Trait Motivation and Emotion Regulation as Predictors of Anxiety

by

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Abstract

Trait avoidance motivation is a known contributing factor in the development of anxiety disorders such as generalised anxiety disorder and social anxiety disorder, with individuals often avoiding situations and experiences which provoke worry. While the relationship between avoidance motivation and anxiety disorders has been confirmed across a range of studies, there are some general inconsistencies, leading to the argument that there may be additional motivational and cognitive factors that play a role in the experience of anxiety, among certain groups.

The primary intention of this thesis was to examine two potential contributing factors; approach motivation and maladaptive emotion regulation. Approach motivation is a construct which has come into focus in anxiety research due to some important modifications to Reinforcement Sensitivity Theory. Among the new predictions and clarifications to the original theory, it has been proposed that the systems responsible for detecting and processing reward and threat may interact. More specifically, the joint subsystems hypothesis proposes that anxiety is the result of conflict between simultaneous activation of the system responsible for approach motivation and the system responsible for avoidance motivation.

On the other hand, researchers have also begun to implicate maladaptive emotion regulation in the development and maintenance of anxiety disorders. Emotion regulation is the process of modifying emotional states, in order to influence and control experienced emotion. People high on the tendency to avoid situations may also be more likely to avoid, or suppress, their emotions. To date, it has not yet been investigated whether emotion regulation plays a moderating role in the relationship between trait motivation and level of anxiety.
Four studies investigating the relationships between trait motivation, maladaptive emotion regulation, and severity of anxiety disorder symptoms (generalised anxiety disorder and social anxiety disorder) were conducted. Study one (N=408) provided support for a joint relationship between approach and avoidance motivation in the prediction of anxiety symptoms, in low risk groups, although the direction of the relationship was unexpected. Study two (N=431) provided evidence that, in the low risk groups, both low approach motivation and high maladaptive emotion regulation significantly predict severity of anxiety disorder symptoms, even after controlling for the effect of avoidance motivation. Study three (N=209) was conducted to investigate whether the relationship between approach motivation and level of anxiety could be explained by a comorbidity with depression. While depression was found to be a significant predictor of anxiety, results indicated that the relationship between approach motivation and severity of anxiety disorder symptoms was independent of depression. Finally, study four (N=209) provided a quasi-experimental test of the relationships between trait motivation, maladaptive emotion regulation, and anxiety, by measuring state anxiety in response to an anxiety-inducing vignette. Results indicated that a high level of avoidance motivation was the only predictor of state anxiety following a mood induction procedure, with low approach motivation and maladaptive emotion regulation not making significant predictions.

In sum, this thesis demonstrates that low approach motivation and maladaptive emotion regulation contribute to the prediction of anxiety symptoms, in addition to high avoidance motivation, within groups at low risk for an anxiety disorder. Alternately, for those people at high risk for an anxiety disorder, high avoidance motivation is largely the sole predictor of anxiety. The findings are
discussed within the context of revised Reinforcement Sensitivity Theory and the joint subsystems hypothesis, and incorporate a discussion of clinical directions for anxiety research.
Synopsis

High avoidance motivation is an established risk factor in the development of anxiety disorders such as generalised anxiety disorder and social anxiety disorder (e.g. Segarra et al., 2007), and is characterised by an avoidance of situations and experiences which provoke worry. This avoidant behaviour can be better understood when placed within a theory of personality in which a behavioural inhibition system (e.g. Gray, 1987) explains why some people have a tendency to experience high levels of trait avoidance motivation. While the relationship between avoidance motivation and anxiety disorders has been confirmed across a number of studies (e.g. Campbell-Sills, Liverant, & Brown, 2004; Segarra, et al., 2007), there is some inconsistency regarding the strength of these results. While the relationship appears to be strong under certain conditions, several longitudinal studies have revealed that the presence of heightened behavioural inhibition in childhood does not always result in anxiety disorders later in life (e.g. Hirshfeld-Becker et al., 2007). This indicates that there are additional contributing factors that act as risk factors. However, these risk factors are not yet fully understood. The intention of this thesis was to examine two potential risk factors: approach motivation and maladaptive emotion regulation.

A motivational construct which has come into focus in anxiety research due to some important modifications to Gray’s (1987) Reinforcement Sensitivity Theory is approach motivation. Among the new predictions and clarifications to Gray’s original theory, it has been proposed that the systems responsible for detecting and processing reward and threat may interact (e.g. Gray & McNaughton, 2000). More specifically, it is proposed that anxiety is the result of conflict between simultaneous activation of the reward system and the punishment system (Smillie, Pickering, & Jackson, 2006).
In addition, researchers have recently begun to examine and confirm the role of emotion regulation in the development and maintenance of anxiety disorders (e.g. Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). Emotion regulation is the process of modifying emotional states, in order to influence and control experienced emotion. People high on the tendency to avoid situations may also be more likely to avoid, or suppress, their emotions. A tendency to utilise maladaptive emotion regulation strategies may increase the risk of those high on avoidance motivation developing an anxiety disorder. However, it has not yet been investigated whether emotion regulation plays a moderating role in the relationship between trait motivation and severity of anxiety disorder symptoms.

The primary aims of this thesis are to determine the role of approach motivation in predicting the severity of anxiety disorder symptoms (social anxiety disorder and generalised anxiety disorder), and also to determine whether emotion regulation moderates the relationship between motivation and anxiety, in a community sample. The major contribution of this thesis is an attempt to integrate knowledge from the trait motivation literature with the literature examining the cognitive mechanism of emotion regulation, in order to more comprehensively explain heightened anxiety disorder symptoms.

Chapter One: The Role of Approach and Avoidance Motivation

The first chapter of the literature review details the study of approach and avoidance motivation from an evolutionary perspective. The strengths of this theoretical framework are demonstrated, followed by a discussion of how anxiety disorders can also be understood utilising evolutionary concepts. The anxiety disorders to be investigated in more depth within this literature review are generalised anxiety disorder and social anxiety disorder, and so a summary of diagnosis, prevalence, and
severity details are provided. Finally, there is a discussion of the empirical research supporting the hypothesised link between approach and avoidance motivation and anxiety disorders. Particularly, the chapter addresses the concern that, while an important risk factor, there may be certain conditions where avoidance motivation does not predict the severity of anxiety disorder symptoms, indicating the presence of additional factors.

**Chapter Two: The Role of Emotion Regulation**

Chapter Two examines emotion regulation, a potential risk factor for anxiety disorders that is gaining momentum in the research literature. After a brief introduction to the definition and history of emotion regulation, including current measurement issues, the chapter demonstrates the importance of considering emotion regulation within an examination of anxiety disorder research. Importantly, this chapter considers the potential relationship between emotion regulation and trait motivation. To date, cognitive factors have been largely ignored when examining the relationship between avoidance motivation and anxiety disorders, and it is proposed here that a dominant avoidance motivational system, combined with a maladaptive emotion regulation style, may contribute to the development of anxiety disorders.

**Chapter Three: Methodological Issues**

Based on Chapters One and Two, Chapter Three presents the methodological issues that arose throughout the literature review process. These issues include a consideration of the definition of emotion regulation, with discussion of how the concepts of emotion regulation and coping differ; the best available measures of emotion regulation and trait motivation were considered and critiqued; and finally, an argument for the use of web-based questionnaires as a valid form of data collection was put forth.
Chapter Four: Study One

Chapter Four provides the rationale, methodology, results, and discussion of the first study. Drawing on Reinforcement Sensitivity Theory, this study aimed to empirically investigate whether there was a joint relationship between approach and avoidance motivation in the prediction of anxiety disorder symptoms, and whether there were differences between those at high risk for an anxiety disorder and those at low risk.

Chapter Five: Study Two

Chapter Five details the second study and provides the rationale, methodology, results, and discussion. This study examined the possibility that a heightened severity of anxiety disorder symptoms exhibited by those high on avoidance motivation and low on approach motivation was moderated by the impact of maladaptive emotion regulation. An additional focus of this study was to determine whether the relationships between approach and avoidance motivation, maladaptive emotion regulation, and anxiety differed by level of risk and type of anxiety disorder (i.e. generalised anxiety disorder and social anxiety disorder) measured.

Chapter Six: Study Three

Chapter Six contains study three and details the rationale, methodology, results, and discussion. This study stemmed from the findings from study two in which low approach motivation was significantly correlated with social anxiety disorder symptoms in a low risk sample. As low approach motivation is often associated with depression, study three examined the possibility that this relationship between low approach motivation and severity of social anxiety disorder symptoms could be explained by a comorbidity with depression.
Chapter Seven: Study Four

Chapter Seven provides the rationale, methodology, results, and discussion of the fourth and final study of the thesis. This study aimed to empirically investigate whether approach and avoidance motivation, and emotion regulation, predicted response to an anxiety-inducing vignette.

Chapter Eight: General Discussion

Chapter Eight contains the general discussion, which provides a summary of the results from each of the four studies. Following this, the implications for understanding the role of approach motivation in anxiety disorder research was considered, followed by a discussion of the role of emotion regulation within this research. Turning to the broader literature, the implications for the personality-psychopathology literature were considered. Finally, limitations and future directions were discussed.
CHAPTER ONE

The Role of Approach and Avoidance Motivation in Anxiety

Introduction

The aim of the present chapter is to introduce the motivational systems of approach and avoidance motivation, and to demonstrate their relationship with anxiety disorders such as generalised anxiety disorder and social anxiety disorder. The joint subsystems hypothesis and revised Reinforcement Sensitivity Theory are introduced as possible theoretical explanations for a joint relationship between approach and avoidance motivation. Finally, empirical evidence is presented justifying this claim.

Motivational Systems of Approach and Avoidance

In evolutionary terms, immediately upon presentation of a stimulus, the organism reflexively evaluates its valence, which then produces the readiness to either approach or avoid the stimulus (e.g. Lewin, 1935). Successful adaptation to the environment is crucial among all animate forms of life, and approach and avoidance motivations are believed to be behaviourally predisposed among humans (Elliot, 2006). The evolutionary importance of approach and avoidance motivation as primary motivational systems in all living organisms, both physically and psychologically, is recognised across a range of disciplines and theoretical frameworks, as noted by researchers such as Elliot (Elliot, 1999, 2008; Elliot & Church, 1997; Elliot & Covington, 2001; Elliot & Mapes, 2005; Elliot & Thrash, 2002; Gable, Reis, & Elliot, 2003). It has been proposed that approach motivation facilitates thriving (such as obtaining food, adequate shelter, and a compatible mate),
while avoidance motivation facilitates survival (such as defensive reactions, withdrawal, and protection; e.g. Elliot, 2008; Elliot & Covington, 2001).

The evolutionary distinction between approach and avoidance motivation also has applicability in psychological research. There is a long history of investigation into approach and avoidance motivational systems within the field of psychological research, and particularly, personality research. For example, Cloninger (1987) proposed a biosocial theory of personality in which the three personality dimensions were novelty seeking, harm avoidance, and reward dependence, proposing that each of these dimensions is genetic, and heritable. Cloninger (1987) further expanded this theory by proposing that a behavioural activation system and a behavioural maintenance system work together, in that approach behaviour and the attainment of rewards for behaviour are influenced by the activation system, while maintenance of previously rewarded behaviours and resistance to extinction are influenced by the maintenance system. Conversely, both the activation system and the maintenance system act in opposition with the inhibition system, which inhibits approach to novel stimuli and increases the risk of extinction of non-rewarded behaviours (Cloninger, 1987).

At the same time that Cloninger was writing about approach and avoidance, J. A. Gray was also theorising about human motivation (e.g. Gray, 1987). Based on evidence from animal research, Gray (1970; 1978; 1987) proposed his Reinforcement Sensitivity Theory (RST), with its primary argument that there are two fundamental neurological systems in which the major dimensions of personality fall under; a behavioural activation system (BAS), comprised of a reward mechanism, and a behavioural inhibition system (BIS), comprised of a punishment mechanism. These systems were proposed to be distinct, but related, with individual
differences evident in terms of level of sensitivity to both reward and punishment (Gray, 1987). Those with high levels of approach motivation (AppM) were thought to have the tendency to be outgoing, novelty-seeking individuals, while those with high levels of avoidance motivation (AM) were proposed to be more inhibited, fearful individuals. Gray’s RST originally proposed that the BIS facilitates the expression of aversive motivation, or anxiety traits, while the BAS facilitates the expression of approach motivation, or impulsivity traits (Gray, 1970; 1978). Specifically, activation of the BIS occurs in response to conditioned punishment stimuli and results in increases in physiological arousal, attention to the environment, state anxiety, and negative affect (Revelle, 1995). The cognitive role of the BIS is to notice these physiological and psychological changes and to inhibit and modify behaviour in order to reduce the perception of threat (Revelle, 1995). There have been some important revisions to RST and these are discussed in detail later in this chapter.

A number of other prominent researchers have also theorised about these motivational systems. Lang (1995) used the term ‘action dispositions’ to refer to emotion, defining them as states of readiness to act, and argued that they are driven by two motivational systems, one appetitive, and one aversive. Action dispositions can vary in terms of the expressive and evaluative language used to describe them, the physiological changes that occur, and behavioural patterns that accompany them (Lang, 1995). Lang proposed that there are two related dimensions of affect; valence, and activation. As an example, he documents the finding that people are more likely to have larger startle reflexes in response to presentation of unpleasant pictures than pleasant ones (Lang, 1995). Thus, consistent with Gray, human motivation is conceptualised as comprising of an approach system and an avoidance system.
In their review of Watson and Tellegen's two-dimensional structure of affect, which included the four bipolar dimensions of pleasantness, positive affect, engagement, and negative affect, Watson, Wies, Vaidya, and Tellegen (1999) highlighted the limitations of the model, such as its failure to fit the data adequately. Using the PANAS, these authors found that low positive affect, unpleasantness, and high negative affect clustered together while pleasantness, high positive affect, and engagement clustered together; they labelled these clusters 'Positive Activation' (PA) and 'Negative Activation' (NA). PA and NA refer to dispositional, trait affect, rather than affective states, with PA referring to the tendency to experience positive states such as enthusiasm and joy, and NA referring to the tendency to experience negative states such as fear and anger (Watson et al., 1999). Further, NA has been found to be strongly correlated with Neuroticism, while PA has been found to be strongly correlated with Extraversion; therefore, PA and NA are proposed to be the subjective components of the behavioural activation system and behavioural inhibition system, respectively, which mediate approach and avoidance behaviour (Watson, et al., 1999). Again, this demonstrates the consistent conceptualisation of two motivational systems across various domains; one relating to approach, and one relating to avoidance.

Similarly, Carver and various colleagues (Carver, 2004; Carver & Scheier, 1990, 1998, 2008; Carver & White, 1994) have developed a theory of emotion regulation which incorporates action tendencies, as originally suggested by Lang (1995), while also explaining how dysregulation of emotion can lead to psychopathology (Rodebaugh & Heimberg, 2008). Carver suggested that action tendencies are involved in the motivation of the pursuit of goal attainment, and that it is the perceived rate of progress towards these goals that can lead to problems with
emotion regulation. Motivation may either be focussed towards the pursuit of positive goals and the approach of desired outcomes, or the pursuit of safety and the avoidance of negative outcomes (Carver, Sutton, & Scheier, 2000). Goals are believed to be pursued by the function of feedback loops; a discrepancy-reducing feedback loop, and a discrepancy-enlarging feedback loop (Carver, 2004). The discrepancy-reducing feedback loop encourages individuals to approach the goal in order to reduce discrepancies between goals and present situations, while the discrepancy-enlarging feedback loop encourages individuals to avoid the anti-goal in order to increase discrepancies between their present situation and the unwanted goal (Carver, 2004). Anxiety is believed to be a result of an unsatisfactory rate of progress towards the goal of avoiding negative outcomes, which results in preoccupation with these goals, which then leads to impairment of the pursuit of positive outcomes.

Further, Elliot and Covington (2001) argued for the central nature of approach-avoidance motivation across many domains of research, based on the following reasons: 1) a long history in intellectual thought; 2) applicability across forms of animate life; 3) immediacy and automaticity of approach and avoidance processes (unlearned and reflexive); 4) neurophysiological data indicating the presence of approach and avoidance brain systems; and 5) it intuitively makes sense. Similarly, Gable, Reis, and Elliot (2003) argued for the adoption of a single appetitive-aversive systems model, and they proposed that the model adequately explains the two behavioural systems found across many domains of inquiry. The first behavioural system is proposed to involve sensitivity to reward and obtaining positive outcomes, while the second behavioural system is believed to involve sensitivity to punishment and avoiding negative outcomes (Gable, et al., 2003). Additionally, Carver and colleagues (2000) conducted their own review of the
literature on approach and avoidance motivation, proposing that a behavioural activation system manages approach behaviours and positive affect, while a behavioural inhibition system manages avoidance behaviours and negative affect.

These researchers have all shown that, theoretically, approach-avoidance motivation has wide applicability across domains. However, Gable and colleagues (2003) took this one step further, empirically testing this claim. A study was conducted which examined approach-avoidance across research domains, such as affect, personality, cognitive evaluation, motivation, and neurophysiology. Measures relevant to approach shared common variance (positive affect, behavioural activation, extraversion, approach coping, positive temperament), while measures relevant to avoidance shared common variance (negative affect, behavioural inhibition, neuroticism, avoidance coping, negative temperament; Gable, et al., 2003), offering support for their initial theory.

Theoretically, and empirically, it is clear that investigation of trait motivational systems is important in many domains of psychological research. One particular domain of research which has benefited substantially from considering approach and avoidance motivation is that of anxiety.

An Introduction to Anxiety Disorders from an Evolutionary Perspective

From a motivational perspective, according to Gray (1994), anxiety occurs as the result of a behavioural predisposition towards a dominant avoidance motivation system. An examination of the behavioural effects of anti-anxiety drugs found that this class of drugs reduced anxiety by impairing conditioned behavioural responses to stimuli that warn of punishment or frustrative non-reward (Gray, 1978). These concepts, derived from learning theory, were then applied by Gray to propose that a
behavioural inhibition system was responsible for reactions to conditioned fear and frustration stimuli (Gray, 1978). Following on from this, Gray later proposed that the resultant subjective state experienced following high levels of activation in the BIS was anxiety (Gray, 1994). Gray’s conceptualisation of anxiety utilising evolutionary concepts of fight and flight, or approach and avoidance, has been widely acknowledged and utilised in the anxiety literature, leading to a greater understanding of anxiety disorders from an evolutionary perspective. The particular relevance of Gray’s RST to personality-psychopathology associations makes it the most appropriate theory of motivation to utilise in this thesis.

Anxiety is considered to be a normal response to threat, and can be beneficial in certain situations. It has been proposed that emotional responses have been shaped by natural selection in order to increase ability to cope in situations involving threat or opportunity (Marks & Nesse, 1997). Every emotion is thought to have the utility to cope with a particular fitness task better than others, where the concept of Darwinian fitness involves the selection of those people most fit to both survive and reproduce; for example, fear is helpful in situations where a threat is present (Glover, 2011; Marks & Nesse, 1997). In the same way, the evolutionary function of anxiety is to increase fitness in situations where there is the risk of a threat to any reproductive resources; “such resources include not only life and health, but also relationships, property, status, reputation, skill, and anything else that could increase Darwinian fitness” (Marks & Nesse, 1997, p. 58). There are four ways in which fear and anxiety are thought to provide protection from an evolutionary perspective; escape or avoidance, aggressive defense, freezing or immobility, and submission or appeasement (Marks & Nesse, 1997). Different situations elicit different types of anxiety response, such as freezing in high places, or submission in a socially
threatening situation, and so it is thought that the different types of anxiety evolved to provide the best level of protection in specific situations (Marks & Nesse, 1997). Additionally, there are four types of dangers that humans may experience as potential fitness threats; predators, contagious viruses, threats to social status, and violence from other humans (Boyer & Bergstrom, 2011).

There is an important difference between fear and anxiety when considering fitness threats; fear is usually associated with an actual and present threat, with behaviour oriented towards moving away from the situation, while anxiety is associated with a potential or distant threat, with behaviour oriented towards the situation (Boyer & Bergstrom, 2011; Glover, 2011; McNaughton & Corr, 2004). Anxiety has evolved to become activated in response to potential threats, rather than after the threatening situation has occurred, because, from an evolutionary perspective, those who had a greater vigilance and alertness to danger were more able to locate the source of potential threat and respond more quickly, and were therefore likely to live longer (Glover, 2011; Marks & Nesse, 1997). Through learning, specific reactions to specific stimuli develop; we are predisposed to focus our attention on cues that have been shaped as threatening, such as snake-like patterns, or tall grass, in addition to the sight of a snake itself (Boyer & Bergstrom, 2011). These processes lead to increased fitness by allowing rapid identification of threatening cues, and easy access to the best response for each threatening situation.

It is proposed that this process of threat detection may be hypersensitive in domains such as the ones identified above, where, in evolutionary terms, the cost of false alarms to fitness is less than the result of failing to detect a threat (Boyer & Bergstrom, 2011; Maximino, Marques de Brito, & Gouveia Jr, 2010). Where the risk is perceived to be low, behaviour becomes more flexible (Maximino, et al., 2010).
Anxiety disorders occur when there are problems with regulation of anxiety; for example, if there is an excessively high level of anxiety for the situation, or a type of anxiety is experienced that is inappropriate for the situation (Marks & Nesse, 1997). The law of diminishing returns has been applied to further explain when anxiety becomes maladaptive; while increases in anxiety may lead to protective gains, it may also involve greater costs, and so it is at the point where the costs of increased anxiety outweigh the benefits that problems begin to occur (Marks & Nesse, 1997).

Research has consistently documented that anxious individuals show attentional biases towards threatening stimuli (e.g. Beck & Clark, 1997; Cisler & Koster, 2010). Beck and Clark (1997) proposed that those individuals high on anxiety were more likely to interpret stimuli as threatening or dangerous than non-anxious individuals. The anxious individual also underestimates their ability to cope with the situation and the potential for safety within the environment (Beck & Clark, 1997). Further, Cisler and Koster (2010) highlighted that anxious individuals are more likely to experience threat at higher intensities than non-anxious individuals, and experience difficulty disengaging from the threat. Individual differences in the perception of threat (such as perceived level of threat and perceived inescapability of threat) in response to threatening stimuli, as a result of heightened AM, has been found to predict defensive behaviour (e.g. Blanchard et al., 2001), and may also play a role in the development of anxiety disorders.

Problematic levels of anxiety may then be diagnosed as one of a number of anxiety disorders listed in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 2000), such as generalised anxiety disorder and social anxiety disorder.
Types of Anxiety Disorders

Generalised anxiety disorder.

Generalised anxiety disorder (GAD) is characterised by the core feature of worry (Turk, et al., 2005), with DSM-IV diagnosis based around this experience of worry and excessive anxiety. Worry must occur more days than not for a period of at least six months, be difficult to control, and cause significant impairment in daily functioning (American Psychiatric Association, 2000). Further, at least three of the following six symptoms must be present; feelings of restlessness, being easily fatigued, difficulty concentrating, irritability, muscle tension, and sleep disturbance (American Psychiatric Association, 2000).

Social anxiety disorder.

Social anxiety disorder (SAD) was first introduced in the 1970s (Morris, Stewart, & Ham, 2005), and DSM-IV (American Psychiatric Association, 2000) diagnosis is based on an individual’s persistent fear of one or more social situations, such as public speaking (American Psychiatric Association, 2000). The social situation must invoke the following to be considered for diagnosis: a fear of negative evaluation, which has been noted as a central feature of SAD (Weeks, Heimberg, Rodebaugh, & Norton, 2008b); a feeling of anxiety; recognition that the fear is excessive or unreasonable; and an attempt to avoid the situation or enduring it with intense anxiety (American Psychiatric Association, 2000). Further, the distress experienced during these social situations must significantly interfere with the individual’s daily functioning (American Psychiatric Association, 2000).
Further statistics.

Based on a nationally representative sample of 9282 participants in the United States, anxiety disorders have been reported to be the most prevalent class of DSM-IV psychiatric disorders, both over a twelve-month period (18.1%; Kessler, Chiu, Demler, & Walters, 2005b) and in terms of lifetime diagnoses (28.8%; Kessler et al., 2005a). In terms of severity, 22.8% of anxiety disorders were classified as serious (Kessler, et al., 2005b). Women were more likely to experience anxiety disorders, while the median age of onset for anxiety disorders was 11 years, with the majority of cases between the ages of six to 21 years (Kessler, et al., 2005a).

SAD was recorded as the fourth most prevalent lifetime disorder (12.1%; Kessler, et al., 2005a), and second most prevalent disorder over a twelve-month period (6.8%; Kessler, et al., 2005b). A total of 29.9% of cases were classified as serious (Kessler, et al., 2005b). GAD was less prevalent than SAD in the sample, with a lifetime prevalence rate of 5.7% (Kessler, et al., 2005b) and twelve-month prevalence rate of 3.1% (Kessler, et al., 2005a). Severity rates were similar to that of SAD, with 32.3% of cases classified as severe (Kessler, et al., 2005b).

In a summary of findings from the National Comorbidity Study Replication, involving 9,282 participants, Merikangas and Swanson (2010) reported a strong degree of concurrence between depression and anxiety; with odds ratios of 5.89 for SAD and 5.74 for GAD, indicating that people with anxiety disorders such as GAD and SAD are at significantly increased risk of comorbid depression, and vice versa.

A National Survey of Mental Health and Wellbeing reported that anxiety disorders were the most common class of mental disorders in Australian adults (aged 16-85; Slade, Johnson, Teeson, Whiteford, Burgess, Pirkis, & Saw, 2009), with one in seven adults (14.4%) experiencing an anxiety disorder over a twelve-month
period. SAD was the second most prevalent type of anxiety disorder (4.7%), while GAD was the fourth most prevalent type of anxiety disorder (2.7%; Slade et al., 2009).

**The Relationship between Avoidance Motivation and Anxiety**

While the theoretical literature supporting a link between avoidance motivation and anxiety disorders is strong, less work has been conducted examining this link empirically. In general, the personality literature indicates that there is a consistent relationship between AM and anxiety across studies; however, the strength of this association varies. Correlations between AM (Carver & White’s BIS or Gray’s conceptualisation of BIS) and various measures of anxiety ranged from 0.26 to 0.66 (e.g. Campbell-Sills, Liverant, & Brown, 2004; Jorm et al., 1999; Segarra, et al., 2007), depending on the measure of anxiety used.

More specifically, a large community sample of 1803 young adults, aged between 19 and 21 years of age, revealed that those people with a lifetime diagnosis of anxiety demonstrated significantly higher AM scores than those without a lifetime diagnosis of anxiety (Johnson, Turner, & Iwata, 2003). Further, a study comparing 40 people with GAD and 40 people without GAD determined that those with GAD had significantly higher levels of AM than those without GAD (Gomez & Francis, 2003). However, the conceptualisation of AM was taken to be a combination of neuroticism and trait anxiety, which limits the validity of results.

In addition, a two year longitudinal study, which followed 606 outpatients with anxiety and mood disorders over the course of their treatment, found that AM significantly predicted depression, GAD, and SAD, with the strongest results being reported among GAD participants (Brown, 2007). Importantly, patients with higher initial levels of AM experienced less symptom improvement in both SAD and GAD.
over the course of the study (Brown, 2007). A number of other studies have also
demonstrated a relationship between AM and anxiety (e.g. Kimbrel, Nelson-Gray, &
Mitchell, 2007; Muris, Meesters, de Kanter, & Timmerman, 2005), indicating that a
heightened sensitivity to threat is an important component of the experience of
anxiety.

The temperament literature expands the depth of knowledge in this area, due
to their focus on longitudinal, rather than cross-sectional, research designs. In general
terms, behavioural inhibition (BI) is usually assumed to represent the childhood
manifestations of avoidance motivation, but the specific definition from the
temperament literature is that it is a predisposition to be shy and fearful as a toddler,
and cautious and withdrawn during early schooling, with a tendency to avoid
exploration of novel items and experiences (Manassis, Hudson, Webb, & Albano,
2004; Shamir-Essakow, Ungerer, & Rapee, 2005). BI has been demonstrated to be
moderately stable in children aged between two and five years of age; that is, two
year old children who demonstrate tendencies towards behavioural inhibition
continue to show these tendencies over the next few years (Kagan, 2008).

The majority of the temperament literature also provides evidence for the
relationship between BI and anxiety disorders (e.g. Biederman et al., 1993;
Dalrymple, Herbert, & Gaudiano, 2007; Muris & Meesters, 2002; Shamir-Essakow,
et al., 2005). In a retrospective study with 102 adult participants diagnosed with
SAD, Dalrymple and colleagues (2007) found BI to be the only significant predictor
of severity of SAD, as retrospectively measured at infancy, toddlerhood, younger
childhood, older childhood, younger teenager, older teenager, and presently.
Developmental factors, such as the experience of a socially traumatic event during
childhood, did not predict symptom severity. Further, in a cross-sectional study that
involved 104 children aged between three and four years of age, conducted as part of a larger intervention program, BI was found to have a significant, positive association with anxiety, after controlling for insecure attachment and maternal trait anxiety (Shamir-Essakow, et al., 2005), indicating that this association is more than just a result of familial predisposition. Additionally, a large longitudinal study, involving both a clinical and a community cohort, revealed that those children who were behaviourally inhibited at baseline had significantly higher rates of multiple anxiety disorders, avoidant disorder, and phobic disorder, at a three year follow-up, than non-inhibited children (Biederman, et al., 1993). The clinical group consisted of 56 children aged between two and seven years of age at baseline, who were recruited from a hospital where their parents had been seeking treatment for panic disorder or agoraphobia. The community group consisted of 41 children aged between seven and eight years of age at baseline, who had originally been recruited as part of a larger longitudinal study; both groups were then combined for analysis (Biederman, et al., 1993). In addition, a significantly higher number of inhibited children with no anxiety disorder diagnosis at baseline had developed an anxiety disorder by the three year follow-up, compared to the uninhibited children (Biederman, et al., 1993), demonstrating that BI is a risk factor for anxiety disorders.

While a large amount of empirical research has now demonstrated that AM is a risk factor for anxiety disorders, there are several inconsistencies that have important implications. For example, Hirshfeld-Becker and colleagues (2007) conducted a longitudinal study with a five-year follow-up in a sample of 284 children, with a mean age of 9.6 years at follow-up, reporting that behavioural inhibition predicted the onset of social anxiety disorder at follow-up; however, the same result was not found for any of the other anxiety disorders. Thus, it appears that
high AM (measured here in the form of behavioural inhibition) may not be a significant risk factor for all anxiety disorders. Further, research involving the Australian Temperament Project (Prior, Smart, Sanson, & Oberklaid, 2000; Sanson, Pedlow, Cann, Prior, & Oberklaid, 1996) found that those children with lower approach behaviours were more likely to develop anxiety in adolescence; however, many children who scored high on levels of shyness at baseline did not develop anxiety in adolescence, again indicating the possibility of additional contributing factors. In addition, Kagan and Snidman (1999) reported that around twenty percent of a sample of 462 four month old infants had an inhibited temperament, as measured via observations of back arching combined with fretting and crying upon presentation of unfamiliar stimuli. Details of an independent study are then reported by the authors (Kagan & Snidman, 1999), in which a sample of 79 young adolescents, who had been classified as either inhibited or uninhibited in the second year of life, were interviewed by a child psychiatrist blind to the classifications. Results showed that only around one third of these adolescents showed signs of social anxiety, and so the authors conclude that inhibited children have a slightly higher than normal risk for developing anxious symptomatology later in life (Kagan & Snidman, 1999). However, it may also be determined from this study that a large number of children with an inhibited temperamental style do not go on to experience problematic anxiety later in life, indicating that the relationship between the motivational systems and anxiety disorders may be more complex than focussing on just inhibition alone.

The Relationship between Approach Motivation and Anxiety

According to Gray (1994), psychopathology may result due to “combinations of over/underactivity and/or dysfunction in more than one system; or dysfunctional
interactions between more than one system” (Gray, 1994, p. 43), suggesting an interaction between the two systems. However, most researchers investigating Gray’s RST, particularly in relation to anxiety, hypothesise that AM and AppM should function independently, using the separable subsystems hypothesis (SSH). That is, participants with high levels of AM should be most sensitive to punishment, and most likely to experience anxiety, regardless of levels of AppM (e.g. Johnson, et al., 2003). Over time, however, the research has highlighted general inconsistencies, such as findings of significant negative correlations between AppM and anxiety (e.g. Corr, 2002), and evidence has emerged that suggest AM and AppM may influence behaviour in ways not predicted by the SSH. Thus, a number of studies have begun to examine Gray’s (1994) initial suggestion that AM and AppM may jointly influence approach and avoidance motivation (e.g. Kambouropoulos & Staiger, 2004); this has been titled the joint subsystems hypothesis (JSH; Corr, 2002). With regards to anxiety, avoidant responses should be strongest in those participants with high levels of AM and low levels of AppM (Corr, 2001).

**Joint Subsystems Hypothesis**

Corr (2004) proposed that there are four conditions under which the JSH would be relevant: 1) when there is weak appetitive or aversive stimuli present; 2) when participants do not have an extreme sensitivity to either punishment or reward; 3) when the environment contains mixed appetitive and aversive stimuli; and 4) when participants are required to perform rapid behavioural and attentional shifts between reinforcing stimuli. Under all other conditions, findings consistent with the SSH should emerge (Corr, 2004). With regards to anxiety, Corr (2002) predicted that strength of reaction to aversive stimuli would be strongest for those high on AM and low on AppM, followed by those high on AM and high on AppM. Further, those low
on AM and low on AppM were also proposed to have a stronger reaction to aversive stimuli than those low on AM and high on AppM (Corr, 2002). Statistically, a significant interaction between AM and AppM, or main effects of both AM and AppM, indicate support for the JSH (Corr, 2002).

Therefore, recent clarifications of RST have proposed that, while the SSH may still hold under certain conditions, inclusion of the JSH as a complement to the SSH in a two-process model may more accurately explain research findings (Corr, 2001). Future studies investigating RST must then determine whether, as hypothesised, avoidance motivation facilitates responses to punishment and antagonises responses to reward, and approach motivation facilitates responses to reward and antagonises responses to punishment (Corr, 2004).

**Revised RST**

Similarly, among other new predictions and clarifications to Gray’s original theory, Gray and McNaughton (2000) also asserted that the systems responsible for detecting and processing reward and threat may interact. However, they proposed some important revisions to the original theory, which have gained substantial research attention in recent years, and must also be considered. The basis of revised RST is that we must take into account defensive direction in order to more comprehensively understand the function of the systems responsible for mediating avoidance behaviour. That is, there is a fight-flight-freeze system (FFFS), responsible for motivation of movement away from a source of danger, and a behavioural inhibition system, responsible for motivation of cautious movement towards a source of danger (Gray & McNaughton, 2000). Importantly, the BIS is now proposed to be activated when there are concurrent conflicting, incompatible goals; that is, the desire for avoidance of harm conflicting with the desire to satisfy appetite (Gray &
McNaughton, 2000). While previously the BIS was conceptualised as a punishment system, the FFFS now takes this role and the BIS has become a “conflict detection and resolution device” (Smillie, et al., 2006, p. 323). Importantly, it is hypothesised that the BIS usually favours FFFS engagement over BAS engagement, by increasing the perceived salience of threat; thus, the greater the conflict, the more likely it will result in a tendency towards BAS inhibition and facilitation of FFFS behaviour (i.e. avoidant responses; Berkman, Lieberman, & Gable, 2009; Kimbrel, 2008; Smillie, et al., 2006). In sum, revised RST proposes that there are three systems responsible for human motivation: the BAS, which is sensitive to reward and motivates approach behaviour; the FFFS, which is sensitive to threat and motivates avoidance behaviour; and the BIS, which is sensitive to goal conflict and motivates threat assessment (e.g. Deary & Johnson, 2009).

