Memory for the future: Implications of implicit cognitions in depression.

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Memory for the Future

Implications of Implicit Cognitions in Depression

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Summary

A consistent feature of clinical depression emphasised in several theories is a pessimistic view of one's personal future. The literature divides future cognitions into positive versus negative with reduced positive future cognitions linked to depression and suicidal ideation. This reduction in future cognitions has been linked to impaired autobiographical memory and emotional avoidance. Specifically, a lack of willingness to access personal past experiences influences future cognitions and subsequently future behaviour. Attempted avoidance of painful past events can generalise to reduced contact with all past experiences, positive and negative. The current thesis had three main aims. First, it aimed to determine the differences, or as the emerging literature suggests, the similarities, in thinking about the future and the past in sub clinically depressed versus non-depressed individuals. Implicit future cognitions and past experiences were related to emotional avoidance in a sub clinical sample. The second aim of the current work was to offer an alternative to the use of self report measures in the future and past thinking literature. To that end, a robust and accurate implicit measure of positive future expectations in depression was tested in a sub clinical sample. This implicit methodology proved a better indicator of depression and hopelessness when compared to widely used explicit methodologies. Finally, the thesis aimed to provide analogue evidence of techniques for the remediation of pessimistic thinking as is characteristic in depression, namely mindfulness and values clarification. Mindfulness and values clarification were demonstrated to be useful techniques in the remediation of pessimistic cognitions with increased acceptance of re- or pre-living personally relevant negative experiences allowing for greater psychological flexibility. Taken together the experimental series reported herein suggests that implicit positive cognitions about the past and future are related to sub clinical depression. Additionally, mindfulness- and values-based skills can moderate the link between past and future cognitions and sub clinical depression.

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'*The future influences the present just as much as the past.*' Nietzsche (1844-1900).

Conference Presentations

Kosnes, L. & McHugh, L. (2010). *Willingness and specificity in future expectations and recall following a focused breathing intervention.* International Association for Behaviour Analysis. Austin, Texas, US, May 2010.

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Kosnes, L., McHugh, L. Saunders, J. & Whelan, R. (2009*). Autobiographical memory and future expectations in a sub-clinically depressed population using the IRAP.*ACBS World Conference, Encschede, Netherlands, 2009.

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Kosnes, L., McHugh, L. Saunders, J. & Whelan, R (2008). *Phenomenological Characteristics in Autobiographical memories and Implicit Future Expectations.* Madrid, Spain, 2008.

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RFT Methods Applied to Clinical & Health Psychological Issues. International Association for Behaviour Analysis, Phoenix, US, 2009.

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Chapter 1

Memory for the Future: the Valence of Past and Future Cognitions in Depression

1.1 General Introduction

Thinking about the future plays a vital role in many aspects of people's lives, and we frequently act in accordance with future anticipations evaluated in relation to their positive or negative outcomes. Research in the area of thinking about ones future has gained increased interest in the last decade due to its link with conditions such as depression and anxiety (MacLeod, Pankhania, Lee, & Mitchell, 1997; MacLeod, Rose, & Williams, 1993). Thinking about, and planning for, the future has been referred to as *'perhaps one of the most fascinating features of the human mind'* (Szpunar, 2010, p.1; see also Buckner & Carroll, 2007; Hesslow, 2002; Ingvar, 1979, 1985; Schacter, Addis, & Buckner, 2008). Although, arguably other organisms can abstract and record survival-oriented patterns of information, in order to guide subsequent behaviour (e.g., food here, predators there), future expectancy in the human world extends beyond the survival value with the ability to generate vivid simulations of environments and situations that have never before existed. Thus, expectancies for the future serve to coordinate ongoing behaviour (Suddendorf & Corballis, 1997).

Wheeler, Stuss and Tulving (1997) looked at the ability to re-experience past events through autobiographical memories as concurrent to the ability to pre-experience the future and coined this 'mental time travel'. Accordingly, expectancy has been noted as a special case of mental time travel capability, inherent in episodic memory and episodic future thinking (Tulving, 2005). In short, effective future action can be drawn from information based on our previous experience. Thus, expectancy can be viewed as where past and future meet to steer present behaviour. By anticipating future fortune or adversity, that is, by constructing a 'cognitive map' that informs methods of attainment and avoidance, humans inherently stand in good stead to prosper in achieving their goals (Bandura, 1986; Higgins, 2000; Rotter, 1954; Tolman, 1932). And as such the ability to 'travel in time' is of great benefit to humans, although, intrinsic to the perception of future failure and sadness, this ability can also have negative consequences. The last three years in particular have seen improved awareness of these phenomena in clinical settings, and there is increasing evidence pertaining to a link between deficits in memory and future expectancy with psychological disorders such as depression and suicidal ideation (e.g., Williams & Broadbent, 1986; Williams, 1996; Williams, Barnhofer, Crane, Hermans, Raes, Watkins, et al., 2007). With the link between past and future experiences singled out as one of the scientific breakthroughs of 2007, in reference to studies by Schacter, Addis and colleagues (e.g., Schacter, Addis, & Buckner, 2007; Addis, Wong, & Schacter, 2007).

