7485 participants randomly sampled from community	50.9% female (Three age cohorts: 20-24 years, 40-44 years and 60-64 years)	"In the last year, have you ever thought about taking your own life?" (Lindelow et al., 1997)	RSQ (Nolen-Hoeksema & Morrow, 1991)	Cross-sectional	Rumination is predictive of suicide ideation.
Barnhofer & Williams (2007) (UK) Crane	32 Previously depressed community volunteers	66% female (31.65 years; SD=13, range 18-64 years)	MINI (Sheehan et al., 1998)	RSQ 22 item (brooding and reflection considered separately)	Case control (3 groups: never suicidal (n=11; ideators only (n=11; previous attempters (n=10)	Significantly higher levels of reflection in the never suicidal group compared to the previous attempters. No difference in brooding between groups. Never suicidal group endorsed more reflective items compared to brooding items – the reverse trend was found for the previous suicide attempter group.

Note: AMDP= Association for Methodology and Documentation in Psychiatry; RSQ=Response Styles Questionnaire; SBQ=Suicide Behaviors Questionnaire; ASIQ=Adult Suicide Ideation Questionnaire; MINI=Mini International Neuropsychiatric Interview

309

Table 2. Longitudinal/prospective studies included in the review

Study (Country)	Participants	Gender (Mean Age)	Suicidality Measure	Rumination Measure	Design	Results
O'Connor, O'Connor & Marshall, (2007) (UK)	211 college students at T1 (71.6% at T2)	73.5% female (24.05 years; range 17-54 years)	Suicide ideation subscale of SPS (Cull & Gill, 1982)	RSQ – 5 Brooding items (Treynor et al., 2003)	Prospective over 8 weeks	Brooding rumination significantly positively correlated with suicide ideation. Brooding rumination mediated relationship between self-oriented perfectionism and suicide ideation.
Smith, Alloy & Abramson (2006) (USA)	138 (11 excluded due to incomplete data) college students.	64.1% female (20.05 years)	#9 BDI (Beck, Rush, Shaw & Emery, 1979) #15 & #59 Symptom Checklist – 90 (Derogatis, 1977) SADS-C diagnostic interview (Endicott & Spitzer, 1978)	RSQ 21 item (Nolen-Hoeksema & Morrow, 1991)	Longitudinal over 2.5 years (assessments approx. every 6 weeks)	RSQ predicted self-reported suicide ideation and duration of suicide ideation. RSQ mediated the relationship between cognitive risk and suicide ideation. Hopelessness partially mediated the relationship between RSQ and suicide ideation & fully mediated the relationship between RSQ and suicide ideation duration RSQ not related to SADS-C measure of suicide thinking
O'Connor & Noyce (2007) (UK)	232 college students at T1 (66% at T2)	73.3% female (25.98 years, SD=14.36)	Suicide ideation subscale of SPS (Cull & Gill, 1982)	RSQ 22 item (brooding and reflection considered separately)	Prospective over 3 months	Brooding, but not reflection, significantly predicted suicide ideation. Brooding fully mediated the self-criticism – suicide ideation relationship.
Miranda & Nolen-Hoeksema (2007) (USA)	Community sample of adults (n=1324 at T1 and n=1134 at T2)	53.5% female (47.8 years, SD=15.1, range 25-82 years)	SCID (First et al., 1997) suicide item on BDI (Beck & Beck, 1972)	RSQ 22 item (brooding and reflection considered separately)	Longitudinal over 1 year	Brooding and rumination predicted suicide ideation at T2. Depressive symptoms at T2 mediated the brooding-suicide ideation relationship.
Morrison & O'Connor (2007) (UK)	81 college students at T1 (90.1% at follow-up)	71.6% female (22.09 years, SD=6.25, range 16-48 years)	Suicide ideation subscale of SPS (Cull & Gill, 1982)	RSQ Short Form (10 item)	Prospective over 3 weeks	Interaction between rumination and stress predicted suicidal ideation

Note: BDI=Beck Depression Inventory; SADS-C= Schedule for Affective Disorders and Schizophrenia – Change; RSQ=Response Styles Questionnaire; SPS=Suicide Probability Scale; SCID=Structured Clinical Interview for DSM-IV

Appendix 2 Response Styles Questionnaire

Instructions: People think and do many different things when they feel sad, blue, or depressed. Please read each of the items below and indicate whether you never, sometimes, often, or always think or do each one when you feel sad, down, or depressed. Please indicate what you generally do, not what you think you should do.