Further, it has been proposed that the FFFS elicits a fear response which is activated by a threatening stimulus that can simply be avoided, while the BIS elicits an anxious response which is activated by a threatening stimulus that requires approach (e.g. Gray & McNaughton, 2000; Perkins, Kemp, & Corr, 2007). More specifically, it is proposed that anxiety is the result of conflict between simultaneous activation of the reward system and the punishment system (Smillie, et al., 2006). In a study involving 101 participants undergoing military training, it was reported that, while the original conceptualisation of BIS was a significant negative predictor of performance on a basic soldiering skills training module, it appeared that BIS was underpinned by separate constructs of anxiety and fear, which then both made significant unique contributions to the prediction of performance on the training module (Perkins, et al., 2007). This finding supports the theoretical assertions made by Gray and McNaughton (2000).
Revised RST has been applied to the study of mood disorders, such as anxiety and depression, in recent years (e.g. Deary & Johnson, 2009). This stems from the proposal that activation of the reward system leads to increases in positive affect, while activation of the punishment system leads to increased negative affect (Smillie, et al., 2006). In a proposal for a fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000), Watson (2005) proposed that, rather than grouping disorders based on assumed similarities, there is now enough evidence to create an empirically based structure that reflects known similarities among the mood and anxiety disorders. It is proposed that the internalising disorders can be broken down into “fear” and “anxious misery” categories (Deary & Johnson, 2009, p. 463), resulting in three broad categories of emotional disorders: bipolar disorders, distress disorders, and fear disorders (Watson, 2005). The distress disorders are identified by their association with high anxiety and low mood, while the fear disorders are distinguished by their association with high levels of avoidance (Deary & Johnson, 2009). Thus, generalised anxiety disorder can be categorised as a distress disorder, while social anxiety disorder can be categorised as a fear disorder (Deary & Johnson, 2009; Watson, 2005); therefore representing a clear departure from the tendency to lump all anxiety disorders together. Further, it would then appear that GAD would be most associated with BIS, while SAD would be most associated with FFFS.

Some recent research has provided some insight into how SAD may be conceptualised using revised RST. It is proposed that a combination of temperamental differences in FFFS and an individual’s learning histories account for susceptibility to specific phobias (Kimbrel, 2008). For specific phobias, such as a fear of snakes, there may rarely be the need to approach threatening stimuli.
However, for those with social anxiety disorder, social stimuli frequently results in approach-avoidance conflicts (Kimbrel, 2008), in that there is potential reward in approaching the stimuli (such as group membership), while there is also significant perceived risk of punishment (such as social rejection). Therefore, in the case of specific phobias, such as a fear of snakes, or a fear of heights, only the FFFS is activated; however, because SAD involves an approach-avoidance conflict, the BIS is also activated in addition to the FFFS (Kimbrel, 2008).

While it took a number of years for researchers to begin considering the implications of revised RST within their research, the past five years have seen an increase in revised RST-based research. However, one of the primary limitations to date is the lack of a validated measure of BIS and FFFS. Current measures of BIS (such as the Carver-White BIS/BAS scales; Carver & White, 1994) may either capture a mixture of fear and anxiety, or fail to measure conflict altogether (Smillie, et al., 2006). In one of the only studies to empirically test some of the predictions of the revised RST, Berkman and colleagues (Berkman, et al., 2009) reported that, in a sample of 96 undergraduates, individuals with higher BIS were statistically faster to respond in situations where there were approach-avoidance conflicts; and BIS was not related to aversive stimuli in the absence of conflict. However, these researchers used the original BIS subscale from the Carver-White BIS/BAS scales (CWBIS/BAS), and, as previously noted, this scale has not yet been tested for its ability to capture the construct of conflict (Smillie, et al., 2006).

Since Smillie and colleagues (2006) raised their concerns about the measurement of revised RST, a group of researchers (Heym, Ferguson, & Lawrence, 2008) have endeavoured to address the issue. Heym and colleagues (2008) conducted a confirmatory factor analysis (CFA) of the CW-BIS/BAS scale with 212
undergraduate participants, with the intention of comparing the original one-factor solution of the BIS subscale with an alternative two-factor solution, representing BIS and FFFS. CFA results supported a revised two-factor structure for the BIS subscale, with a four-item BIS-anxiety subscale, and a three-item FFFS-fear subscale (Heym, et al., 2008). This study provides preliminary evidence that revised RST may be able to be adequately measured using a revised structure of Carver and White’s (1994) CW-BIS/BAS scale.

In sum, it has been proposed that the BIS system may be best conceptualised as the system that resolves conflict between approach and avoidance (Deary & Johnson, 2009). It has also been proposed by researchers that anxiety is the result of conflict between simultaneous activation of the reward system and the punishment system (e.g. Smillie, et al., 2006). However, the precise role of interacting appetitive and aversive motivational systems in understanding anxiety disorders is unclear. It is possible that heightened threat sensitivity (high AM), combined with reduced sensitivity to reward (low AppM), may exacerbate the severity of anxiety symptoms (i.e. JSH).

**Empirical Support for the Joint Role of Approach and Avoidance**

Little research has examined a potential interaction between AM and AppM for the prediction of anxiety; however, nine empirical studies were able to be located for this review of the literature. In a recent review, authors indicated that studies investigating anxiety symptoms have tended to find no or very weak associations with AppM (Bijttebier, Beck, Claes, & Vandereycken, 2009). While four studies reviewed here found no evidence for a joint role of approach and avoidance motivation in anxiety, two found support for the JSH, in that low AppM was associated with anxiety, and two found support for revised RST, where high AppM
was associated with anxiety. The ninth study was the only study which could be interpreted as having taking into consideration Corr’s conditions, by combining community and clinical samples, and separating the participants into anxious and non-anxious groups. The wide variety of findings indicates much is still unknown about the relationship between AM and AppM in the prediction of anxiety, and that much of the discrepancy may be due to participant characteristics.

A study investigating maternal styles as predictors of psychopathology was conducted by Kimbrel and colleagues (2007), which included consideration of trait measures of AM and AppM in a sample of 181 undergraduate students. Only high AM was found to predict anxiety, while both high AM and low AppM independently predicted depression (Kimbrel, et al., 2007). This finding further indicates there may be a joint relationship between AM and AppM for depression, but not for anxiety.

Hundt and colleagues (2007) examined the role of AM and AppM, utilising a self-report trait measure, in anxiety in a sample of 285 undergraduates, predicting that only high AM would predict anxiety. Results indicated a significant interaction between high AM and high AppM in the prediction of anxiety; however, the measure of anxiety used was poor, as an included factor analysis indicated the anxiety factor consisted of both anxiety and depression items, and so the authors renamed the factor “mixed anxiety-depression” (Hundt, et al., 2007).

This finding of a significant interaction between AM and AppM may be able to be explained by the combination of anxiety and depression within the same measure, as low AppM is often implicated in studies of depression. Researchers have proposed that depression is characterised by a lack of positive mood and low desire to seek out novel experiences, rather than an avoidance of new sensations and experiences (e.g. Depue & Iacono, 1989; Kasch, Rottenberg, Arnow, & Gotlib, 2002;
Watson, et al., 1999). As such, depression is thought to be related to a lack of AppM rather than an overactive AM. Studies such as the one conducted by Kasch and colleagues (2002), involving 62 clinically depressed participants and 27 non-depressed participants, further indicates that there is likely to be an interaction between AM and AppM in the prediction of depression, as the clinically depressed participants were more likely to experience diminished AppM functioning and overactive AM functioning than the non-depressed participants. Thus, inclusion of depression and anxiety as a joint construct in studies of this nature should be avoided.

Following their initial study, Hundt, Kimbrel, Mitchell, and Nelson-Gray (2008) investigated the joint role of AM and AppM, again using a trait measure, in externalising disorders such as drug abuse, alcohol abuse, psychopathy, and attention-deficit/hyperactivity disorder (ADHD) in a sample of 203 university students. The researchers predicted that participants with a combination of high AppM and low AM would be most likely to exhibit symptoms of these disorders. However, the interaction between AM and AppM did not significantly predict alcohol use, drug use, ADHD, or psychopathy, and so the authors concluded that high AppM was the most robust predictor of externalising disorders (Hundt, et al., 2008).

The use of a university student sample significantly restricts the generalisability of findings in each of the three studies detailed above, as university students are unlikely to be experiencing clinical levels of alcohol dependency, drug use, or psychopathy. Among other, independent studies, 132 university students completed a word pleasantness task, a word recall task, and a story completion task, in an emotional information processing study (Gomez, Cooper, McOrmond, &
Tatlow, 2004). For all three tasks, the interaction between AM and AppM, as measured via a trait reward and punishment expectancy scale, in the prediction of task performance was not significant, indicating a lack of support for the JSH. Again, however, a university student sample was utilised.

In contrast, Knyazev and Wilson (2004) found support for the JSH in a sample of 768 Russian high school students investigating the role of AM and AppM in emotional and conduct problems, with a combination of high AM and low AppM predicting high risk for emotional problems (such as anxiety, apathy, and sleep problems; Knyazev & Wilson, 2004). Again, however, anxiety was conceptualised within the larger construct of emotional problems, as measured by the Strengths and Difficulties Questionnaire, and so the significant association with low AppM could again be due to the one of the other emotional problems, such as sleep problems.

Also providing support for the JSH, Corr (2002) examined electromyographic (EMG) reactivity to aversive situations in a sample of 70 university students and found that those participants with high AM and low AppM demonstrated the highest levels of EMG reactivity.

Alternately, some support has also been provided for revised RST, in which high AppM, rather than low AppM, is reported to be related to anxiety. For example, Kambouropoulos and Staiger (2004) reported that the group with high AM and high AppM demonstrated the highest levels of inhibition, in a sample of 78 university students, where inhibition was measured via a behavioural task which rewarded correct responding with additional points and punished incorrect responding with the removal of points. This finding indicates that it may be a conflict between high AM and high AppM, rather than an underactive AppM, that is important for the experience of anxiety.
Further, Berkman and colleagues (Berkman, et al., 2009) reported that high AM and high AppM interacted to result in faster response times under situations involving conflict, in a sample of 96 undergraduates who completed a memory task. The task consisted of asking participants to indicate whether they would eat or not eat various foods from the perspective of a fake tribe of people, who had contrasting views to the average Western person, in order to create an approach-avoidance conflict in terms of responding (Berkman, et al., 2009). Again, these findings point towards a conflict between high AM and high AppM. Importantly, neither of the above two studies measured anxiety directly, and so it may be that results differ when considering anxiety disorder symptoms.

It is proposed here that a primary reason for the conflicting findings presented above may be that the majority of studies to date do not take into account one of the most important conditions of Corr’s (2004) theory; that the JSH would not be relevant in conditions where participants with a hyperactive AM are included. The university sampling techniques employed by the majority of researchers in this area (e.g. Gomez, et al., 2004; Hundt, et al., 2008; Hundt, et al., 2007; Kimbrel, et al., 2007; Knyazev & Wilson, 2004) do not consider that a portion of their sample would exhibit high levels of AM, and thus be fundamentally different from the other participants who did not have a high sensitivity to threat. As a result, their findings may not be able to be considered as evidence confirming or rejecting the JSH, as non-significant findings may possibly be due to the inclusion of high AM participants in the sample, for whom the JSH is not relevant.

In the only study which could be located that separated participants into anxious and non-anxious groups, Vervoort and colleagues (2010) examined AM and AppM in 175 children and adolescents (115 clinically anxious, 60 control), reporting
that, for the control group, both AM and AppM predicted anxiety, while for the clinically anxious group, only AM predicted anxiety. This finding requires replication and extension, as it provides the first evidence of the importance of considering the conditions specified by Corr (2004); that the JSH would not be relevant in conditions where participants with a hyperactive AM are included. It appears that, as predicted, there may only be a joint relationship between AM and AppM in those participants who do not have an extreme sensitivity to AM, and that, in anxious groups, the overactive AM overrides the AppM.

Conclusion

In sum, a large amount of research has now demonstrated that AM is a risk factor for anxiety disorders, and is seems that AppM may also play an important role. Those individuals with high levels of AM who process threat in maladaptive ways may be more likely to develop anxiety disorders; however, cognitive factors appear to have been largely ignored in the investigation of the link between avoidance motivation and anxiety disorders. Trait motivation is known to be related to affect, with those individuals high on trait avoidance also having the tendency to experience generally negative affect, and those high on trait approach tending also to experience generally positive affect (e.g. Watson, et al., 1999). Further, the experience of affect is not entirely stable over time; there are fluctuations in affect which require management. Therefore, a cognitive mechanism which manages fluctuations in experienced affect is an important consideration when examining trait motivation.

The following chapter will review the relationship between the cognitive mechanism known as emotion regulation, and anxiety disorders. The chapter will consider definition and measurement issues surrounding the concept of emotion regulation, before turning to the empirical evidence linking maladaptive emotion regulation with
anxiety disorders. The chapter will also consider the potential relationship between trait motivation and emotion regulation, in the prediction of anxiety disorder symptoms.
CHAPTER TWO

The Role of Emotion Regulation in Anxiety

Introduction
The preceding chapter discussed the role of approach and avoidance motivation in anxiety disorders such as generalised anxiety disorder and social anxiety disorder. It was argued that, while avoidance motivation is a known risk factor for the development and maintenance of anxiety disorders, approach motivation may also play an important role. However, cognitive factors, such as emotion regulation, have rarely been considered in investigations of this nature. Therefore, the focus of the current chapter is to introduce the construct of emotion regulation, with consideration of current definition and measurement issues. The primary aim is to present a theoretical argument for including emotion regulation within a model of anxiety, including explanation of the potential relationships with approach and avoidance motivation.

Definition of Emotion Regulation
Cognitive factors have been largely ignored in the investigation of the link between avoidance motivation and anxiety disorders. One potentially relevant cognitive mechanism that is currently the focus of increased attention in the literature is emotion regulation (ER). While it is generally agreed that higher levels of negative emotion are associated with psychopathology (e.g. Cole & Hall, 2008), this negative emotion itself does not lead to the development of anxiety disorders. Rather, it has been proposed that it is the way that these emotions are regulated that is important.
The experience of emotions is able to be shaped by an individual, and the ability to modulate emotional responses is termed emotion regulation (e.g. Davidson, 1998). Emotion regulation may be controlled or automatic, and conscious or unconscious, and it is used to strengthen, lessen, or maintain the emotional response (Davidson, 1998). An individual can have a strong influence over which emotions they experience, when they are experienced, how they are experienced, and how they are expressed (Rottenberg & Gross, 2003). Further, emotion regulation strategies may be antecedent-focused or response-focused: antecedent-focused strategies, such as reappraisal, typically focus on altering the experience of the emotion; whereas response-focused strategies, such as suppression, typically focus on altering the expression of the emotion, which has already been experienced (Amstadter, 2008). It has been noted that response-focused strategies are potentially more likely to have negative effects, as they do not impact the experience of the emotion, instead often attempting to ignore and avoid the emotion altogether (Amstadter, 2008).

Taking into account all these aspects, the definition of ER utilised in the present study is that ER is the process of modifying emotional states, in order to influence and control experienced emotion (Gross & John, 2003).

**Measures of Emotion Regulation**

There is a general lack of consensus regarding the way ER is measured within the literature. As a result, the findings differ, depending on the measure of ER used. For example, some measures of ER focus only on behavioural strategies, some focus on cognitive strategies, and others measure only the most common types of ER strategies. Additionally, there is some confusion surrounding the conceptual differences between ER and coping, which is discussed in further detail in the following chapter. As a result, the literature is fragmented, and research examining
the role of ER in anxiety disorders is being approached in a number of different ways, limiting the generalisability of results. Therefore, it is important to obtain an understanding of what aspect of ER each measure is designed to capture, and to determine the most relevant measure based on the present definition of ER utilised throughout this thesis.

The two most commonly utilised emotion regulation measures are Gross and John’s (2003) Emotion Regulation Questionnaire (ERQ), and Gratz and Roemer’s (2004) Difficulties in Emotion Regulation Scale (DERS), with reviews generally advocating support for both of these measures (Sloan & Kring, 2007). However, Larsen’s (Larsen, 2000; Larsen & Prizmic, 2004) Measure of Affect Regulation Scales (MARS) is based on a well-developed theoretical framework, and measures both behavioural and cognitive emotion regulation strategies, which the other measures do not. These three measures of ER will be reviewed below.

**Difficulties in Emotion Regulation Scale (DERS).**

Gratz and Roemer (2004) reviewed the literature on emotion regulation and asserted that the lack of research involving emotion regulation problems in clinical samples was due in part to the lack of a comprehensive measure. They aimed to develop a clinically relevant measure that was based on a comprehensive conceptualisation of emotion regulation. The DERS (Gratz & Roemer, 2004) is a 36-item self-report questionnaire that measures six domains of problems with affect regulation; nonacceptance of emotional responses, difficulties engaging in goal-directed behaviour, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity.

Gratz and Roemer’s (2004) DERS has been utilised in a variety of research projects, with a number of them being conducted by Gratz herself, alongside various
colleagues. One paper applied the concept of emotion regulation in a clinical sample with borderline personality disorder, although it did not directly utilise the DERS in the primary analyses (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006); while another examined deliberate self-harm (Gratz & Chapman, 2007). In a study of male undergraduate students, of which 25 engaged in frequent deliberate self-harm and 54 had no history of deliberate self-harm, the only two predictors of group membership, in a logistic regression analysis, were history of physical abuse, and DERS total score (Gratz & Chapman, 2007). The importance of ER is highlighted in studies such as these, as measures of emotional expressivity and affect intensity failed to reach significance. This indicates that, while intensity and expression of emotions may not play an important role in mental health issues such as deliberate self-harm, the way that emotions are managed and modified plays an important role.

Four other papers were located which also utilised the DERS in clinical samples. One study was conducted with a sample of 695 university students, who completed a disordered eating behaviour scale and classified as 106 binge eaters and 589 non-bingers (Whiteside et al., 2007). A regression analysis indicated that total DERS score significantly predicted binge eating score, over and above that of sex, food restriction score, and over-evaluation of weight and shape score (Whiteside, et al., 2007). A further regression analysis indicated that the two DERS subscales which uniquely predicted binge eating score were the limited access to emotion regulation strategies scale and the lack of emotional clarity scale (Whiteside, et al., 2007). However, the regression analyses were not split into binge eaters and non-bingers, which may have highlighted some potential differences between disordered and control groups.
The second study examined DERS scores among 60 treatment-seeking cocaine patients and 50 healthy volunteers (Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007). The cocaine patients had a significantly higher total DERS score than the controls upon entry into a locked inpatient facility; however, three to four weeks later, upon discharge, there were no longer any significant differences between the groups (Fox, et al., 2007). In terms of DERS subscales, for the cocaine patients, only the impulse control difficulties scale and lack of emotional awareness scale remained significantly different from the controls at discharge (Fox, et al., 2007). The impulse control difficulties scale consists of items such as "when I’m upset, I lose control over my behaviours" and as such, may be uniquely relevant to people with high levels of AppM, as evidenced in research linking impulsivity with substance abuse (Bijttebier, et al., 2009); there does not appear to be this same relationship between impulsivity and anxiety.

A third study (Steenkamp et al., 2008) examined differences in DERS scores between 22 participants with borderline personality disorder, 20 participants with obsessive-compulsive personality disorder, and 27 controls. Borderline symptom severity was significantly predicted by the limited access to emotion regulation strategies scale, the lack of emotional clarity scale, and the impulse control difficulties scale. Again, personality disorders differ quite significantly from anxiety disorders and the DERS subscales that play a role in the prediction of anxiety disorders may differ.

Finally, Fox, Hong, and Sinha (2008) examined emotion regulation in a sample of 50 treatment-seeking alcohol dependent participants and 62 social drinkers. Results indicated that the treatment seekers scored significantly higher on the lack of emotional awareness scale and the impulse control difficulties scale
during their first week of treatment, compared to the social drinkers (Fox et al., 2008). However, at discharge, the only significant difference between treatment seekers and social drinkers was on the impulse control difficulties scale, which occurred an average of 36 days later (Fox et al., 2008).

The findings from these studies suggest that various subscales of the DERS are clinically sensitive, particularly with regards to the impulse control difficulties scale, the lack of emotional awareness scale, and the lack of emotional clarity scale. The clinical relevance of the DERS may also apply to the examination of the role of emotion regulation in anxiety disorders; however, none of the reviewed studies considered potential comorbidities with anxiety or mood disorders.

However, examination of the item content of the DERS reveals that this measure does not capture the definition of ER utilised in this thesis, and so is therefore limited in its applicability to any research conceptualising ER in a similar manner. Of the six subscales, all contain items that do not represent an attempt to measure whether there is an attempt to modify emotional states. Rather, the DERS appears to be more concerned with the experience of the emotional state itself. For example, the nonacceptance of emotional responses scale includes items such as “when I’m upset, I feel guilty for feeling that way”; the difficulties engaging in goal-directed behaviour scale includes items such as “when I’m upset, I have difficulty concentrating”; the impulse control difficulties scale includes items such as “when I’m upset, I feel out of control”; the lack of emotional awareness scale includes items such as “I care about what I am feeling”; the limited access to emotion regulation strategies scale includes items such as “when I’m upset, my emotions feel very overwhelming”; and the lack of emotional clarity scale contains items such as “I have no idea how I am feeling”. Therefore, while at face value the subscale labels
appear to provide a suitable measure of difficulties in properly regulating emotions, it is proposed here that the DERS is not a valid measure of the process of modifying emotional states. Rather, the measure appears to have a better fit with a different conceptualisation of ER, proposed by Mennin and colleagues (e.g. Mennin, 2004; Mennin, Heimberg, Turk, & Fresco, 2005; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). In a series of studies, an emotion dysregulation model of anxiety was developed, which comprised four facets of maladaptive emotion regulation: increased intensity of emotions, lack of understanding of emotions, fear of emotions, and maladaptive management of emotions (Mennin, 2004; Mennin, et al., 2005; Mennin, et al., 2007). While this approach has merit, it does not fit the conceptualisation of ER utilised in the present thesis.

**Emotion Regulation Questionnaire (ERQ).**

In their measure of emotion regulation, Gross and John (2003) decided not to study all of the emotion regulation strategies, but instead to focus on the long-term consequences of two particular strategies that were well-defined and common. Additionally, they wanted to focus on one strategy that was antecedent-focused (cognitive reappraisal) and one that was response-focused (emotional suppression; Gross & John, 2003). Cognitive reappraisal involves reinterpreting an emotional event in a way that changes the emotional impact of that event, while emotional suppression involves the inhibition of the expression of emotion (Gross & John, 2003). The authors proposed that antecedent-focused strategies such as cognitive reappraisal have the potential to change the trajectory of the emotion before it is fully experienced, while response-focused strategies such as emotional suppression merely vary the behavioural expression of the emotion.
In order to investigate this, Gross and John developed the ERQ (Gross & John, 2003). The ERQ is a ten item self-report questionnaire designed to measure individual differences in reappraisal and suppression, with six items measuring reappraisal and four items measuring suppression. To date, the ERQ is one of the most widely cited measures in the study of emotion regulation.

Alongside development of the measure, a series of five studies utilising the ERQ were conducted by the authors with community samples (Gross & John, 2003). The first study consisted of 1483 university students, and, in addition to a series of factor analyses confirming the structure of the ERQ, and reliability analyses, gender and ethnic differences were also examined. Men and ethnic minority groups scored significantly higher on the suppression scale than females and European Americans; however, there were no significant gender or ethnic differences on the reappraisal scale (Gross & John, 2003). The second study further established the validity of the ERQ, with convergent and discriminant validity established, in a sample of 1628 university students.

The third study consisted of 145 university students and aimed to examine the relationship between the ERQ and emotional experience and emotion expression. Results indicated that reappraisers were more likely to experience and express positive emotion, and less likely to experience and express negative emotion, than non-reappraisers (Gross & John, 2003). Further, suppressors were less likely to experience and express positive emotion, and more likely to experience negative emotion, but no more likely to express negative emotion, than non-suppressors (Gross & John, 2003). The fourth study examined the social consequences of emotion regulation strategies in 837 university students. Results indicated that reappraisers were more likely to have closer relationships, and to be better liked by
their peers, as reported by their peers, than non-reappraisers (Gross & John, 2003). Alternatively, suppressors reported greater avoidance within their relationships, received less social support from others, and their peers rated them as lacking in emotional closeness with others (Gross & John, 2003). In the fifth and final study, designed to examine relationships between the ERQ and well-being in 595 university students, reappraisers were found to show less symptoms of depression, and higher levels of life satisfaction, self-esteem, and optimism than non-reappraisers (Gross & John, 2003). Alternately, suppressors showed more depressive symptoms, and lower levels of life satisfaction, self-esteem, and optimism than non-suppressors (Gross & John, 2003).

In general, the final three studies in the series indicate that reappraisers tend to have more positive experiences, share closer social relationships, and experience greater levels of well-being, indicating that reappraisal may be categorised as an adaptive ER strategy. In comparison, suppressors tend have more negative experiences, have less close social relationships, and be more likely to suffer from low self-esteem and have a poor quality of life; thus, suppression may be categorised as a maladaptive ER strategy. The ability for the ERQ to distinguish between those people who have a strong level of psychological well-being, and those who may be experiencing some difficulties is important, as this may be relevant to an examination of anxiety disorders. In addition, this distinction between adaptive and maladaptive ER, in addition to the antecedent-focused and response-focused distinction, allows the ERQ to be utilised in a wide range of studies, for a variety of purposes. However, the reliance on a four-item scale to represent maladaptive ER, and a six-item scale to represent adaptive ER, may be restrictive.
Gross and John's (2003) ERQ has also been utilised in a number of other studies. Tamir and colleagues (Tamir, John, Srivastava, & Gross, 2007) found that a sample of 437 students who viewed emotions as fixed and stable were less likely to utilise cognitive reappraisal as an ER strategy than those who viewed emotion as more changeable. Further, these students then went on to experience lower well-being, higher levels of depressive symptomatology, and lower social adjustment. Again, this pattern of results indicates that issues such as depression and social problems may be experienced by those people who utilise suppression as an ER strategy, rather than reappraisal, indicating that emotion regulation may be an important construct to consider when examining similar issues such as anxiety.

In a study involving 134 undergraduate students, Magar, Phillips, and Hosie (2008) found that use of suppression rather than reappraisal predicted participation in risky behaviours such as smoking and alcohol-induced fighting. Again, the link between suppression and a lowered level of quality of life is evident, raising once more the possibility of a relationship between suppression and anxiety. Finally, Verduyn and colleagues (Verduyn, Delvaux, Van Coillie, Tuerlinekx, & Van Mechelen, 2009) examined whether emotion regulation strategy helped predict duration of emotional experience, in a sample of 60 university students. Results indicated that suppression was related to a longer duration of negative emotional experience and shorter duration of positive emotional experience. However, no significant findings were reported for reappraisal. The relationship between a general negative emotional experience and suppression highlights the potential for a significant relationship between suppression and anxiety disorders.

In general, the literature reviewed above indicates considerable support for the ERQ as an effective measure of ER. The scale appears to be reliable and valid,
and can distinguish between those who manage their emotions adaptively and those who have a maladaptive ER style. However, it is intentionally limited in only measuring two types of ER, and thus, its research applicability is also limited. Overall, though, results indicate that there are individual differences in use of ER strategies, and that this may influence issues such as predicting the presence of anxiety disorders, thus providing a strong argument for the consideration of ER within studies investigating relationships between motivation and anxiety.

Measure of Affect Regulation Styles (MARS).

Larsen’s (2000) measure of emotion regulation utilises the theoretical background provided by Carver and Scheier (1990), in terms of their discrepancy-reducing and discrepancy-enlarging feedback loops within an action control framework. Carver and Scheier’s theory (Carver, 2004; Carver & Scheier, 1990, 1998, 2008) proposes that goals which are being used to guide behaviour are compared to the present state of the situation, and if discrepancies are found, behaviour is adjusted so that it more closely resembles the goal state. Further, it is proposed that there are two dimensions of affect; one manages the approach of incentives, while the other manages the avoidance of threat. When progress is going well with regard to approach processes, eagerness or happiness is experienced; however, when progress is poor, sadness or depression is experienced. On the other hand, when progress is going well with regard to avoidance processes, relief or calmness is experienced, but when progress is poor, fear or anxiety is experienced (Carver, 2004).

Larsen (2000) proposed a modification to the theory, in which individual differences in temperament, as well as present affective state, impact a person’s attention to emotional stimuli within their environment. For example, those high on neuroticism tend to report stronger negative affective responses than those low on
neuroticism, while those high on state affect intensity tend to be less accurate in perceiving physiological changes, such as increases in heart rate, than those low on state affect intensity (Larsen, 2000). This emotional experience is then evaluated in terms of the direction and strength of any perceived discrepancies in subjective emotional states in that some people may not perceive smaller distinctions between affective states, while others are highly sensitive to any changes. Further, the present affective state is compared to the individual’s optimal, desired affective state, with some people desiring stronger affective states than others. The perceptions obtained from these comparisons between current affective state and ideal affective state then leads to the utilisation of emotion regulation strategies (Larsen, 2000).

The revised MARS (Larsen & Prizmic, 2004) is a 32-item self-report questionnaire that measures different strategies utilised in the attempt to regulate emotion; emotion regulation strategies are either cognitive or behavioural, and focus on either the situation or the emotion (Larsen, 2000). Strategies used to regulate negative affect included: 1) distraction, 2) venting, 3) suppression, 4) cognitive reappraisal, 5) downward social comparison, 6) problem directed action or planning to avoid problems in the future, 7) self-reward, 8) exercise, relaxation, eating, and other physical manipulations, 9) socialising or seeking support from others, and 10) withdrawal. Strategies used to regulate positive affect included: 1) gratitude, 2) helping others, and 3) humour, laughter, and expressing positive emotions (Larsen & Prizmic, 2004).

No published psychometrics could be located for the MARS, but preliminary psychometric data was obtained from R.J. Larsen and Z. Prizmic (personal communication, September, 2009). Analyses indicated the presence of seven factors: 1) active distraction, 2) cognitive engagement, 3) behavioural engagement, 4)
venting and expressing affect, 5) passive distraction and acceptance, 6) rumination and withdrawal, and 7) waiting and reframing; however, investigation of the psychometric data revealed that three of seven factors had Cronbach’s alphas under .45, indicating low reliability (R.J. Larsen & Z. Prizmic, personal communication, September, 2009). However, the scale has been utilised in well-being research, with results indicating that cognitive engagement and active distraction predicted life satisfaction, in a positive direction (Prizmic, Kaliterna-Lipovcan, & Franc, 2009).

Importantly, a literature search located only one study which utilised the MARS as a measure of emotion regulation strategies. This paper provides some important insight into a potential future direction for the MARS. In a sample of 380 undergraduate students split into a flourishing affective health group, and moderate affective health group, and a languishing affective health group, based on their positivity ratio (positive emotions divided by negative emotions), Barber, Bagsby, and Munz (2010) investigated the relationship between group membership and use of particular emotion regulation strategies. Those participants in the languishing group were more likely to drink coffee, consume alcohol, treat themselves to something special, or consult an advisor, while the non-languishing groups were more likely to attempt to understand their feelings, to make plans for avoiding similar problems in the future, and to be grateful for the good things in their life (Barber, et al., 2010). This study provides a unique examination of the different emotion regulation strategies utilised by participants experiencing large amounts of negative affect in comparison to those experiencing primarily positive affect, and highlights the importance of scales such as the MARS to allow for such an in-depth understanding of emotion regulation.
In sum, the MARS has considerable strengths in that it measures both behavioural and cognitive emotion regulation strategies, and is based around a strong theoretical framework, developed by Carver and Scheier (1990); however, the factor structure of the scale has yet to be confirmed and therefore could not be utilised in the present thesis.

**The Theoretical Link between Emotion Regulation and Anxiety Disorders**

Attempts have been made to understand anxiety disorders utilising the concept of emotion regulation. In her review of the literature examining the relationship between emotion regulation and anxiety disorders, Amstadter (2008) proposed that a core feature of anxiety disorders is the experience of excessive negative emotion. However, it is not the emotion itself that is maladaptive, but the timing and intensity that presents a problem (Amstadter, 2008). Undesirable emotions are more likely to be regulated than desirable emotions, and anxiety disorders result when there is a consistent failure to choose the adaptive emotional response to a situation, or a tendency for maladaptive emotional responses to be chosen (Amstadter, 2008).

One group of researchers have attempted to define the set of processes that leads to maladaptive emotion regulation among people with anxiety disorders. Turk and colleagues (2005) proposed four characteristics of people with anxiety disorders. First, there is a heightened intensity of emotional experience in which emotions occur more quickly and easily than is the case for most people (Turk, et al., 2005). Second, people with anxiety disorders tend to have a poor understanding of their emotions; they are unable to accurately identify different emotions being experienced (Turk, et al., 2005). Third, people with anxiety disorders often have a fear of emotion, in that they react negatively to their undesired emotional states (Turk, et al.,
Finally, those people with anxiety disorders tend to manage their emotional responses in a maladaptive manner (Turk, et al., 2005).

With consideration of the literature reviewed to date, it is proposed here that ER strategies generally thought to be maladaptive, such as suppression, may act as risk factors for anxiety disorders such as GAD and SAD. Alternately, ER strategies that are generally thought to adaptive, such as cognitive reappraisal, may act as protective factors for anxiety disorders such as GAD and SAD. In addition, as indicated by Turk and colleagues (2005), people with anxiety disorders tend to have a heightened intensity of emotional experience, and this may be the result of an overactive AM system, with its increased sensitivity to punishment. As a result, people with high BIS, who also utilise maladaptive ER, may be at a higher risk for developing an anxiety disorder.

Over the past five years, empirical support for the role of emotion regulation in anxiety disorders has grown, and this evidence is reviewed below.

**Empirical Support for the Role of Emotion Regulation in Anxiety Disorders**

There is a growing amount of research implicating emotion regulation in the experience of anxiety. The findings from empirical research can largely be grouped into three areas of interest: cross-sectional studies examining emotional experience in clinical and community groups; longitudinal studies examining risk factors for anxiety disorders; and cross-sectional studies examining use of specific ER strategies in clinical and community groups. By far, the most research has been conducted into the first area of interest.
Cross-sectional studies examining emotional experience in clinical and community groups.

Three cross-sectional studies have recently been published which compare the ER characteristics of people classified as having a clinical level of anxiety, and controls, providing valuable insight into the relationship between ER and anxiety (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Decker, Turk, Hess, & Murray, 2008; Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006; Turk, et al., 2005). One study compared thirty participants who had been diagnosed with an anxiety or mood disorder (the most common diagnosis (57%) was social anxiety disorder) and thirty control participants (Campbell-Sills, et al., 2006). The second study categorised 325 university students into a GAD group (according to scores on a self-report GAD scale) and a control group (Salters-Pedneault, et al., 2006); while the final study compared 33 university students classified as having GAD via self-report to 105 university students classified as being control participants (Decker, et al., 2008).