The future can be perceived as positive and negative, and such a balanced approach has an inherently functional advantage which has served humans well as a survival value by motivating future behaviour as well as presenting warnings about negative outcomes following continued dysfunctional behavioural approaches. However, a shift in the balance of personal future perception, as entirely positive or negative is less functional, and equally less psychologically healthy. As such it has been proposed that the ratio of positive to negative cognition may be essential in evaluations of psychological dysfunction (Schwartz & Garamoni, 1989). In this regard it has been suggested that an uneven balance, of slightly more positive than negative cognitions, holds the most advantageous function in coping with stressful events (Schwartz & Garamoni, 1986). That is, an increased negative outlook is linked to depression, and when asked about their expectancy in regards to the likely outcome of a series of future events, moderately depressed undergraduate students were found to predict that negative events were more likely and that positive events were less likely to happen relative to non-depressed individuals (Andersen, 1990; Andersen, Spielman, & Bargh, 1992). Additionally, individuals are more likely to become depressed if the occurrences of negative events are believed to reflect general personal incompetence and insignificance (Abramson, Metalsky, & Alloy, 1989). Depression in turn, is a debilitating psychological disorder, with serious implications in terms of human suffering, lost productivity, and even loss of life (Wells & Sherbourne, 1999; Wulsin, Vaillant, & Wells, 1999).

As such, another uniquely human behaviour linked to future thinking, in regards to a pessimistic future outlook, is suicide. In fact, every 40 seconds someone ends their own life, constituting mortality rates of one million people every year, or 16 per 100,000 worldwide (WHO, 2009). These numbers, however, do *not include* the number of people who attempt suicide and live, or those with suicidal ideation. In fact, two thirds of those who commit suicide have made at least one prior attempt to end their life (e.g., Appleby, Shaw, Amos, et al., 1999; Isometsa & Lonnqvist, 1998). With recent reports uncovering a substantial increase in suicide rates among young people, between the ages of 15 to 24. In fact young people have now become the group at highest risk in most countries, whereas traditionally, it was found that elderly males held the highest suicide rates (WHO, 2009). Suicide in itself has been referred to as an extreme form of experiential avoidance (Baumeister, 1990; Chiles & Strosahl, 2005); that is, such avoidance may be the ultimate escape from psychological pain. Baumeister (1990) found that suicide notes commonly refer to emotional escape as the desired function of suicides and thus '*suicide can be seen as an ultimate step in the effort to escape from self*' (p. 90). Similarly this pattern is found in reports from non-fatal self-injury, for instance, self-harming college students reported using emotionally avoidant coping styles more often relative to students who do not self-harm (Andover, 2006). In their study Chapman, Gratz & Brown (2006) present direct evidence that self-harm correlates with experiential avoidance, as such it may be that experiential avoidance doesn't just give rise to psychological problems, which may lead to suicidal ideation and ultimately suicide, these cognitions and the subsequent behaviour may be the ultimate expression of an avoidant coping strategy.

Future cognition has been noted as an important factor in understanding suicidality (e.g., Abramson et al., 1989; O'Connor, Fraser, Whyte, MacHale, & Masterson, 2008; MacLeod, Pankhania, Lee, & Mitchell, 1997). Although a lack of positive future thinking is significantly related to suicide risk, negative expectations about the future are not independently associated with suicidality (MacLeod et al., 1997; O'Connor, Connery, & Cheyne, 2000; O'Connor, O'Connor, O'Connor, Smallwood, & Miles, 2004). Indeed, recent studies have suggested that clinically depressed individuals are distinguished from non-depressed individuals more specifically by a propensity to reduced expectations of positive events occurring (Andersen & Limpert, 2001; MacLeod

& Salaminiou, 2001). With long term follow-up studies noting reduced levels of hopelessness as related to the occurrence of positive life events in undergraduates who have a stable, global attributional style (Needles & Abramson, 1990).This is consistent with the hopelessness model of depression - by way of individuals believing that valued outcomes will not to occur, and that one is helpless to alter those outcomes (Abramson et al., 1989). In this regard, positive future cognitions have been found to play an important role in the experience of, and recovery from, psychological disorders (MacLeod & Moore, 2000). With hopelessness and depression more strongly related to positive future thinking relative to negative future thinking (MacLeod, Tata, Tyler, Schmidt, Davidson, & Thompson, 2005), suicidal behaviour has been conceptualised as an inability to generate positive future expectations (MacLeod, Tata, Evans, Tyler, Schmidt, Davidson, Thornton, & Catalan, 1998; MacLeod et al.,1997; MacLeod, Rose, Williams, 1993; Hunter & O'Connor, 2003; O'Connor, Whyte, Fraser, Masterton, Miles, MacHale, 2007; O'Connor et al., 2004; O'Connor et al., 2000).