1	Think about how alone you feel		2	Think "I won't be able to do my job if I don't snap out of this"	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

3	Think about your feelings of fatigue and achiness		4	Think about how hard it is to concentrate	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

5	Think "What am I doing to deserve this?"		6	Think about how passive and unmotivated you feel	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

7	Analyse recent events to try to understand why are depressed		8	Think about how you don't seem to feel anything anymore	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

9	Think "Why can't I get going?"		10	Think "Why do I always react this way?"	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

11	Go away by yourself and think about why you feel this way		12	Write down what you are thinking and analyse it	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

13	Think about a recent situation wishing it had gone better		14	Think "I won't be able to concentrate if I keep feeling this way"	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

15	Think "Why do I have problems other people don't have?"		16	Think "Why can't I handle things better?"	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	
17	Think about how sad you feel		18	Think about all your shortcomings, failings, faults, mistakes	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	
19	Think about how you don't feel up to doing anything		20	Analyse your personality and try to understand why you are depressed	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	
21	Go someplace alone to think about your feelings		22	Think about how angry you are with yourself	
	Almost Never			Almost Never	
	Sometimes			Sometimes	
	Often			Often	
	Almost Always			Almost Always	

Appendix 3 Multi Dimensional Perfectionism Scale

Instructions: Listed below are a number of statements concerning personal characteristics and traits. Read each item and decide whether you agree or disagree and to what extent. If you strongly agree, circle 7; if you strongly disagree, circle 1; if you feel somewhere in between, circle any one of the numbers between 1 and 7. If you feel neutral or undecided, the midpoint is 4.

		Disagree						Agree
		1	2	3	4	5	6	7
1	When I am working on something I cannot relax until it is perfect							
2	I am not likely to criticise someone for giving up too easily							
3	It is not important that the people I am close to are successful							
4	I seldom criticise my friends for accepting second best							
5	I find it difficult to meet others' expectations of me							
6	One of my goals is to be perfect in everything I do							
7	Everything that others do must be of top-notch quality							
8	I never aim for perfection in my work							
9	Those around me readily accept that I can make mistakes too							
10	It doesn't matter when someone close to me does not do their absolute best							
11	The better I do, the better I am expected to do							
12	I seldom feel the need to be perfect							
13	Anything I do that is less than excellent, will be seen as poor work by those around me							
14	I strive to be as perfect as I can be							
15	It is very important that I am perfect in everything I attempt							
16	I have high expectations for the people who are important to me							
17	I strive to be the best at everything I do							
18	The people around me expect me to succeed at everything I do							
19	I do not have very high standards for those around me							
20	I demand nothing less than perfection of myself							
21	Others will like me even if I don't excel at everything							
22	I can't be bothered with people who won't strive to better themselves							
23	It makes me uneasy to see an error in my work							
24	I do not expect a lot from my friends							
25	Success means that I must work even harder to please others							
26	If I ask someone to do something, I expect it to be done flawlessly							
27	I cannot stand to see people close to me make mistakes							
28	I am perfectionistic in setting my goals							
29	The people who matter to me should never let me down							
30	Others think I am okay, even when I do not succeed							
31	I feel that people are too demanding of me							
32	I must work to my full potential at all times							
33	Although they may not show it, other people get very upset with me when I slip up							
34	I do not have to be the best at whatever I am doing							
35	My family expects me to be perfect							
36	I do not have very high goals for myself							
37	My parents rarely expected me to excel in all aspects of my life							
38	I respect people who are average							
39	People expect nothing less than perfection from me							
40	I set very high standards for myself							
41	People expect more from me than I am capable of giving							
42	I must always be successful at school or work							
43	It does not matter to me when a close friend does not try their hardest							
44	People around me think I am still competent even if I make a mistake							
45	I seldom expect others to excel at whatever they do							

Appendix 4 Goal Adjustment Scale

Instructions: During their lives people cannot always attain what they want and are sometimes forced to stop pursuing the goals they have set. We are interested in understanding how you usually react when this happens to you. Please indicate the extent to which you agree or disagree with each of the following statements, as it usually applies to you.