Empirical findings from the three studies detailed above suggest that people with anxiety disorders such as GAD appear to have similar levels of emotional clarity and awareness of their emotional experience as controls (Campbell-Sills, et al., 2006; Salters-Pedneault, et al., 2006). However, compared to controls, people with GAD have been found to experience a higher level of emotional intensity and a greater lack of understanding of their emotions, but make more regular attempts to regulate their emotions (Decker, et al., 2008). This indicates that people with more understanding of their emotional experiences and how to manage them may be at less risk of developing anxiety disorders than those who do not have these skills.

People with anxiety disorders were also found to be more likely to use maladaptive emotion regulation strategies (Decker, et al., 2008; Salters-Pedneault, et
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Anxious participants were more likely than control participants to utilise distraction and rumination techniques (Decker, et al., 2008), to accurately identify and describe emotions, to mask and hide feelings (Decker, et al., 2008), and to have deficits in ability to engage in goal directed behaviour, clarity of emotional experiences, impulse control, and acceptance of emotions (Salters-Pedneault, et al., 2006).

A fourth, related, study, consisted of 766 undergraduate students who were split into a GAD group, a SAD group, and a control group based on self-report scores (Turk, et al., 2005). Turk and colleagues (2005) examined which aspects of emotion dysregulation were specific to GAD or common to anxiety disorders in general (GAD and SAD). The authors reported a number of similar findings to the three studies reviewed above, with both GAD and SAD participants experiencing greater ER dysfunction than controls, but there were four important findings in this paper. These findings included: 1) individuals with GAD experienced emotions more intensely than both individuals with SAD and controls; 2) individuals with SAD were less expressive of positive emotions than both individuals with GAD and controls; 3) individuals with SAD had more difficulty describing emotions than individuals with GAD, while individuals with GAD had more difficulty than controls; 4) individuals with SAD paid less attention to emotions than individuals with GAD and controls (Turk, et al., 2005). These findings indicate that, while there are a number of similarities between the two anxiety disorders, there were some important differences. Primarily, it appears that SAD participants may have a more dysfunctional understanding and appreciation of their emotions than GAD participants may. This could contribute to a much more persistent level of ER dysfunction in those people who experience social anxiety.
Further, in a related study examining anxiety sensitivity, a known risk factor for anxiety disorders, Kashdan and colleagues (Kashdan, Zvolensky, & McLeish, 2008) reported that the most severe anxiety symptoms were experienced by those high on anxiety sensitivity and who were also high on non-acceptance of emotions and had limited access to emotion regulation strategies.

In summary, while people with anxiety disorders have normal awareness of their emotional experiences, they experience more intense emotions than others, and are required to utilise ER strategies more often. Therefore, access to appropriate and effective ER strategies is important; however, people with anxiety disorders tend to utilise maladaptive ER strategies.

Longitudinal studies examining risk factors for anxiety disorders.

Adaptive ER acted as a protective factor, while maladaptive ER was a risk factor, in a longitudinal study examining the trajectory of anxiety symptoms in 290 male children from low-income families (Feng, Shaw, & Silk, 2008), providing preliminary evidence for the claim that people with greater understanding of their emotions may be less likely to develop an anxiety disorder. However, the measure of ER consisted of behavioural observation, in which a cookie was presented to the child but kept out of their reach for three minutes. Emotion regulation strategies included active distraction, passive waiting, focus on delay object or task, information gathering, and physical comfort seeking; maintaining or increasing focus on the cookie was thought to be comprise maladaptive ER, while refocusing attention on a non-distressing stimulus was thought to be an adaptive ER response (Feng, et al., 2008).

In a longitudinal study following 155 participants from infancy through adolescence, emotion regulation style in preschool was significantly associated with
anxiety symptoms during childhood (Bosquet & Egeland, 2006). However, at final follow-up, at seventeen years of age, emotion regulation in preschool did not predict lifetime anxiety diagnosis (Bosquet & Egeland, 2006). Unfortunately, emotion regulation was not measured after pre-school and so results are limited, as it is likely that emotion regulation strategies develop and change throughout childhood and adolescence. For example, Gullone, Hughes, King, and Tonge (2010) reported that younger children and adolescents were more likely to use suppression or reappraisal as ER strategies than their older peers.

The use of a behavioural measure of ER in both of these studies is limiting in that it measures only external ER strategies, to an external stressor, and so it remains to be seen whether the same results would be found among adult samples using a more theoretically based, cognitive measure of ER. However, these studies provide important evidence that emotion regulation style in early childhood can predict anxiety at later stages of development, thus indicating it may act as an important risk factor in the development of anxiety disorders.

Cross-sectional studies examining use of specific ER strategies in clinical and community groups.

Results suggest that emotion regulation, in the form of reappraisal and suppression, is generally not correlated with trait anxiety in non-anxious community samples (Dennis, 2007; Moore, Zoellner, & Mollenholt, 2008). In a sample of 67 psychology undergraduate students, trait anxiety was significantly correlated with reappraisal (−.31) but not with suppression (.21; Dennis, 2007). However, Moore and colleagues (2008) recruited two separate groups of participants: a community sample of 292 female undergraduate students, and a sample of 67 trauma-exposed women. Findings indicated that, as previously mentioned, trait anxiety was not correlated with either
suppression or reappraisal, in the community sample, but there were significant correlations between trait anxiety and reappraisal (−.36) and between trait anxiety and suppression (.38) in the trauma-exposed sample (Moore, et al., 2008).

These findings may be attributable to differences in trait approach and avoidance motivation. It is possible that a dominant avoidance motivational system, being the motivational system that results in high trait anxiety, combined with poor emotion regulation strategies, may contribute to the development or maintenance of anxiety disorders.

While the relationship between motivation and anxiety has been established in the first chapter of this thesis, and the relationship between emotion regulation and anxiety disorders has been established in the present chapter, the relationship between motivation and emotion regulation is less clear. Research investigating the potential relationship between trait motivation and emotion regulation are reviewed below.

The Relationship between Emotion Regulation and Motivation

Four recent studies were located which have investigated the relationship between motivation and ER. The first two studies measured motivation and ER in isolation, while the second two also examined the relationship between ER, motivation and anxiety. The first study included 60 female undergraduate students, and the ER strategy measured was rumination, which was proposed to be a maladaptive ER strategy (Leen-Feldner, Zvolensky, Feldner, & Lejuez, 2004). Findings indicated that BIS significantly predicted a rumination response style (Leen-Feldner, et al., 2004). While only considering one specific ER strategy, results support the hypothesis that there is a significant relationship between trait motivation and ER.
The second study utilised both self-report and behavioural measures of ER in a study containing 101 adults (Tull, Gratz, Latzman, Kimbrel, & Lejuez, 2010). The authors reported that avoidance motivation (AM) had a significant positive relationship with overall ER difficulties, while the approach motivation (AppM) dimension of fun-seeking had a significant positive relationship with overall ER difficulties and the AppM dimension of reward responsiveness had a significant negative relationship with overall ER difficulties (Tull, et al., 2010). These results confirm predictions of a positive correlation between high AM and ER difficulties, and indicate that the relationship between AppM and ER may be complex. However, a significant limitation of this study was the measure of ER utilised, as it measures both the experience of emotion as well as the regulation of emotion, and so the results cannot be attributed to ER alone. Further, the separation of the AppM construct into three sub-factors (fun-seeking, reward responsiveness, and drive) has been criticised for its lack of theoretical justification with regards to Gray’s original theory (Heym, et al., 2008). In addition, none of the AppM subscales were significantly correlated with a new measure of AppM, designed specifically to measure the BAS component of Gray’s RST (Smillie & Jackson, 2005), providing additional evidence that the measurement of the AppM construct requires further examination.

The third study to examine the relationship between motivation and ER was conducted by Dennis (2007), who conducted a hierarchical regression using depressed mood, AM, AppM, adaptive ER, and maladaptive ER to predict trait anxiety in a sample of 67 college students, reporting that only AM was a significant predictor. However, this study was considerably limited by its sample size. In a more recent study, utilising a modified cognitive emotion regulation questionnaire, a
model was presented in which negative cognitive ER (such as self-blame and rumination) was predicted to mediate the impact of negative affect and sensitivity to punishment on anxiety symptoms (Tortella-Felia, Balle, & Sese, 2010). In a sample of 1441 twelve to seventeen year old participants, negative affect and sensitivity to punishment combined predicted 49% of negative cognitive ER, which in turn predicted 49% of anxiety symptoms (Tortella-Felia, et al., 2010). Conceptually, the model presented in Tortella-Feliu and colleagues (2010) paper differs considerably from the model presented here. That is, a composite variable titled “negative affectivity” consisting of negative affect and sensitivity to punishment was utilised rather than a theoretical model of individual differences. Nevertheless, this study indicates that both trait motivation and emotion regulation play a joint relationship in the prediction of anxiety, supporting the argument presented in this chapter.

Conclusion

In summary, this chapter has presented evidence that people with anxiety disorders such as GAD and SAD tend to utilise maladaptive ER strategies, and that there is also a relationship between trait motivation and emotion regulation. Therefore, it is proposed that ER may moderate the relationship between motivation and anxiety. A very limited amount of research has considered this proposal to date. Particularly, it is predicted here that those people with high AM, who have the tendency to avoid situations and experiences, may also be more likely to avoid, or suppress, their emotions. A tendency to utilise maladaptive ER strategies, such as suppression, may increase the risk of those high on AM developing an anxiety disorder. Thus, it is argued here that maladaptive ER may play a moderating role in the relationship between motivation and level of anxiety.
The following chapter will review the methodological issues that have arisen during this review of the literature. The chapter will consider issues surrounding conceptual distinctions between constructs, measurement issues, and the use of web-based questionnaires versus paper questionnaires.
CHAPTER THREE

Methodological Issues

Introduction

The preceding chapters of this thesis discussed the role of approach and avoidance motivation, and maladaptive emotion regulation, in anxiety disorders such as generalised anxiety disorder and social anxiety disorder. It was argued that maladaptive ER may play a moderating role in the relationship between trait motivation and level of anxiety. However, a number of methodological issues arose throughout this review of the literature. Therefore, the aim of this chapter is to outline specific methodological and conceptual issues that were identified in the literature review. The following issues will be considered in this chapter: conceptual differences between the emotion regulation literature and the coping literature; measures of emotion regulation; measures of Gray’s Reinforcement Sensitivity Theory; self-report measures of revised RST; and the use of web-based questionnaires for data collection.

Conceptual Differences between the Emotion Regulation Literature and the Coping Literature

There is an extensive literature on the role of coping in psychological illness and disorders, and, as investigations into ER appear disjointed and under-researched, it may be argued that the study of ER could be encompassed by the study of coping. However, while it would appear that ER has many similarities to the concept of coping, there are important differences which distinguish the two constructs. Gross (Gross, 1999; Gross & John, 2003) noted a major difference between coping and
emotion regulation in that coping is defined much more broadly; it includes emotional strategies but also non-emotional strategies, such as buying a map when lost in a new city. Further, Gross (Gross, 1999; Gross & Thompson, 2007) noted that coping is also different from emotion regulation in terms of duration. For example, coping with death requires much more long-term coping strategies than regulation of anger in a particular situation. Additionally, coping does not consider the whole range of emotion regulation experiences; for example, the coping literature does not examine strategies applied to physiological indicators of emotional arousal, or that of positively valenced emotions. Instead, it focuses specifically on responses to stressful situations (Gross, 1999). In a study involving 1628 participant, Gross and John (2003) proposed that the coping styles of reinterpretation and venting should be the most highly related to reappraisal and suppression. Results indicated that reappraisal was positively related to reinterpretation ($\beta = .43$), while suppression was negatively related to venting ($\beta = -.43$; Gross & John, 2003). Examination of the beta coefficients indicates that, while there is a moderate convergence between constructs, they were also distinct.

Watson and Sinha (2008) also conducted a study in which they measured both ER and coping, finding similar results to Gross and John (2003). In a sample of 422 undergraduate students, there was evidence for both independence and overlap of the two constructs, with different predictive abilities for psychopathology (Watson & Sinha, 2008). For example, cluster analysis techniques indicated that the emotion regulation strategies of distraction, avoidance, and social diversion clustered together, with no influence of coping strategies; while emotion-focused coping and the emotion regulation strategy of rehearsal clustered together, indicating some overlap for this cluster (Watson & Sinha, 2008). Further, a combination of ER
strategies and coping strategies predicted anxiety, indicating again that while there is some overlap between constructs, both add predictive validity to analyses. In sum, there is evidence that ER is a separate construct from coping, and that examination of ER strategies explains additional variance in the prediction of anxiety, after consideration of coping strategies.

**Measures of Emotion Regulation**

Three emotion regulation measures were reviewed in the previous chapter. The Difficulties in Emotion Regulation Scale (DERS) is widely utilised in the emotion regulation literature, and has established links with psychopathology, but examination of the item content indicates that this measure is more concerned with the experience of emotion than emotion regulation itself. The Emotion Regulation Questionnaire (ERQ) is also utilised regularly and possibly represents the gold standard in terms of measurement at this time. However, it is consciously limited in that it only measures two ER strategies; cognitive reappraisal and suppression. The Measure of Affect Regulation Styles (MARS) is a promising measure based on a strong theoretical framework, but suffers from a lack of psychometric validation.

In sum, the MARS has the potential to be the best measure of ER, due to its strong foundations in theory, particularly as this theory relates to avoidance motivation. However, reliability and validity psychometrics have not been published for the scale, and other researchers have failed to utilise the MARS in their research. Given the lack of psychometric data, and the lack of independent investigations conducting a thorough validation of the MARS, the scale was deemed inappropriate for use in this thesis. The DERS does not appropriately measure ER in the way it is defined here, and so the ERQ is noted as being the superior measure for the present
study. However, it will be important to consider the limitations of the ERQ in the interpretation of findings from each study.

**Self-Report Measures of Gray’s Reinforcement Sensitivity Theory**

The Sensitivity to Punishment and Sensitivity to Reward Questionnaire and Carver and White’s BIS/BAS scales are both widely used in the research literature to measure BIS and BAS as conceptualised by Gray. These two measures are recognised as the strongest of the available measures (Cogswell, Alloy, van Dulmen, & Fresco, 2006); however, both have psychometric limitations.

The Carver-White BIS/BAS scales (CW-BIS/BAS; Carver & White, 1994) consist of 20 self-report items, which measure BIS, BAS Reward Responsiveness, BAS Drive, and BAS Fun Seeking. The three BAS scales can also be summed to calculate an overall BAS score. Internal reliabilities ranged from .66 to .76, with established convergent validity and discriminant validity; test-retest correlations ranged from .59 to .69 (Carver & White, 1994). However, confirmatory factor analysis (CFA) reported poor fit for both the two-factor and the four-factor solution (Cogswell, et al., 2006).

The Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia, Avila, Molto, & Caseras, 2001) measures BIS (sensitivity to punishment) and BAS (sensitivity to reward), based on Gray’s theory. The original SPSRQ consists of 48 items; internal reliability ranged from .75 to .83; test-retest reliability was .59 over three years, and convergent and discriminant validity were established (Torrubia, et al., 2001). However, O’Connor and colleagues (O’Connor, Colder, & Hawk, 2004) conducted CFA on the original scale and reported poor fit. They then constructed a psychometrically stronger short version, consisting of 35 items, although this shorter version still had problems with model fit. More recently,
Cooper and Gomez (2008) also constructed a short-form of the SPSRQ, containing 24 items. Again, the shorter version still did not indicate strong model fit using CFA.

In sum, both the CW-BIS/BAS and the SPSRQ are widely used in the literature, and currently represent the best of the available self-report measures of BIS and BAS. However, as noted, both have statistical limitations. The Carver-White BIS/BAS scales were chosen as the primary avoidance motivation measure for the present study. The decision to utilise the Carver-White BIS/BAS scales was made based on the tendency for it to be more commonly utilised in the literature examining relationships with anxiety and emotion regulation than the SPSRQ, which then allows for some direct comparisons with previous published literature. The Carver-White BIS/BAS scales also form the basis for the only known self-report measure of revised RST. Thus, the following section reviews the need for a measure of revised RST, and examines the new measure that is currently available.

**Revised RST**

Revisions to Gray’s RST (revised RST; Gray, 1982) have led to some important changes in the conceptualisation of BIS and BAS, and these changes have yet to be adequately addressed in existing self-report measures (Smillie, et al., 2006). Only one paper could be located which aimed to determine whether existing measures could be utilised to measure the revised conceptualisation of BIS and BAS (Heym, et al., 2008).

As detailed in the earlier chapters of this thesis, one of the core features of revised RST is that there are now three major subsystems rather than the original two: specifically, the original BIS has now been split into a BIS, which resolves conflict between approach and avoidance, and an FFFS, which refers to the defensive avoidance system. To date, no new scales have been developed to measure revised
RST. Rather, Heym and colleagues (2008) have proposed a split of the BIS subscale of the Carver-White BIS/BAS scale, in order to account for the inclusion of the FFFS and revision to the BIS within revised RST. With a sample of 212 undergraduate students, confirmatory factor analysis (CFA) indicated that FFFS and BIS are able to be effectively distinguished within the Carver-White BIS subscale, with three items forming the FFFS subscale and four items forming the BIS subscale (Heym, et al., 2008). Recently, Vervoort and colleagues (2010) have successfully replicated the CFA with the child version of the Carver-White BIS/BAS scales and a sample of 175 children and adolescents, increasing support for this revision of the measure’s subscales.

In summary, the CW-BIS/BAS scales and the SPSRQ represent the best available self-report measures of BIS and BAS, as conceptualised by the original Reinforcement Sensitivity Theory. However, substantial revisions were made to Gray’s RST more than ten years ago, and only recently have researchers begun to consider some of the measurement issues that arose from these revisions. In particular, Heym and colleagues (2008) have made an important step forward with their confirmatory factor analysis of the original CW-BIS/BAS scales, incorporating FFFS and revised RST into an existing measure of BIS and BAS. The next step for revised RST research is to further validate this revision to the CW-BIS/BAS scales, or to develop new measures. Heym and colleagues’ (2008) proposed revisions to the factor structure of the CW-BIS/BAS is psychometrically valid, and theoretically sound, and so the present thesis seeks to utilise the revised factor structure where possible, in order to provide further validation of the psychometric properties of the revised scale, as well as some important tests of revised RST in general.
Chapter Three: Methodological Issues

The Use of Web-Based Questionnaires for Data Collection

The final issue to be considered in this chapter concerns the use of web-based questionnaires. While reviewing the studies in the introduction chapters, it became evident that the majority of research in this area is conducted with undergraduate university students as participants. While this allows for a large participant sample, it significantly restricts the generalisability of findings, as university students are not accurately representative of the general population. Thus, an examination of the advantages and disadvantages of this data collection method is warranted in order to identify potential issues for studies of this nature.

There are numerous advantages to using web-based questionnaires when collecting data, such as access to a more heterogenous sample of participants, ease of recruiting large samples, and a high sense of participant anonymity. In addition, participants can take part in studies at the time and place that best suits them, while working at their own pace (Wood & Griffiths, 2007). However, there are also potential disadvantages; namely, survey error. Participants cannot be obtained randomly, and the sub-group of the population who do not have internet access have no chance of being selected for participation (Tuten, 2010). In addition, response rates tend to be lower than for mail surveys, presumably due to issues such as slow internet connections, incompatible software, or confusing visual presentation of the questionnaire (Tuten, 2010). However, research has shown that web-based response rates can be enhanced via the use of incentives to participate, such as lotteries (Goritz, 2010). Further, due to the anonymity of online research, it is very difficult to follow-up with participants regarding missing data, whereas in situations where questionnaires are completed in the presence of the researcher, this issue can easily be addressed (Cantrell & Lupinacci, 2007).
There are also a number of ethical concerns when conducting online research. For example, it is still necessary to obtain informed consent, it is difficult to ensure that minors do not participate, data must be transmitted and stored in a secure manner, and some participants may feel that there has been a violation of their virtual environment (Buchanan & Williams, 2010). However, it is proposed that online research is no more ethically problematic than traditional mail surveys, so long as the researcher considers the ethical concerns of the study (Buchanan & Williams, 2010). In addition, there are a number of ethical advantages to online research, such as that participants can easily drop out of the study without feeling a sense of pressure to continue, and it is easier to ensure participant anonymity (Buchanan & Williams, 2010).

Most researchers who have considered the implications of conducting online research (e.g. Holmes, 2009) have advised that, in general, the use of online questionnaires can be an efficient and effective way of collecting data, so long as the methodological and ethical considerations of all methods of data collection are carefully addressed.

**Conclusion**

This chapter has identified specific issues pertaining to the clarification of conceptual issues, measurement issues, and data collection procedures. The methodological decisions made throughout this chapter will be utilised in the following four studies, in order to maintain a strong data analytic procedure. The next four chapters detail the rationale, methodology, results, and discussion for each of the four studies, with the primary aim of determining the role of approach motivation and emotion regulation in the prediction of severity of social anxiety disorder symptoms, and generalised anxiety disorder symptoms, in a community sample. The following
chapter presents the first in the series of four studies, and focuses on establishing evidence for a joint relationship between approach and avoidance motivation in the prediction of level of anxiety.
CHAPTER FOUR

Study One: The Joint Role of Approach and Avoidance Motivation in Anxiety

Introduction
The preceding chapter presented the methodological issues that arose throughout the literature review chapters. Conceptual and measurement decisions were made, and a rationale was provided. These decisions then allowed for the formulation and execution of a number of studies, in order to test the research questions. Therefore, the present chapter provides the rationale, methodology, results, and discussion of the first study in the series of studies. The aim of the present chapter is to draw on the joint subsystems hypothesis in order to investigate the interplay between approach and avoidance motivation in the prediction of anxiety.

Rationale
Anxiety disorders, such as generalised anxiety disorder and social anxiety disorder, are the most prevalent class of DSM-IV psychiatric disorder (Kessler, et al., 2005a; Kessler, et al., 2005b). While anxiety is considered to be a normal response to threat, with the evolutionary function of providing the best level of protection in threatening situations, anxiety disorders are thought to occur when there is an excessive level of anxiety within a specific situation, or anxiety is experienced in a situation that is inappropriately interpreted as threatening (Marks & Nesse, 1997).

From a motivational perspective, it has been proposed that a neurological system is responsible for reactions to conditioned threat, and that the resultant
subjective state following high levels of activation in this system is anxiety (Gray, 1994). Gray's Reinforcement Sensitivity Theory (RST) proposes that there are two distinct, but related, neurological systems involved in the regulation of human motivation and emotion (Gray, 1970, 1978, 1987), in which the behavioural inhibition system (BIS) is characterised by a sensitivity to threat, and the behavioural activation system (BAS) is characterised by a sensitivity to reward. Further, it is proposed that the BIS facilitates the expression of avoidance motivation (AM), in the form of anxious traits, and the BAS facilitates the expression of approach motivation (AppM), in the form of impulsivity or sensation seeking traits (Gray, 1970, 1978). Those high on AppM are usually outgoing, novelty-seeking individuals, while those high on AM are likely to be inhibited, fearful individuals. Activation of the BIS in response to physiological and psychological changes in the environment occurs in response to a hypersensitivity to threat, often resulting in avoidance behaviour; thus Gray proposed that people with extreme BIS levels are at risk for developing anxiety disorders (Gray, 1994).

Empirical evidence, reviewed in chapter one of this thesis, were primarily consistent with the proposed relationship between AM and anxiety (e.g. Brown, 2007; Gomez & Francis, 2003; Johnson, et al., 2003); however, not all people with a hypersensitive AM go on to develop anxiety disorders (e.g. Kagan & Snidman, 1999; Prior, et al., 2000; Sanson, et al., 1996), indicating that the relationship between AM and anxiety disorders may be more complex than originally proposed. In fact, Gray himself argued that psychopathology may result due to “combinations of over/underactivity and/or dysfunction in more than one system; or dysfunctional interactions between more than one system” (Gray, 1994, p. 43), possibly suggesting
an interaction between the two systems, rather than anxiety disorders being a result of high AM in isolation.

However, little research to date has focused on the role of AppM in the experience of anxiety. Hardin and colleagues (2006) highlight a common flaw in motivational research: most research interested in introverted and anxious behaviour focuses on the role of AM, while most research interested in extraverted and outgoing behaviour focuses on the role of AppM. Further, most researchers investigating the role of Gray’s RST in the experience of anxiety disorders hypothesise that AM and AppM should function separately; this has become known as the separable subsystems hypothesis (SSH). That is, those people with extreme levels of AM should be most sensitive to punishment, and therefore most likely to experience a higher severity of anxiety disorder symptoms, regardless of AppM level (e.g. Johnson, et al., 2003).

Over time, however, significant findings of negative correlations between AppM and anxiety have emerged (Corr, 2002), indicating that AppM may influence anxiety in ways not predicted by the SSH. These findings have led to further examination of Gray’s (1994) initial suggestion that AM and AppM may jointly influence approach and avoidance motivation; this has been titled the joint subsystems hypothesis (JSH; Corr, 2002). The primary prediction is that avoidance motivation facilitates responses to punishment and antagonises responses to reward, while approach motivation facilitates responses to reward and antagonises responses to punishment (Corr, 2004). The nature of the joint relationship between AM and AppM is proposed to be such that the reaction to aversive stimuli would be strongest for those high on AM and low on AppM, followed by those high on AM and high on
AppM; with those low on AM and low on AppM also having a stronger response to aversive stimuli than those low on AM and high on AppM (Corr, 2002).

The focus of this study was to examine the validity of the JSH when measuring severity of generalized anxiety disorder (GAD) and social anxiety disorder (SAD) symptoms, by determining the interplay between AM and AppM between groups. There are some important conditions of the JSH, proposed by Corr (2004), that are not regularly taken into consideration, and so a unique contribution of the present study was to take into account one of the most important of these conditions. Corr proposed that the JSH would only be relevant when participants do not have a hypersensitivity to threat, and that under all other conditions, findings consistent with the SSH should emerge (Corr, 2004). Thus, the JSH should be relevant for those people at low risk for an anxiety disorder, who do not experience extreme levels of anxiety and have a low sensitivity to threat. Alternately, the SSH should be relevant for those people at high risk for an anxiety disorder, who experience extreme levels of anxiety and a high sensitivity to threat.

To date, research investigating the JSH, reviewed in the first chapter of this thesis, has resulted in conflicting findings (e.g. Bijttebier, et al., 2009; Hundt, et al., 2008; Hundt, et al., 2007; Kimbrel, et al., 2007; Knyazev & Wilson, 2004), and it is proposed here that the primary reason for these conflicting findings may be that they do not take into account this important condition for the JSH. In the only study to be located which separated the participants into clinically anxious and non-anxious groups, results indicated that the JSH was relevant for the non-anxious group of 60 adolescents, while the SSH was relevant for the 115 clinically anxious adolescents (Vervoort, et al., 2010).
Therefore, this study aimed to determine whether, for those at low risk for either GAD or SAD, the JSH was better able to explain severity of anxiety symptoms than the SSH. Further, this study aimed to investigate whether the SSH was better able to explain severity of anxiety symptoms among those at high risk for either GAD or SAD, than the JSH.

**Hypotheses.**

- H1: For those at low risk for either GAD or SAD, the group with the combination of high AM and low AppM will report the highest anxiety disorder symptoms, supporting the JSH;

- H2: For those at high risk for either GAD or SAD, those with high AM will report the highest anxiety disorder symptoms, supporting the SSH.

**Method**

**Participants**

Four hundred and eight participants completed the questionnaire. In order to examine potential differences between risk for GAD and risk for SAD groups, participants who scored above the level of clinical risk for both GAD and SAD, as calculated using established cut-off scores, were removed from the analyses, so that comorbidity was not a possible contributing factor within the results. Remaining participants were 304 adults, ranging in age from 18 to 73 (M=32.53, SD=11.62). Seventy-seven percent of the sample was female, and 78% identified themselves as Australian. Forty-seven percent were married or living with their partner, while a further 28% were presently single; 53% of the entire sample were living with a partner and/or children. Thirty percent of participants were presently studying, with 61% holding either an undergraduate or postgraduate degree. Fifty-two percent of
participants were full-time employed, while 17% were unemployed. Forty-five percent of the sample had sought treatment for a mental health issue at some point in their lives; while in terms of diagnosis, 19% indicated they had a diagnosis of GAD and 4% had a diagnosis of SAD.

**Measures**

**Demographics.**

Demographics collected included information regarding age, gender, ethnicity, relationship status, education, employment, living situation, history of mental illness, and source of access to the questionnaire.

**The Carver-White BIS/BAS scales.**

The Carver-White BIS/BAS scales (CW-BIS/BAS; Carver & White, 1994) consist of 20 self-report items, which measure BIS, BAS Reward Responsiveness, BAS Drive, and BAS Fun Seeking. The three BAS scales can also be summed to calculate an overall BAS score. Participants are asked to indicate how much they agree or disagree with statements such as “criticism or scolding hurts me quite a bit”. Items are rated on a four-point Likert scale (from 1 = strongly disagree to 4 = strongly agree); scores range from 7-28 for the BIS scale, while scores range from 13-52 for the overall BAS scale. Internal reliabilities ranged from .66 to .76, with established convergent validity and discriminant validity; test-retest correlations ranged from .59 to .69 (Carver & White, 1994). However, confirmatory factor analysis reported poor fit for both the two-factor and the four-factor solution (Cogswell, et al., 2006). Cronbach’s alpha in the present study was .83 for the BAS subscale and .81 for the BIS subscale.
The Generalized Anxiety Disorder Questionnaire.

The Generalized Anxiety Disorder Questionnaire (GAD-Q-IV; (Newman et al., 2002) is a nine item self-report questionnaire that measures presence of excessive and uncontrollable worry. Six of the nine items were presented in yes/no format, with questions such as “do you experience excessive worry”; further, one item required participants to “list the most frequent topics about which you worry excessively and uncontrollably”. Participants were also asked to answer questions such as “how much are you bothered by worry and physical symptoms” on a nine-point Likert scale (from 0 = no distress to 8 = very severe distress). Scores ranged from 0-12, with a cut-off of 5.7 suggesting clinical levels of GAD. This cut-off resulted in a sensitivity of 83% and a specificity of 89% (Newman, et al., 2002). In the present study, the GAD-Q-IV was utilised to indicate risk for GAD, with those participants scoring below the cut-off categorised as “low risk for GAD”, and those participants scoring above the cut-off classified as “high risk for GAD”. In addition, the GAD-Q-IV has been reported to have good discriminant validity and high test-retest reliability (Newman, et al., 2002). However, as scale scores are categorical, severity of GAD cannot be determined. Cronbach’s alpha in the present study was .87.

The Liebowitz Social Anxiety Scale.

The Liebowitz Social Anxiety Scale (LSAS; (Heimberg et al., 1999) is a commonly utilised measure of social anxiety, evaluating fear and avoidance of 24 social interaction and performance situations. Participants are asked to indicate their level of fear for each situation, based on a four-point Likert scale (from 0 = none to 3 = severe); and their level of avoidance of the situation, also based on a four-point Likert scale (from 0 = never to 3 = usually). Scores range from 0-144, with scores of 55 or higher indicating clinical levels of SAD (Liebowitz, 1987). In the present
study, the LSAS was utilised to indicate risk for SAD, with those participants scoring below the cut-off of 55 categorised as “low risk for SAD”, and those participants scoring above the cut-off of 55 classified as “high risk for SAD”. Internal reliability was high, ranging from .89 to .92, while convergent and discriminant validity were also high (Heimberg, et al., 1999). Cronbach’s alpha in the present study was .97.

**Procedure**

Power analyses conducted using statistical program G*Power 3 determined the sample size required for the overall sample in the present study (Faul, Erdfaulder, Lang, & Buchner, 2007). To achieve the desired level of power of .80, with a significance level of .05, and an expected effect size of around .17 (based on findings from Kimbrel, et al., 2007), a sample size of 195 was required. Therefore, there was sufficient power for the present study.

An online questionnaire was advertised via the use of paid online (e.g. Facebook) advertisements, as well as snowballing techniques. In addition, advertisements were printed and displayed around the Melbourne campus of Deakin University and on the Deakin University website. An advertisement was also placed on numerous anxiety-related websites and forums, such as Anxiety Disorders Association of Victoria and beyondblue. The multiple methods of data sampling were initiated to ensure participants did not all come from one subject pool. Fifty-one percent of the sample was obtained via snowballing techniques (i.e. through friends, family, and work colleagues), while a further 25% was obtained through paid and unpaid advertisements on social networking sites Facebook and MySpace.

Further, while the majority of participants completed the questionnaire electronically (87%), thirteen percent completed an identical paper version of the
questionnaire, in order to reduce any sampling bias that may occur with a study conducted entirely online (e.g. Van Selm & Jankowski, 2006; Whitehead, 2007).

**Results**

**Data Screening**

Preliminary data analyses were conducted on personality and anxiety measures. Variables were examined for out of range values, univariate outliers, missing values, deviations from normality, and multivariate outliers. In order to investigate the relationships between the primary measures, a correlation matrix was also examined. Inspection of the data revealed two out of range values for age; one participant was aged 13, another was aged 14. Both participants’ data was deleted. One participant had only completed two of the ten scales and was deleted.

According to Tabachnick and Fidell (2007), univariate outliers are those cases with standardised scores exceeding 3.29 ($p<.001$). Utilising this criteria, there were six univariate outliers in the data set. Specifically, the six outliers were from the Carver-White BIS/BAS scales (CW-BIS/BAS; standard score $<-3.29$). The outliers were recoded back to three standard deviations below the mean (Tabachnick & Fidell, 2007).

Analyses were conducted to determine whether the missing values were missing completely at random. Little’s MCAR statistic ($p = .003$) indicated that the data was not missing completely at random, and so an estimation method was required to impute missing values. Examination of the missing values determined that all variables had <5% missing data, and so item mean substitution was utilised to impute missing values.

Low absolute values indicated that both skewness (ranging from -.46 to .80) and kurtosis (ranging from -1.5 to .38) statistics were normal. Examination of
Mahalanobis distance, with four dependent variables (BIS, BAS, severity of GAD symptoms, and severity of SAD symptoms) and a critical value of 18.47, revealed two multivariate outliers. Because there were only two cases and because the scores were not much higher than the critical value (18.88 and 22.18), they were left in the data file (Pallant, 2005).

**Method Effects**

A one-way MANOVA was performed to assess whether there were any differences between those who completed a questionnaire electronically and those who completed a paper questionnaire. Worry, emotion regulation, personality, affect, and anxiety measures were subjected to a one-way MANOVA. Due to violations of equality of error variances and unequal N values, an alpha of .01 was set (Pallant, 2005). There were no statistically significant differences between electronic and paper questionnaires on any of the dependent measures: $F(12, 387) = 2.28, p = .01$. All further analyses combined the electronic and paper questionnaire data due to these non-significant differences.

**Joint Subsystems Hypothesis**

A median-split procedure (e.g. Corr, 2002; Kambourooulos & Staiger, 2004), yielded four groups (+AM/+AppM, +AM/-AppM, -AM/+AppM, -AM/-AppM), where the median AM score was 23.0 and the median AppM score was 36.0. The groups were constituted as follows: +AM/+AppM, $N = 101$; +AM/-AppM, $N = 102$; -AM/+AppM, $N = 103$; -AM/-AppM, $N = 99$. A series of ANOVAs were then conducted to examine differences between the four AM/AppM groups on levels of generalised anxiety and social anxiety symptoms. This data analytic strategy was utilised as it is a replication of the group structure and analyses used by Corr (2002) in his original test of the JSH. Further research investigating the JSH has also utilised
this same data analytic strategy (e.g. Kambouropoulos & Staiger, 2004), and so it was deemed appropriate for the present study. Comparisons were made across four types of participants: those who scored above the cut-off score for risk for GAD (high risk GAD; N=69), those who scored below the cut-off score for risk for GAD (low risk GAD; N=181), those who scored above the cut-off score for risk for SAD (high risk SAD; N=54), and those who scored below the cut-off score for risk for SAD (low risk SAD; N=181).