The 'Cry of Pain' model describes suicidal behaviour as a reaction to a given context where the individual's perception of the experience is one of defeat, no escape and no release (Williams, 2001; Williams, Crane, Barnhofer, & Duggan, 2005; O'Connor, 2003). With reduced positive future expectancies linked to the perceived lack of potential 'rescue' from the current situation. Thus, producing a spiraling effect of feelings of entrapment, with the experiences perceived as unpreventable, subsequently increasing the risk of suicidal ideation. O'Connor and colleagues (e.g., O'Connor, Fraser, Whyte, & MacHale, 2008) have argued that positive future thought, for example, of enjoyable and meaningful events, would serve to 'rescue' suicidal individuals from such despair. Carver and Scheier, in their self-regulation model (e.g., Carver & Scheier, 1998), further describe the ability to generate and engage with future expectations as analogous to recognition, following and attainment of personal goals and values. These findings led to the premise that positive future thinking predicts the degree of hopelessness. Though it has been argued that unlike hopelessness, positive future thinking provides more practical options for intervention and treatment planning, as it suggests a specific cognitive-behavioral mechanism in which to tailor a clinical intervention (O'Connor et al., 2008).

The current thesis aims to examine the link between thoughts about the past / expectancies for the future and depressive cognition. Chapter 1 will provide a background on a number of areas in order to facilitate an understanding of the empirical Chapters 2-7. In what follows the reader will be presented with sections on i). Depression; ii). Theories of depression; iii). Typically employed assessment and measurements of depression; iv). Research in the area of autobiographical memories and future expectancies; and v). Novel methods of assessing future expectancies. First, consideration will be given to the aetiology and detection of depression.

1.2 Depression

Depression has been documented as persistent in its course and disabling in its form, with the intensity of functional and psychosocial impairment greater than that associated with chronic illnesses such as diabetes and arthritis (Hays, Wells, Sherbourne, Rogers, & Spritzer, 1995). The significance of depression is evidenced by World Health Organization data which found the illness to have affected about 121 million people worldwide in 2004, with numbers increasing each year (WHO, 2004). As early as the 1970's, the noticeable prevalence of clinical depression led to it being referred to as the 'common cold' of psychiatry (Seligman, 1975). Decade's later prevalence rates for depression continue to remain high, with depression emerging as the leading overall diagnosed illness (Henderson, Andrews, & Hall, 2000). Depression has been reported as chronic in 10-25% of sufferers and a major source of disability in normal life and at work (Tylee, Gastpar, Lepine & Mendlewicz, 1999). The level of impairment has been found to increase as a function of the severity of depression (Lepine, Gastpar, Mendlewicz, & Tylee, 1997), and although it is predicted that 60-80% of sufferers of depression can be effectively treated (WHO, 2004), it is anticipated that less than 50% of individuals seek treatment (Andrews, Hall, Teesson, & Henderson, 1999). The World Health

Organization (2009) measures the degree of disability associated with mental or physical illness with reference to a measure of disability-adjusted-life-years (DALY). The DALY offers a way to make comparisons between illnesses, with one year of life lost to disability or mortality equaling one DALY. With recent comparisons seeing depression as accounting for 13 percent of DALYs lost, relative to all diseases worldwide (WHO, 2004). Depression rates are forecast to be second only to ischaemic heart disease (coronary artery disease or CAD) as the most affected disease by 2020 (as measured by DALY) (WHO, 2004). Despite this morbidity, and the number of studies demonstrating the significant proportion of the population currently affected by depression, the disorder commonly goes un-recognised in clinical practice (Andrews et al., 1999). And it has been estimated that two-thirds of those who do seek treatment remain undiagnosed in primary care settings (Ani, Bazargan, Hindman, Bell, Farooq, Akhanjee, Yemofio, Bakerl, & Rodriguez, 2008). This suggestion is supported by a recent study which found that general practitioners only accurately diagnosed about 50% of presenting patients with depression (Kroenke, 2010).

1.2.1 *The Complexity of Symptomatology*

One of the complexities involved in understanding the individuals that make up the group of un-recognised depression sufferers pertains to the multifaceted symptomology of depression. Symptoms of depression are complex in that manifestations and grouping of symptoms can be inconsistent, interconnected and often nondescript (Hunt, Auriemma, & Cashaw, 2003). Classification systems, such as the Diagnostic and Statistical Manual of Mental Disorders-IV-TR (APA, 2000) and the International Disease Classification System 10 (ICD-10; WHO, 2007), have listed a criteria of symptoms that must be presenting in order to determine a diagnosis of depression, with somatic symptoms relatively well recognized in depression (Beck, 1967; Tylee, Gastpar, Lepine, & Mendlewicz, 1999; Wilhelm, Parker, & Hadzi-Pavlovic, 1997). In a study by Tylee and colleagues (1999) over 76% of participants reported a lack of feeling, sadness and low mood. Furthermore, 59% reported becoming increasingly emotional with a desire to cry a lot. However, the current classification systems do not strive to identify the individual experience of depression.