	If I have to stop pursuing an important goal in my life…	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	It's easy for me to reduce my effort towards the goal.					
2	I convince myself that I have other meaningful goals to pursue.					
3	I stay committed to the goal for a long time; I can't let it go.					
4	I start working on other new goals.					
5	I think about other new goals to pursue					
6	I find it difficult to stop trying to achieve the goal.					
7	I seek other meaningful goals.					
8	It's easy for me to stop thinking about the goal and let it go.					
9	I tell myself that I have a number of other new goals to draw upon.					
10	I put effort toward other meaningful goals.					

Appendix 5 Dot Probe Stimuli

Positive Word	Neutral Pairing	Negative Word	Neutral Pairing
love	vote	despair	testing
happy	green	grief	slate
joy	bag	sad	wit
tender	sooner	cry	pen
excited	voltage	tragic	rhythm
devoted	witness	suicide	nursery
relieved	stimulus	guilty	impose
smile	uncle	rejected	moderate
friendly	occasion	misery	margin
hopeful	shallow	upset	shove
amazed	expert	punish	weekly
proud	yield	gloom	oyster
enjoying	sandwich	helpless	resident
faithful	gigantic	hurt	gear
cheerful	sanction	ashamed	abolish
humorous	wildlife	doom	hint
ardent	willow	hopeless	fragment
eager	total	failure	balance
lively	ladder	blame	total
peaceful	rational	weakness	transfer
pleased	academy	bad	bag
calm	keen	grave	wrist
glorious	validity	ugly	tray
cheer	salad	awful	solar
carefree	civilian	solemn	deduct
pleasant	resident	bored	kitty
pious	maple	fault	bathe
bright	beauty	worse	rapid
sunny	juice	mistakes	youngest
lucky	onion	tire	pink

Appendix 6 Perceived Stress Scale

Instructions: Please put an X in the box which indicates how often you have felt or thought a certain way since you completed the first part of the experiment (4-6 weeks ago)

	How often have you…..	Never	Almost Never	Sometimes	Fairly Often	Very Often
1	Been upset because of something that happened unexpectedly?					
2	Felt that you were unable to control the important things in your life?					
3	Felt nervous and stressed?					
4	Dealt successfully with irritating life hassles?					
5	Felt that you were effectively coping with important changes that were occurring in your life?					
6	Felt confident about your ability to handle your personal problems?					
7	Felt that things were going your way?					
8	Found that you could not cope with all the things you had to do?					
9	Been able to control irritation in your life?					
10	Felt that you were on top of things?					
11	Been angered because of things that happened that were outside of your control?					
12	Found yourself thinking about things that you have to accomplish?					
13	Been able to control the way you spend your time?					
14	Felt difficulties were piling up so high that you could not overcome them?					

Appendix 7 Life Events Scale for Students

Instructions: Please put a cross in the appropriate box to indicate whether you have experienced any of the following events in the past twelve months

		Yes	No
1	Death of parent		
2	Major personal injury or illness		
3	Major argument with parents		
4	Beginning an undergraduate programme at university		
5	Moving away from home		
6	Getting an unjustified low mark on a test		
7	Failing a number of courses		
8	Minor violation of the law (e.g. speeding ticket)		
9	Getting kicked out of college		
10	Seeking psychological or psychiatric consultation		
11	Vacation alone/with friends		
12	Pregnancy (either yourself or being the father)		
13	Minor car accident		
14	Seriously thinking about dropping college		
15	Getting your own car		
16	Jail term (self)		
17	Moving out of town with parents		
18	Vacation with parents		
19	Establishing new steady relationship with partner		
20	Finding a part-time job		
21	Sex difficulties with boy/girlfriend		
22	Failing a course		
23	Major change of health in close family member		
24	Major car accident (car wrecked, people injured)		
25	Death of your best or very good friend		
26	Family get-togethers		
27	Break-up of parent's marriage/divorce		
28	Losing a part-time job		
29	Major and/or chronic financial problems		
30	Major argument with boy/girlfriend		
31	Parent losing a job		
32	Switch in program within same college or university		
33	Losing a good friend		
34	Change of job		
35	Break-up with boy/girlfriend		
36	Minor financial problems		

Appendix 8 Beck Hopelessness Scale

Instructions: Please put an X in the box to indicate whether you think each of the following statements is TRUE or FALSE for you, at this moment in time.