Table 4.1 reports on a correlation analysis for severity of GAD symptoms, severity of SAD symptoms, AM, and AppM, indicating significant associations between the variables of interest. Inspection of Table 4.1 indicated that AM was significantly positively associated with both GAD symptoms and SAD symptoms, while AppM was significantly negatively correlated with SAD symptoms but not GAD symptoms. Table 4.2 details mean (and standard deviation) scores for each of the analyses.

Table 4.1.

*Correlations between Severity of GAD Symptoms, Severity of SAD Symptoms, AM, and AppM.*

<table>
<thead>
<tr>
<th></th>
<th>GAD</th>
<th>SAD</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAD</td>
<td>.12*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>.41**</td>
<td>.47**</td>
<td></td>
</tr>
<tr>
<td>AppM</td>
<td>.01</td>
<td>-.17**</td>
<td>-.02</td>
</tr>
</tbody>
</table>

*Note: *p*.05, **p*.01. GAD = generalised anxiety disorder; SAD = social anxiety disorder; AM = avoidance motivation; AppM = approach motivation.
Table 4.2.

Mean (and Standard Deviation) Scores of GAD-Q-IV and LSAS by Risk for Anxiety Disorder Group and AM/AppM Group.

<table>
<thead>
<tr>
<th></th>
<th>AM/-AppM</th>
<th>AM/+AppM</th>
<th>AM/-AppM</th>
<th>AM/+AppM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>High risk GAD</td>
<td>9.74</td>
<td>1.81</td>
<td>8.16</td>
<td>2.16</td>
</tr>
<tr>
<td>Low risk GAD</td>
<td>1.37</td>
<td>1.69</td>
<td>1.29</td>
<td>1.44</td>
</tr>
<tr>
<td>High risk SAD</td>
<td>67.50</td>
<td>12.42</td>
<td>62.80</td>
<td>6.06</td>
</tr>
<tr>
<td>Low risk SAD</td>
<td>27.70</td>
<td>13.22</td>
<td>26.22</td>
<td>13.50</td>
</tr>
</tbody>
</table>

Note: GAD = generalised anxiety disorder; SAD = social anxiety disorder; AM = avoidance motivation; AppM = approach motivation.

The first ANOVA was conducted with the high risk GAD participants. There was a statistically significant difference in GAD-Q-IV scores between the four groups, $F(3, 166) = 12.13, p < .001$, eta squared = 0.18. Tukey post-hoc comparisons indicated that the mean score for $+AM/-AppM$ was significantly higher than $-AM/+AppM (p < .001)$, and that the mean score for $+AM/+AppM$ was also significantly higher than $-AM/+AppM (p < .001)$. Bar graphs, with error bars (+/- 1 SEM), are presented in Figure 4.1.

The second ANOVA was conducted with the low risk GAD participants. There was a statistically significant difference in GAD-Q-IV scores between the four groups, $F(3, 231) = 10.54, p < .001$, eta squared = 0.12. Tukey post-hoc comparisons indicated that the mean score for $+AM/-AppM$ did not significantly differ from any other groups, but the mean score for $+AM/+AppM$ was significantly higher than both $-AM/-AppM (p < .001)$ and $-AM/+AppM (p < .001)$. Bar graphs, with error bars (+/- 1 SEM), are presented in Figure 4.2.
Figure 4.1. Mean severity of GAD-Q-IV scores for (median-split) low and high AM and AppM (error bars display +/- 1 SEM), in high risk for generalised anxiety disorder participants.

Figure 4.2. Mean severity of GAD-Q-IV scores for (median-split) low and high AM and AppM (error bars display +/- 1 SEM), in low risk for generalised anxiety disorder participants.
The third ANOVA was conducted with the high risk SAD participants. There was a statistically significant difference in LSAS scores between the four groups, $F(3, 152) = 4.06, p < .001$, eta squared = 0.07. However, following Bonferroni adjustment, there were no significant mean differences between groups. Bar graphs, with error bars (+/- 1 SEM), are presented in Figure 4.3.

Finally, the fourth ANOVA was conducted with the low risk SAD participants. There was a statistically significant difference in LSAS scores between the four groups, $F(3, 245) = 8.77, p < .001$, eta squared = 0.10. Tukey post-hoc comparisons indicated that the mean score for +AM/-AppM was significantly higher than -AM/+AppM ($p < .01$), and that the mean score for +AM/+AppM was also significantly higher than -AM/+AppM ($p < .001$). Bar graphs, with error bars (+/- 1 SEM), are presented in Figure 4.4.

![Figure 4.3](image)

Figure 4.3: Mean severity of LSAS scores for (median-split) low and high AM and AppM (error bars display +/- 1 SEM), in high risk for social anxiety disorder participants.
Figure 4.4. Mean severity of LSAS scores for (median-split) low and high AM and AppM (error bars display +/- 1 SEM), in low risk for social anxiety disorder participants.

Discussion

This study aimed to investigate whether the joint subsystems hypothesis was better able to explain severity of anxiety disorder symptoms than the separable subsystems hypothesis, and whether there were differences in AM/AppM scores between those at high risk for an anxiety disorder and those at low risk. It was predicted that the JSH would hold for the low risk group, while the SSH would be more relevant for the high risk group. However, data did not provide support for these hypotheses.

In order to specifically test the JSH, it was predicted that low risk participants with a combination of high AM and low AppM would have significantly higher anxiety scores than the other three groups. However, the JSH was not supported in low risk groups: in the low risk for GAD sample, the +AM/+AppM participants had
significantly higher GADQ-IV scores than both the –AM/-AppM and –AM/+AppM participants. There were no other significant differences. Further, in the low risk for SAD group, the –AM/+AppM participants had significantly lower LSAS scores than both the +AM/-AppM and +AM/+AppM participants. Again, these were the only significant differences. Combined, the results indicated that there was one important difference between the +AM/-AppM and the +AM/+AppM groups: while the +AM/-AppM group did not differ from any of the other groups within the low risk GAD sample, the +AM/+AppM low risk GAD group scored significantly higher than both the –AM/-AppM group and the –AM/+AppM group.

For those at high risk for either GAD or SAD, it was predicted that high AM would have the strongest relationship with anxiety disorder symptoms, regardless of AppM level, supporting the SSH. However, the –AM/+AppM participants had significantly lower GADQ-IV scores than both the +AM/-AppM and the +AM/+AppM participants, in the high risk for GAD sample; and there were no significant mean differences between groups in the high risk for SAD sample.

In summary, then, there were no significant differences between AM/AppM groups among the high risk SAD group, while for the high risk GAD group and the low risk SAD group, the only significant mean differences were for the –AM/+AppM group when compared to both the +AM/-AppM and +AM/+AppM groups. Most interestingly, for the low risk GAD group, it was an association with high AppM and not low AppM that seemed to be implicated in the experience of anxiety disorder symptoms.

**Separable Subsystems Hypothesis**

As Corr (2004) predicted, interactions between AM and AppM did not appear to contribute to the experience of anxiety disorder symptoms among those at high risk
for either GAD or SAD in the present study. Both of the +AM groups had significantly higher levels of anxiety than the −AM/+AppM group. As participants in the high risk groups generally tend to experience a high sensitivity to punishment, and have strong reactions to threat, resulting in avoidant behaviour and a predisposition to develop an anxiety disorder, the impact of AppM is subdued due to this amplification of AM (Corr, 2002). Research has tended to support this hypothesis; for example, Bijttebier and colleagues (2009) reviewed the research investigating the role of RST in psychopathology, reporting that the general finding for anxiety disorders was a positive association with AM and little or no association with AppM. Present results, however, do not strictly concur with these previous findings, as there were no significant mean differences between groups within the high risk for SAD group.

**Joint Subsystems Hypothesis**

While the role of AM in the experience of anxiety disorders has been well documented, the relationship between AppM and anxiety is less clear. The JSH predicts that low AppM, combined with high AM, should have the strongest relationship with anxiety, in non-extreme groups (Corr, 2002). However, in the low risk for SAD group, both of the +AM groups had significantly higher levels of anxiety disorder symptoms than the −AM/+AppM group, indicating that AM and AppM appear to play separate roles in the experience of anxiety. Further, in the low risk for GAD group, the anxiety scores for the +AM/-AppM group did not significantly differ from either of the −AM groups. Thus, it seems that, in those with low AM, high AppM protects the participant from the experience of anxiety, while in those with high AM, high AppM increases the risk of experiencing GAD symptoms.
These findings do not support Corr’s (2002) JSH, and are in fact more consistent with a separate revision to Gray’s RST.

**Revised RST**

A possible explanation for the unexpected findings reported in this study can be found in a related but separate area of focus within RST research. Among other new predictions and clarifications to Gray’s original theory, Gray and McNaughton (2000) proposed some substantial revisions to RST, in which the BIS system may be best conceptualised as the system that resolves conflict between approach and avoidance (Deary & Johnson, 2009), and that this conflict might impact behaviour more than either BIS or BAS alone. One of the only studies to empirically test some of the predictions of these revisions was conducted by Berkman and colleagues (Berkman, et al., 2009), who reported that high BIS and high BAS significantly interacted during situations involving conflict. Further, Kambouropoulos and Staiger (2004) demonstrated that the highest levels of inhibition in a behavioural task, which rewarded correct responding with additional points and punished incorrect responding with the removal of points, was experienced by participants in the +AM/+AppM group. Interestingly, the same methodology for grouping participants into AM/AppM groups was utilised by Kambouropoulos and Staiger (2004) as was used in the present study. The findings from the current study, in addition to those presented by Berkman and colleagues (2009) and Kambouropoulos and Staiger (2004), indicate that there may be a conflict between high AM and high AppM, rather than an under-active AppM, that is important to the experience of anxiety.

Therefore, it is proposed that anxiety is the result of conflict between simultaneous activation of the reward system and the punishment system (Smillie, et al., 2006). Conclusions drawn from the present study, for those participants at low
risk for GAD, therefore would appear to more closely align with the theoretical propositions of revised RST to that of the original RST, as the combination of high AM and high AppM was associated with increased levels of anxiety disorder symptoms.

**Limitations**

The cross-sectional nature of the present study limits the conclusions that can be made. As participants completed self-report measures of GAD and SAD, rather than a diagnostic interview, this study was unable to categorise participants into those with diagnosed anxiety disorders and make comparisons with a control group. Thus, the current study may only reflect on anxiety disorder symptoms, and future research is required to test these relationships at the clinical level.

A further limitation involves the issue of Corr’s conditions for the JSH, in which the JSH is proposed to only be relevant in non-extreme AM/AppM groups. While the present study considered these conditions in terms of high and low risk for anxiety disorders, those participants who may have experienced extreme levels of AppM were not considered. As the focus of the present study was on aversive motivation and the AM, those participants with extreme AppM levels were not separated into groups. However, it is possible that this limitation may account for some of the findings, particularly as high AppM was found to be associated with the experience of anxiety. Additionally, the artificial dichotomisation of categorical data, via the use of the median-split procedure, has limitations which may have impacted the findings of the present study (e.g. MacCallum, Zhang, Preacher, & Rucker, 2002).
Conclusion

In summary, this study reported that in a low risk for GAD sample, the interplay between high AM and high AppM was significant, while the interaction between both of the low AM groups was not. These results were strikingly different from the high risk for GAD sample. This indicates that future studies should ensure they do not group high risk and low risk participants together, as many studies (particularly those utilising university samples) have tended to do. Finally, there was a lack of support for the joint subsystems hypothesis in the low risk for GAD group, with high AppM emerging as an important factor in understanding the experience of anxiety, rather than low AppM as predicted. This further contributes to the complexities noted within the field of RST, and indicates that a potential next step may be to further develop and empirically test new revisions to RST, in which approach-avoidance conflict plays a major role.

In addition, as indicated in the introduction chapters, cognitive factors such as emotion regulation have largely been ignored within investigations of trait motivation and anxiety. Consideration of cognitive factors such as emotion regulation may help to clarify the relationships tested in the present study, and so the following chapter details the rationale, methodology, results, and discussion of study two, which examines the role of emotion regulation in the relationship between trait motivation and severity of anxiety disorder symptoms.
CHAPTER FIVE

Study Two: The Role of Maladaptive Emotion Regulation in the Relationship between Motivation and Anxiety

Introduction
The preceding chapter detailed an empirical study designed to examine a hypothesised joint relationship between approach and avoidance motivation in the prediction of severity of anxiety disorder symptoms, among those at high risk for an anxiety disorder and those at low risk. There was some evidence for an interaction between approach and avoidance motivation, in the low risk for anxiety disorder groups. As discussed in the conclusion of the last chapter, little research has considered cognitive factors such as emotion regulation in studies of this nature. Therefore, the aim of the present chapter is to consider emotion regulation as a potential moderator for the relationship between trait motivation and severity of anxiety disorder symptoms. Thus, the present chapter provides the rationale, methodology, results, and discussion of the second study in this series of studies.

Rationale
A joint relationship between AM and AppM was hypothesised in the first study of this thesis, and results indicated that, in the low risk for GAD group, there was evidence of an interplay between AM and AppM. However, the significant interaction was not in the hypothesised direction; high AppM emerged as an important predictor of anxiety, rather than low AppM as originally predicted by the JSH (Corr, 2002). Further, in the low risk for SAD group, there was no evidence to
support JSH. These findings may be able to be explained by consideration of a separate revision to RST, made by Gray and McNaughton (2000), titled revised RST.

The core prediction of revised RST is that the behavioural inhibition system (BIS) is now conceptualised as a system that is activated in response to concurrent conflicting goals between the fight-flight-fear system (FFFS), responsible for avoidance of threat or harm, and the behavioural approach system (BAS), responsible for approach of reward (Gray & McNaughton, 2000). In terms of anxiety, a conflict arises between a desire to approach an anxiety-provoking situation (e.g. for social gain) and a desire to avoid the same anxiety-provoking situation (for fear of rejection), activating the BIS which then elicits an anxious response.

Some empirical support for these predictions (e.g. Berkman, et al., 2009; Kambouropoulos & Staiger, 2004) has been established in recent years, indicating that AppM may play an important role in the understanding of the development and maintenance of anxiety. However, some research has reported that low AppM interacts with AM (e.g. Corr, 2002; Knyazev & Wilson, 2004), rather than high AppM, and so future research is required.

Further, potential moderators of the relationship between trait motivation and severity of anxiety disorder symptoms, such as cognitive factors, have largely been ignored in research of this nature. One potentially relevant cognitive mechanism is emotion regulation (ER). Briefly, ER is the process of modifying emotional states, in order to influence and control experienced emotion (Gross & John, 2003). It is known that people with anxiety disorders such as GAD and SAD experience more intense emotions than non-clinical samples (Turk, et al., 2005), and are more likely to utilise maladaptive ER techniques (Decker, et al., 2008; Salters-Pedneault, et al., 2006). However, less is known about the relationship between trait motivation and
emotion regulation. A very limited amount of research has considered this to date, but the available research has indicated that high levels of BIS are correlated with high levels of maladaptive ER (Leen-Feldner, et al., 2004; Tortella-Felia, et al., 2010; Tull, et al., 2010). It is argued here that individuals with high levels of AM may cognitively process threat in maladaptive ways, thus increasing the risk of developing anxiety disorders such as GAD and SAD. Therefore, the construct of emotion regulation is predicted to be a moderator of the relationship between trait motivation and severity of anxiety symptoms.

Particularly, it is predicted here that those people with high AM, who have the tendency to avoid situations and experiences, may also be more likely to avoid, or suppress, their emotions. A tendency to utilise maladaptive ER strategies, such as suppression, may increase the risk of those high on AM developing an anxiety disorder. Thus, it is argued here that maladaptive ER may play a moderating role in the relationship between AM and severity of anxiety disorder symptoms. Further, to account for the findings of study one, it is proposed that a tendency to use maladaptive ER strategies may increase the risk of those people high on both AM and AppM to develop anxiety disorders.

**Hypotheses.**

- H1: The BIS scale of the Carver-White BIS/BAS scale will reliably split into two factors to form FFFS and BIS, as specified by Heym and colleagues (2008);

- H2: High AM and high AppM will predict a higher severity of SAD and GAD symptoms, in those participants at low risk for an anxiety disorder;
• H3: High AM will predict a higher severity of SAD and GAD symptoms, in those participants at high risk for an anxiety disorder;

• H4: High maladaptive ER will moderate the relationship between motivation and severity of anxiety symptoms;

  a) Specifically, a combination of high maladaptive ER and high AM will significantly predict severity of anxiety symptoms.

Method

Participants

The study included 431 adult participants ranging in age from 18 to 73 years (M=32.41, SD=11.38), who completed a self-report questionnaire. The majority of participants completed the questionnaire electronically, while a small number completed an identical paper version of the questionnaire. Demographic information of participants is presented in Table 5.1.

Measures

Participants completed a questionnaire consisting of basic demographics, a GAD measure, a SAD measure, a motivation measure, and an ER measure. The demographics, GAD measure, SAD measure, and motivation measure have previously been described in study one so they are only briefly described here.

Demographics.

Demographics collected included information regarding age, gender, ethnicity, relationship status, education, employment, living situation, and source of access to the questionnaire.
Table 5.1.

*Participant Demographics for Study Two.*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Grouping</th>
<th>%</th>
<th>Grouping</th>
<th>%</th>
<th>Grouping</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire</td>
<td>Electronic</td>
<td>89%</td>
<td>Paper</td>
<td>11%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>78%</td>
<td>Male</td>
<td>22%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Australian</td>
<td>68%</td>
<td>Other</td>
<td>32%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married/De Facto</td>
<td>44%</td>
<td>Single</td>
<td>37%</td>
<td>Partner</td>
<td>19%</td>
</tr>
<tr>
<td>Living Situation</td>
<td>Partner/children</td>
<td>51%</td>
<td>Other adults/parents</td>
<td>37%</td>
<td>Living alone</td>
<td>12%</td>
</tr>
<tr>
<td>Education</td>
<td>University degree</td>
<td>54%</td>
<td>High School</td>
<td>26%</td>
<td>Certificate/Trade</td>
<td>20%</td>
</tr>
<tr>
<td>Studying</td>
<td>Not studying</td>
<td>66%</td>
<td>Part-time</td>
<td>16%</td>
<td>Full-time</td>
<td>18%</td>
</tr>
<tr>
<td>Employment</td>
<td>Full-time</td>
<td>43%</td>
<td>Not employed</td>
<td>26%</td>
<td>Casual/part-time</td>
<td>31%</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Snowballing</td>
<td>41%</td>
<td>Facebook/MySpace</td>
<td>30%</td>
<td>Other</td>
<td>29%</td>
</tr>
</tbody>
</table>

The Carver-White BIS/BAS scales.

The Carver-White BIS/BAS scales (CW-BIS/BAS; Carver & White, 1994) consist of 20 self-report items, which measure BIS, BAS Reward Responsiveness, BAS Drive, and BAS Fun Seeking. The three BAS scales can also be summed to calculate an overall BAS score. Cronbach’s alpha in the present study was .83 for the BAS subscale and .81 for the BIS subscale.

The Generalized Anxiety Disorder Questionnaire.

The Generalized Anxiety Disorder Questionnaire (GAD-Q-IV; Newman, et al., 2002) is a nine item self-report questionnaire that measures presence of excessive and uncontrollable worry. Cronbach’s alpha in the present study was .87.
The Liebowitz Social Anxiety Scale.

The Liebowitz Social Anxiety Scale (LSAS; Heimberg, et al., 1999; Liebowitz, 1987) is a commonly utilised measure of social anxiety, evaluating fear and avoidance of 24 social interaction and performance situations. Cronbach’s alpha in the present study was .97.

The Emotion Regulation Questionnaire.

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is a 10 item self-report questionnaire that measures the two most common forms of emotion regulation: cognitive reappraisal (antecedent-focused) and emotional suppression (response-focused). The emotional suppression subscale is utilised in the present study as the measure of maladaptive emotion regulation. The emotional suppression subscale of the ERQ asked participants to answer questions about how they control their emotions; for example, “I control my emotions by not expressing them”. Items are rated on a seven-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). High internal reliability has been established (.79 for reappraisal; .73 for suppression), and convergent and discriminant validity have been demonstrated (Gross & John, 2003). Cronbach’s alpha in the present study was .84 for the reappraisal subscale, and .81 for the suppression subscale.

Procedure

An online questionnaire was advertised via the use of snowballing techniques. In addition, advertisements were printed and displayed around the Burwood campus of Deakin University and on the Deakin University website. An advertisement was placed on numerous anxiety-related websites and forums, such as Anxiety Disorders Association of Victoria and beyondblue. The multiple methods of data sampling were initiated to ensure participants did not all come from one subject pool.
Further, approximately ten percent of participants were asked to complete a paper questionnaire, in order to reduce any sampling bias that may occur with a study conducted entirely online (e.g. Van Selm & Jankowski, 2006; Whitehead, 2007). Further, it has been noted that the reliability and validity of measures utilised online may differ from their paper and pencil equivalent (Whitehead, 2007). However, recent research has demonstrated that the internal reliability and validity of highly regarded measures, such as the Penn State Worry Questionnaire and the Depression, Anxiety, and Stress Scale, remain comparable to the psychometric properties of the paper and pencil versions, when utilised online (Zlomke, 2009).

Results

Data Screening

Basic data screening was conducted and described in study one. Additional checks specific to regression analyses were then conducted and these are presented below. Table 5.2 depicts means, standard deviations, and minimum and maximum scores for all measured variables.

Power analyses conducted using statistical program G*Power 3 determined the sample size required for the present study (Faul, et al. 2007). To achieve the desired level of power of .80, with a significance level of .01, and an expected effect size of around .17 (based on findings from Kimbrel, et al., 2007), with four predictors required for a two-step hierarchical regression, a sample size of 73 was required. Therefore, there was sufficient power for the present study.

According to Tabachnick and Fidell (2007), univariate outliers are those cases with standardised scores exceeding 3.29 ($p<.001$). Utilising this criteria, there were six univariate outliers in the data set. Specifically, the six outliers were from the Carver-White BIS/BAS scales (CW-BIS/BAS; standard score < -3.29). The outliers
Table 5.2.


<table>
<thead>
<tr>
<th>Variable</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maladaptive ER</td>
<td>1.00</td>
<td>7.00</td>
<td>3.60</td>
<td>1.50</td>
</tr>
<tr>
<td>AM</td>
<td>3.00</td>
<td>12.00</td>
<td>9.41</td>
<td>1.82</td>
</tr>
<tr>
<td>AppM</td>
<td>19.00</td>
<td>52.00</td>
<td>36.06</td>
<td>5.47</td>
</tr>
<tr>
<td>GAD Symptoms</td>
<td>0.00</td>
<td>13.00</td>
<td>5.51</td>
<td>4.59</td>
</tr>
<tr>
<td>SAD Symptoms</td>
<td>0.00</td>
<td>136.00</td>
<td>51.41</td>
<td>30.72</td>
</tr>
</tbody>
</table>

*Note:* ER = emotion regulation; AM = avoidance motivation; AppM = approach motivation; GAD = generalised anxiety disorder; SAD = social anxiety disorder.

were recoded back to three standard deviations below the mean (Tabachnick & Fidell, 2007).

Analyses were conducted to determine whether the missing values were missing completely at random. Little’s MCAR statistic (*p* = .003) indicated that the data is not missing completely at random, and so an estimation method is required to impute missing values. Examination of the missing values determined that all variables had <5% missing data, and so item mean substitution was utilised to impute missing values.

Examination of Mahalanobis distance, with five dependent variables and a critical value of 20.52, revealed two multivariate outliers. Because there were only two cases and because the scores were not much higher than the critical value (23.79 and 25.76), they were left in the data file (Pallant, 2005).
Low absolute values indicated that both skewness (ranging from .01 to .75) and kurtosis (ranging from -1.5 to .35) statistics were normal, indicating that the data met the assumptions for normality.

A correlation matrix with each of the measured constructs is presented in Table 5.3. Examination of the correlations indicates that, as none of the correlations were above .90, there were no issues with multicollinearity or singularity. Examination of the Tolerance and VIF scores further indicated that there was no problem with multicollinearity.

**Fear and Anxiety as Separate Constructs**

Heym and colleagues (2008) examined the factor structure of the CW-BIS/BAS and reported results of a confirmatory factor analysis in which the original BIS scale could be successfully separated into two subscales: BIS and FFFS. At the time of data analysis, no other studies could be located which confirmed this revised factor structure, and so the first analysis in the present study aimed to replicate Heym and colleagues’ (2008) factor structure of the BIS subscale from the CW-BIS/BAS scale, using confirmatory factor analysis with AMOS 17.0.

All latent variables were scaled by constraining the variances to one, and, due to chi-square being sensitive to large sample sizes, model fit was instead assessed using a three-index strategy: SRMR (standardised root mean square residual); RMSEA (root mean-square residual); and CFI (comparative fit index), based on Byrne’s (2001) recommendations. Good model fit was indicated by an SRMR value less than .08, an RMSEA value less than .08, and a CFI value greater than .95 (Byrne, 2001).
Table 5.3.

**Correlations between AM, AppM, Maladaptive ER, and Anxiety Measures, By Risk for Anxiety Group.**

<table>
<thead>
<tr>
<th></th>
<th>AM</th>
<th>AppM</th>
<th>MalER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk for GAD (n=244)</td>
<td>AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AppM</td>
<td>-.04</td>
<td>-.20**</td>
</tr>
<tr>
<td></td>
<td>MalER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GAD-Q-IV</td>
<td>.41**</td>
<td>.04</td>
</tr>
<tr>
<td>High risk for GAD (n=187)</td>
<td>AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AppM</td>
<td>-.07</td>
<td>-.22**</td>
</tr>
<tr>
<td></td>
<td>MalER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GAD-Q-IV</td>
<td>.39**</td>
<td>-.16*</td>
</tr>
<tr>
<td>Low risk for SAD (n=261)</td>
<td>AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AppM</td>
<td>-.12</td>
<td>-.09</td>
</tr>
<tr>
<td></td>
<td>MalER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LSAS</td>
<td>.36**</td>
<td>-.15*</td>
</tr>
<tr>
<td>High risk for SAD (n=170)</td>
<td>AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AppM</td>
<td>-.16</td>
<td>-.28**</td>
</tr>
<tr>
<td></td>
<td>MalER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LSAS</td>
<td>.26**</td>
<td>-.23**</td>
</tr>
</tbody>
</table>

*Note: *p < .05, **p < .01. GAD = generalised anxiety disorder; SAD = social anxiety disorder; AM = avoidance motivation; AppM = approach motivation; MalER = maladaptive ER; GAD-Q-IV = generalised anxiety disorder questionnaire; LSAS = Liebowitz social anxiety scale.

The two-factor model (FFFS and BIS) produced a $\chi^2$ (df = 13) = 35.54, $p < .001$ and CFI = .97, SRMR = .04, RMSEA = .06, indicating good fit. Investigation of the standardised residual covariances revealed that there were no standardised residuals larger than 2.58, indicating the model was correctly specified. Figure 5.1 details the standardised regression weights, and reveals that all items contributed
significantly to the model. Cronbach’s alpha was .70 for the FFFS subscale, and .74 for the BIS subscale.

As the hypothesised factor structure of the BIS subscale from the CW-BIS/BAS scale was confirmed, the findings were then incorporated into each of the remaining analyses. For each of the following correlation and regression analyses, the FFFS subscale was utilised to measure AM, while the BAS subscale remained the measure of AppM. The BIS subscale was not required in the present study due to the focus on revised RST, in which the BIS is only relevant in studies where the punishment and reward systems have both been activated, resulting in conflicting goals; the FFFS has now taken on the role of the punishment system.

![Diagram](image)

*Figure 5.1. CFA of the BIS subscale from the CW-BIS/BAS.*

**Statistical Design for Tests of Moderation**

This section details the procedure for running the hierarchical regression analyses in order to test for moderation. A moderating variable is one that alters the direction or
the strength of the relationship between a predictor variable and an outcome variable (Frazier, Tix, & Barron, 2004); thus, the primary purpose of the series of regressions was to determine whether the effect of motivation on anxiety level depends on the level of maladaptive emotion regulation. There are a number of established guidelines for conducting moderation analyses using multiple regression (e.g. Aiken & West, 1991; Frazier, et al., 2004).

The entire sample was split into four groups: those with a high risk for SAD, those with a low risk for SAD, those with a high risk for GAD, and those with a low risk for GAD. Each of the regressions testing for moderation was conducted separately for each of the above groups, in order to determine whether there were any differences depending on group membership.

The first regression for each group was concerned with potential main effects and interactions between AM and AppM, in order to provide a basic test of RST without the influence of emotion regulation. It is crucial for variables used in a test of interaction to be centred (Aiken & West, 1991); therefore, the first step was to centre AM and AppM. The next step was to compute the interaction term by multiplying the two centred predictor variables (e.g. Frazier, et al., 2004; Kambouropoulos, 2005). The regression was then conducted, with centred variables AM and AppM entered at the first step, followed by the AM x AppM interaction term at the second step, with anxiety level acting as the dependent variable.

Following this, the second regression for each group was concerned with potential main effects and interactions between AM, AppM, and maladaptive ER, in order to test the conceptual model presented in this study. Again, the dependent variable was anxiety level. The first step was to centre the variables AM, AppM, and maladaptive ER. These were entered at the first step of the regression. The two-way
interaction terms were calculated by multiplying each combination of the three centred predictor variables, and the AM x AppM, AM x maladaptive ER, and AppM x maladaptive ER interaction terms were then entered at the second step of the regression. The three-way interaction term was then calculated by multiplying the three centred predictor variables, and the AM x AppM x maladaptive ER interaction term was then entered at the third step of the regression.

Predictors of Severity of Anxiety Disorder Symptoms

To test the hypothesis that maladaptive ER would moderate the relationship between motivation and anxiety, a series of hierarchical regression analyses were conducted.

Low risk for GAD.

In the first analysis, AM (centred) and AppM (centred) were included as predictor variables of level of GAD symptoms at the first step of the equation. The interaction of AM and AppM (the multiplicative term) was added at the second step. At the first step, AM and AppM accounted for a significant proportion of variance in severity of GAD symptoms ($R^2 = .18$), $F(2, 241) = 25.90, p < .001$, with AM being the only significant contributor to level of GAD symptoms ($\beta = .42, p < .001$). Inclusion of the interaction term at the second step did not significantly improve prediction of GAD symptoms ($\Delta R^2 = .00$), $F(1, 240) = 0.51, p = .48$, indicating that there was no significant interaction between AM and AppM in the prediction of severity of GAD symptoms (see Table 5.4).

In the second analysis, AM (centred), AppM (centred), and maladaptive ER (centred) were entered at the first step, while the two-way interactions terms were entered at the second step and the three-way interaction term was entered at the third step. At the first step, AM, AppM, and maladaptive ER accounted for a significant proportion of variance in severity of GAD symptoms ($R^2 = .19$), $F(3, 240) = 19.28$,.
Table 5.4.

*Main Effects and Interaction Effects for Hierarchical Regression Analyses*

*Predicting Severity of GAD Symptoms, in Low Risk for GAD Group.*

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*Note:* *p < .05. GAD = generalised anxiety disorder; AM = avoidance motivation; AppM = approach motivation; MalER = maladaptive emotion regulation.
Chapter Five: Study Two

$p < .001$, with AM ($\beta = .43, p < .001$) and maladaptive ER ($\beta = .13, p < .05$) both independently predicting severity of GAD symptoms. Inclusion of the two-way interaction terms at the second step did not significantly improve prediction of GAD symptoms ($\Delta R^2 = .00$), $F(3, 237) = 0.35, p = .79$, indicating that there was no significant two-way interactions between AM, AppM, and maladaptive ER in the prediction of severity of GAD symptoms. Further, inclusion of the three-way interaction terms at the third step did not significantly improve prediction of GAD symptoms ($\Delta R^2 = .00$), $F(1, 236) = 0.14, p = .70$, indicating that there was no significant three-way interactions between AM, AppM, and maladaptive ER in the prediction of severity of GAD symptoms. These analyses are displayed in Table 5.4.

**High risk for GAD.**

In the first regression, AM (centred) and AppM (centred) were included as predictor variables of level of GAD symptoms at the first step of the equation. The interaction of AM and AppM (the multiplicative term) was added at the second step. At the first step, AM and AppM accounted for a significant proportion of variance in severity of GAD symptoms ($R^2 = .17$), $F(2, 184) = 18.59, p < .001$, with AM being the only significant contributor ($\beta = .38, p < .001$). Inclusion of the interaction term at the second step did not significantly improve prediction of the severity of GAD symptoms ($\Delta R^2 = .00$), $F(1, 183) = 0.44, p = .51$, indicating that there was no significant interaction between AM and AppM in the prediction of GAD symptoms. These analyses are displayed in Table 5.5.

In the second regression, AM (centred), AppM (centred), and maladaptive ER (centred) were entered at the first step, while the two-way interactions terms were entered at the second step and the three-way interaction term was entered at the third step. At the first step, AM, AppM, and maladaptive ER accounted for a significant
Table 5.5.

**Main Effects and Interaction Effects for Hierarchical Regression Analyses**

**Predicting Severity of GAD Symptoms, in High Risk for GAD Group.**

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*Note: *p < .05. GAD = generalised anxiety disorder; AM = avoidance motivation; AppM = approach motivation; MalER = maladaptive emotion regulation.
proportion of variance in the severity of GAD symptoms \( (R^2 = .17) \), \( F(3, 183) = 12.74, p < .001 \). Again, only AM significantly contributed at this step \( (\beta = .39, p < .001) \). Inclusion of the two-way interaction terms at the second step did not significantly improve prediction of GAD \( (\Delta R^2 = .01) \), \( F(3, 180) = 0.58, p = .63 \), indicating that there was no significant two-way interactions between AM, AppM, and maladaptive ER in the prediction of severity of GAD symptoms. Further, inclusion of the three-way interaction terms at the third step did not significantly improve prediction of GAD symptoms \( (\Delta R^2 = .01) \), \( F(1, 179) = 1.85, p = .18 \), indicating that there was no significant three-way interactions between AM, AppM, and maladaptive ER in the prediction of severity of GAD symptoms (see Table 5.5).

**Low risk for SAD.**

In the first regression, AM (centred) and AppM (centred) were included as predictor variables at the first step of the regression equation. The interaction of AM and AppM (the multiplicative term) was added at the second step. The first step of the regression model accounted for a significant proportion of variance in the severity of SAD symptoms \( (R^2 = .15) \), \( F(2, 258) = 22.01, p < .001 \), with both AM \( (\beta = .35, p < .001) \) and AppM \( (\beta = -.13, p < .05) \) significantly contributing in this step. The second step of the model did not account for an additional portion of variance in the severity of SAD symptoms \( (\Delta R^2 = .00) \), \( F(1, 257) = 0.00, p = .99 \), indicating that there was no significant interaction between AM and AppM in the prediction of severity of SAD symptoms. Table 5.6 displays these analyses.