Depressed individuals often find it difficult to enjoy, or to be interested in, normal activities (Beck, 1967), with optimism about the future somewhat affected (Outram, Murphy, & Cockburn, 2004). Energy is often reported as low and concurs with reports of tiredness and a general lack of interest (Tylee et al., 1999). The experience of such symptoms often results in behavioural withdrawal, refraining from engagement with normally followed activities. Spiraling from such withdrawal stems feelings of anxiousness and fear, with some individuals thoroughly incapacitated by such emotional experiences (Beck, 1967). In this regard, previously pleasurable events and daily tasks often become perceived as unattainable, due to a lack of attentiveness and fluency in thought processes, with such cognitions commonly accompanied by a preoccupation with thoughts about personal pain and a lack of solutions to anticipated events (Abramson et al., 1989).

Sleep patterns are commonly noted as altered in depressed individuals, with a variety of insomnias recognized. Indeed it has been suggested that a lack of sleep and an upset sleep pattern occur in the majority (around 63%) of cases presenting with depression (Berio, D'Ilario, Ruffo, Di Virgilio, & Rizzo, 2000). Appetite is usually affected, often appetite declines, though some individuals report an increased appetite, with cravings for specific food types (Beck, 1967). Subsequently, general health is affected, as well as the ability to adhere to regular life activities, with romantic and personal friendships frequently noted as strenuous and subsequently afflicted (Tylee et al., 1999).

As has been noted, when an individual becomes clinically depressed, they are prone to feelings of sadness and tearfulness (Beck, 1967), other recognised behaviours are irritability, anxiety and tension, as well as feelings of guilt and beliefs about letting others down (Fennell, 1993). A negative self-image (Derry & Kuiper, 1981), with overgeneralised negative evaluations pertaining to personal worth, worry or ruminations over past failings is commonly denoted in depressive samples (Beck, 1967). It has been suggested that there are specific factors that increase people's risk for developing repeated episodes of depression, although no set factors have been isolated, with risk factors for depression appearing to be multifaceted and co-dependent across social, biological and psychological domains (Street, Sheeran, & Orbell, 1999). In light of the high recurrence of depressive symptoms, with more than 75% of depressed patients experiencing more than one depressive episode, (Boland & Keller 2009), the personal, social and economic impact of depression holds extensive long-term consequences (McNair, Highet, Hickie, & Davenport, 2002).

1.3 Theories of Depression

It is common in psychology, as in everyday conversation, to separate actions into three categories, namely, behaviour, cognition, and emotion. From this perspective, behaviour typically refers to observable acts, usually defined by their form or topography (e.g., Gray, 1999). Cognition is regularly referred to as activities of the mind, or unobservable mental processes (e.g., Ellis & Hunt, 1993), and often indicated as a likely cause of behaviour. Whereas emotions are typically defined as bodily or affective states (e.g., Ellis, Ottoway, Varner, Becker, & Moore, 1997), and are as such often understood as the feelings associated with cognition and behaviour (Gray, 1999). Cognition and emotion has generally been referred to in the depression literature more often than behaviour *per se.* That is, the prevailing line of depression research, that is, cognitive theories of depression, view individual suffering as dominated by representations of self-referential information involving themes of loss, failure, worthlessness, rejection and hopelessness (Abramson et al., 1989; Beck, 1967; Ingram, Miranda, & Segal, 1998). This overemphasis on emotions is recurrently referred to as the reason for, or the motivation behind thoughts and actions. This concept of depression has arguably been seen as deficient in its own regard (Skinner, 1974) and a resurgence of behaviour analytic theories of depression have more recently emerged, proposing a functional approach in accounting for depression (e.g., Zettle, 2004; Zettle & Hayes, 2002). However, over the past few decades the most widely researched theories of depression have come from the cognitive literature. Therefore, in the section that follows the reader will firstly be provided with a background to cognitive theories of depression.

1.3.1. *Cognitive Theories*

There is a long history of research investigating the interaction of cognition and emotion in depression, with a focus on cognitive processes and on the content of depressive cognition (e.g., Beck, 1967; Seligman, 1975; Abramson, Metalsky, & Alloy, 1989). This line of research has described symptoms of depression in terms of negative views of the self, the world, and the future, with recognition of attention and memory as playing a key role in the increased vulnerability for the first onset and the recurrence of depression. Thus cognitive theories of depression regard increased risk for the development and recurrence of depressive episodes as pertaining to people's thoughts, expectancies, attitudes, and interpretations as well as the way in which they attend to and recall events (e.g., Ingram, Miranda, & Segal, 1998; Weinstein, 1983).