		True	False
1	I look forward to the future with hope and enthusiasm		
2	I might as well give up as I can't make things better for myself		
3	When things are going badly, I am helped by knowing that they can't stay that way forever		
4	I can't imagine what my life would be like in 10 years		
5	I have enough time to accomplish the things I most want to do		
6	In the future I expect to succeed in the things I most want to do		
7	My future seems dark to me		
8	I expect to get more of the good things in life than the average person		
9	I just don't have good luck and there is no reason to think that I will in the future		
10	My past experiences have prepared me well for my future		
11	All I can see ahead is unpleasantness rather than pleasantness		
12	I don't expect to get what I really want		
13	When I look ahead to the future, I expect I will be happier than I am now		
14	Things just don't work out the way I want them to		
15	I have great faith in the future		
16	I never get what I want so its foolish to want anything		
17	It's very unlikely that I will get any real satisfaction in the future		
18	The future seems vague and uncertain to me		
19	I can look forward to more good times than bad times		
20	There's no use in really trying to get something I want because I probably won't get it		

Appendix 9 Hospital Anxiety and Depression Scale

Instructions: These questions are designed to help identify how you feel. Read each item and place an X opposite the reply which comes closest to how you have been feeling in the past few weeks. Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.
Mark only one answer to each question

1 I feel tense or "wound up"
Most of the time   _____
A lot of the time   _____
Time to time, occasionally   _____
Not at all   _____

2 I feel as if I am slowed down
Nearly all the time   _____
Very often   _____
Sometimes   _____
Not at all   _____

3 I still enjoy the things I used to do

Definitely as much   _____
Not quite so much   _____
Only a little   _____
Hardly at all   _____

4 I get a sort of frightened feeling like butterflies in the stomach
Not at all   _____
Occasionally   _____
Quite often   _____
Very often   _____

5 I get a sort of frightened feeling as if something awful is about to happen
Very definitely and quite badly   _____
Yes, but not too badly   _____
A little but it doesn't worry me   _____
Not at all   _____

6 I have lost interest in my appearance

Definitely   _____
I don't take so much as I should   _____
I may not take quite as much care   _____
I take just as much care as ever   _____

7 I can laugh and see the funny side of things
As much as I always could   _____
Not quite so much now   _____
Definitely not so much now   _____
Not at all   _____

8 I feel restless as if I have to be on the move
Very much indeed   _____
Quite a lot   _____
Not very much   _____
Not at all   _____

9 Worrying thoughts go through my mind

A great deal of the time   _____
A lot of the time   _____
From time to time but not too often   _____
Not at all   _____

10 I look forward with enjoyment to things
As much as I ever did   _____
Rather less than I used to   _____
Definitely less than I used to   _____
Hardly at all   _____

11 I feel cheerful
Not at all   _____
Not often   _____
Sometimes   _____
Most of the time   _____

12 I get sudden feelings of panic
Very often indeed   _____
Quite often   _____
Not very often   _____
Not at all   _____

13 I can sit at ease and feel relaxed

Definitely   _____
Usually   _____
Not often   _____
Not at all   _____

14 I can enjoy a good book or radio or TV programme
Often   _____
Sometimes   _____
Not often   _____
Very seldom   _____

Appendix 10 Centre for Epidemiological Studies Depression Scale

Instructions: What follows is a list of ways you might have felt or behaved. Please indicate how often you have felt this way during the past week.

		Rarely (Less than 1 day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)
1	I was bothered by things that usually don't bother me				
2	I did not feel like eating / my appetite was poor				
3	I felt that I could not shake off the blues even with help from my family / friends				
4	I felt that I was just as good as other people				
5	I had trouble keeping my mind on what I was doing				
6	I felt depressed				
7	I felt that everything I did was an effort				
8	I felt hopeful about the future				
9	I thought that my life had been a failure				
10	I felt fearful				
11	My sleep was restless				
12	I was happy				
13	I talked less than usual				
14	I felt lonely				
15	People were unfriendly				
16	I enjoyed life				
17	I had crying spells				
18	I felt sad				
19	I felt that people dislike me				
20	I could not get "going"				

Appendix 11 Suicide Probability Scale

Instructions: Please read the statements below and indicate how often you they have applied to you in the past week

	None or a little of the time	Some of the time	Good part of the time	Most or all of the time
I think of things too bad to share with others				
In order to punish others, I think of suicide				
I feel I need to punish myself for things I have done and thought				
I feel the world is not worth continuing to live in				
I feel people would be better off if I were dead				
I feel it would be less painful to die than to keep living the way things are				
I have thought of how to do myself in				
I think of suicide				

Appendix 12   Profile of Mood States

Instructions: Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE circle under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST <u>WEEK</u> INCLUDING TODAY. The numbers refer to the phrases below.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