In the second regression, AM (centred), AppM (centred), and maladaptive ER (centred) were entered at the first step, while the two-way interactions terms were entered at the second step and the three-way interaction term was entered at the third step. The first step of the regression model accounted for a significant proportion of
Table 5.6.

*Main Effects and Interaction Effects for Hierarchical Regression Analyses*

*Predicting Severity of SAD Symptoms, in Low Risk for SAD Group.*

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*Note:* p < .05. SAD = social anxiety disorder; AM = avoidance motivation; AppM = approach motivation; MalIER = maladaptive emotion regulation.
variance in the severity of SAD symptoms ($R^2 = .16$), $F(3, 257) = 16.69, p < .001$. AM ($\beta = .37, p < .001$), AppM ($\beta = -.12, p < .05$), and maladaptive ER ($\beta = .13, p < .05$) significantly contributed at this step. The second step of the model did not account for an additional portion of variance in SAD scores ($\Delta R^2 = .00$), $F(3, 254) = 0.44, p = .73$, indicating that there was no significant two-way interactions between AM, AppM, and maladaptive ER in the prediction of the severity of SAD symptoms. Further, inclusion of the three-way interaction terms at the third step did not significantly improve prediction of GAD symptoms ($\Delta R^2 = .01$), $F(1, 253) = 2.07, p = .15$, indicating that there was no significant three-way interactions between AM, AppM, and maladaptive ER in the prediction of severity of GAD symptoms (see Table 5.6).

**High risk for SAD.**

In the first regression, AM (centred) and AppM (centred) were included as predictor variables at the first step of the regression equation. The interaction of AM and AppM (the multiplicative term) was added at the second step. The first step of the regression model accounted for a significant proportion of variance in the severity of SAD symptoms ($R^2 = .12$), $F(2, 167) = 11.14, p < .001$, with both AM ($\beta = .26, p < .01$) and AppM ($\beta = -.22, p < .01$) significantly contributing in this step. The second step of the model did not account for an additional portion of variance in the severity of SAD symptoms ($\Delta R^2 = .00$), $F(1, 166) = 0.00, p = .96$, indicating that there was no significant interaction between AM and AppM in the prediction of severity of SAD symptoms. These analyses are displayed in Table 5.7.

In the second regression, AM (centred), AppM (centred), and maladaptive ER (centred) were entered at the first step, while the two-way interactions terms were
Table 5.7.

Main Effects and Interaction Effects for Hierarchical Regression Analyses

Predicting Severity of SAD Symptoms, in High Risk for SAD Group.

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Note: *p < .05. SAD = social anxiety disorder; AM = avoidance motivation; AppM = approach motivation; MalER = maladaptive emotion regulation.
entered at the second step and the three-way interaction term was entered at the third step. The first step of the regression model accounted for a significant proportion of variance in SAD scores \((R^2 = .14)\), \(F(3, 166) = 8.94, p < .001\). AM \((\beta = .27, p < .001)\), AppM \((\beta = -.18, p < .05)\), and maladaptive ER \((\beta = .15, p < .05)\) all significantly contributed at this step. The second step of the model did not account for an additional portion of variance in the severity of SAD symptoms \((\Delta R^2 = .01)\), \(F(1, 165) = 0.86, p = .46\), indicating that there was no significant two-way interactions between AM, AppM, and maladaptive ER in the prediction of severity of SAD symptoms. Inclusion of the three-way interaction terms at the third step did not significantly improve prediction of GAD symptoms \((\Delta R^2 = .01)\), \(F(1, 162) = 0.99, p = .32\), indicating that there was no significant three-way interactions between AM, AppM, and maladaptive ER in the prediction of severity of GAD symptoms (see Table 5.7).

**Discussion**

Previous research has established that people high on AM are at increased risk for developing an anxiety disorder (e.g. Gomez & Francis, 2003; Johnson, et al., 2003). The present study examined the possibility that a heightened severity of anxiety disorder symptoms exhibited by those high on AM was moderated by maladaptive ER. Specifically, it was argued that people with high AM are at increased risk of developing an anxiety disorder if they also exhibit a tendency to utilise maladaptive ER strategies. Support for this hypothesis was not found, with no evidence of moderating effects. Rather, there were various main effects that differed according to the group being examined. These will be discussed in turn, drawing on the relevant literature to assist in interpreting the data.
Specifically, in individuals with a low risk for generalised anxiety disorder, avoidance motivation and maladaptive emotion regulation significantly predicted levels of anxiety; however, approach motivation did not. For individuals at high risk for generalised anxiety disorder, only avoidance motivation significantly predicted anxiety level. For those individuals at low risk for social anxiety disorder, both approach and avoidance motivation significantly predicted level of anxiety, but when maladaptive emotion regulation and the interaction terms were added, the main effect of maladaptive emotion regulation was significant, while the main effect of approach motivation was non-significant, highlighting the possibility of mediating effects. Finally, for those participants at high risk for social anxiety disorder, approach and avoidance motivation both significantly predicted level of anxiety, but when maladaptive emotion regulation and the interaction terms were added, the main effect of maladaptive emotion regulation was significant, while the main effect of approach motivation was non-significant.

Avoidance motivation was the primary contributing variable for each of the four groups, as expected. For the high risk groups in particular, it was the only significant predictor of anxiety at the third step of the analysis. It appears that high AM may be such a potent predictor in those people at high risk for an anxiety disorder that other potential predictors cease to be important. For example, the reason that AppM and maladaptive ER were not significant predictors of anxiety in the high risk groups may be that the effect of AM was so large that the contribution of all other variables was suppressed. This is consistent with the argument posited by Corr (2002; 2004), in that the JSH would only be relevant when participants do not have an extreme sensitivity to either punishment or reward. This means that, for those participants who do have an extreme sensitivity to punishment, approach motivation
is not expected to play a significant role in the prediction of anxiety. Corr (2004) suggests that the SSH should be adopted under conditions which do not meet this criterion, and thus, the finding that high AM was the only predictor of anxiety in the high risk groups was expected.

A more complex story was evident for the low risk groups, particularly with regards to SAD. In the low risk for SAD group, low AppM significantly predicted severity of social anxiety symptoms in the first analysis. However, this effect became non-significant with the addition of maladaptive ER, indicating that the use of suppression as an emotion regulation strategy may mediate the effect of AppM on severity of social anxiety symptoms, in low risk groups. This significant negative relationship between AppM and ER is consistent with the only previous work that could be located which has examined the relationship between AppM and ER, in which Tull and colleagues (2010) reported that the AppM dimension of reward responsiveness was negatively related to overall self-report ER difficulties, in a sample of 101 adults.

This negative association between AppM and maladaptive ER indicates that a higher level of reward sensitivity is associated with less suppression of emotions, and so it may be that higher AppM acts as a protective factor against the development of maladaptive ER strategies. As those with high levels of AppM are thought to have the tendency to be outgoing and novelty-seeking, they may be more likely to try out various ER strategies in order to determine which strategies work best for them, and may also be much more likely to express their emotions to others, rather than suppress them. Therefore, individuals with deficits in AppM may be at higher risk of utilising the maladaptive ER tendency to suppress emotional behaviours, which in turn affects severity of social anxiety symptoms. However, as mediation analyses
were not the initial intention of the present study, future research should endeavour to replicate this finding using path analysis.

This interesting and unexpected finding indicates that, in addition to the direct impact of avoidance motivation, deficits in the motivational system responsible for mediating responses to rewarding stimuli, resulting in approach behaviour (BAS; e.g. Smillie, et al., 2006), may significantly predict a tendency to regulate emotions in a maladaptive way, which may then predict the severity of social anxiety disorder symptoms. Potentially, deficits in AppM, evidenced by a low desire to approach novel and exciting stimuli (e.g. Bijttebier et al., 2009), leads to deficits in maladaptive ER, evidenced by a low desire to approach emotions in a productive way, instead tending to inhibit and suppress them (e.g. Gross & John, 2003), which then leads to anxiety. To date, however, the small amount of research that has been conducted in this area has tended to only report relationships between AM and maladaptive ER, and AppM and adaptive ER (e.g. Dennis, 2007), and so these findings are unique. This theoretical model is presented in Figure 5.2 below.

![Figure 5.2: Model of Avoidance Motivation, Approach Motivation, Maladaptive Emotion Regulation, and Severity of Social Anxiety Symptoms in Participants at Low Risk for Social Anxiety Disorder.](image_url)
It is important to consider potential reasons for why the model presented here is only relevant in the low risk for SAD group. It is proposed here that, in high risk groups, individuals have an extreme sensitivity to threat, and the relationship between threat sensitivity and the severity of social anxiety symptoms is so pronounced, that low levels of sensitivity to reward and the tendency to suppress emotions are less relevant. This then indicates that there may be two distinct pathways to the experience of anxiety; for low risk groups, the model is presented in Figure 2, while for high risk groups, the relationship between AM and social anxiety symptoms is primary. However, this hypothesis remains preliminary and requires further investigation.

In the low risk for GAD group, AppM did not significantly predict anxiety. This differs considerably from the results from study one, and indicates that more work is required to identify whether AppM does in fact play a role in the prediction of severity of GAD symptoms. The finding from the present study is consistent with previous research, however, indicating that AppM has limited applicability in anxiety disorder research (Bijttebier, et al., 2009). Conversely, there was a main effect of maladaptive ER, indicating that both high AM and the tendency to utilise suppression as a maladaptive ER strategy, predicts severity of GAD symptoms. Thus, individuals who tend to restrain themselves from expressing any emotional behaviour, combined with a tendency to avoid novel or feared experiences, experience a greater severity of anxiety symptoms. This link between ER and GAD has been indicated previously, with findings that people with GAD were more likely to use distraction and rumination techniques, as well as being more likely to mask and hide emotions, than controls (Decker, et al., 2008). Further, those who met diagnostic criteria for GAD experienced less acceptance of their emotions, less
ability to engage in goal-directed behaviour, more impulse control difficulties, less access to ER strategies, and less clarity of emotions, than controls (Salters-Pedneault, et al., 2006).

One potential explanation for the lack of significant findings with regards to AppM and anxiety in the GAD group comes from a recent study examining impulsivity in 79 participants with a GAD diagnosis (Piero, 2010). Using the Barratt Impulsiveness Scale – Version 11 (Patton, Stanford, & Barratt, 1995) to measure the three primary components (cognitive, motor, and nonplanning) of impulsivity, it was reported that only the motor component was related to clinical severity of GAD (Piero, 2010). This aspect of impulsivity is characterised by a tendency to act without thinking or an inability to withhold responses (Barratt, 1959; 1965) and findings indicated that those participants with a higher level of anxiety symptoms also had a higher level of motor impulsiveness (Piero, 2010). AppM is thought to comprise a reward mechanism that then facilitates the expression of impulsivity traits (Gray, 1970; 1978); thus it is important to consider impulsivity in studies of this nature. It is possible that an exclusive focus on the BAS to conceptualise AppM in this study was too specific and neglects aspects of impulsivity. That is, as a measure of reward sensitivity, the BAS may not be broad enough to capture the intricacies of the different components of AppM, such as Barratt’s (1959; 1965) three primary components, and in particular, the motor component. Consideration of other aspects of AppM may have enhanced the results; however, as a BAS measure was utilised to operationalise AppM in the present study, this analysis was unable to be conducted, and so future research may seek to measure different components of AppM in research of this nature.
The importance of maladaptive ER and AppM in predicting severity of SAD symptoms in community samples is a unique finding and has a number of implications for research. These findings suggest the need to separate high risk and low risk groups when conducting research of this nature. The majority of studies in this area have tended to utilise a general university student sample (e.g. Dennis, 2007), and the current findings indicate this may be especially problematic for anxiety research, as the pattern of predictors is entirely different depending on the sample characteristics. Further, an important conclusion from the present line of research investigating relationships between motivation, emotion regulation, and severity of anxiety disorder symptoms, is that the results support the JSH, rather than revised RST, in that low AppM, rather than high AppM, was an important contributing factor in the prediction of anxiety. However, this was only true for the low risk for SAD group.

Finally, an important research direction to arise from the findings concerns the relationship between low AppM and social anxiety. Low AppM is most often associated with depression; for example, in a study comparing BIS and BAS in 62 depressed participants and 27 non-depressed participants, it was reported that the depressed participants scored significantly lower on BAS than the control group, and lower BAS levels were significantly associated with worse outcomes at an eight-month follow-up (Kasch, et al., 2002). There is a strong theoretical argument for findings such as these: researchers such as Fowles (1987b) have proposed that depression is significantly associated with a disruption to the approach motivation system, in which there is evidence of a loss of appetitive behaviours due to a perceived reduction in rewards or the expectation of future rewards, leading to an increased sense of hopelessness. Examination of the items of the Major Depression
Inventory (MDI; Bech et al., 1997; Bech & Wermuth, 1998), a self-report measure of the ICD-10 and DSM-IV symptoms of depression, indicates that a reduced responsiveness to normal, everyday activities that non-depressed people usually find enjoyable, is a core feature of the measurement of depression, further supporting this claim. For example, one of the MDI items asks “have you lost interest in your daily activities?” (Bech et al., 1997; Bech & Wermuth, 1998). Therefore, it is important to consider the relationship between AppM, social anxiety, and depression, in future research. It is possible that the relationship between low AppM and social anxiety could be explained by a comorbidity with depression, as the two disorders are often reported to be comorbid. For example, in a large US survey involving 8098 participants, 26.5% who met the diagnostic criteria for major depression also had social anxiety disorder (Kessler, Stang, Wittchen, Stein, & Walters, 1999).

Limitations

The primary limitation of the present study was that the measure of maladaptive ER only accounted for one particular type of ER rather than examining a range of strategies. The ERQ only measures one type of maladaptive ER strategy – suppression. It is possible that measures of ER which account for a wider range of ER strategies, such as distraction and rumination, may allow for a more in-depth examination of the relationships between emotion regulation, approach and avoidance motivation, and anxiety. In particular, a balance between social and individual strategies, and cognitive and behavioural strategies, would appear to be important. The suppression scale of the ERQ would appear to only measure the social strategy of not expressing emotions to others. To illustrate with the example of distraction, techniques may be social in nature (spending time with friends), or solitary (watching television in bed), and may also be cognitive in nature (thinking
about other things), or behavioural (eating ice-cream). To date, it is unknown whether consideration of these issues would impact research findings. As discussed by Cisler and colleagues (Cisler, Olatunji, Feldner, & Forsyth, 2010), there has been a noticeable lack of research investigating the psychometric properties of the prominent ER measures. Future studies should seek to determine whether results vary according to ER measure used, and more importantly, whether the existing measures correlate with each other and demonstrate similar relationships with anxiety measures (Cisler, et al., 2010).

Conclusion
In sum, while the relationship between high avoidance motivation and anxiety is strong, the findings from the present study indicate that, under certain conditions, low approach motivation and high maladaptive emotion regulation also significantly predict severity of anxiety disorder symptoms. Future studies may benefit from the evidence that there are important differences in predictors of anxiety between high risk and low risk groups. Additional research is required to more fully examine the relationship between social anxiety and approach motivation, and potential links with depression.

The following chapter will examine some of the potential explanations for the findings from study two, as considered in the discussion of the present chapter. Primarily, the relationship between approach motivation and emotion regulation in the prediction of severity of social anxiety disorder symptoms will be examined in more detail, by including a measure of depression to determine whether a comorbidity between depression and social anxiety disorder may explain the findings. This will then determine whether the significant relationship between low AppM and social anxiety disorder symptoms can be fully explained by a comorbidity
with depression, or whether this relationship remains significant regardless of the level of depression symptoms. Thus, the next chapter will detail the rationale, methodology, results, and discussion of the third study.
CHAPTER SIX

Study Three: Does Consideration of Depression Explain the Relationship Between Approach Motivation and Emotion Regulation in the Prediction of Social Anxiety Disorder Symptoms?

Introduction

The previous study presented findings which indicated that, in participants at low risk for social anxiety disorder, high levels of maladaptive emotion regulation potentially mediated the relationship between low approach motivation (AppM) and level of anxiety, and there was also a main effect of high avoidance motivation (AM). However, as noted in the previous chapter, the relationship between low AppM and social anxiety may be able to be explained by a comorbidity with depression. As depression was not measured in studies one or two, the third study will include a new sample of participants who complete measures of depression alongside trait motivation, anxiety, and emotion regulation. Therefore, the aim of the present chapter is to present the rationale, methodology, results, and discussion of the third study, in which the role of depression in the relationship between trait motivation, emotion regulation, and severity of social anxiety disorder symptoms, is considered.

Rationale

The first two studies in this thesis have indicated that Gray’s Reinforcement Sensitivity Theory (RST; Gray, 1982; 1987), with its two system view of motivation, has some important implications for the study of anxiety. RST has undergone
important theoretical extensions and clarifications over the past decade (e.g. Corr, 2001, 2002; Gray & McNaughton, 2000), with increased attention given to the potential role of AppM in anxiety. These changes may help to clarify under which conditions AppM would be expected to contribute to the experience of anxiety.

Corr’s (2001) joint subsystems hypothesis (JSH) proposes that those people with high AM and low AppM will exhibit the highest responsivity to aversive stimuli, while advocates of revised RST argue that anxiety is the result of conflict between simultaneous activation of the reward system and the punishment system, with responses to aversive stimuli being strongest in those with both high AM and high AppM (e.g. Gray & McNaughton, 2000; Smillie, et al., 2006).

The results of the first two studies in this thesis indicated conflicting results; results from study one indicated that high AppM was implicated in social anxiety, while study two showed low AppM was important. However, while the first study separated participants into BIS/BAS groups and then investigated differences in the level of anxiety disorder symptoms between each of the groups, study two examined significant predictors of anxiety disorder symptoms. Thus, the differences in findings may be due to the analyses used. Nonetheless, examination of the correlation matrices in both studies indicates that, in general, AppM is negatively correlated with levels of SAD.

Importantly, AppM was significantly related to SAD in both studies; however, these findings were shown to only be applicable in low risk samples; in those at high risk for either GAD or SAD, there was no significant effect of AppM. More specifically, results from study one indicated that for the low risk for GAD group, a combination of high AM and high AppM resulted in the highest level of anxiety. There were no differences between groups for the high risk for SAD group;
while in the low risk for SAD group and the high risk for GAD group showed significantly lower levels of anxiety in the group with low levels of AM and high levels of AppM. In study two, however, results differed significantly from those in study one. AppM was not a significant predictor of anxiety in the low risk for GAD group, the high risk for GAD group, or the high risk for SAD group, while low AppM was a significant predictor of anxiety in the low risk for SAD group. As previously noted, the data analytic technique differed between the two studies, and so the divergence in findings may be due to these differences. The present study will replicate the analyses used in study two, with a new sample of participants, in order to investigate this discrepancy in findings between AppM and anxiety.

It is presumed that in clinical samples, the dominance of the avoidance system inhibits the approach system (e.g. Fowles, 1987a). Corr (2002) has developed this further in his joint subsystems hypothesis (JSH), suggesting that AM and AppM may have a joint relationship, but only when participants do not have an extreme sensitivity to either punishment or reward (Corr, 2004). Therefore, in the group at high risk for SAD, it would be expected that a hypersensitive AM (and thus, an extreme sensitivity to punishment or threat) would inhibit AppM activity, and so there would not be a joint relationship between AM and AppM in the prediction of anxiety. This important hypothesis highlights the limitations of the majority of studies conducted in this area to date (e.g. Hardin, et al., 2006; Knyazev & Wilson, 2004), which do not split the analyses into high risk and low risk samples.

Additionally, it is possible that the significant findings for the low risk participants in the previous study were due to a comorbidity with depression, which was not measured in the first two studies. Social anxiety disorder and depression are often reported to be highly comorbid (e.g. Kessler, Stang, Wittchen, Stein,
Walters, 1999; Stein & Chavira, 1998; Stein et al., 2001); for example, 11.4% of a sample of 38 participants with unipolar depression also met diagnostic criteria for SAD (Pini, et al., 1997). In a larger study, conducted as part of a nationally representative US household survey, 26.5% of 8098 participants with lifetime major depression also met the diagnostic criteria for SAD (Kessler, et al., 1999).

Depression is often the most commonly reported comorbid disorder in people experiencing SAD. For example, in a large study involving 2300 patients seeking psychiatric treatment, 639 participants met the diagnostic criteria for SAD, and 41.8% of these participants also met the diagnostic criteria for major depressive disorder; this was by far the most common comorbidity among participants (Dalrymple & Zimmerman, 2007). There may also be evidence for a causal relationship between SAD and depression. Stein and colleagues (2001) conducted a longitudinal study with 2548 participants aged 14-24 years of age at baseline, who then went on to complete two follow-up interviews (34-50 months later). Results indicated that those participants in the 18-24 age group at baseline, who had SAD at baseline, were significantly more likely to have experienced a depressive episode at follow-up than those with no history of a mental disorder at baseline, with the authors arguing that this provides some evidence that SAD in adolescence increases the risk of experiencing a depressive episode later in life (Stein, et al., 2001).

Fowles (1994) argued that Gray’s motivational systems could be applied to a range of psychopathologies, including depression. In particular, he proposed that depression is characterised by high AM and low AppM; depression being characterised as a state of hopelessness in which nothing can be done to improve one’s situation, and a disengagement from approach motivation (Fowles, 1994). In support of this hypothesis, (Dickson & MacLeod, 2004) reported that depression had
an inverse correlation with approach measures, in a study investigating approach and avoidance goals in late adolescence. In an experimental study where approach motivation was measured using a cognitive task, Wang, Brennan, and Holte (2006) reported that clinically depressed participants had significantly lower approach motivation, as measured by response time to emotionally valenced words in a Deployment of Attention Task, than previously depressed or never depressed participants.

In a specific test of Gray's Reinforcement Sensitivity Theory, Kimbrel, Nelson-Gray, and Mitchell (2007) reported that high AM and low AppM predicted anhedonic depression, in a sample of 181 undergraduates. In a related study, again conducted with undergraduates, Hundt and colleagues (2007) reported that low AppM exacerbated the effects of high AM on anhedonic depression. Of particular interest to the present research, in a study conducted by Kasch and colleagues (2002), analyses were conducted separately on a clinically depressed group and a control group. These researchers reported that the depressed group had a significantly lower level of AppM than the control group. However, no analyses were presented on the control group separately from the clinical group; all focus was on analyses of the clinically depressed participants. Taken together, the above mentioned studies reveal a strong, consistent link between low AppM and depression.

In recent years, a group of researchers have developed a theoretical model intended to explain the role of AppM in the prediction of bipolar spectrum disorders (Alloy et al., 2006), and this model has also been applied to depression (Urosevic, Abramson, Harmon-Jones, & Alloy, 2008). The model proposes that a hypersensitive AppM is responsible for people developing bipolar disorders, as they experience extreme fluctuations in both activation, as well as deactivation, of AppM (Alloy, et
al., 2006). In their expansion of the model, designed to explain depression, it was hypothesised that for those with a hyposensitive AppM, following an event which is perceived to be either a failure to obtain, or a loss of, important rewards or goals, the individual gives up, resulting in a sense of hopelessness (rather than viewing the event as a challenge to regain the reward; Urosevic, et al., 2008). Following on from this, the lower the expectation of a positive outcome that an individual has, the more hopelessness they experience, finally resulting in depression (Urosevic, et al., 2008). Additional risk factors for the experience of depression include the level of AppM prior to the event, as well as the presence of a weak regulatory system (Urosevic, et al., 2008).

Thus, the theoretical and empirical relationship between low AppM and depression is strong, indicating that the relationship between low AppM and anxiety disorder symptoms in the previous study may be explained by a hyposensitive AppM which predisposes individuals to depression. Therefore, the primary aim of the present study is to determine whether the relationship between low AppM and social anxiety can be explained by a comorbidity with depression. The secondary aim is to test the model from study two, while controlling for depression, in a low risk for SAD group.

**Hypotheses.**

- H1: High AM and low AppM will significantly predict heightened anxiety scores, after controlling for depression, in a low risk for SAD group;

- H2: High maladaptive ER will significantly predict heightened anxiety scores, after controlling for depression, in a low risk for SAD group.
Method

Participants

Participants were asked to complete an online questionnaire consisting of measures of personality, emotion regulation, social anxiety, and depression. The present study included 208 adult participants ranging in age from 18 to 72 years $M = 33.42$ (SD = 11.25). One hundred and ten participants (53%) were categorised as being at low risk for SAD, using the published cut-off scores from the LSAS of 55 (Liebowitz, 1987). The other 99 participants (47%) could be classified as high risk for SAD.

Demographic information of participants is presented in Table 6.1.

Table 6.1.

*Participant Demographics for Study Three.*

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<td></td>
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<td></td>
</tr>
<tr>
<td>Recruitment</td>
<td>Facebook</td>
<td>50%</td>
<td>Snowballing</td>
<td>17%</td>
<td>Other</td>
<td>33%</td>
</tr>
</tbody>
</table>
Measures

The demographics, GAD measure, SAD measure, motivation measure, and ER measure have previously been described in study two but are provided here for clarity.

Demographics.

Demographics collected included information regarding age, gender, ethnicity, relationship status, education, employment, living situation, and source of access to the questionnaire.

The Carver-White BIS/BAS scales.

The Carver-White BIS/BAS scales (CW-BIS/BAS; Carver & White, 1994) consist of 20 self-report items, which measure BIS, BAS Reward Responsiveness, BAS Drive, and BAS Fun Seeking. The three BAS scales can also be summed to calculate an overall BAS score. In recent years, Heym and colleagues (2008) examined the factor structure of the CW-BIS/BAS and reported results of a confirmatory factor analysis in which the original BIS subscale could be successfully distinguished into two constructs. These results were confirmed in study two of this thesis, and so this new factor structure will be utilised in the present study, with the Fight-Flight-Fear System (FFFS) subscale being used to represent the current conceptualisation of BIS. For each of the following analyses, the FFFS subscale was utilised to measure AM, while the BAS subscale remained the measure of AppM. Cronbach’s alpha was .70 for the FFFS subscale and .84 for the BAS subscale in the present study.
The Liebowitz Social Anxiety Scale.

The Liebowitz Social Anxiety Scale (LSAS; Heimberg, et al., 1999) is a commonly utilised measure of social anxiety, evaluating fear and avoidance of 24 social interaction and performance situations. Cronbach’s alpha was .97 in the present study.

The Emotion Regulation Questionnaire.

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is a 10 item self-report questionnaire that measures the two most common forms of emotion regulation: cognitive reappraisal and emotional suppression. The emotional suppression subscale is utilised in the present study as the measure of maladaptive emotion regulation. Cronbach’s alpha was .81 for the suppression subscale in the present study.

The Major Depression Inventory.

The Major Depression Inventory (MDI; Bech et al., 1997; Bech & Wermuth, 1998) is a 10 item self-report questionnaire that measures ICD-10 and DSM-IV symptoms of depression. Participants are asked to indicate how they have been feeling over the past two weeks. Items are rated on a six-point Likert scale (from 0 = at no time to 5 = all the time). Original internal reliability was reported at .92, and strong external validity was also established (Bech & Wermuth, 1998). Cronbach’s alpha was .92 in the present study.

Procedure

Participant recruitment was conducted via the use of snowballing techniques, as well as advertisements placed on Google and Facebook. In addition, advertisements were printed and displayed around the Burwood campus of Deakin University and on the
Deakin University website. Finally, participants from an earlier study \((N=231)\) who indicated an interest in participating in the next phase of the research were contacted via email.

**Analyses**

Power analyses conducted using statistical program G*Power 3 determined the sample size required for the present study (Faul, et al. 2007). To achieve a medium effect size (.15) with a significance level of .05, and power set at .80, for a regression with four predictors, G*Power 3 determined a required sample size of 85 participants. The hypothesis was tested via a hierarchical regression in SPSS.

**Results**

**Data screening**

Preliminary data analyses were conducted on personality, anxiety, emotion regulation, and depression measures. Variables were examined for out of range values, univariate outliers, missing values, deviations from normality, multivariate outliers. A correlation matrix was also examined. Table 6.2 details the correlation matrices. Inspection of the data revealed one out of range value for age; one participant was aged 17, and so was deleted from the data file. A further three participants were deleted as they had failed to complete three or more entire scales.

According to Tabachnick and Fidell (2007), univariate outliers are those cases with standardised scores exceeding 3.29 \((p<.001)\). Utilising this criterion, there were four univariate outliers in the data set. As there were so few outliers, and inspection of the 5\% trimmed mean indicated they were not having much impact on the mean scores and their values were not very extreme compared to the other values around them, no action was taken (Pallant, 2005).
Table 6.2.

_Correlations Between Depression, AM, AppM, and Suppression, by Risk for Social Anxiety Disorder Group._

<table>
<thead>
<tr>
<th></th>
<th>Dep</th>
<th>AM</th>
<th>AppM</th>
<th>Supp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk for SAD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dep</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AppM</td>
<td>.13</td>
<td>-.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supp</td>
<td>.38&quot;&quot;</td>
<td>-.28&quot;&quot;</td>
<td>-.00</td>
<td></td>
</tr>
<tr>
<td>SAD</td>
<td>.39&quot;&quot;</td>
<td>.40&quot;&quot;</td>
<td>-.02</td>
<td>.25&quot;&quot;</td>
</tr>
<tr>
<td>High risk for SAD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dep</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>.30&quot;&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AppM</td>
<td>-.08</td>
<td>-.21&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supp</td>
<td>.08</td>
<td>-.08</td>
<td>-.27&quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>SAD</td>
<td>.43&quot;&quot;</td>
<td>.40&quot;&quot;</td>
<td>-.47&quot;&quot;</td>
<td>.10</td>
</tr>
</tbody>
</table>

*Note:* $p < .05$, **$p < .01$. SAD = social anxiety disorder; Dep = depression, AM = avoidance motivation; AppM = approach motivation; Supp = suppression.

Analyses were conducted to determine whether the missing values were missing completely at random. Little’s MCAR statistic ($p = .35$) indicated that the data was missing completely at random. As there was only a small amount of missing data, pairwise deletion of cases was appropriate and estimation was not necessary (Pallant, 2005).

All scales violated the assumption of normality ($p < .05$); however, low absolute values indicated that both skewness (ranging from -.59 to .23) and kurtosis (ranging from -1.05 to -.15) statistics were normal. As the sample was large, transformation was not necessary. Inspection of Mahalanobis distance revealed that there were no multivariate outliers, with five dependent variables and a critical value of 20.52.
Inspection of the correlation matrices indicated no evidence of multicollinearity or singularity. Examination of the correlations indicates that, as none of the correlations were above .70, there are no issues with multicollinearity. Further, examination of the Tolerance and VIF scores also indicates that there is no problem with multicollinearity. In addition, there was no combination of subscale scores and total scale scores from the same measure, and so there were no potential issues with singularity.

Examination of the residuals scatterplot and normal probability plot confirmed the assumptions of normality, linearity, homoscedasticity, and independence of residuals had been met. Further, Cook’s Distance values were all below 1 indicating there are no unusual cases.

**Predictors of social anxiety disorder symptoms**

To test the hypothesis that high AM, low AppM, and high maladaptive ER would significantly predict severity of social anxiety disorder symptoms, after controlling for depression, the data file was split into low risk and high risk participants, based on established cut-off scores on the LSAS, as detailed in the method section, and two hierarchical regression analyses were conducted.

**Low risk for SAD.**

In the first regression, depression was included as a predictor variable at the first step of the regression equation. AM and AppM were added at the second step, and ER was entered at the third step. At the first step of the regression model, a significant proportion of the variance in SAD scores was accounted for ($R^2 = .15$), $F(1, 199) = 17.21$, $p < .001$, with depression significantly contributing to the prediction of SAD ($\beta = .39$, $p < .001$).
At the second step of the model, AM and AppM accounted for a significant proportion of variance in SAD scores ($\Delta R^2 = .15$), $F(2, 97) = 9.94, p < .001$, with AM significantly contributing to the prediction of SAD ($\beta = .38, p < .001$) and depression remaining a significant predictor ($\beta = .37, p < .001$). However, AppM did not significantly contribute to the prediction of SAD ($\beta = -.03, p = .70$).

At the third step of the model, a significant proportion of the variance in SAD scores was accounted for ($\Delta R^2 = .06$), $F(1, 96) = 9.02, p < .01$, with suppression significantly contributing to the prediction of SAD ($\beta = .28, p < .01$), and depression ($\beta = .26, p < .01$) and AM ($\beta = .46, p < .001$) remaining significant predictors. Table 6.3 details full results.

Table 6.3.

*Hierarchical Regression Analysis Predicting Severity of SAD Symptoms, in Low Risk for SAD Group.*

<table>
<thead>
<tr>
<th>DV</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>Depression</td>
<td>Depression</td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
<td>B</td>
</tr>
<tr>
<td>Severity of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAD Symptoms</td>
<td>.53</td>
<td>.13</td>
<td>.39</td>
</tr>
<tr>
<td>AM</td>
<td>2.68</td>
<td>.61</td>
<td>.38</td>
</tr>
<tr>
<td>AppM</td>
<td>-.08</td>
<td>.23</td>
<td>-.03</td>
</tr>
<tr>
<td>Depression</td>
<td>.36</td>
<td>.13</td>
<td>.26</td>
</tr>
<tr>
<td>AM</td>
<td>3.28</td>
<td>.62</td>
<td>.46</td>
</tr>
<tr>
<td>AppM</td>
<td>-.02</td>
<td>.23</td>
<td>-.01</td>
</tr>
<tr>
<td>Maladaptive ER</td>
<td>2.75</td>
<td>.92</td>
<td>.28</td>
</tr>
</tbody>
</table>

*Note:* $p < .05$. SAD = generalised anxiety disorder; AM = avoidance motivation; AppM = approach motivation; ER = emotion regulation.
**High risk for SAD.**

In the second regression, depression was included as a predictor variable at the first step of the regression equation. AM and AppM were added at the second step, and ER was entered at the third step. At the first step of the regression model, a significant proportion of the variance in SAD scores was accounted for ($R^2 = .19$), $F(1, 92) = 21.06, p < .001$, with depression significantly contributing to the prediction of SAD ($\beta = .43, p < .001$).

Table 6.4.

*Hierarchical Regression Analysis Predicting Severity of SAD Symptoms, in High Risk for SAD Group.*

<table>
<thead>
<tr>
<th>DV</th>
<th>Predictor variable</th>
<th>B</th>
<th>SE B</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$sr^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity of SAD</td>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAD Symptoms</td>
<td>Depression</td>
<td>.79</td>
<td>.17</td>
<td>.43</td>
<td>4.59*</td>
<td>.19</td>
</tr>
<tr>
<td></td>
<td>AM</td>
<td>3.20</td>
<td>1.23</td>
<td>.22</td>
<td>2.60*</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>AppM</td>
<td>-1.42</td>
<td>.29</td>
<td>-.40</td>
<td>-4.90*</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Step 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>.62</td>
<td>.16</td>
<td>.34</td>
<td>3.99*</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>AM</td>
<td>3.15</td>
<td>1.26</td>
<td>.22</td>
<td>2.51*</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>AppM</td>
<td>-1.44</td>
<td>.30</td>
<td>-.41</td>
<td>-4.73*</td>
<td>.14</td>
</tr>
<tr>
<td></td>
<td>Maladaptive ER</td>
<td>-.29</td>
<td>1.20</td>
<td>-.02</td>
<td>.81</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* $p < .05$. SAD = generalised anxiety disorder; AM = avoidance motivation; AppM = approach motivation; ER = emotion regulation.