Within cognitive theories of depression the role of negative inferential styles has been highlighted, with regards to dysfunctional beliefs, rumination, and information-processing biases as vulnerabilities to depression (Alloy, Abramson, Walshaw, & Neeren, 2006). According to this view, individuals, who attribute negative life events to enduring and general causes, and catastrophize about the consequences of such events, may be more likely to experience depression than those who do not adopt these negative cognitive processes (Abramson, Metalsky, & Alloy, 1989). Based on early attempts by Seligman (1975), to map the behavioural scope of learned helplessness in animals, the proposal that learned helplessness plays a causal role in human depression arose. It was suggested that deficiencies in the relations made between the outcome of events and behaviour preceding such events, consequently shaped behaviour. That is, by following self-instructed rules such as 'no matter how hard I try, I will never be able to [reward or punishment]'. Thus it was proposed that the lack of adequately established relations between behaviour and outcome is subsequently ensued by decreased behaviour, motivation and ability to learn. However, these models faced criticism for not accounting for cognition. In a revision of Seligman's (1974, 1975) work, Abramson, Seligman and Teasdale (1978) reformulated the helplessness model with reference to consequences of the *belief* that a lack of success is due to personal stable and internal factors (i.e. a lack of ability). Such a belief is necessarily generalized beyond the immediate task, and is viewed by the individual as important in regards to the causality of their current and future situations.

The hopelessness theory of depression, proposed by Abramson, Metalsky and Alloy (1989) further extends on Seligman's work on learned helplessness and attribution styles (Seligman, 1975; Seligman, Abramson, Semmel, & von Baeyer, 1979) by suggesting that when confronted with a negative event, people who are pessimistic in their outlook (i.e. someone who attributes negative experiences as a trait characteristic pertaining to themselves) are vulnerable to ongoing depression as they assume that a negative event in the present will consequently be followed by other negative events, *and* interpret such incidents of negative experiences in regards to personal attributes of being fundamentally flawed or worthless (Abramson et al., 1989). Thus, depressed individuals appear to have dysfunctional attitudes about themselves that influence their perception of events, processing of information, and which extends to interpretations of past *and* future experiences (Beck, 1967).

One of the most influential models of depression comes from Beck and colleagues, who have focused on how thoughts influence mood, which in turn leads to an influence on behaviour (Beck, Rush, Shaw, & Emery, 1979). In Becks' model, depressed individuals are described as holding negative thoughts about the self, the environment, and the future. Beck and colleagues labelled these negative thoughts as 'automatic', in the sense that they may arise without warning. This conceptualisation of depression further proposes that depressed individuals not only lack motivation, but are resistant to any attempts at activation (e.g., Young, Beck, & Weinberger, 1993), with these behaviours manifested in a lack of willingness to engage with the world around them. Thus, Beck and colleagues were among the first to conceptualize depression by taking into account both cognitive and behavioural factors.

Following on from the view that certain cognitions, emotions and bodily states cause deficient behavioural outcomes, it was suggested that in order to improve behavioural consequences, these causes must be eliminated, or at least reduced. Subsequently, the treatment targets for Cognitive Behavioural Therapy (CBT), one of the main treatment packages to derive from these theories of depression, have been to alter depressive thoughts in order to change mood and subsequently behaviour, with the view to encourage increased engagement with affable activities (e.g., behavioural activation).

1.3.2 *Behavioural Theories*

While research on depression has exceeded investigation on virtually every other disorder by psychiatry and cognitive researchers, the behaviour analytic writings on clinical depression have been relatively light in comparison (e.g., Dougher & Hackbert, 1994; 2000; Ferster, 1973; Lewinsohn, 1974; see Eifert, Beach, & Wilson, 1998). Skinner paid little attention to depression in his writings; and in his brief dealings with the issue, he emphasized overt (i.e., observed by others) behaviour rather than the emotional experiences involved. As such when Skinner (1953) spoke of depression he did so by referring to the term "depression" in quotes, to avoid giving the term any special status other than that of a verbal description. Skinner described depression as an "emotional condition," and did not elaborate on this point; instead the focus was on reductions in overt behaviour. Skinner highlighted the centrality of reduced positive reinforcement (i.e. the provision of a consequence found to be rewarding in order to encourage and maintain behaviour) in depression. That is, that social behaviour depends on a reinforcing environment and as such behaviour may become reduced due to a change in the environment or pertaining to a lack of reinforcement overall to the produced behaviour. This postulate of reinforcement contingent behaviour underpins a theory brought forth by Lewinsohn (1974), which subsequently dominated the behavioural literature for several decades. That is to say, Lewinsohn and colleagues proposed that depression, to a greater extent, could be accounted for *just* by examining positive reinforcers. In their view depression was regarded as a low rate of response-contingent positive reinforcement (RCPR). The focus for Lewinsohn, in line with Skinners earlier proposal, was on the behavioural reductions often seen in depression. This suggestion was supported by subsequent evidence from studies where a relationship between rates of positive reinforcement and depression intensity was observed (e.g., Lewinsohn & Libet, 1972). However, Lazarus and colleagues took note of previous work by Skinner, who had suggested that depression may be an emotional response to aversive rule following, especially aversive social control (1953, pp. 360-363), and they proposed that depression could be accounted for by a loss of reinforcers, or by a decrease in the effectiveness of reinforcers (e.g., Costello & Lazarus, 1972). A similar description was proposed by Ferster (1973), who, in a more functional behaviour analytic account of depression, characterised depression as potentially resulting from both a loss of positively reinforcing behaviour as well as an increase in avoidance and escape behaviours. It has been suggested in this regard that the emotional experience of depression is a product of increased aversive control (e.g., withdrawal from society in an effort to remove oneself from any negative experiences) as well as reduced appetitive control (e.g., helplessness in the face of own behaviour contributing to a positive outcome) (Kanter, Busch, Weeks, & Landes, 2008).