1. Friendly	0	1	2	3	4	23. Unworthy	0	1	2	3	4	45. Desperate	0	1	2	3	4
2. Tense	0	1	2	3	4	24. Spiteful	0	1	2	3	4	46. Sluggish	0	1	2	3	4
3. Angry	0	1	2	3	4	25. Sympathetic	0	1	2	3	4	47. Rebellious	0	1	2	3	4
4. Worn out	0	1	2	3	4	26. Uneasy	0	1	2	3	4	48. Helpless	0	1	2	3	4
5. Unhappy	0	1	2	3	4	27. Restless	0	1	2	3	4	49. Weary	0	1	2	3	4
6. Clear-headed	0	1	2	3	4	28. Unable to concentrate	0	1	2	3	4	50. Bewildered	0	1	2	3	4
7. Lively	0	1	2	3	4	29. Fatigued	0	1	2	3	4	51. Alert	0	1	2	3	4
8. Confused	0	1	2	3	4	30. Helpful	0	1	2	3	4	52. Deceived	0	1	2	3	4
9. Sorry for things done	0	1	2	3	4	31. Annoyed	0	1	2	3	4	53. Furious	0	1	2	3	4
10. Shaky	0	1	2	3	4	32. Discouraged	0	1	2	3	4	54. Efficient	0	1	2	3	4
11. Listless	0	1	2	3	4	33. Resentful	0	1	2	3	4	55. Trusting	0	1	2	3	4
12. Peeved	0	1	2	3	4	34. Nervous	0	1	2	3	4	56. Full of pep	0	1	2	3	4
13.Considerate	0	1	2	3	4	35. Lonely	0	1	2	3	4	57. Bad-tempered	0	1	2	3	4
14. Sad	0	1	2	3	4	36. Miserable	0	1	2	3	4	58. Worthless	0	1	2	3	4
15. Active	0	1	2	3	4	37. Muddled	0	1	2	3	4	59. Forgetful	0	1	2	3	4
16. On edge	0	1	2	3	4	38. Cheerful	0	1	2	3	4	60. Carefree	0	1	2	3	4
17. Grouchy	0	1	2	3	4	39. Bitter	0	1	2	3	4	61. Terrified	0	1	2	3	4
18. Blue	0	1	2	3	4	40. Exhausted	0	1	2	3	4	62. Guilty	0	1	2	3	4
19. Energetic	0	1	2	3	4	41. Anxious	0	1	2	3	4	63. Vigorous	0	1	2	3	4
20. Panicky	0	1	2	3	4	42. Ready to fight	0	1	2	3	4	64. Uncertain about things	0	1	2	3	4
21. Hopeless	0	1	2	3	4	43. Good natured	0	1	2	3	4	65. Bushed	0	1	2	3	4
22. Relaxed	0	1	2	3	4	44. Gloomy	0	1	2	3	4						

Appendix 13   Rumination Induction

Instructions: For the next few minutes, try your best to focus your attention on each of the ideas on the following pages.
Read each item slowly and silently to yourself. As you read the items, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments visualising and concentrating on each item.
Please continue until the experimenter returns.

Think about: the physical sensations you feel in your body
Think about: your character and who you strive to be
Think about: the degree of clarity in your thinking right now
Think about: why you react the way you do
Think about: the way you feel inside
Think about: the possible consequences of your current mental state
Think about: how similar or different you are relative to other people
Think about: what it would be like if your present feelings lasted
Think about: why things turn out the way they do
Think about: trying to understand your feelings
Think about: how awake or tired you feel now
Think about: the amount of tension in your muscles
Think about: whether you are fulfilled
Think about: your physical appearance
Think about: whether you feel stressed right now
Think about: the long-term goals you have set
Think about: the amount of certainty you feel
Think about: your present feelings of fatigue or energy
Think about: possible explanations for your physical sensations
Think about: how hopeful or hopeless you are feeling
Think about: the level of motivation you feel right now
Think about: the degree of helplessness you feel
Think about: the degree of calmness or restlessness you feel
Think about: the possible consequences of the way you feel
Think about: what your feelings might mean
Think about: how sad or happy you are feeling
Think about: the expectations your family has for you
Think about: why your body feels this way
Think about: why you get this way sometimes
Think about: how passive or active you feel
Think about: what people notice about your personality
Think about: how optimistic or pessimistic you feel about the future
Think about: how weak or strong your body feels right now
Think about: the degree of relaxation or agitation you feel
Think about: the kind of person you think you should be
Think about: the degree of control you feel right now
Think about: what would happen if your current physical state lasted
Think about: sitting down and analysing your personality
Think about: why you turned out this way
Think about: the things that are most important in your life
Think about: how quick or slow your thinking is right now
Think about: the degree of decisiveness you feel
Think about: trying to understand who you are
Think about: how you feel about your friendships
Think about: whether you have accomplished a lot so far