At the second step of the model, AM and AppM accounted for a significant proportion of variance in SAD scores ($\Delta R^2 = .24$), $F(2, 90) = 18.50, p < .001$, with AM ($\beta = .22, p < .05$) and AppM ($\beta = -.40, p < .001$) significantly contributing to the
prediction of SAD, and depression remaining a significant predictor \((\beta = .34, p < .001)\).

At the third step of the model, ER did not account for a significant proportion of variance in SAD scores \((\Delta R^2 = .00)\), indicating suppression was not a significant predictor of SAD. However, AM \((\beta = .22, p < .05)\), AppM \((\beta = .41, p < .001)\), and depression remained significant predictors \((\beta = .34, p < .001)\). Table 6.4 details full results.

**Discussion**

The first two studies in the current thesis found that AppM was significantly related to SAD in a low risk sample. In this study, we examined the possibility that this relationship between AppM and SAD could be explained by a comorbidity with depression. This hypothesis was not supported; in the low risk group, AppM did not significantly improve the prediction of anxiety, after controlling for depression. Intriguingly however, low AppM was a significant predictor of SAD in the high risk sample, after controlling for depression. Therefore, the relationship between AppM and SAD was independent of depression, in the high risk group. This finding deserves further consideration and will be discussed in detail.

Corr (2002) proposed that the JSH would only be relevant under conditions where participants do not have a high sensitivity to either punishment or reward, specifying that there would be no joint role of AM and AppM should this condition be violated. Therefore, in the case of high risk for SAD participants, and thus, participants with a high sensitivity to punishment, it was expected that AppM would not play a significant role. Study two of this thesis confirmed these predictions, while the results of the present study indicate the opposite; low AppM was a significant
predictor of SAD symptoms in the high risk sample, even after controlling for the
effect of depression at the first step.

A potential explanation of the contradiction in findings comes from a recent
line of research conducted by Kimbrel and colleagues (Hundt, Mitchell, Kimbrel, &
Nelson-Gray, 2010; Kimbrel, Mitchell, & Nelson-Gray, 2010), involving the
investigation of AM and AppM roles in social functioning and SAD. In a series of
three studies conducted with undergraduate psychology students, it was
demonstrated that high AM and low AppM significantly predicted social interaction
anxiety, while only high AM predicted social observation anxiety (Kimbrel, et al.,
2010), where social interaction anxiety involves direct social interactions with others
and social observation anxiety involves being observed by others or performing in
front of others. In a separate study, high AppM was found to predict emotional
reliance on others, excessive reassurance seeking, perceived availability of support,
social events attended, and phone contacts with friends, while low AppM predicted
lack of social self-confidence, in a sample of 248 undergraduate university students
(Hundt, et al., 2010). Further, Kashdan (2002) reported that, in a sample of 214
undergraduate students, social interaction anxiety was significantly negatively
correlated with AppM, while an initially significant negative correlation between
social observation anxiety and AppM became non-significant after controlling for
social interaction anxiety. Together, these studies indicate that AppM may only be
implicated in social interaction anxiety but not in social observation anxiety.
However, as this was not an initial focus of the study, the measure which was utilised
to determine level of social anxiety symptoms (Liebowitz Social Anxiety Scale;
Heimberg, et al., 1999), was not able to discriminate between social interaction
anxiety and social observation anxiety. Therefore, analyses designed to determine
whether AppM predicted social interaction anxiety but not social observation anxiety, were not possible. However, other validated measures are available which do discriminate between social interaction anxiety and social observation anxiety, and so future research may aim to determine the role of AppM in both social interaction anxiety and social observation anxiety.

Interest in measuring the subdimensions of social anxiety grew with the development of the Social Phobia Scale and Social Interaction Anxiety Scale (Mattick & Clarke, 1988, 1998; Mattick, Peters, & Clarke, 1989), which were designed as companion scales in the measurement of social anxiety disorder. In a sample of 66 clinically socially anxious participants (with comparison groups of 50 community participants and 53 undergraduate participants), high levels of social interaction anxiety was found to be significantly related to generalised social anxiety disorder (where the anxiety is evident in most social situations) but not to specific social phobias (where the anxiety is limited to specific social situations, such as public speaking; Heimberg, Mueller, Holt, Hope, & Leibowitz, 1992). In contrast, social observation anxiety was significantly associated with both specific and generalised social anxiety disorder (Heimberg, et al., 1992).

Each of these studies detailed in the paragraphs above indicate that the measurement of social anxiety disorder may be complex. It would appear that AppM has particular implications for social interaction anxiety, but not for social observation anxiety, and so it becomes important to extend this line of research by including consideration of the subdimensions of social anxiety in future studies of this nature. It is possible that low approach motivation impacts participants’ level of willingness to engage in social interactions with others, therefore worsening the experience of social anxiety. This would then identify low AppM as an important
risk factor in the development and maintenance of social anxiety disorder. Thus, a potential line of investigation for future research involves examining the sub-dimensions of social anxiety for both low risk and high risk groups.

**Limitations**

The studies reviewed above highlight some potential areas for future research. It is possible that the relationship between AppM and social anxiety differs depending on the sub-dimensions of social anxiety that were examined. The present study utilised a measure of SAD that provided an overall social anxiety score, and therefore could not capture these potential differences. The finding that low AppM predicted SAD in the high risk but not the low risk group may be able to be explained by examining the specific sub-dimensions and separate aspects of social functioning and social anxiety.

In addition, the cross-sectional nature of the present study limits the conclusions that can be made. AM and AppM are behavioural systems; thus, an ideal test of the JSH, as described by Corr (2004), is to present to participants an experimental situation in which there is a degree of mixed rewarding and punishing stimuli, in order to activate both AM and AppM systems. The current study may only reflect on AM and AppM as trait measures of motivation, and so future work is required to examine these relationships using an experimental research design.

Importantly, it may also be the case that the manner in which the BAS is measured by most validated scales is problematic. It is proposed within Gray’s RST that BAS provides the causal basis for trait impulsivity, and that impulsivity is strongly linked to a sensitivity to reward (e.g. Jackson & Smillie, 2004). The problem with most BAS scales, according to Jackson and Smillie (2004), is that they measure impulsivity as a representation of BAS, rather than striving to measure the motivational role of appetitive stimuli. The most commonly utilised scale is Carver
and White's (1994) CW-BIS/BAS scale, and their separation of the BAS construct into three sub-factors (fun-seeking, reward responsiveness, and drive) has been criticised for its lack of theoretical justification with regards to Gray's original theory (Heym, et al., 2008). In addition, none of the BAS subscales were significantly correlated with a new measure of AppM, designed specifically to measure the BAS component of Gray's RST (Smillie & Jackson, 2005), providing further evidence that Carver-White's BAS scale requires further examination and testing. However, it was the measure of choice in the present study as it is commonly utilised in the anxiety and emotion regulation literature, allowing for direct comparisons with previous studies, as well as being the basis for the revised RST scale which was also utilised in the present study. Regardless, it is possible that use of a difference measure of BAS may improve the validity of findings, and so more research is required, both in terms of replicating and extending the present study, as well as continued investigation of the measurement of BAS.

Conclusion

In summary, this study reported that in the high risk sample, high AM and low AppM significantly predicted social anxiety symptoms, while for the low risk sample, AppM did not make a significant prediction. Depression was a significant predictor in both samples, and results indicated that the relationship between AppM and social anxiety was independent of depression.

The fourth and final study is detailed in the following chapter. While the present study has indicated that approach motivation, avoidance motivation, and maladaptive emotion regulation all play a role in the prediction of heightened social anxiety disorder symptoms, it is possible that trait motivation and emotion regulation only predict anxiety under trait-level conditions. Therefore, the following chapter
presents the rationale, methodology, results, and discussion for study four, which examines whether trait motivation and emotion regulation predict state levels of anxiety in response to a threatening event.
CHAPTER SEVEN

Study Four: An Experimental Test of Relationships between 
Motivation, Emotion Regulation, and State Anxiety

Introduction
The previous chapters have examined the conditions under which avoidance motivation, approach motivation, and maladaptive emotion regulation can predict severity of anxiety disorder symptoms; in particular, generalised anxiety disorder and social anxiety disorder. Under certain conditions, high levels of avoidance motivation, low levels of approach motivation, and high levels of maladaptive emotion regulation have all been shown to predict anxiety disorder symptoms. The aim of the present chapter is to investigate whether avoidance motivation, approach motivation, and maladaptive emotion regulation can predict response to an anxiety-provoking situation, in order to determine whether these relationships remain significant when measuring state anxiety. Thus, the rationale, methodology, results, and discussion are presented for the fourth study, which aims to determine whether approach motivation, avoidance motivation, and maladaptive emotion regulation predict state anxiety in response to a threatening event.

Rationale
The first three studies in this thesis have demonstrated that there is a joint relationship between AM and AppM, as well as an effect of maladaptive ER, in the prediction of anxiety within certain groups. These findings indicate that all three constructs play a significant role in the prediction of severity of anxiety disorder
symptoms, and it is important to investigate these relationships further, as it may be that avoidance motivation, approach motivation, and emotion regulation only predict anxiety under trait-level conditions.

The measure of social anxiety utilised in the previous studies of this thesis represents a somewhat trait level representation of anxiety disorder symptoms, in that participants were asked to indicate, retrospectively, their overall tendency to experience anxiety and avoidance in a variety of situations. As trait level, retrospective measures of anxiety may not necessarily predict an individual’s actual, real-world response to an anxiety-provoking situation, the present study sought to provide a measure of state anxiety following exposure to a mood induction procedure. By exposing participants to an anxiety-provoking situation, rather than relying solely on trait assessments, important insights may be gained into how trait motivation and maladaptive emotion regulation predict anxiety response. Therefore, the present study will extend the findings from the previous studies by predicting response to an anxiety-provoking event, rather than severity of anxiety symptoms. To date, very little research has examined the relationships between trait motivation, ER, and state anxiety.

Theoretically, trait anxiety represents a trait-level disposition to experience state anxiety in situations perceived as anxiety-provoking, while state anxiety is an emotional response to an anxiety-inducing stimulus (e.g. Bardel & Colombel, 2009; Jouvent et al., 1999). The person and the situation must interact for state anxiety to occur (Endler & Kocovski, 2001); therefore, the logical next step in this line of research is to apply the findings from the previous studies to a real world setting, by measuring activated state anxiety.
To clarify, while the previous studies in this thesis measured “an individual’s predisposition to respond” (Endler & Kocovski, 2001, p. 232) to anxiety-provoking events, and how this relates to trait motivation and ER, the present study aims to measure state levels of anxiety in response to a threatening event, and determine whether the relationships with trait motivation and ER differ, in order to make some conclusions about predictors of anxiety in real world settings.

The literature investigating the relationship between trait motivation and state anxiety, or emotion regulation and state anxiety, is scarce. In related studies, Kambourooulos and Staiger (2004) asked participants to complete a behavioural inhibition task, in a sample of 78 university students. Those participants high on both AM and AppM experienced the highest level of impairment on the task, which required them to respond as quickly and accurately as possible to a stimulus, with punishments for incorrect responses. The authors concluded that the task may have resulted in a heightened level of state anxiety among participants and, consequently, behavioural inhibition (Kambourooulos & Staiger, 2004).

Further, Kopecky, Sawyer, and Behnke (2004) conducted an experimental study with a sample of 136 college students, in which participants were asked to present a five to seven minute speech in front of classmates and the course instructor. Using Gray’s (1987) Reinforcement Sensitivity Theory as a theoretical basis for the study, the primary aim was to determine whether response to the anxiety-provoking situation was able to be predicted AM (Kopecky, et al., 2004). A significant positive correlation was reported between state anxiety and AM, with AM accounting for 15.8% of the unique variance in state anxiety (Kopecky, et al., 2004).

In a related study, Clay and colleagues (Clay, Fisher, Xie, Sawyer, & Behnke, 2005) proposed that people with a highly reactive AM system experience more
intense levels of state anxiety than those with low AM, particularly during the first minute of a public speaking task. In a sample of 60 college students, there was a significant positive correlation between AM and sensitisation (heightened state anxiety during the first minute of a public speaking task), and 32.6% of the unique variance in sensitisation score was predicted by AM (Clay, et al., 2005). Together, these two studies indicate that consideration of AM can help to explain levels of state anxiety experienced in an anxiety-provoking situation.

There is a considerable lack of research examining the relationship between maladaptive emotion regulation styles and state anxiety, with most studies either manipulating the use of emotion regulation strategies within a stressful environment, or measuring trait levels of anxiety. However, a related study provides some insight into the potential direction of this relationship. Lam, Dickerson, Zoccola, and Zaldivar (2009) conducted a study in which the maladaptive emotion regulation strategy of suppression was measured as part of an experimental study in which 128 university students were asked to provide a five minute speech on why they would be a good candidate for a job, with salivary cortisol used as a measure of reactivity to the task. There was a significant increase in cortisol across all participants, and most interestingly, high suppression use predicted exaggerated cortisol reactivity to the task (Lam et al., 2009). Thus, it appears that a maladaptive emotion regulation style may predict a significant increase in an individual’s response to an anxiety-provoking situation; however, this remains to be investigated.

Each of the studies detailed above was conducted utilising an experimental research design. In order to measure state anxiety it is important to utilise, at a minimum, a quasi-experimental research design, in order to manipulate participants’ experience of state anxiety by presenting an anxiety-inducing stimulus. Throughout
this thesis, the advantages of web-based research has been advocated, as this allows access to a more heterogenous sample of participants, an ease of recruiting large samples, a high sense of participant anonymity, and participants can take part in studies at the time and place that best suits them, while working at their own pace (Holmes, 2009; Wood & Griffiths, 2007). Thus, a form of mood induction, conducted online, was designed to induce levels of state anxiety among participants.

Briefly, an online questionnaire was developed, which included the usual measures of trait motivation, emotion regulation, social anxiety, and depression. In addition, state anxiety was measured via the use of visual analogue scales, administered immediately prior to the mood induction, and again immediately following the mood induction. The mood induction procedure itself consisted of a vignette task in which participants were asked to list three events which had made them anxious over the past year, provide a detailed description of each event, and then choose one event to attempt to re-experience over a four-minute period.

With consideration of the findings presented above, it is predicted here that those people high on AM, low on AppM, and high on maladaptive ER, will be more susceptible to experiencing state anxiety in anxiety-provoking situations.

**Primary hypotheses.**

- **H1:** There will be a significant increase in state anxiety from pre- to post-mood induction;

- **H2:** After controlling for baseline levels of state anxiety, high AM, low AppM, and high maladaptive ER will significantly predict post-mood induction state anxiety.
In addition to the primary hypotheses, a comparison between a high risk for SAD group and a high risk for depression group will also be made, in order to determine whether high AM, low AppM, and high maladaptive ER are specific risk factors for SAD, or whether results can also be generalised to depression.

A group at low risk for both SAD and depression, and a group at high risk for comorbid SAD/depression, will also be included in order to comprehensively categorise the sample. A review of studies investigating the association between personality and psychopathology has indicated that depression tends to be correlated with high AM and low AppM, although there have been a number of conflicting findings (Bijttebier, et al., 2009). In terms of the ER strategy of suppression, Aldao, Nolen-Hoeksema, and Schweizer (2010) reported that suppression had a significant positive association with both depression and anxiety. While it appears that depression may have similar associations with motivation and ER, little work has been done involving direct comparisons between depression and social anxiety, and therefore some preliminary hypotheses have been formulated for the present study.

Secondary hypotheses.

- H3: Those participants at high risk for SAD will have significantly higher levels of AM than those at high risk for depression and the low risk group; those at high risk for depression will have significantly lower levels of AppM than those at high risk for SAD and the low risk group;

- H4: Those participants at high risk for either depression or SAD will report significantly higher levels of maladaptive ER than the low risk group;
• H5: Those participants at high risk for comorbid SAD/depression will have higher levels of AM, lower levels of AppM, and higher levels of maladaptive ER than all other groups.

Method

Participants

Participants were asked to complete an online questionnaire consisting of measures of personality, emotion regulation, social anxiety, and depression, as well as participating in a vignette task designed to induce state anxiety and completing a series of visual analogue scales. The present study included 208 adult participants ranging in age from 18 to 72 years M=33.42 (SD=11.25). One hundred and ten participants (53%) were categorised as being at low risk for SAD, using the published cut-off scores from the LSAS. The other 99 participants (47%) could be classified as high risk for SAD. One hundred and two participants (50%) were categorised as being at high risk for depression, using the published cut-off scores from the MDI. A further 97 participants (47%) were classified as low risk, while 7 participants (3%) had missing data and could not be classified. Demographic information of participants is presented in Table 7.1.

Measures

The demographics, SAD measure, depression measure, motivation measure, and ER measure have previously been described in study three but are provided here for clarity.
Demographics.

Demographics collected included information regarding age, gender, ethnicity, relationship status, education, employment, living situation, and source of access to the questionnaire.

Table 7.1.

Participant Demographics for Study Four.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Grouping</th>
<th>%</th>
<th>Grouping</th>
<th>%</th>
<th>Grouping</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>79%</td>
<td>Male</td>
<td>21%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Australian</td>
<td>86%</td>
<td>Other</td>
<td>14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married/De Facto</td>
<td>41%</td>
<td>Single</td>
<td>42%</td>
<td>Partner</td>
<td>17%</td>
</tr>
<tr>
<td>Living Situation</td>
<td>Partner/children</td>
<td>47%</td>
<td>Other adults/parents</td>
<td>40%</td>
<td>Living alone</td>
<td>13%</td>
</tr>
<tr>
<td>Education</td>
<td>University degree</td>
<td>40%</td>
<td>High School</td>
<td>28%</td>
<td>Certificate/Trade</td>
<td>32%</td>
</tr>
<tr>
<td>Studying</td>
<td>Not studying</td>
<td>59%</td>
<td>Part-time</td>
<td>17%</td>
<td>Full-time</td>
<td>24%</td>
</tr>
<tr>
<td>Employment</td>
<td>Full-time</td>
<td>32%</td>
<td>Not employed</td>
<td>30%</td>
<td>Casual/part-time</td>
<td>38%</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Facebook</td>
<td>50%</td>
<td>Snowballing</td>
<td>17%</td>
<td>Other</td>
<td>33%</td>
</tr>
</tbody>
</table>

The Carver-White BIS/BAS scales.

The Carver-White BIS/BAS scales (CW-BIS/BAS; Carver & White, 1994) consist of 20 self-report items, which measure BIS, BAS Reward Responsiveness, BAS Drive, and BAS Fun Seeking. The three BAS scales can also be summed to calculate an overall BAS score. In recent years, Heym and colleagues (2008) examined the factor structure of the CW-BIS/BAS and reported results of a confirmatory factor analysis in which BIS and Fight-Flight-Fear System (FFFS) constructs were successfully
distinguished from the original BIS subscale. These results were confirmed in study two of this research project, and so this new factor structure was utilised in the present study. For each of the analyses in this study, the FFFS subscale was utilised to measure AM, while the BAS subscale remained the measure of AppM. Cronbach’s alpha was .70 for the FFFS subscale and .84 for the BAS subscale in the present study.

The Liebowitz Social Anxiety Scale.

The Liebowitz Social Anxiety Scale (LSAS; Heimberg, et al., 1999) is a commonly utilised measure of social anxiety, evaluating fear and avoidance of 24 social interaction and performance situations. Cronbach’s alpha was .97 in the present study.

The Major Depression Inventory.

The Major Depression Inventory (MDI; Bech et al., 1997; Bech & Wermuth, 1998) is a 10 item self-report questionnaire that measures ICD-10 and DSM-IV symptoms of depression. Cronbach’s alpha was .92 in the present study.

The Emotion Regulation Questionnaire.

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is a 10 item self-report questionnaire that measures the two most common forms of emotion regulation: cognitive reappraisal and emotional suppression. The emotional suppression subscale is utilised in the present study as the measure of maladaptive emotion regulation. Cronbach’s alpha was .81 for the suppression subscale in the present study.
State anxiety.

State anxiety was measured via the use of visual analogue scales (VAS). Three 10cm visual analogue scales were administered prior to and immediately after mood induction to provide a measure of change in levels of state anxiety. Participants were asked to rate how anxious, distressed, and tense they felt at that moment, with endpoints not at all and extremely (based on Kambouropoulos & Staiger, 2004). Scores were then added to form a composite "state anxiety" score. Cronbach's alpha was .93 for pre-state anxiety and .95 for post-state anxiety.

Mood induction.

The Mood induction Procedure (MIP) was chosen according to guidelines provided by Westermann, Spies, Stahl, and Hesse (1996), who conducted a meta-analysis of MIPs and reported that presentation of a story was the most effective MIP for inducing both positive and negative moods, particularly that which explicitly instructed the participant to get involved in the situation. This study and others (e.g. Slyker & McNally, 1991) have demonstrated that it is not necessary for the presentation of music as well as story in order to induce anxiety. An adaptation of vignettes used by Marzillier and Davey (2005) and Schneider and colleagues (Schneider, Appelhans, Whited, Oleski, & Pagoto, 2010) was constructed.

Participants were asked to list three events that had made them feel anxious over the past year. They were then asked to write a description of each of these events, describing it in as much detail as they could. After they had completed this task, they were given the following instructions:

Decide which event makes you feel most anxious when you think about it right now. I am going to ask you to think about that event carefully for the next four minutes. Try to re-experience the memory you've
retrieved as vividly as you can. Imagine the situation as clearly as possible. Picture the surroundings; see the people or the objects; hear the sounds; experience the events happening to you. Let yourself think the thoughts that you had in that situation. Let yourself feel the tension entering your body. Try to concentrate on the anxious feelings and to get into the mood as much as possible. Please indicate when you are ready to begin.

When participants indicated they had read the instructions, they were given four minutes to think about their chosen event. The first 68 participants to complete the questionnaire were given the MIP at the beginning of the questionnaire, while the remaining 140 participants were given the MIP at the end of the questionnaire, in order to control for potential order effects.

Procedure

Participant recruitment was conducted via the use of snowballing techniques, as well as advertisements placed on Google and Facebook. In addition, advertisements were printed and displayed around the Burwood campus of Deakin University and on the Deakin University website. Finally, participants from an earlier study (N=231) who indicated an interest in participating in the next phase of the research were contacted via email.

Analyses

Power analyses conducted using statistical program G*Power 3 determined the sample size required for the present study (Williams & Hasking, 2009). To achieve a medium effect size (.15) with a significance level of .05, and power set at .80 (for a regression with four predictors, G*Power 3 determined a required sample size of 85
participants. The hypotheses were tested via a series of hierarchical regressions in SPSS 17.0.

**Results**

**Data Screening**

The same data was used for Study Three and Study Four; hence, data screening had already been conducted. However, as the state anxiety variables were unique to Study Four, these variables required data screening. Two participants were missing data on the state anxiety variables and so were removed from further analysis. There were no univariate outliers in the data set. Low absolute values indicated that both skewness (.48 for pre-state anxiety and -.53 for post-state anxiety) and kurtosis (-.89 for pre-state anxiety and -.88 for post-state anxiety) statistics were normal. In order to investigate the relationships between the primary measures, a correlation matrix was examined. Correlations are provided in Table 7.2, indicating that state anxiety correlated strongly with depression, AM, and SAD. However, examination of the correlations indicates that, as none of the correlations were above .90, there were no issues with multicollinearity or singularity. Examination of the Tolerance and VIF scores further indicated that there was no problem with multicollinearity.

**Mood Induction**

A paired-samples t-test was conducted to evaluate the impact of the mood induction on participants’ scores on the state anxiety composite variable. There was a statistically significant increase in state anxiety from Time 1 (M = 536.51, SD = 399.80) to Time 2 (M = 872.62, SD = 440.71), t(205) = -12.08, p < .001. The eta squared statistic (.42) indicated a large effect size.
Table 7.2.

**Correlations Between Pre-State Anxiety, Post-State Anxiety, Depression, Avoidance Motivation, Approach Motivation, and Maladaptive Emotion Regulation.**

<table>
<thead>
<tr>
<th></th>
<th>Pre-SA</th>
<th>Post-SA</th>
<th>Dep</th>
<th>AM</th>
<th>AppM</th>
<th>MalER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-SA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-SA</td>
<td>.55**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dep</td>
<td>.63**</td>
<td>.48**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>.39**</td>
<td>.37**</td>
<td>.33**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AppM</td>
<td>-.09</td>
<td>-.13</td>
<td>-.08</td>
<td>-.20**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MalER</td>
<td>.22**</td>
<td>.17**</td>
<td>.33**</td>
<td>-.03</td>
<td>-.20**</td>
<td></td>
</tr>
<tr>
<td>SAD</td>
<td>.50**</td>
<td>.42**</td>
<td>.59**</td>
<td>.53**</td>
<td>-.33**</td>
<td>.35**</td>
</tr>
</tbody>
</table>

*Note:* $p < .05$, $**p < .01$. SA = state anxiety; Dep = depression; AM = avoidance motivation; AppM = approach motivation; MalER = maladaptive emotion regulation.

**Predictors of State Anxiety**

To test the hypothesis that high AM, low AppM, and high maladaptive ER would significantly predict post-state anxiety, after controlling for pre-state anxiety, vignette order, depression symptoms, and social anxiety symptoms, a hierarchical regression analysis was conducted.

Pre-state anxiety and order of vignette presentation were controlled for at the first step of the regression equation; depression symptoms and social anxiety symptoms were controlled for at the second step. AM was entered at the third step of the regression equation, and ER and AppM were entered at the fourth step.

The first step of the regression model accounted for a significant proportion of variance ($R^2 = .31$), $F(2, 193) = 42.37$, $p < .001$, with pre-state anxiety significantly contributing to the prediction of post-state anxiety ($\beta = .56$, $p < .001$).
The second step of the model accounted for an additional significant proportion of variance ($\Delta R^2 = .04$), $F(2, 191) = 5.36$, $p < .01$, with pre-state anxiety remaining a significant predictor ($\beta = .41$, $p < .001$). However, depression symptoms ($\beta = .15$, $p = .08$) and SAD symptoms ($\beta = .13$, $p = .09$) did not significantly contribute to the prediction of post-state anxiety, indicating that the result was only marginally significant across the combined variables.

The third step of the model accounted for an additional significant proportion of variance ($\Delta R^2 = .02$), $F(1, 190) = 4.75$, $p < .05$, with AM significantly contributing to the prediction of post-state anxiety ($\beta = .15$, $p < .01$), and pre-state anxiety ($\beta = .38$, $p < .001$) remaining a significant predictor.

The fourth step of the model did not account for a significant proportion of variance ($\Delta R^2 = .00$), indicating inclusion of maladaptive ER and AppM did not significantly improve prediction of SAD. However, AM ($\beta = .16$, $p < .05$), and pre-state anxiety ($\beta = .38$, $p < .001$) remained significant predictors. Table 7.3 reports full results.

**Group Profiles of Motivation and Emotion Regulation**

A multivariate analysis of variance was performed to investigate group differences in three dependent variables: AM, AppM, and maladaptive ER. The independent variable was group membership, with four groups: low risk group, risk for SAD group, risk for depression group, and risk for comorbidity group.

There was a statistically significant difference between groups on the combined dependent variables: $F(9, 561) = 8.56$, $p < .001$; Pillai’s Trace = .36; partial eta squared = .12. When the results for the dependent variables were considered separately, and using a Bonferroni adjusted alpha level of .017, group differences in AM ($F(3, 187) = 14.77$, $p < .001$; partial eta squared = .19) and maladaptive ER
Table 7.3.

Hierarchical Regression Analysis Testing Predictors of Post-State Anxiety.

<table>
<thead>
<tr>
<th>DV</th>
<th>Predictor variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>$r^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-state</td>
<td>Step 1: Vignette order</td>
<td>-33.65</td>
<td>58.87</td>
<td>-.04</td>
<td>-.57</td>
<td></td>
</tr>
<tr>
<td>anxiety</td>
<td>Pre-state anxiety</td>
<td>.62</td>
<td>.07</td>
<td>.56</td>
<td>8.99*</td>
<td>.29</td>
</tr>
<tr>
<td>Step 2:</td>
<td>Vignette order</td>
<td>-41.52</td>
<td>57.86</td>
<td>-.04</td>
<td>-.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-state anxiety</td>
<td>.46</td>
<td>.09</td>
<td>.41</td>
<td>5.39*</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>Depression symptoms</td>
<td>5.27</td>
<td>2.94</td>
<td>.15</td>
<td>1.79</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAD symptoms</td>
<td>1.85</td>
<td>1.09</td>
<td>.13</td>
<td>1.69</td>
<td></td>
</tr>
<tr>
<td>Step 3:</td>
<td>Vignette order</td>
<td>-42.05</td>
<td>57.30</td>
<td>-.05</td>
<td>-.73</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-state anxiety</td>
<td>.42</td>
<td>.09</td>
<td>.38</td>
<td>4.97*</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>Depression symptoms</td>
<td>5.72</td>
<td>2.92</td>
<td>.16</td>
<td>1.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAD symptoms</td>
<td>.77</td>
<td>1.19</td>
<td>.05</td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AM</td>
<td>35.32</td>
<td>16.20</td>
<td>.15</td>
<td>2.18*</td>
<td>.02</td>
</tr>
<tr>
<td>Step 4:</td>
<td>Vignette order</td>
<td>-43.48</td>
<td>57.57</td>
<td>-.05</td>
<td>-.76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-state anxiety</td>
<td>.42</td>
<td>.09</td>
<td>.38</td>
<td>4.95*</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>Depression symptoms</td>
<td>5.88</td>
<td>2.99</td>
<td>.17</td>
<td>1.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAD symptoms</td>
<td>.39</td>
<td>1.30</td>
<td>.03</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AM</td>
<td>36.14</td>
<td>16.98</td>
<td>.16</td>
<td>2.13*</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Maladaptive ER</td>
<td>5.31</td>
<td>18.88</td>
<td>.02</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AppM</td>
<td>-3.49</td>
<td>4.90</td>
<td>-.05</td>
<td>-.71</td>
<td></td>
</tr>
</tbody>
</table>

*Note: $p < .05$. SAD = social anxiety disorder; AM = avoidance motivation; AppM = approach motivation; ER = emotion regulation.

$(F(3, 187) = 10.30, p < .001; \text{partial eta squared} = .14)$ reached statistical significance.

There were no significant differences in AppM levels between groups $(F(3, 187) = 3.13, p = .03; \text{partial eta squared} = .05)$. Figures 7.1 and 7.2 depict these significant results graphically. Post hoc tests were then conducted and significant comparisons are indicated in Table 7.4.
Figure 7.1. Mean avoidance motivation scores by disorder group (error bars display +/- 1 SEM).

Figure 7.2. Mean maladaptive emotion regulation scores by disorder group (error bars display +/- 1 SEM).
Table 7.4.

*Means and standard deviations by group membership.*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Low risk (n=69)</th>
<th>Risk for SAD (n=24)</th>
<th>Risk for Depression (n=30)</th>
<th>Risk for Comorbid (n=68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.91&lt;sub&gt;a&lt;/sub&gt; 1.85</td>
<td>9.79&lt;sub&gt;b&lt;/sub&gt; 1.74</td>
<td>8.53&lt;sub&gt;b,c&lt;/sub&gt; 2.13</td>
<td>10.57&lt;sub&gt;a,c&lt;/sub&gt; 1.35</td>
</tr>
<tr>
<td>SD</td>
<td>5.42</td>
<td>6.50</td>
<td>4.18</td>
<td>6.21</td>
</tr>
</tbody>
</table>

*Note.* Means in the same row with the same subscript differ significantly at $p < .05$ in the Tukey honestly significant difference comparison. SAD = social anxiety disorder; AM = avoidance motivation; AppM = approach motivation; MalER = maladaptive emotion regulation.

**Discussion**

This study aimed to investigate whether approach and avoidance motivation, and emotion regulation, predicted an anxious response to a threatening stimulus, as measured using an anxiety-inducing vignette. By examining state anxiety, the findings from this study will allow for some important insights into the conditions under which trait motivation and emotion regulation predict anxiety. Specifically, it was predicted that high AM, low AppM, and high maladaptive ER would significantly predict post-mood induction state anxiety. There was limited support for the hypotheses; while there was a significant effect of the mood induction on levels of state anxiety, only high AM predicted this change, while AppM and ER did not make a unique contribution.

In addition, there was also limited support for the second set of hypotheses from the present study. The low risk participants, who were at low risk for both depression and social anxiety disorder, had significantly lower levels of maladaptive
emotion regulation than all other participants. There were no significant differences between groups on level of AppM. Finally, those at risk for comorbid depression/SAD had significantly higher AM levels than those at risk for depression, and the low risk group; and those at risk for SAD had significantly higher AM levels than those at risk for depression.

The joint subsystems hypothesis was not supported in the present study, with the original separable subsystems hypothesis appearing to have more applicability. While the previous studies in this thesis examined the joint subsystems hypothesis in relation to an overall level of anxiety symptoms, the present study focused on response to anxiety. The significant effects of AppM and maladaptive ER that were evident in the previous studies may not have emerged in the present study due to this emphasis on anxiety response, rather than overall level of anxiety symptoms. Thus, it appears that, while AppM and maladaptive ER play an important role in the explanation of trait anxiety and anxiety disorder symptoms, in situations where participants may be experiencing a heightened sense of state anxiety following response to an anxiety-inducing stimulus, only AM is significant.

It may be that an amplification of the impact of aversive stimuli in those with high levels of AM, in anxiety-provoking situations, subdues the impact of appetitive stimuli, measured via AppM, and maladaptive ER (e.g. Corr, 2002). These findings have important implications for our understanding of individual differences in responses to an anxiety-provoking situation. In the present study, it appears that AM can account for unique variance in the prediction of state anxiety, even after controlling for baseline anxiety, order of vignette presentation, depression symptoms, and SAD symptoms; and that it may subdue the impact of AppM and maladaptive ER. Thus, individuals with a highly active behavioural inhibition system would
appear to be much more likely to respond with increased anxiety when confronted with threatening and stressful stimuli, regardless of behavioural approach system activity or existing psychopathologies. Overall, while the joint subsystems hypothesis was not supported in the present study, the findings are important as little research has investigated the role of AM and AppM in the prediction of anxiety response to date.

One group of researchers who have conducted some research in this area provide some interesting thoughts on the role of AM and AppM in the experience of state anxiety (Wilhelm et al., 2005). Utilising a theory proposed by Fowles (1980, 1987a), in which skin conductance level (SCL) is hypothesised to reflect AM activity and heart rate is hypothesised to reflect AppM activity, Wilhelm and colleagues (2005) collected self-report and physiological data from 20 participants who were exposed to a scaffolding elevator simulation. The high-anxious participants had increased self-report anxiety as well as increased SCL reactivity, compared to the low-anxious participants, while there was an absence of heart rate reactivity. Importantly, the researchers predicted this lack of heart rate reactivity, proposing that the constraining nature of the simulation did not allow for active avoidance responses, and therefore not activating the AppM system. Rather, the physical passivity required during the task resulted in engagement of the AM system. Studies such as this highlight the importance of measuring AM and AppM behaviourally or physiologically, in order to activate the systems and make some strong conclusions about the role of AM and AppM in the experience of state anxiety. The study also reiterates the importance of separating participants into anxious and non-anxious groups, in studies of this nature.
In terms of group differences in the present study, the significant results highlight some important implications. Firstly, findings indicate that maladaptive ER is heightened in all participants at risk for a mood disorder, regardless of whether this involves anxiety, depression, or both. Clinically, it would appear that consideration of emotion regulation strategies during treatment for any level or type of mood disorder may be warranted. In recent years, researchers have begun to argue for the use of emotion regulation therapy programs for the treatment of anxiety disorders. For example, Mennin (2006) developed an emotion regulation therapy program, in response to the finding that disorders such as generalised anxiety disorder are difficult to treat with traditional methods such as cognitive-behavioural therapy. In addition, Trosper, Buzzella, Bennett, and Ehrenreich (2009) have also argued that traditional cognitive-behavioural therapy is limited in terms of treating individuals with comorbid diagnoses, or those with complex emotional issues beyond their specific anxiety disorder. Trosper and colleagues (2009) developed the Unified Protocol for the Treatment of Emotional Disorders in Youth, which was designed specifically to provide a transdiagnostic, cognitive-behavioural therapy based treatment tool centered on the management of emotions. However, more clinical research is required to confirm these hypotheses.