Thus throughout the conceptualisation phase the behavioural view has retained a focus on the role of individual learning histories in regards to factors that may contribute to the onset of depression (e.g., changes in reinforcer availability or influence), as well as the factors that may contribute to its maintenance (e.g., avoidance and escape behaviours).

1.3.3 *The Role of Verbal Behaviour in Depression*

Traditional behavioural theories of depression did not attribute a strong role for language in its development. Though, over the past few decades, cognitive researchers have maintained the belief that cognition holds a causal role in depression, a notion supported by the considerable line of research confirming the presence of negative cognitive content during depressive episodes (Clark, Beck, & Alford, 1999). However, the aim to *ascertain* negative cognitive biases as autonomous features of depression has not been successful (Ingram, Miranda, & Segal, 1998), although it is apparent that cognitions affect behaviour on a moment-to-moment basis (Kanter et al., 2008). From a behaviour analytic point of view, the thinking-feeling relations put forward by cognitive models of depression are essentially behaviour-behaviour relations (Hayes & Brownstein, 1986). Thus behaviour analysts have attempted to model the environmental conditions responsible for such relations (Kanter, 2008).

Stimulus equivalence is an empirically demonstrable phenomenon in which, by training a series of unidirectional relations between arbitrary stimuli, a number of untrained or derived relations emerge in an overall pattern according to which the stimuli seem subsequently to be treated as mutually substitutable or equivalent (Sidman, Kirk, & Wilson-Morris, 1985; Sidman, 1994). Equivalence has been extensively looked at within behaviour analysis and is generally trained and tested by means of conditional discriminations / match-to-sample (MTS) procedures. Associated with stimulus equivalence is an effect known as transfer of function. Of particular interest is the psychological function documented following the formation of an equivalence relation, that is, even without precise instruction the function of a relation established for one member of an equivalence class may transfer to other members of that class.

A diverse range of behavioural functions have now demonstrated susceptibility to transfer of functions, such as avoidant responses, preferences, self discrimination and moods with others (see Dymond & Rehfeldt, 2000 for a review). An example of particular relevance to the current research comes from Auguston and Dougher (1997), who demonstrated the transfer of avoidance functions through equivalence. Participants were first trained in two-four member equivalence relations. Next they were exposed to a conditioning procedure in which shock was paired with one member of one relation only. Participants were then trained in a differential signaled avoidance task during which they learned to avoid shock by making a particular response in the presence of the conditioned shock stimulus. Finally, it was demonstrated that participants also displayed the avoidance response in the presence of stimuli equivalent to the conditioned shock stimulus, but not to stimuli in the other equivalence relation.

Early behavioural theories have perhaps been limited in the lack of accounting for language and/or cognition *per se*. As has been clearly presented in the cognitive literature, and particularly in light of depression, cognitions (such as future expectancies) are important. In this regard, promise may lie in a in a relatively new behavioural account of language and cognition, that expands on the equivalence literature to account for human language and cognition from a behavioural perspective, namely Relational Frame Theory (RFT) (Hayes, Barnes-Holmes, & Roche, 2001). RFT extends the equivalence findings and further lends these to verbal behaviour (including thinking) which is seen as the behaviour of framing events relationally, that is, responding to one stimulus in terms of its given or *inferred* relation to other stimuli.