Appendix 14 Distraction Induction

Instructions: For the next few minutes, try your best to focus your attention on each of the ideas on the following pages.
Read each item slowly and silently to yourself. As you read the items, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments visualising and concentrating on each item.
Please continue until the experimenter returns.

Think about: and imagine a boat slowly crossing the Atlantic
Think about: the layout of a typical classroom
Think about: the shape of a large black umbrella
Think about: the movement of an electric fan on a warm day
Think about: raindrops sliding down a window pane
Think about: a double-decker bus driving down a street
Think about: and picture a full moon on a clear night
Think about: clouds forming in the sky
Think about: the layout of the local shopping centre
Think about: and imagine a plane flying overhead
Think about: fire darting round a log in a fire-place
Think about: and concentrate on the expression on the face of the *Mona Lisa*
Think about: the car park at a large supermarket
Think about: two birds sitting on a tree branch
Think about: the shadow of a stop sign
Think about: the layout of the local post office
Think about: the structure of a high-rise office building
Think about: and picture the Eiffel Tower
Think about: and imagine a lorry load of apples
Think about: the pattern on an Oriental rug
Think about: the 'man in the moon'
Think about: the shape of the continent of Africa
Think about: a band playing outside
Think about: a group of polar bears fishing in a stream
Think about: the shape of Sydney Opera House
Think about: the shape of Great Britain
Think about: the way Stonehenge looks at sunset
Think about: the outline of the Houses of Parliament
Think about: a train stopped at a station
Think about: a lone cactus in the desert
Think about: the shape of the country Italy
Think about: a row of shampoo bottles on display
Think about: a petrol station on a major road
Think about: the fuzz on the shell of a coconut
Think about: the queens' head on a stamp
Think about: a band playing the National Anthem
Think about: the shape of a cello
Think about: the birthmark on Gorbachev's head
Think about: the shape of the United States of America
Think about: the baggage claim area at the airport
Think about: the size of the Statue of Liberty
Think about: the shape of a cricket bat
Think about: a freshly painted door
Think about: the shiny surface of a trumpet
Think about: a kettle coming to the boil

Appendix 15 Dot Probe Stimuli for first pilot

Set One				Set Two			
Negative Word	*Neutral Pairing*	*Positive Word*	*Neutral Pairing*	*Negative Word*	*Neutral Pairing*	*Positive Word*	*Neutral Pairing*
suffer	parked	love	vote	grave	filed	humorous	wildlife
wound	dried	happy	green	cancer	saddle	ardent	willow
attacks	physics	joy	bag	desperate	variables	eager	total
victims	smelled	tender	sooner	danger	league	lively	ladder
tease	aisle	excited	voltage	defeat	museum	peaceful	rational
discouraged	connections	devoted	witness	shot	cars	pleased	academy
gloomy	pastel	relieved	stimulus	trauma	enjoin	calm	keen
tormented	mythology	smile	uncle	kill	shop	glorious	validity
panicky	clarets	friendly	occasion	worried	context	cheer	salad
insecure	fetching	hopeful	shallow	powerless	multitude	carefree	civilian
horror	wagons	amazed	expert	devastated	stagecoach	pleasant	resident
dead	data	proud	yield	angry	curve	pious	maple
afraid	detail	enjoying	sandwich	threat	varied	bright	beauty
bitter	handle	faithful	gigantic	severe	recall	sunny	juice
evil	hill	cheerful	sanction	sinister	integral	lucky	onion
fright	sipped	fun	cow	assault	bottles	sexy	vest
disease	remarks	win	hat	lost	read	kiss	taxi
worthless	batteries	valentine	repentant	despised	tomatoes	sex	arm
rejected	quantity	affection	appliance	humiliated	waterproof	promotion	sentiment
bomb	crew	music	table	injury	holder	triumphant	skyscraper
worst	owned	joyful	kettle	intimidated	coefficient	miracle	cabinet
catastrophe	approximate	thrill	rattle	awful	tract	passion	journal
lethal	racket	orgasm	locker	mourn	scans	delight	prairie
ignored	lighted	comedy	finger	scared	planet	victory	passage
tragic	rector	terrific	mischief	conflict	detailed	success	patient
terror	pupils	paradise	elevator	dull	flew	treasure	reverent
trap	tent	laughter	bathroom	murder	junior	humour	engine
hazard	ballot	champion	medicine	agitation	fireplace	mother	street
hopeless	feathers	loved	truck	incurable	reclaimed	rainbow	hairpin
inadequate	transition	beach	chair	stress	cities	cash	tool