Secondly, it is important to consider the specific measure of AM utilised in the present study. Revised Reinforcement Sensitivity Theory distinguishes between anxiety and fear based on a categorical distinction of defensive direction, in which the function of fear is to move individuals away from threat, while the function of anxiety is to move individuals cautiously towards threat (McNaughton & Corr, 2004). The fight-flight-freeze system, which the Heym and colleagues (2008) revised Carver-White BIS/BAS scale is designed to measure, is the defensive avoidance
subsystem of the brain responsible for acting as a threat detection system and underlying the emotions of fear and panic (Kimbrel, 2008). Results from the present study indicated that AM is significantly higher in risk for comorbidity participants and in risk for SAD participants, when compared to risk for depression participants.

In his theoretical model of generalised social phobia, Kimbrel (2008) proposed that people with high AM are more likely to perceive novel or ambiguous social situations as threatening than those with low AM, and also to experience higher levels of arousal and increased scanning for threat cues. As a result, these people are more likely to consistently fear and avoid social situations perceived to be threatening, and also to develop negative expectancies and beliefs surrounding social situations (Kimbrel, 2008). The findings from the present study would appear to align with Kimbrel’s (2008) theory, as those participants who scored at high risk for SAD also experienced higher levels of AM.

However, further research is required in this area, as a recent study reported only limited support for McNaughton and Corr’s (2004) defensive direction hypothesis: Perkins and colleagues (Perkins, Cooper, Abdelall, Smillie, & Corr, 2010) collected self-report data involving responses to threat scenarios from 173 participants recruited through a university, finding that, while fear significantly predicted orientation away from threat, anxiety did not predict orientation towards threat.

In general, the scope of research in this area is limited. There are considerably fewer behavioural studies than cross-sectional studies, particularly when examining state anxiety. Therefore, the present study provides some important insight into an under-studied area. Further, the results from the present study indicate that the vignette used provided a valid method for inducing state anxiety. As no other studies
could be located which conducted such a study online, this study provides an important first step towards conducting quasi-experimental research in an online environment. Finally, it appears that levels of AM and maladaptive ER differ according to risk for anxiety disorder, highlighting the importance of considering psychopathology in studies of this nature.

Limitations

The present study was limited in the design of the mood induction procedure. The vignette was adapted from two recent studies and as such, had not previously been used as an online form of mood induction, or validated. A literature review failed to locate any published online mood induction procedures, and so the novel application of the mood induction may present some unique limitations. For example, it is possible that participants may have experienced less anxiety during the online mood induction than they would have in a laboratory session. However, the online mood induction was designed with these limitations in mind, and analyses indicated that the significant effect of the vignette on state levels of anxiety was strong, and was therefore an appropriate method of mood induction. A further limitation regarding the mood induction was that participants were not randomly allocated to receive the mood induction at either the beginning of the questionnaire or the end of the questionnaire. Although some attempt was made to account for potential order effects, this limitation may have confounded the results. However, analyses were conducted to investigate potential order effects and no important differences were found.

A further limitation of the study pertains to the measures of AM and AppM utilised. While the online design for data collection allowed ease of participant recruitment, it meant that behavioural measures of AM and AppM were unable to be
utilised. Future studies should endeavour to utilise behavioural measures of AM and AppM in order to activate BIS and BAS in a full experimental study.

**Conclusion**

In summary, this study reported that high AM was the only predictor of state anxiety following a mood induction procedure. Low AppM and high maladaptive ER were not significant predictors. Thus, there was a lack of support for the joint subsystems hypothesis, with the separable subsystems hypothesis appearing to be most relevant. This finding is in conflict with the previous studies in this thesis and indicates that a potential next step may be to further test Gray’s Reinforcement Sensitivity Theory using behavioural measures and research designs.

It has been argued throughout this thesis that there would be an interplay between approach and avoidance motivation, as well as an effect of maladaptive emotion regulation, in the prediction of symptoms of generalised anxiety disorder and social anxiety disorder. The following chapter provides a summary of the findings from each of the four studies presented in this thesis, and considers evidence for and against the proposal that approach motivation and maladaptive emotion regulation would contribute to the prediction of anxiety. Implications, future directions, and methodological limitations are also presented.
CHAPTER EIGHT

General Discussion

Introduction

The main objective of this thesis was to determine the interplay between avoidance motivation, approach motivation, maladaptive emotion regulation, and severity of anxiety disorder symptoms. It has been argued throughout this thesis that approach and avoidance motivation are interacting systems, which are applicable when considering level of anxiety. It has also been argued within this thesis that individuals who process emotional responses to threat in maladaptive ways may be more likely to develop anxiety disorders. However, cognitive factors such as emotion regulation appear to have been largely ignored in the investigation of the link between avoidance motivation and anxiety disorders. Therefore, a major contribution of this thesis was to examine the interplay between trait motivation and emotion regulation in the prediction of anxiety disorder symptoms. Four studies were conducted which examined various aspects of the proposed model.

The first study examined whether approach and avoidance motivation jointly influence anxiety disorder symptoms. The second study was designed to test whether maladaptive emotion regulation moderated the relationship between motivation and severity of anxiety disorder symptoms. The third study aimed to determine whether the significant findings from the second study could be explained by comorbidity with depression; and the fourth study examined the interplay of motivation and emotion regulation with regards to state anxiety. This chapter will summarise the results from each of the four studies. The way in which each of the studies
contributes to our understanding of the literature will be discussed, followed by a
discussion of the thesis limitations and recommendations for future research.

Summary of Results

Each of the four studies is summarised below. This includes a discussion of the aims,
hypotheses, and primary findings from each study.

Study one: The joint role of approach and avoidance motivation.

The first study aimed to investigate whether the joint subsystems hypothesis was
better able to explain severity of anxiety disorder symptoms than the separable
subsystems hypothesis, and whether there were differences between those at high
risk for an anxiety disorder and those at low risk. It was predicted that the joint
subsystems hypothesis would hold for the low risk group, while the separable
subsystems hypothesis would be more relevant for the high risk group. That is, it was
predicted that the +AM/-AppM group would have the highest level of anxiety in the
low risk for SAD and low risk for GAD groups, while for the high risk for SAD and
high risk for GAD groups, the +AM groups would have higher levels of anxiety,
regardless of AppM levels. However, data did not provide support for the
hypotheses. There were no significant mean differences between AM/AppM groups
among the high risk for social anxiety disorder group, while for the high risk for
generalised anxiety disorder group and the low risk for social anxiety disorder group,
the only significant mean differences were for the –AM/+AppM group when
compared to both the +AM/-AppM and +AM/+AppM groups. Most interestingly,
for the low risk for generalised anxiety disorder group, high AppM and not low
AppM was implicated in the experience of anxiety.

In summary, this study reported that in a low risk for generalised anxiety
disorder sample, a combination of high AM and high AppM had the strongest
relationship with trait anxiety. Therefore, there was a lack of support for the joint subsystems hypothesis in the low risk for generalised anxiety disorder group, with high AppM emerging as an important factor in understanding the experience of anxiety, rather than low AppM as predicted.

**Study two: The role of maladaptive emotion regulation.**

The second study examined the possibility that a heightened level of anxiety disorder symptoms exhibited by those high on AM is moderated by maladaptive ER. Support for this hypothesis was not found, with no evidence of moderating effects for any of the analyses. Rather, there were various main effects that differed according to the group being examined. Specifically, in the low risk for generalised anxiety disorder group, AM and maladaptive ER were both significant positive predictors of the severity of generalised anxiety disorder symptoms, but AppM did not make a significant contribution. For the high risk for generalised anxiety disorder group, the only significant predictor was AM. For the low risk for social anxiety disorder group, high AM and low AppM independently predicted the severity of social anxiety disorder symptoms, but when maladaptive ER was added, this main effect was significant, while the main effect of AppM became non-significant, indicating the presence of mediation. Finally, for the high risk for social anxiety disorder, high AM and low AppM independently predicted the severity of social anxiety disorder symptoms, but when maladaptive ER was added, the effect of AppM became non-significant (and there was no significant effect of maladaptive ER). Contrary to study one, this study provided some support for the joint subsystems hypothesis, in the high risk for SAD and low risk for SAD groups, which could then be fully explained by the addition of maladaptive ER into the equation.
In sum, while the relationship between high avoidance motivation and anxiety is strong, the findings from the present study indicate that, under certain conditions, low approach motivation and high maladaptive emotion regulation also significantly predicted the severity of social anxiety disorder symptoms.

**Study three: The role of depression.**

The first two studies in the current thesis found that AppM was significantly related to anxiety in low risk samples. The third study examined the possibility that this relationship between AppM and severity of social anxiety disorder symptoms could be explained by comorbidity with depression. Support for this hypothesis was not found; while depression was found to be a significant predictor of social anxiety disorder symptoms in both the high risk and the low risk sample, the significant effect of AppM did not disappear with the addition of depression into the regression equation. Therefore, the relationship between AppM and social anxiety disorder symptoms appears to be independent of depression. Intriguingly, AppM was a significant negative predictor of social anxiety disorder symptoms in the high risk sample but not the low risk sample.

In summary, this study reported that in the high risk sample, high FFFS and low AppM significantly predicted the severity of social anxiety disorder symptoms, while for the low risk sample, AppM did not significantly predict social anxiety disorder symptoms. Again, this provides some support for the joint subsystems hypothesis, although not for the low risk group as expected. Depression was a significant predictor in both samples, and results indicated that the relationship between AppM and severity of social anxiety disorder symptoms was independent of depression.
Study four: An experimental test of relationships.

The fourth and final study aimed to investigate whether approach and avoidance motivation, and emotion regulation, predicted response to an anxiety-inducing vignette. It was predicted that high AM, low AppM, and high maladaptive ER would significantly predict post-mood induction state anxiety. There was limited support for the hypotheses; while there was a significant effect of the mood induction on levels of state anxiety, only high AM predicted this change, while AppM and ER did not make a unique contribution. In addition, results of this study indicated that those participants scoring at high risk for social anxiety disorder and/or depression also had higher levels of maladaptive emotion regulation than those participants that scored at low risk for both social anxiety disorder and depression.

In sum, this study reported that high AM was the only predictor of state anxiety following a mood induction procedure. Low AppM and high maladaptive ER were not significant predictors. Thus, there was a lack of support for the joint subsystems hypothesis, with the separable subsystems hypothesis appearing to be most relevant.

Implications

There are a number of implications that arose from the series of four studies. These can be grouped into four main areas: the role of approach motivation in the prediction of anxiety disorder symptoms; the role of emotion regulation in the prediction of anxiety disorder symptoms; the relationship between trait motivation and emotion regulation; and the personality-psychopathology relationship. Each of these areas is reviewed in detail below.
Understanding the role of AppM in the prediction of anxiety.

While the role of AM remained consistent across studies, and strongly supported hypotheses that high AM is a contributing factor in anxiety disorders such as generalised anxiety disorder and social anxiety disorder, the relationship between AppM and anxiety was less clear. In study one, high AppM was a predictor of anxiety, but only for those at low risk for generalised anxiety disorder. In study two, low AppM was a predictor of anxiety, but only for the social anxiety disorder analyses; both high and low risk. In study three, low AppM was again implicated in the prediction of social anxiety disorder, but only in the high risk participants. Finally, in study four, AppM was not a significant predictor of state anxiety, and there were no differences in AppM across the low risk group, high risk for social anxiety disorder only, high risk for depression only, and risk for comorbid social anxiety disorder and depression groups. Hence, study one supported revised Reinforcement Sensitivity Theory for certain groups, studies two and three supported the joint subsystems hypothesis for certain groups, and study four supported the separable subsystems hypothesis.

These findings appear contradictory, and indicate that the relationship between approach motivation and anxiety may be particularly complex. It was hypothesised that, by accounting for the differences between low risk and high risk samples, the discrepancies in findings within the relevant literature would have been accounted for, but this has not been the case. However, it is important to note that there is an interaction between approach and avoidance motivation across all studies, supporting claims that AppM plays a significant role in the prediction of the severity of anxiety disorder symptoms. As the relationship between approach and avoidance motivation appears to change from group to group, and study to study, the correlation
matrices for each study sample, without splitting groups, were examined for further clarity. These correlation matrices indicated that there was a consistent negative correlation between approach motivation and anxiety, across each of the four studies. This finding supports the joint subsystems hypothesis, rather than revised Reinforcement Sensitivity Theory, as each separate study shows the same +AM/-AppM correlation with anxiety when considered overall. Therefore, this thesis has challenged the traditional view that approach and avoidance motivation function independently of each other, indicating that there is a level of interdependence between the two systems (e.g. Gray, 1994).

The evidence provided in this thesis for a joint relationship between high avoidance motivation and low approach motivation in the prediction of social anxiety disorder symptoms supports recent proposals for a model of social anxiety disorder which includes consideration of approach motivation (Hundt, et al., 2010; Kimbrel, 2008; Kimbrel, et al., 2010). In a theoretical model of the development and maintenance of generalised social anxiety disorder (referring to people who fear most social situations, in comparison to specific social anxiety disorder, which refers to people who fear a limited number of social situations), Kimbrel (2008) proposed that, while there is now a good understanding about the maintenance factors of social anxiety disorder, the development of the disorder is less well understood. It was then proposed that a greater understanding of the disorder could be gained by utilising a Reinforcement Sensitivity Theory framework (Kimbrel, 2008). Specifically, it was proposed that, while BIS and FFFS hyperactivity are powerful risk factors for social anxiety disorder, low approach motivation acts as an additional, moderating, risk factor by facilitating FFFS activity (Kimbrel, 2008). Thus, it was proposed that people high on avoidance motivation and low on approach motivation would show
the most severe levels of anxiety in response to threat (Kimbrel, 2008). More specifically, high avoidance motivation was hypothesised to make social interactions more anxiety-provoking, while low approach motivation was proposed to make social interactions less enjoyable; combined, high avoidance motivation and low approach motivation increase the risk for developing social anxiety disorder (Kimbrel, et al., 2010).

As detailed in the discussion section of study three, Kimbrel and colleagues (Hundt, et al., 2010; Kimbrel, et al., 2010) have recently endeavoured to test the assertions reviewed above, regarding the relationship between approach motivation and social anxiety disorder. In a study aiming to distinguish between social interaction anxiety (which involves direct social interactions with others) and social observation anxiety (which involves being observed by others or performing in front of others), Kimbrel and colleagues (2010) demonstrated that high AM and low AppM significantly predicted social interaction anxiety, while only high AM predicted social observation anxiety. In a separate study, conducted with a sample of 248 undergraduate university students, high AppM was found to predict emotional reliance on others, excessive reassurance seeking, perceived availability of support, social events attended, and phone contacts with friends, while low AppM predicted lack of social self-confidence (Hundt, et al., 2010). Similarly, in an older study involving 214 undergraduate students, Kashdan (2002) reported that social interaction anxiety was significantly negatively correlated with AppM, while an initially significant negative correlation between social observation anxiety and AppM became non-significant after controlling for social interaction anxiety. Together, these studies indicate that approach motivation may only be implicated in social interaction anxiety but not in social observation anxiety.
The scale utilised to provide a measure of social anxiety throughout this
thesis was the Liebowitz Social Anxiety Scale (LSAS; Heimberg, et al., 1999),
which was not designed to provide separate measures of social interaction anxiety
and social observation anxiety. However, examination of the item content of the
LSAS indicates that the scale does contain items which pertain to each construct. For
example, the “working while being observed” item could be regarded as a measure
of social observation anxiety, while the “talking to people in authority” item could be
regarded as a measure of social interaction anxiety. The general finding of a
significant relationship between low AppM and social anxiety in the studies
reviewed above is similar to the overall finding reported in the present thesis; that
severity of social anxiety disorder symptoms is significantly correlated with low
AppM, across a series of studies. However, the finding that AppM significantly
predicts social interaction anxiety but not social observation anxiety (e.g. Kashdan,
2002; Kimbrel, et al., 2010) may indicate that the discrepant findings regarding the
relationship between approach motivation and different levels of social anxiety
within this thesis could be accounted for by examination of the different
subdimensions of disorder. However, more work is required to test these predictions.

The study of emotion regulation within anxiety research.

In addition to AppM, maladaptive emotion regulation was also found to contribute to
heightened generalised anxiety disorder and social anxiety disorder symptoms, but
only in those participants who did not score at high risk for either of the disorders. In
study two, maladaptive emotion regulation mediated the effect of low approach
motivation, but only in the low risk for social anxiety disorder group. Further, there
was a main effect of maladaptive emotion regulation in the prediction of severity of
anxiety symptoms, but only in the low risk for generalised anxiety disorder group. In
addition, study four indicated that those participants with higher levels of social anxiety and/or depression also had higher levels of maladaptive emotion regulation than those participants that scored at low risk for both social anxiety disorder and depression. Together, the findings of this thesis indicate that even after accounting for approach and avoidance motivation, there was a significant relationship between maladaptive emotion regulation and severity of anxiety disorder symptoms, so long as the experienced anxiety was not already at risk of being at the clinical level. Thus, this thesis has provided evidence that maladaptive emotion regulation may be an important risk factor in the development of anxiety disorders such as generalised anxiety disorder and social anxiety disorder.

There are important clinical implications of the findings from this thesis, regarding the potential role of emotion regulation in the development and maintenance of anxiety disorders. Several theoretical papers have put forward the argument that emotion regulation is a crucial construct to consider when designing treatment programs for people with anxiety disorders. For example, Mennin (2006) developed an emotion regulation therapy program, in response to the finding that disorders such as generalised anxiety disorder are difficult to treat with traditional methods such as cognitive-behavioural therapy. Based on the premise that emotion dysregulation is comprised of a four-factor framework (increased intensity of emotions, lack of understanding of emotions, fear of emotions, and maladaptive management of emotions), Mennin’s (2006) proposed treatment program was specifically designed to address the avoidant tendencies of people with generalised anxiety disorder within this framework. A preliminary case study with a thirty year old woman, conducted by Mennin (2004), indicated that the program may improve treatment outcomes; however, the program does not appear to have been empirically
evaluated. Importantly, though, there is the potential that a treatment program aimed at education and skills training of the use of adaptive emotion regulation strategies may assist in the treatment of anxiety disorders such as generalised anxiety disorder and social anxiety disorder.

In addition, Trosper and colleagues (2009) have also argued that traditional cognitive-behavioural therapy is limited in terms of treating individuals with comorbid diagnoses, or those with complex emotional issues beyond their specific anxiety disorder. This argument is supported by a study conducted by Suveg, Sood, Comer, and Kendall (2009). It was demonstrated that a cognitive-behavioural therapy program, delivered to 37 children (aged 7-15 years of age) diagnosed with generalised anxiety disorder, separation anxiety disorder, or social anxiety disorder, successfully reduced worry regulation skills but had no impact on sadness regulation skills or anger regulation skills (Suveg, et al., 2009). In response to this, Trosper and colleagues (2009) developed the Unified Protocol for the Treatment of Emotional Disorders in Youth, while Wilamowska, Thompson-Hollands, Fairholme, Ellard, Farchione, and Barlow (2010) developed the United Protocol for Transdiagnostic Treatment of Emotional Disorders, both of which were designed specifically to provide a transdiagnostic, cognitive-behavioural therapy based treatment tool centered on the management of emotions. Preliminary findings indicated that clinical severity ratings, in a sample of twelve adolescents with an anxiety or depressive disorder, significantly reduced at follow-up; in addition, there were also significant reductions in maladaptive emotion regulation (Trosper et al., 2009; Wilamowska et al., 2010). The lack of focus on emotion in CBT programs is important, and the development of treatment programs such as these indicates that it is beneficial to extend traditional CBT programs to include emotion-based components. In addition
to addressing cognitive distortions and behavioural avoidance, such programs will then have the potential to assist in the management of anxious and depressive emotions, as well as managing additional emotional issues, resulting in a greater quality of life.

Together, the recent interest in developing treatment programs centered on emotion regulation highlights the importance of considering emotion regulation in situations involving anxiety, and these treatment programs will benefit from the findings such as those in the present thesis. It may be that clinical interventions for at-risk populations aimed at teaching appropriate emotion regulation strategies to use in anxiety-provoking situations may alleviate some of the anxious symptoms experienced and result in a decreased risk for development of an anxiety disorder.

However, the results from the present thesis indicate that maladaptive emotion regulation does not play a role in the experience of anxiety among those people at high risk for an anxiety disorder, after accounting for approach and avoidance motivation. Rather, it is the low risk groups for which maladaptive emotion regulation plays a significant role in the experience of anxiety. These findings may suggest that there are a separate group of people who would benefit from education about the appropriate and successful management of emotions, and who experience some anxiety due to a maladaptive emotion regulation style. It is possible that, left untreated, this group of people may go on to develop anxiety disorders, regardless of their level of avoidance motivation; thus, this may be a separate pathway to clinical anxiety.

Indirect evidence from the temperament literature provides some preliminary support that maladaptive emotion regulation styles may predict anxiety later in life. As discussed in the introductory chapters, behavioural inhibition, measured during
childhood, is widely understood to provide a measure of shy, cautious, and withdrawn behaviour, and an avoidance of novel experiences (Manassis, et al., 2004; Shamir-Essakow, et al., 2005). Many of these behaviours may also be representative of a maladaptive emotion regulation style; for example, a child who withdraws from an uncomfortable situation and immerses themself in an enjoyable play activity to distract themselves may be suppressing negative emotions. Behavioural inhibition has been shown to predict the development of anxiety disorders (e.g. Biederman, et al., 1993; Dalrymple, et al., 2007), and so the potential for maladaptive emotion regulation to act as a risk factor for anxiety disorders deserves further attention.

Further, some recent longitudinal research has indicated that maladaptive emotion regulation predicts anxiety symptoms over time. Bosquet and Egeland (2006) examined the presence of anxiety symptoms from childhood through to adolescence in a sample of 155 children, finding that early emotion regulation difficulties predicted anxiety symptoms at later stages. Additionally, in a recent study with a sample of 1065 adolescents aged 11-14 years, McLaughlin, Hatzenbuehler, Mennin, and Nolen-Hoeksema (2011) reported that emotion regulation problems at baseline predicted a significant increase in the experience of anxiety symptoms at seven-month follow-up, providing empirical evidence that maladaptive emotion regulation is a risk factor for anxiety symptoms in adolescence.

In summary, the findings presented in this thesis also indicate that the relationship between emotion regulation and severity of anxiety disorder symptoms is complex and varies between anxiety disorders; thus, consideration of trait motivation within this area of research is crucial.
The relationship between trait motivation and emotion regulation.

There is a distinct dearth of literature examining a potential relationship between trait motivation and emotion regulation, particularly with regards to anxiety. The majority of research conducted has examined either the role of trait motivation in anxiety, or the role of emotion regulation in anxiety, while the combination of personality and cognition in the prediction of anxiety has rarely been considered. Thus, a considerable strength of the present thesis is its theoretical approach towards obtaining an understanding of how these two constructs may function interdependently in the prediction of the severity of anxiety disorder symptoms. This approach is important because research focussed only on trait motivation fails to take into account potential moderating or mediating factors in the development of anxiety disorders, while research focussed only on emotion regulation as a predictor of anxiety fails to consider which individuals may be more likely to develop a maladaptive emotion regulation style than others.

Only two recent papers were able to be located that may provide some insight into findings from this thesis (Dennis, 2007; Tull, et al., 2010), while an additional three papers looking at the related construct of temperament within childhood, and its relationship with emotion regulation, were also examined (Suveg, Morelen, Brewer, & Thomassin, 2010; Troper & May, 2011; Zalewski, Lengua, Wilson, Trancik, & Bazinet, 2011). The first known study to examine relationships between trait motivation and emotion regulation in the prediction of anxiety was conducted by Dennis (2007). In her study, Dennis (2007) reported the finding that approach motivation was positively correlated with the adaptive emotion regulation strategy of reappraisal, but had no association with suppression, while avoidance motivation was positively correlated with reappraisal and negatively correlated with suppression. In a
regression, however, only avoidance motivation significantly predicted trait anxiety, although the interaction between avoidance motivation and suppression almost reached significance (Dennis, 2007). While the reported correlations were in the expected direction, the regression analysis failed to reach significance, which may have been due to the failure to separate the participants into high and low risk groups, as was shown to be an important consideration within the studies in this thesis.

More recently, Tull and colleagues (2010) argued that individual differences, within the context of reinforcement sensitivity theory, may impact the way people regulate their emotions. Empirically, it was demonstrated that while avoidance motivation was positively correlated with overall emotion regulation difficulties, the relationship between approach motivation and emotion regulation was more complex (Tull, et al., 2010). More specifically, the fun-seeking subscale of approach motivation was positively associated with overall emotion regulation difficulties, while the reward responsiveness subscale of approach motivation was negatively associated with overall emotion regulation difficulties (Tull, et al., 2010). The findings from this study may highlight an important consideration for the study of the role of AppM in emotion regulation, and anxiety disorders. It appears that AppM may be a complex, multidimensional construct, and while this does not strictly concur with the theoretical framework presented in this thesis, it deserves further consideration.

Similar findings have been reported in the study of relationships between child temperament and emotion regulation. For example, in a sample of 676 university students reporting on current emotion regulation tendencies and retrospective childhood levels of behavioural inhibition, Suveg and colleagues
(2010) reported that maladaptive emotion regulation fully mediated the relationship between behavioural inhibition and anxiety. Similarly, Zalewski and colleagues (2011) reported that children who were unable to regulate their responses to an anxious stimulus were characterised by a shy temperament, while those children who were able to regulate their emotional responses were characterised by a low level of shyness, in a sample of 196 children in the third to fifth grade of school. In a study measuring slightly different, but related, constructs, Trosper and May (2011) examined the relationship between childhood disposition and emotion expression (defined in the study as a combination of level of emotion awareness and level of motivation to express negative emotions), in the prediction of anxiety. The authors demonstrated that both a negative emotional disposition and a deficient level of emotion expression both predicted anxiety symptoms, in a sample of 112 children aged between seven and seventeen years of age (Trosper & May, 2011). Importantly, when the sample was split into two age groups (where the younger age group were twelve years or younger, and the older age group were aged thirteen and over), negative emotionality was the only predictor of anxiety in the younger age group, while emotion expression was the only predictor of anxiety in the older age group (Trosper & May, 2011). Further analysis revealed that, in the older age group only, a significant positive relationship between negative emotionality and anxiety was fully mediated by the effect of maladaptive emotion expression. This may indicate that emotion regulation becomes an important aspect of development during the teenage years.

Taken together, these five papers represent the beginning of an important new area of research, and demonstrate the validity of examining the relationship between trait motivation and emotion regulation, as potential pathways to problematic levels
of anxiety. It would appear that high levels of avoidance motivation and high levels of maladaptive emotion regulation are joint risk factors in the experience of anxiety. However, the relationship between approach motivation and maladaptive emotion regulation has suffered from a lack of research attention, and the findings from the present thesis go some way towards understanding this relationship. In addition, the findings from the present thesis contribute substantially to this understanding of the relationship between trait motivation and emotion regulation, by demonstrating that this relationship is complex and inconsistent, and deserved further consideration.

**The personality-psychopathology relationship.**

The findings from this thesis have other implications for the broader literature, particularly in terms of the personality-psychopathology relationship. There are four prominent personality-psychopathology models: a predisposition/vulnerability model, a complication/scar model, a pathoplasty/exacerbation model, and a spectrum model (Krueger & Tackett, 2003). Briefly, the predisposition model proposes that certain personality traits place an individual at risk for developing psychopathology; the complication model asserts that psychopathology changes an individual’s personality; the pathoplasty model hypothesis that personality traits influence the presentation of psychopathology; and the spectrum model suggests that personality traits and levels of psychopathology lie on a continuum (Tackett, 2006).

Widiger and Smith (2008) have taken a pathoplasty approach to explain the relationship between personality and psychopathology, proposing that this relationship is bidirectional, as each can influence the appearance or presentation of each other. Specifically, the presence of an axis I disorder, such as generalised anxiety disorder or social anxiety disorder, can alter the appearance and expression of personality traits; while the appearance and expression of psychopathology can
also vary depending on the individual’s personality traits (Widiger & Smith, 2008). When a person is feeling particularly anxious or upset they will often be unable to give an accurate description of their “usual way of thinking, feeling, behaving, and relating to others” (Widiger & Smith, 2008, p. 747). In addition, a common symptom of mood disorders such as generalised anxiety disorder or social anxiety disorder is distortion in self-image, and so it may often be the case that people with anxiety disorders provide inaccurate descriptions of their personality traits as a direct result of their anxiety (Widiger & Smith, 2008).

While this argument has some merit, the general conceptualisation throughout this thesis concurs with the predisposition model; that is, it is proposed that certain levels of approach and avoidance motivation place individuals at risk for developing an anxiety disorder, such as generalised anxiety disorder and social anxiety disorder. One of the primary advantages of this approach, advocated throughout this thesis, is the utilisation of a strong theoretical model that proposes there are underlying motivational systems that regulate behaviour. There are strong, theoretical bases to each of the predictions made in this thesis, such as utilising the joint subsystems hypothesis to make predictions about the conditions under which there would be a relationship between approach motivation and anxiety. Further, use of this theoretical framework enabled an extension of the scope of research in this area, in terms of proposing that these same motivational systems may also play a role in the regulation of emotion.

While much more work is required in order to comprehensively test each of the four personality-psychopathology models, it is evident that this is an area particularly relevant to the present thesis. Future work may also benefit from seeking
to ground their studies within a strong theoretical framework such as Reinforcement Sensitivity Theory.

**Future Directions**

Interest in this area of research has surged in the past three years. At the conception of this thesis, the relationship between trait motivation and emotion regulation was rarely considered, and the study of emotion regulation was segregated and lacked purpose. Thus, there are many questions yet to be investigated, and issues that require further investigation. One of the most significant contributions this thesis makes is the demonstration that maladaptive emotion regulation predicts severity of anxiety disorder symptoms, such as generalised anxiety disorder and social anxiety disorder, over and above the effect of trait motivation. Future research must then seek to expand the knowledge obtained from this thesis, particularly with regards to the specific emotion regulation strategies that increase anxiety disorder symptoms, and also surrounding emotion regulation strategies that may act as potential protective factors.

Several new conceptualisations of emotion regulation have been published in recent years, and these ideas may benefit from testing using a theoretical model such as the one presented in this thesis. For example, Eisner, Johnson, and Carver (2009) reported that symptoms of depression, generalised anxiety disorder, and social anxiety disorder were all significantly related to scales designed to measure down-regulation of positive emotions, in a sample of 248 undergraduate students. This novel study highlights one the complexities of the emotion regulation construct, in that it is not only suppression of negative emotions that may be the focus of anxious individuals, but also the suppression of positive emotions. This may be for reasons such as not wanting to appear overly emotional in social situations (e.g. Eisner, et al.,
2009). Examination of the item content of the suppression subscale of the Emotion Regulation Questionnaire (Gross & John, 2003), which was utilised as the maladaptive emotion regulation measure throughout this thesis, indicates that the subscale appears to measure both negative emotion suppression and positive affect suppression. It may be that these two constructs require separation, rather than inclusion of both within the same subscale, and future research may seek to confirm this hypothesis.

Other developments in the conceptualisation of emotion regulation include work conducted by Gyurak, Gross, and Etkin (2011), which argues for the separation of implicit emotion regulation and explicit emotion regulation. The authors argue that most research to date has focussed on explicit emotion regulation (that which requires conscious effort, insight and awareness), while the more implicit form of emotion regulation (that which is automatic and needs no insight or awareness) requires more work, and has the potential to be a more efficient and effortless form of emotion regulation (Gyurak, et al., 2011). Future research may benefit from an examination of both explicit and implicit adaptive and maladaptive emotion regulation strategies, in the prediction of anxiety, as there may be some specific forms of emotion regulation that play a more prominent role in the relationship between trait motivation and anxiety. For example, if implicit emotion regulation is found to be particularly adaptive, it may act as a protective factor in the relationship between avoidance motivation and severity of anxiety disorder symptoms.

In another recent study, Cote, Gyurak, and Levenson (2010) argue for the importance of distinguishing between a knowledge of the best way to regulate emotion and the ability to actually implement emotion regulation strategies. This is an important distinction not considered in the present study, and may be able to
provide some insight into people's experience of anxiety, particularly in terms of cognitive reappraisal, as measured in the present study. For example, participants may understand that reappraisal is an adaptive form of emotion regulation, but do not possess the skills to engage in this behaviour, instead utilising the more maladaptive form of emotion regulation, suppression.

Mennin and colleagues' (e.g. Mennin, 2004; Mennin, et al., 2005; Mennin, et al., 2007) emotion dysregulation model of anxiety, as discussed in the introduction chapters, comprises four facets of maladaptive emotion regulation: increased intensity of emotions, lack of understanding of emotions, fear of emotions, and maladaptive management of emotions. Evidently, the present thesis only considered the last of these four facets. While the reason for this was justified (i.e. the definition of emotion regulation utilised for the present thesis was that proposed by Gross and John (2003): the process of modifying emotional states, in order to influence and control experienced emotion), it can be argued that it is also important to consider the intensity of experienced emotion, the level of understanding of experienced emotion, and the level of fear of emotion, alongside the study of strategies used to manage emotion, in the prediction of anxiety. With an understanding of the conceptual difference between emotional experience and emotion regulation, future studies may seek to examine both constructs simultaneously, to allow for a more in-depth understanding of the role of all aspects of emotion, when investigating the relationships between trait motivation, emotion regulation, and anxiety.

Finally, Koole (2009) conducted an integrative review of the emotion regulation literature, and put forth a new classification system. The target by function classification system included three targets (attention, knowledge, and body), and three functions (need-oriented, goal-oriented, and person-oriented), with the author
arguing that this system has the potential to provide the foundation for developing a taxonomy of emotion regulation strategies (Koole, 2009); however, this is yet to be examined empirically.

Each of these recent papers, along with the studies of this thesis, indicates that much more research is required before a gold standard measurement of emotion regulation is able to be developed and utilised. There is an urgent need for strengthening the definition and measurement of emotion regulation, as theoretical models such as the one presented in this thesis will remain limited until this issue can be rectified. In addition to this, there is a particular need to determine which specific emotion regulation strategies have the strongest relationships with generalised anxiety disorder and social anxiety disorder, in order to identify the strategies that are most relevant in the development and maintenance of these anxiety disorders. It may be the case that certain maladaptive emotion regulation strategies are more strongly linked with generalised anxiety disorder, while other strategies predict social anxiety disorder more strongly. Identification of these strategies will allow for the development of prevention programs and treatment programs targeted specifically at reducing maladaptive emotion regulation strategies in specific anxiety disorders (e.g. Aldao & Nolen-Hoeksema, 2010).