1.3.4 *Relational Frame Theory (RFT)*

From the Relational Frame Theory perspective equivalence is just one of many types of relations (Barnes-Holmes & Barnes-Holmes, 2000). That is, in exploration of the phenomena of derived relational responding RFT research has demonstrated such responding in accordance with various derived relations such as relations of *sameness*, *opposition*, and *difference* (Roche & Barnes, 1996, 1997; Steele & Hayes, 1991; Whelan & Barnes-Holmes, 2004), *more than* and *less than* (Dymond & Barnes, 1995; O'Hora, Roche, Barnes-Holmes, & Smeets, 2002; Whelan, Barnes-Holmes, & Dymond, 2006), and *before* and *after* (O'Hora, Barnes-Holmes, Roche, & Smeets, 2004; see also Barnes & Roche, 1996; Hayes & Barnes, 1997). There is thus accumulating evidence supporting the view that, similar to the transfer of function seen with equivalence relations, other prevalent relations may also facilitate this transformation of functions (for a review, see Dymond & Rehfeldt, 2001).

According to RFT automatic negative thoughts may augment depressed feelings due to the ability to construct arbitrary relations in language, and that it is this capacity which renders human psychological suffering so common (Hayes et al., 2001). That is, words and thoughts alone are able to evoke feelings which subsequently may determine behaviour. For instance, in the context of future cognition, if a student worries about failing their degree course, the very word 'exam', or the thought of sitting an exam, may evoke related thoughts and feelings of anxiety and fear, as though the person was actually sitting the exam or had truly failed the exam. These relations can even trigger physical reactions linked to anxiety and depression. In the given example, paired with negative thoughts of 'not being able' or 'not being good enough' these relations may avert individuals from revising for exams, as they are having the thought that they are likely to fail anyway – such hopeless ideation thus inhibits behaviour and may contribute to further depression, or even instigate frames of cognition related to suicidal ideation. RFT refers to this potentially pathological pattern of behaviour in regards to the effects observed with transfer of functions (Hayes et al., 2001). For example, hearing someone talking about a relationship break-up, or about a recent bereavement, can quite understandably be painful for someone who has just experienced something similar. The person is only exposed to words, but the words evoke automatic (or related) thoughts and feelings, as though a real loss were *here* and *now,* in the present. Interestingly, equivalent automatic thoughts may be evoked by the same person hearing about someone's successful relationships, i.e. hearing that someone is getting married may equally bring to mind thoughts of personal failed relationships - as the relations constructed may occur in the context of frames of opposition as well as frames of equivalence. Skinner (1945) offered the view that transformation of function within language means that humans learn not only to consider emotions in relation to separate events, but also *experience* some of the events as positive and some as negative (Hayes, 1984). As such, having language involves the fact that, when in a given context a positive evaluation is made, the very same event may at a separate point generate a negative evaluation (e.g., the absence of the positive event, i.e. the preceding positively evaluated event is weighed against the current context; see Hayes, Barnes-Holmes, & Roche, 2001; Hayes et al., 1999). With this it can be seen how social interactions facilitate training and strengthening of discriminations amongst private events (Hayes, Barnes-Holmes, & Roche, 2001), and as such how a withdrawal from contexts where one hold the opportunity to receive reinforcement may perpetuate the pathological construct of cognitions.

1.4 Expectancies

From the above discussion (see Sections 1.2, 1.3.1 and 1.3.2) there appears to be some consensus that depression is marked by negative affect, de-motivation, and reduced behavioural activation. With an ensuing deprivation of positive expectancies, especially in relation to events that are perceived as personally important to the individual, or as it has been denoted - an increased negative future outlook, a signature symptom of major depression (e.g. Beck et al., 1979 Abramson et al.,1989). As with emotion and cognition, the perspectives on expectancies by cognitive approaches presume that expectancies (or a lack thereof) are causal of behaviour. However with the advent of RFT, expectancies about the future can be examined from the behavioural analytical perspective as a set of derived rules based on experience, which can affect other behaviour through the transformation of function. For instance, an individual's earlier success on a specific assignment will increase the expected likelihood of future success (Feather, 1966; Feather & Saville, 1967), as well as shape subsequent behaviour in future assignments of a similar fashion. The degree of influence derived from subjective expectancies further aids to direct subsequent behaviour, and may as such be confirmed or disconfirmed by the ensuing experience (Olson, Roese, & Zanna, 1996). The likelihood of expectancies being influenced in this way is reflected by the level of contact with the more general sources of personal beliefs, that is, information derived from past experience, social learning, the media, and so forth. As such, expectancies as derived relations, and the behaviour they may influence, can be observed as products of environmental contingencies, thus the link with the environmental context becomes relevant in research into this phenomenon. Importantly, when existing expectancies are confirmed (i.e. when behaviour is reinforced) their subjective likelihood may increase (i.e. behaviour will increase/decrease).