Appendix 16 Dot Probe Stimuli for second pilot

Set One				Set Two			
Negative Word	*Neutral Pairing*	*Positive Word*	*Neutral Pairing*	*Negative Word*	*Neutral Pairing*	*Positive Word*	*Neutral Pairing*
paralysis	fragrance	pillow	hammer	disaster	reserved	luxury	autumn
anguished	appliance	desire	favour	unhappy	passage	rescue	fabric
punishment	lighthouse	trophy	banner	poverty	highway	caress	golfer
distressed	skyscraper	pretty	doctor	divorce	village	joyful	salute
unfaithful	nonchalant	orgasm	errand	helpless	startled	thrill	rattle
depression	restaurant	sunset	custom	murderer	clothing	riches	invest
headache	mischief	truth	hotel	hostage	gymnast	beauty	column
sickness	kerosene	party	black	leprosy	ketchup	family	church
terrible	busybody	music	board	traitor	volcano	mother	street
suffocate	repentant	peace	table	crucify	context	honest	avenue
syphilis	pancakes	proud	grass	suicide	vehicle	comedy	clouds
accident	innocent	savior	option	useless	stomach	humour	engine
dead	dark	friend	chance	hate	iron	christmas	leisurely
pain	ship	snuggle	bandage	war	cat	enjoyment	sentiment
rape	vest	spring	theory	hurt	foam	promotion	penthouse
sad	cow	ecstasy	garment	jail	bowl	acceptance	employment
debt	bake	diamond	subdued	sick	milk	satisfied	orchestra
hell	news	rainbow	whistle	bomb	fish	vacation	windmill
vomit	jelly	wedding	journal	thief	ankle	handsome	kerchief
loser	diver	liberty	curious	grief	elbow	paradise	elevator
drown	quart	delight	nourish	demon	salad	treasure	radiator
slave	swift	sunrise	reunion	upset	razor	kindness	consoled
ulcer	swamp	sunlight	corridor	gloom	tower	terrific	umbrella
toxic	aloof	engaged	opinion	cruel	stove	romantic	curtains
cancer	barrel	excellence	aggressive	morgue	limber	success	quality
killer	sphere	confident	astronaut	abuse	nurse	victory	machine
burial	violin	waterfall	sheltered	detest	garter	adorable	reverent
misery	tennis	valentine	obsession	devil	adult	diploma	reptile
hatred	humble	affection	intellect	rabies	runner	passion	utensil
lonely	legend	progress	hospital	trauma	gender	justice	natural
death	field	pleasure	scissors	afraid	yellow	aroused	anxious
betray	poster	champion	contents	stench	mantel	cuddle	nipple
rotten	kettle	birthday	bathroom	prison	finger	miracle	lantern
corpse	cannon	laughter	computer	stress	window	wealthy	privacy
maggot	icebox	friendly	identity	pollute	glacier	admired	prairie
poison	coarse	graduate	nonsense	victim	butter	triumph	hydrant
funeral	teacher	win	hat	loneliness	inhabitant	car	boy
torture	agility	joke	chin	toothache	headlight	fame	lamp
despise	trumpet	hug	nun	discomfort	astonished	sex	bar
fearful	cabinet	fun	odd	depressed	lightning	sexy	frog
assault	cottage	joy	bus	terrorist	hairdryer	kiss	lion
crushed	nursery	gift	dawn	humiliate	lightbulb	god	air
disloyal	mushroom	free	body	rejected	mountain	loved	wagon
failure	serious	cheer	trunk	terrified	sceptical	happy	glass
seasick	swimmer	lucky	stiff	troubled	medicine	honor	chair
mutilate	pamphlet	merry	stool	slaughter	abundance	baby	save
bankrupt	activate	cash	tool	infection	athletics	beach	coast
tragedy	patient	home	part	nightmare	hamburger	love	wife