Another important area for the focus of future research is adaptive emotion regulation. As maladaptive emotion regulation was found to be a risk factor for anxiety disorders, it is also possible that adaptive emotion regulation may function as a protective factor. Future research is required to examine the role of adaptive emotion regulation in the development of anxiety disorders, particularly in studies that also examine the role of trait motivation. It may be the case that adaptive emotion regulation, such as reappraisal (e.g. Gross & John, 2003), has a significant
relationship with approach motivation and that combined, they act as joint protective factors against the experience of anxiety. While examination of adaptive emotion regulation was outside the scope of this thesis, it is proposed that the theoretical model presented would benefit from consideration of the role of adaptive emotion regulation in anxiety disorder research. However, research such as that conducted by Aldao and Nolen-Hoeksema (2010) indicates that use of maladaptive emotion regulation strategies had a significantly stronger association with measures of anhedonic depression, anxious arousal, and eating disorder symptomatology than adaptive emotion regulation measures. This may signify that non-use of adaptive emotion regulation strategies is less important to the development and maintenance of anxiety disorders than the use of maladaptive emotion regulation strategies. This proposition requires further testing, but if found to be valid, has important clinical implications in that it may be most effective to teach anxious individuals how to reduce their use of maladaptive emotion regulation strategies (for example, teaching mindfulness techniques to reduce suppression of emotions), rather than a direct focus on adaptive emotion regulation strategies (e.g. Aldao & Nolen-Hoeksema, 2010).

**Methodological Limitations**

There are a number of general issues which may explain why conflicting findings were reported, particularly with regards to the measurement of the key constructs within this thesis, and so the following section details each of these issues and indicates how they may be addressed in future research. Due to the nature of these limitations, care must be exercised when interpreting the results.

**Measures of approach motivation.**

The manner in which approach motivation is measured by most validated scales may be problematic. It has been proposed that the behavioural activation system provides
the causal basis for trait impulsivity, and that impulsivity is strongly linked to a sensitivity to reward (e.g. Jackson & Smillie, 2004). According to Jackson and Smillie (2004), however, most approach motivation scales, such as the Carver-White BIS/BAS scale (Carver & White, 1994) utilised in this thesis, are designed to measure impulsivity as a representation of approach motivation, rather than striving to measure the motivational role of appetitive stimuli. In addition, the Carver-White BIS/BAS scale separates the approach motivation construct into three sub-factors (fun-seeking, reward responsiveness, and drive), and it has been criticised for its lack of theoretical justification with regards to Gray’s original theory (Heym, et al., 2008). Further, none of these subscales were significantly correlated with a new measure of AppM, designed specifically to measure the BAS component of Gray’s RST (Smillie & Jackson, 2005), providing further evidence that the BAS construct needs further examination and testing. Therefore, it is possible that different measures of BAS may result in differing significant findings, and thus additional research is required.

Additionally, as there is evidence for a joint relationship between approach and avoidance motivation, it is proposed here that Corr’s (2004) set of conditions for which his joint subsystems hypothesis would be relevant requires further consideration. It is clearly stated that the joint subsystems hypothesis would be relevant when participants do not have an extreme sensitivity to either punishment or reward (Corr, 2004), indicating that hypersensitivity in one system may dampen the other. However, when it comes to testing this hypothesis, there is no attempt within the literature to determine how an extreme sensitivity to punishment or reward can be defined and operationalised, making testing of this hypothesis difficult. For example, there are no established cut-off scores for the Carver-White BIS/BAS scales, in order
to determine which participants can be classified as “extreme”. For this thesis, it was taken to mean that the joint subsystems hypothesis would only be relevant when participants were not at high risk for an anxiety disorder, and thus, cut-off scores for anxiety disorders were utilised to indicate those participants with an extreme sensitivity to punishment. However, this conceptualisation may not be the best, or the most accurate, attempt to measure Corr’s (2004) joint subsystems hypothesis, with full consideration of the conditions specified. Future research must endeavour to more comprehensively review and test the conditions of the joint subsystems hypothesis.

Most importantly, however, this thesis indicates that there is a strong need to utilise behavioural measures of approach and avoidance motivation, in which the behavioural inhibition system and the behavioural activation system are activated experimentally. The self-report measures utilised in the present study evidenced varying results, indicating limitations that may be dependent upon the measures used. Approach and avoidance motivation are behavioural systems, and so the most accurate way to determine how they function with regards to anxiety disorders is using behavioural methods.

**Measures of emotion regulation.**

While the emotion regulation strategy of suppression is widely argued to be a maladaptive strategy linked to increases in anxiety as well as reoccurrence of the originally suppressed emotions and thoughts (e.g. Aldao & Nolen-Hoeksema, 2010; Wenzlaff & Wegner, 2000), the measure of maladaptive emotion regulation utilised in this thesis does not comprehensively measure maladaptive emotion regulation in general, and as such, results may not be generalised to the study of maladaptive emotion regulation as a construct. Future research is required to determine whether
the present findings can be replicated when examining other maladaptive emotion regulation strategies. However, there is a general lack of consensus regarding the definition and measurement of ER in the literature, and as a result, the literature is fragmented and measurement issues are being approached in a number of different ways, limiting the generalisability of results from any study. The scale used in this thesis is the most commonly utilised scale in the literature to date, and, as previously noted, does not comprehensively cover a range of emotion regulation strategies. Instead, when developing the Emotion Regulation Questionnaire, Gross and John (2003) decided to focus on the long-term consequences of two particular strategies that are well-defined and common. Additionally, they wanted to focus on one strategy that was antecedent-focused (cognitive reappraisal) and one that was response-focused (emotional suppression; Gross & John, 2003). The only other measure of emotion regulation which is utilised with some regularity is Gratz and Roemer’s (2004) Difficulties in Emotion Regulation Scale (DERS). However, examination of the item content of the DERS reveals that it appears to be more concerned with the experience of the emotional state itself, rather than an aiming to measure whether there is an attempt to modify emotional states. Thus, there is an urgent need for a new measure of emotion regulation before the study of the role of emotion regulation in the development of anxiety disorders can be pursued with a clear direction.

**Measures of risk for anxiety disorder.**

The measures used to determine risk for generalised anxiety disorder and risk for social anxiety disorder may be considered a limitation of the present thesis, as they were self-report measures and as such, were not able to determine clinical levels of anxiety or presence of an anxiety disorder. While the measures were chosen for their
strengths of being designed to represent a self-report version of more clinical diagnoses, as determined by the DSM-IV (American Psychiatric Association, 2000), the nature of self-report measures determines that they are not able to accurately determine whether a participant has a clinical level of disorder. Future research may seek to utilise more clinical measures of anxiety, such as by diagnostic interview, in order to confidently group participants into those who have an anxiety disorder, and those who do not. As this thesis was only able to measure risk, rather than presence or absence of disorder, the generalisability of results was limited.

The anxiety measures chosen for use in this thesis; the Generalised Anxiety Disorder Questionnaire-IV (Newman, et al., 2002) and the Liebowitz Social Anxiety Scale (Heimberg, et al., 1999; Liebowitz, 1987), were specifically chosen for their inclusion of established cut-off scores that are widely utilised in the literature, in order to maximise the potential for separating participants into those who were at high risk of experiencing an anxiety disorder, and those who were at low risk.

However, there is an alternate school of thought, particularly with regards to social anxiety disorder, which strongly argues for the adoption of a spectrum approach to clinical indicators of severity (e.g. Filho et al., 2010; Kashdan, 2007; Merikangas, Avenevoli, Acharyya, Zhang, & Angst, 2002; Stein, Torgrud, & Walker, 2000), where the experience of social anxiety exists along a continuum of severity. Researchers such as Merikangas and colleagues (2002) have developed diagnostic criteria for subthreshold social anxiety disorder, proposing that there is a subthreshold level of social anxiety disorder in cases where there is at least one symptom of social anxiety disorder in combination with a degree of avoidance. This area of research indicates that this thesis may have oversimplified the categorisation
of participants into either high risk or low risk and highlights an area for future research.

**Conclusion**

This thesis aimed to determine the interplay between avoidance motivation, approach motivation, maladaptive emotion regulation, and severity of anxiety disorder symptoms (social anxiety disorder and generalised anxiety disorder). Specifically, it was predicted that, while high avoidance motivation is a known risk factor for heightened anxiety disorder symptoms, low approach motivation and maladaptive emotion regulation would act as additional risk factors. Within this thesis, Reinforcement Sensitivity Theory was adopted as the theoretical framework. Overall, it was demonstrated that low approach motivation and maladaptive emotion regulation contributed to the prediction of anxiety disorder symptoms, in addition to high avoidance motivation, within low risk groups.

These results suggest the need for further research into the proposed model, with a number of methodological limitations that may have impacted findings. Risk factors for the development of anxiety disorders such as generalised anxiety disorder and social anxiety disorder are not well understood, and this area of research requires further examination grounded within a strong theoretical framework. There is a particular need for longitudinal and experimental research, utilising clinical measures of anxiety and behavioural measurement and activation of the motivational constructs.

In conclusion, the findings of this thesis have demonstrated that low approach motivation and maladaptive emotion regulation are important concepts when measuring severity of anxiety disorder symptoms, and indicate that there is a considerable way to go before the pathways to anxiety are fully understood.
References


References


References


Salters-Pedneault, K., Roemer, L., Tull, M. T., Rucker, L., & Mennin, D. S. (2006). Evidence of broad deficits in emotion regulation associated with chronic...


List of Appendices

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Appendix B  Plain language statements
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APPENDIX A

Ethics approval documents
DEAKIN UNIVERSITY

Human Ethics Advisory Group – Faculty of Health,
Medicine, Nursing and Behavioural Sciences

221 Burwood Highway,
Burwood Victoria 3125 Australia
Telephone +61 3 2517174
Facsimile +61 3 9251 7425
humbs-research@deakin.edu.au

Memorandum

To
A/Prof Petra Staiger/Dr Nicolas Kambouropolous
School of Psychology

From
Secretary – HEAG-H
Faculty of Health, Medicine, Nursing, and Behavioral Sciences

Subject
HEAG-H 157/09: The moderating effect of emotion regulation on the relationship between avoidance motivation and anxiety

Approval has been given for A/Prof Petra Staiger/Dr Nicolas Kambouropolous, School of Psychology, to undertake this project for a period of 1 year from 05 November 2009 with the following conditions:

Remove “and will be destroyed” from section 9.

The approval given by the Deakin University HEAG - H is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time
- Any events which might affect the continuing ethical acceptability of the project
- The project is discontinued before the expected date of completion
- Modifications that have been requested by other Human Research Ethics Committees

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

HEAG-H may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007). An Annual Project Report Form can be found at http://www.deakin.edu.au/research/admin/ethics/human/forms/ which you will be required to complete in relation to this research. This should be completed and returned to the Administrative Officer to the HEAG-H, Dean’s office, Health, Medicine, Nursing & Behavioural Sciences, Burwood campus by Monday 23rd November, 2009 and when the project is completed.

Good luck with the project!

Steven Sawyer
Secretary
HEAG-H

Ms Elodie O’Connor

Signature Redacted by Library
Memorandum

To       A/Prof Petra Staiger & Dr. Nicolas Kambouropolous  
         School of Psychology

From     Secretary – HEAG-H  
         Faculty of Health, Medicine, Nursing, and Behavioral Sciences

Subject  HEAG-H157_2009: The moderating effect of emotion regulation on the relationship 
         between avoidance motivation and anxiety.

Approval has been given for A/Prof Petra Staiger & Dr. Nicolas Kambouropolous of the 
School of Psychology, to undertake this project with the modifications that were requested on 
the 15 July, 2010.

Signature Redacted by Library

Steven Sawyer  
Secretary  
HEAG-H

cc: Elodie O’Connor
DEAKIN UNIVERSITY

Human Ethics Advisory Group – Faculty of Health,
Medicine, Nursing and Behavioural Sciences

221 Burwood Highway,
Burwood Victoria 3125 Australia
Telephone +61 3 2517174
Facsimile +61 3 9251 7425
hmbbs-research@deakin.edu.au

Memorandum

To  
Associate Professor Petra Staiger
School of Psychology

From  
Secretary – HEAG-H
Faculty of Health, Medicine, Nursing, and Behavioral Sciences

Date  
21 December, 2010

Subject  

Approval has been given for Associate Professor Petra Staiger, School of Psychology, to undertake this project for a period of 3 years from 21 December, 2010.

The approval given by the Deakin University HEAG-H is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time
- Any events which might affect the continuing ethical acceptability of the project
- The project is discontinued before the expected date of completion
- Modifications that have been requested by other Human Research Ethics Committees

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

HEAG-H may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007). An Annual Project Report Form can be found at http://www.deakin.edu.au/research/admin/ethics/human/forms/ which you will be required to complete in relation to this research. This should be completed and returned to the Administrative Officer to the HEAG-H, Dean’s office, Health, Medicine, Nursing & Behavioural Sciences, Burwood campus by Tuesday 23rd November, 2010 and when the project is completed.

Good luck with the project!

Steven Sawyer
Secretary
HEAG-H

cc Elodie O’Connor
Memorandum

To: Associate Professor Petra Staiger  
   School of Psychology

From: Secretary – HEAG-H  
       Faculty of Health, Medicine, Nursing, and Behavioral Sciences


Approval has been given Associate Professor Petra Staiger, of the School of Psychology, to undertake this project with the modifications that were requested on the 18 January, 2011.

Steven Sawyer  
Secretary  
HEAG-H

cc Elodie O'Connor
APPENDIX B

Plain language statements
Plain Language Statement – Studies 1 & 2

Date: 10th November 2009

Full Project Title: The Effect of Emotion Regulation on Avoidance Motivation and Anxiety Disorders

Principal Researcher: Associate Professor Petra Staiger

Student Researcher: Ms. Elodie O’Connor

Associate Researcher: Dr Nicolas Kambouropoulos

This Plain Language Statement is two pages long. Please make sure you have all the pages.

1. Your Consent

You are invited to take part in this research project.

This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project so that you can make a fully informed decision whether you are going to participate.

Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

Once you understand what the project is about and if you agree to take part in it, you will be asked to complete a questionnaire. By completing the questionnaire you indicate that you understand the information and that you give your consent to participate in the research project.

2. Purpose and Background

The purpose of this project is to investigate the role that personality and emotions play in the experience of anxiety. This is a student project and is a requirement of the Doctor of Philosophy course at Deakin University.

A total of 500 people will participate in this project.

It has been shown that a tendency to avoid unfamiliar situations increases the chance of experiencing anxiety in everyday life. However, not all people with this tendency experience anxiety, indicating the presence of other risk factors, such as the way we manage our emotions. This study aims to determine whether the way in which individuals manage their emotions contributes to the experience of anxiety.

If you are aged 18 years and over, you are invited to participate in this research project.

The results of this research may be used to help researcher Elodie O’Connor to obtain a Doctor of Philosophy degree.

3. Funding

This research is totally funded by Deakin University.

4. Procedures

Participation in this project will involve completing a short anonymous questionnaire, which will take approximately 15 minutes to complete.

Questions will be related to a number of areas, including demographics, anxiety, worry, emotion regulation, alcohol use, personality, and mood. Examples of some of the questions and statements that are included are “is your worry excessive in intensity, frequency, or amount of distress it
causes”, “when I am feeling negative emotions, I make sure not to express them”, and “are you easily discouraged in difficult situations”.

5. Possible Benefits
The current project may benefit participants who may learn about the process of psychological research. Furthermore, it is hoped that this study will benefit members of the community by increasing the understanding of the role of emotion regulation strategies involved in anxiety. Examination of this relationship will allow more effective intervention, prevention, and treatment programs to be developed and employed in future. However, we cannot guarantee or promise that you will receive any benefits from this project.

6. Possible Risks
It is not expected that participation in this study will result in any feelings of psychological distress or discomfort. However, some individuals may react adversely to some of the questions relating to anxiety or alcohol use. If you experience any distress, please feel free to withdraw from the study immediately. There are no implications involved in withdrawing from the study.
Participants are advised to contact the Deakin University student counsellor on 9244 6300 (available to Deakin students only). Alternately, they may contact beyondblue on 1300 22 4636, or DirectLine on 1800 888 236.

7. Privacy, Confidentiality and Disclosure of Information
No identifying information such as your name or address will be collected. Storage of data will adhere to the University regulations and kept in secure storage for six years following publication, after which the data will be disposed of in a confidential manner. Electronic information will be stored in password-protected files on a computer and hard copies will be stored in a locked filing cabinet at Deakin University, which will only be accessible by the Principal and Associate researchers.
In any publication, information will be provided in such a way that you cannot be identified. Individual participants will not be identifiable in such a publication, as the data is only analysed in group form and consequently only group data will be reported.

8. Results of Project
No identifiable individual data will be summarised or documented. A summary of group findings will be available upon completion of the study. If participants would like to be informed of the aggregate research findings, they may contact Associate Professor Petra Staiger at Deakin University on (03) on 9244 6876 or email her at petra.staiger@deakin.edu.au

9. Participation is Voluntary
Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. Any information obtained from you to date will not be used.
Before you make your decision, a member of the research team will be available via email to answer any questions you have about the research project. You can ask for any information you want.

10. Ethical Guidelines
This project will be carried out according to the National Statement on Ethical Conduct in Human Research (2007) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.
The ethics aspects of this research project have been approved by the Human Research Ethics Committee of Deakin University.
11. Complaints
If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a participant, then you may contact:
HEAG-H, Dean’s Office, Faculty of Health, Medicine, Nursing and Behavioural Sciences, Deakin University, 221 Burwood Highway, Burwood, VIC 3125, Telephone: (03) 9251 7174, Email: hmnbs-research@deakin.edu.au

Please quote project number HEAG-H 157/09

12. Reimbursement for your costs
You will not be paid for your participation in this project.

13. Further Information, Queries or Any Problems
If you require further information, wish to withdraw your participation or if you have any problems concerning this project, you can contact the principal researcher.

The researcher responsible for this project is:
Associate Professor Petra Staiger
School of Psychology, Deakin University
221 Burwood Highway,
Burwood, 3125.
Phone: (03) 9244 6876
Email: petra.staiger@deakin.edu.au
Plain Language Statement – Studies 3 & 4

Date: 6th December 2010

Full Project Title: An Experimental Test of the Moderating Effect of Emotion Regulation on the Relationship between Motivation and Anxiety

Principal Researcher: Associate Professor Petra Staiger

Student Researcher: Ms. Elodie O’Connor

Associate Researcher(s): Dr Nicolas Kambouropoulos

This Plain Language Statement and Consent Form is four pages long. Please make sure you have all the pages.

1. Your Consent

You are invited to take part in this research project.

This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project so that you can make a fully informed decision whether you are going to participate.

Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

Once you understand what the project is about and if you agree to take part in it, you will be asked to complete a questionnaire. By completing the questionnaire you indicate that you understand the information and that you give your consent to participate in the research project.

2. Purpose and Background

The purpose of this project is to investigate the role that personality and emotions play in the experience of anxiety. This is a student project and is a requirement of the Doctor of Philosophy course at Deakin University.

A total of 50 people will participate in this project.

It has been shown that a tendency to avoid unfamiliar situations increases the chance of experiencing anxiety in everyday life. However, not all people with this tendency experience anxiety, indicating the present of other risk factors, such as the way we manage our emotions. This study aims to determine whether the way in which individuals manage their emotions contributes to the experience of anxiety.

If you are aged 18 years and over, you are invited to participate in this research project.

The results of this research may be used to help researcher Elodie O’Connor to obtain a Doctor of Philosophy degree.
3. **Funding**
This research is totally funded by Deakin University.

4. **Procedures**
Participation in this project will involve completing a short anonymous questionnaire, which will take approximately 15 minutes to complete.

Questions will be related to a number of areas, including demographics, anxiety, worry, emotion regulation, and personality. It will also involve reading two vignettes and answering questions about each. Examples of some of the questions and statements that are included are “Is your worry excessive in intensity, frequency, or amount of distress it causes”, “When I am feeling negative emotions, I make sure not to express them”, and “are you easily discouraged in difficult situations”.

5. **Possible Benefits**
The current project may benefit participants who may learn about the process of psychological research. Furthermore, it is hoped that this study will benefit members of the community by increasing the understanding of the role of emotion regulation strategies involved in anxiety. Examination of this relationship will allow more effective intervention, prevention, and treatment programs to be developed and employed in future. However, we cannot guarantee or promise that you will receive any benefits from this project.

6. **Possible Risks**
It is not expected that participation in this study will result in any feelings of psychological distress or discomfort. However, some individuals may react adversely to some of the questions relating to anxiety or alcohol use. If you experience any distress, please feel free to withdraw from the study immediately. There are no implications involved in withdrawing from the study.

Participants are advised to contact the Deakin University student counsellor on 9244 6300 (available to Deakin students only). Alternately, they may contact beyondblue on 1300 22 4636, or DirectLine on 1800 888 236.

7. **Privacy, Confidentiality and Disclosure of Information**
No identifying information such as your name or address will be collected. Storage of data will adhere to the University regulations and kept in secure storage for six years following publication, after which the data will be disposed of in a confidential manner. Electronic information will be stored in password-protected files on a computer and hard copies will be stored in a locked filing cabinet at Deakin University, which will only be accessible by the Principal and Associate researchers.

In any publication, information will be provided in such a way that you cannot be identified. Individual participants will not be identifiable in such a publication, as the data is only analysed in group form and consequently only group data will be reported.

8. **Results of Project**
No identifiable individual data will be summarised or documented. A summary of group findings will be available upon completion of the study. If participants would like to be informed of the aggregate research findings, they may contact Associate Professor Petra Staiger at Deakin University on (03) on 9244 6876 or email her at petra.staiger@deakin.edu.au

9. **Participation is Voluntary**
Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. However, as this study is anonymous, you can only withdraw from the project prior to submitting
the questionnaire. Before you make your decision, a member of the research team will be available via email to answer any questions you have about the research project. You can ask for any information you want.

10. **Ethical Guidelines**

This project will be carried out according to the *National Statement on Ethical Conduct in Human Research* (2007) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

The ethics aspects of this research project have been approved by the Human Research Ethics Committee of Deakin University.

11. **Complaints**

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a participant, then you may contact:

Secretary HEAG-H, Dean’s Office, Faculty of Health, Medicine, Nursing and Behavioural Sciences, 221 Burwood Highway, Burwood, VIC 3125, Telephone: (03) 9251 7174, Email: hmnbs-research@deakin.edu.au

Please quote project number HEAG-H 122/10.

12. **Reimbursement for your costs**

You will not be paid for your participation in this project, but you will have the chance to win a $100 Coles-Myer voucher.

13. **Further Information, Queries or Any Problems**

If you require further information, wish to withdraw your participation or if you have any problems concerning this project, you can contact the principal researcher.

The researcher responsible for this project is:

Associate Professor Petra Staiger  
School of Psychology, Deakin University  
221 Burwood Highway,  
Burwood, 3125.  
Phone: (03) 9244 6876  
Email: petra.staiger@deakin.edu.au
APPENDIX C

Advertisements
HOW DO YOU MANAGE YOUR EMOTIONS???

Looking for research participants!

My name is Elodie O’Connor and I am conducting a research project under the supervision of Associate Professor Petra Staiger as part of the requirements for the Doctor of Philosophy (PhD) degree.

My study involves completing an anonymous questionnaire with questions on emotion regulation, personality, and anxiety. It will take approximately 20 minutes to complete, and your responses will be anonymous. If you are over the age of 18, I would greatly appreciate your involvement in this study. However, your participation in this study is voluntary.

Please note that completion of the questionnaire is an indication of your consent to participate in this study. As this study is anonymous, please do not provide any identifying information.

If you would like to participate, an online questionnaire can be found at:

http://www.deakin.edu.au/psychology/research/elodie

Alternately, you can contact me at elodie@deakin.edu.au, if you would prefer a paper copy of the questionnaire that you can complete and post back to me.

Thank you for your help; your time is very much appreciated. Elodie.
HOW DO YOU MANAGE YOUR ANXIETY???

Looking for research participants!

My name is Elodie O’Connor and I am conducting a research project under the supervision of Associate Professor Petra Staiger as part of the requirements for the Doctor of Philosophy (PhD) degree at Deakin.

I am interested in how people feel when they are in a situation where they feel socially anxious or uncomfortable. Participation in this study involves imagining a number of scenarios in which you might feel socially uncomfortable, and then completing a questionnaire with questions on emotion regulation, personality, depression, and anxiety. It will take approximately 20 minutes to complete, and your responses will be anonymous.

If you are over the age of 18, I would greatly appreciate your involvement in this study. However, your participation in this study is voluntary. Please note that completion of the questionnaire is an indication of your consent to participate in this study. As this study is anonymous, do not provide any identifying information.

In appreciation of your time, you will have the chance to win a $100 Coles-Myer voucher.

If you would like to participate, please complete the survey online at http://www.deakin.edu.au/psychology/research/elodie or contact Elodie at elodie@deakin.edu.au for more information.
APPENDIX D

Questionnaires
Section A  Demographics

The following section asks you some general questions about yourself.

1. Age in years: ______

2. Gender:  □ Male  □ Female

3. What country were you born in? __________________________

4. Which ethnic/cultural group do you most identify with? __________________________

5. What is your current relationship status?
   □ Single (never married)  □ Married/Living with Partner
   □ Casual partner  □ Separated/Divorced
   □ Steady partner  □ Widowed

6. What is the highest level of education you have achieved?
   □ Primary School  □ TAFE Diploma/Certificate/Trade
   □ Some High School  □ Undergraduate degree
   □ Completed High School  □ Postgraduate degree

7. Are you currently studying?
   □ Yes, full-time  □ No
   □ Yes, part-time

8. Are you currently employed?
   □ Casually employed  □ Full-time employed
   □ Part-time employed  □ No

9. Who are you currently living with?
   □ Living alone  □ Living with partner and/or children
   □ Living with parents  □ Living with other adults
10. Have you ever sought treatment for a mental health problem?

☐ Yes  ☐ No

a. If yes, please discuss: ____________________________

11. Have you ever been diagnosed with any of the following mental health problems?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalised anxiety disorder</td>
<td></td>
<td></td>
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<tr>
<td>Social anxiety disorder</td>
<td></td>
<td></td>
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<tr>
<td>Panic disorder</td>
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<tr>
<td>Phobia</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Depressive disorder</td>
<td></td>
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<tr>
<td>Substance use disorder</td>
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<tr>
<td>Personality disorder</td>
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<tr>
<td>Other (specify..................)</td>
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</tbody>
</table>

a. If yes, please discuss: ____________________________

12. How did you hear about this research project?

☐ Deakin University  ☐ Anxiety website

☐ Friend/Family member  ☐ Other (specify........................................)
### Section B  Generalised Anxiety Disorder Questionnaire-IV

1. Do you experience excessive worry?  
   - Yes  
   - No

2. Is your worry excessive in intensity, frequency, or amount of distress it causes?  
   - Yes  
   - No

3. Do you find it difficult to control your worry (or stop worrying) once it starts?  
   - Yes  
   - No

4. Do you worry excessively and uncontrollably about minor things such as being late for an appointment, minor repairs, homework, etc.?  
   - Yes  
   - No

5. Please list the most frequent topics about which you worry excessively and uncontrollably:  
   a)  
   b)  
   c)  
   d)  
   e)  
   f)

6. During the last six months, have you been bothered by excessive and uncontrollable worries more days than not?  
   - Yes  
   - No

**IF YES, PLEASE CONTINUE. IF NO, SKIP TO THE NEXT SECTION**

7. During the past six months, have you often been bothered by any of the following symptoms?  
   - Restlessness or feeling keyed up or on edge  
   - Difficulty falling/staying asleep or restless/unsatisfying sleep  
   - Difficulty concentrating or mind going blank  
   - Irritability  
   - Being easily fatigued  
   - Muscle tension

   - Yes  
   - No

8. How much do worry and physical symptoms interfere with your life, work, social activities, family, etc.?  
   *Cross one number.*

<table>
<thead>
<tr>
<th></th>
<th>0 None</th>
<th>1 Mildly</th>
<th>2 Moderately</th>
<th>3 Severe</th>
<th>4 Very severely</th>
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</table>

9. How much are you bothered by worry and physical symptoms (how much distress does it cause you)?  
   *Cross one number.*

<table>
<thead>
<tr>
<th></th>
<th>0 No distress</th>
<th>1 Mild distress</th>
<th>2 Moderate distress</th>
<th>3 Severe distress</th>
<th>4 Very severe distress</th>
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</table>
**Section C  Liebowitz Social Anxiety Scale**

Read each situation carefully and answer two questions about that situation. The first question asks how anxious or fearful you feel in the situation. The second question asks how often you avoid the situation. If you come across a situation that you ordinarily do not experience, we ask that you imagine “what if you were faced with that situation”, and then rate the degree to which you would fear this hypothetical situation and how often you would tend to avoid it. Please base your ratings on the way that the situations have affected you in the last week.

<table>
<thead>
<tr>
<th>Fear or anxiety:</th>
<th>0 = None</th>
<th>1 = Mild</th>
<th>2 = Moderate</th>
<th>3 = Severe</th>
<th>Avoidance:</th>
<th>0 = Never (0%)</th>
<th>1 = Occasionally (1-33%)</th>
<th>2 = Often (33-67%)</th>
<th>3 = Usually (67-100%)</th>
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<tbody>
<tr>
<td>1. Telephoning in public</td>
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<td>2. Participating in small groups</td>
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<td>3. Eating in public places</td>
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<td>4. Drinking with others in public places</td>
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<td>5. Talking to people in authority</td>
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<td>6. Acting, performing or giving a talk in front of an audience</td>
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<td>7. Going to a party</td>
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<td>8. Working while being observed</td>
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<td>9. Writing while being observed</td>
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<td>10. Calling someone you don’t know very well</td>
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<td>11. Talking with people you don’t know very well</td>
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<td>12. Meeting strangers</td>
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<td>13. Urinating in a public bathroom</td>
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<td>14. Entering a room when others are already seated</td>
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<td>15. Being the centre of attention</td>
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<td>16. Speaking up at a meeting</td>
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<td>17. Taking a test</td>
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<td>18. Expressing a disagreement or disapproval to people you don’t know very well</td>
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<td>19. Looking at people you don’t know very well in the eyes</td>
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<td>20. Giving a report to a group</td>
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<td>21. Trying to pick up someone</td>
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<td>22. Returning goods to a store</td>
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<td>23. Giving a party</td>
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<td>24. Resisting a high pressure salesperson</td>
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</table>
# Section D  Carver-White BIS/BAS Scales

*Please rate how much you agree or disagree with the following statements.*

**KEY:**

<table>
<thead>
<tr>
<th>1 – Strongly disagree</th>
<th>2 – Disagree</th>
<th>3 – Agree</th>
<th>4 – Strongly agree</th>
</tr>
</thead>
</table>

1. If I think something unpleasant is going to happen I usually get pretty "worked up"

2. When good things happen to me, it affects me strongly

3. I worry about making mistakes

4. When I want something, I usually go all-out to get it

5. I'm always willing to try something new if I think it will be fun

6. Criticism or scolding hurts me quite a bit

7. When I'm doing well at something, I love to keep at it

8. When I see an opportunity for something I like, I get excited right away

9. I feel pretty worried or upset when I think or know somebody is angry at me

10. If I see a chance to get something I want, I move on it right away

11. I often act on the spur of the moment

12. Even if something bad is about to happen to me, I rarely experience fear or nervousness

13. I will often do things for no other reason than that they might be fun

14. I go out of my way to get things I want

15. I feel worried when I think I have done poorly at something

16. I crave excitement and new sensations

17. When I get something I want, I feel excited and energised

18. I have very few fears compared to my friends

19. When I go after something I use a "no holds barred" approach

20. It would excite me to win a contest
Section E  Emotion Regulation Questionnaire

We would like to ask you some questions about your emotional life; in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways.

**KEY:**

<table>
<thead>
<tr>
<th>1 Strongly disagree</th>
<th>2</th>
<th>3</th>
<th>4 Neutral</th>
<th>5</th>
<th>6</th>
<th>7 Strongly agree</th>
</tr>
</thead>
</table>

1. When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about

2. I keep my emotions to myself

3. When I want to feel less negative emotion (such as sadness or anger), I change what I’m thinking about

4. When I am feeling positive emotions, I am careful not to express them

5. When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm

6. I control my emotions by not expressing them

7. When I want to feel more positive emotion, I change the way I’m thinking about the situation

8. I control my emotions by changing the way I think about the situation I’m in

9. When I am feeling negative emotions, I make sure not to express them

10. When I want to feel less negative emotion, change the way I’m thinking about the situation
# Section F  Major Depression Inventory

The following questions ask about how you have been feeling over the last two weeks. Please put a tick in the box which is closest to how you have been feeling.

**KEY:**

<table>
<thead>
<tr>
<th>1 – All the time</th>
<th>2 – Most of the time</th>
<th>3 – Slightly more than half the time</th>
<th>4 – Slightly less than half the time</th>
<th>5 – Some of the time</th>
<th>6 – At no time</th>
</tr>
</thead>
</table>

1. Have you felt low in spirits or sad?  
2. Have you lost interest in your daily activities?  
3. Have you felt lacking in energy and strength?  
4. Have you felt less self-confident?  
5. Have you had a bad conscience or feelings of guilt?  
6. Have you felt that life wasn’t worth living?  
7. Have you had difficulty in concentrating, e.g. when reading the newspaper or watching television?  
8a. Have you felt very restless?  
8b. Have you felt subdued or slowed down?  
9. Have you had trouble sleeping at night?  
10a. Have you suffered from reduced appetite?  
10b. Have you suffered from increased appetite?
Section G  State Anxiety and Mood Induction

1. Please indicate your current level of anxiety by placing a cross where appropriate on the scale below.

<table>
<thead>
<tr>
<th>Not at all anxious</th>
<th>Extremely anxious</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all distressed</td>
<td>Extremely distressed</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all tense</td>
<td>Extremely tense</td>
</tr>
</tbody>
</table>

2. Please list three events that have made you feel anxious over the past year.

Event 1........................................................................................................................................
Event 2........................................................................................................................................
Event 3........................................................................................................................................

3. Now please describe each event in as much detail as you can, including what led up to the situation, what occurred, how you felt about it, and the outcome.

Event 1........................................................................................................................................
Event 2........................................................................................................................................
Event 3........................................................................................................................................

4. For each event, please indicate how anxious it made you feel.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very mild anxiety</td>
<td>Moderate level of anxiety</td>
<td>Very severe anxiety</td>
<td></td>
<td></td>
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</tbody>
</table>
5. Decide which event makes you feel most anxious when you think about it right now.

I am going to ask you to think about that event carefully for the next four minutes. Try to re-experience the memory you’ve retrieved as vividly as you can. Imagine the situation as clearly as possible. Picture the surroundings; see the people or the objects; hear the sounds; experience the events happening to you. Let yourself think the thoughts that you had in that situation. Let yourself feel the tension entering your body. Try to concentrate on the anxious feelings and to get into the mood as much as possible.

Allow four minutes to pass

6. Now please indicate your current level of anxiety by placing a cross where appropriate on the scale below.

Not at all anxious  |  Extremely anxious

Not at all distressed  |  Extremely distressed

Not at all tense  |  Extremely tense