Thus in the event of such contingencies changing or diminishing, the individual may experience a state of deprivation, which can take shape in different forms of behaviour, e.g. avoidance strategies may initially lead to a lack of awareness of the changes (or deliberate attempts to circumvent these alterations) and as such facilitate increased attempts to regain the reinforcing quality, or a withdrawal from situations that facilitate such reinforcement may be enforced. As such, once the expectancy of access to reinforcers is removed, this may result in depression. As noted above (see Section 1.3.1) it can be argued that future expectancy is a prevalent and recurrent theme within the depression theories. In line with behavioural accounts, of expectancies being formed with a basis in past learning history, the wider literature on expectancies similarly denotes expectancy for future events as rooted in past events (i.e. the recollection or memory of past behaviour) – where individuals make use of past experiences to shape images of potential future events.

With regards to anticipation of future events, increased hopelessness has arguably been suggested to ensue following the development of depressive predictive certainty. That is a *certainty* pertaining to the expectancy that positive future outcomes will not occur and that negative outcomes will occur (Andersen, 1990; Andersen & Lyon, 1987; Andersen, Spielman, & Bargh, 1992). As noted above, this certainty may be developed through an inability to recognise changes in the reinforcing environment. For example, through a lack of awareness of the influence such contingencies may have on the individuals' experiences. With the certainty of the situation inferred from the resulting futile attempts at gaining control over the experience, e.g. by removing oneself from the situation. In this regard it has been proposed that the failure to anticipate positive experiences which prevent depressed individuals from experiencing positive occurrences, may originate in a lack of positive experiences necessitating *some form of* behavioural approach. Jacobsen and colleagues (1996) used exposure to positive and rewarding experiences in an attempt to demonstrate the value of positive experience expectancies (or a lack thereof) in depression. Being able to recognize the extent to which hopeless ideation results from a reduced ability to experience and anticipate pleasure, *or* an inability to bring to mind potentially rewarding situations has clear implications for interventions (e.g., mood enhancement and motivational strategies, mindfulness vs. imagined construction to bring to mind pleasurable situations, values clarification), as well as helping to develop a better understanding of the phenomenon.

1.4.1 *Mental Time Travel*

A recent focus on past experience as an integral part of future thinking has emerged and has contributed to the revival of research into the phenomenon of mental time travel (e.g. Atance & O'Neill, 2001; Schacter & Addis, 2007; Schacter, Addis, & Buckner, 2007, 2008; Suddendorf & Corballis, 2007; Szpunar, 2010). The ability to mentally time travel into the future as a function of the episodic memory system originated with Tulving (1972), who was the first to propose that episodic future thinking reflects the individuals' personal experiences, and as such the anticipation of future episodes is linked to particular autobiographical events in the personal past (Tulving, 1972, 1983). Accordingly, it is this systematic awareness that allows humans to mentally represent and become aware of their existence across time, and with it, the opportunity to hold on to subjective experiences throughout time, a function referred to by Tulving (1985) as 'autonoetic consciousness' (Wheeler, Stuss, & Tulving, 1997). That is, the present moment may be perceived as both an extension of the past and a prelude to our future (Suddendorf & Corballis, 1997; Wheeler, Stuss, & Tulving, 1997; Buckner & Carroll, 2007; Hesslow, 2002; Ingvar, 1979; Schacter, Addis, & Buckner, 2008).

The recent revival of the link between autobiographical past and future experiences has lead to a wide range of research in several areas and evidence is currently available in support of mental time travel from domains such as neuroimaging (Addis, Wong, & Schacter, 2007; Botzung, Denkova, & Manning, 2008; Okuda et al., 2003; Szpunar, Watson, & McDermott, 2007; Buckner & Carroll, 2007; Hassabis & Maguire, 2007; Schacter & Addis, 2007; Spreng, Mar, & Kim, 2009; Schacter & Addis, 2009; Szpunar, Chan, & McDermott, 2009), neuropsychology, clinical psychology

(D'Argembeau, Raffard, & Van der Linden, 2008; Williams et al., 1996), and developmental psychology (Atance & O'Neill, 2005; Busby & Suddendorf, 2005; Addis, Sacchetti, Ally, Budson, & Schacter, 2009). Taken together, the evidence suggests a close relationship between episodic autobiographical memory and episodic future thought.

1.4.1.1 *Autobiographical Memory*

With the content represented in future cognitions arguably linked to retrieval from episodic memory (for a discussion see Hegdé, 2007 and Szpunar, 2010), by way of individuals sampling the contents of personal memories in order to construct novel scenarios conceived to occur in the future (Schacter & Addis, 2007), it is necessary to consider what constitutes autobiographical memory *per se*. 'Autobiographical Memory' is a term that easily corresponds to the daily use of the word memory, and has been defined as 'memory for the events of one's life' (Conway & Rubin, 1993, p. 103). Autobiographical memory includes both personal semantic (i.e., facts about the self, such as knowing where one was born) and episodic information (i.e., single events, such as remembering the first day at university) (cf. Baddeley, 1992 and Brewer, 1996). Tulving (1972; 1983) suggested that the two types of information were segregated in regards to the mental time travel effect, as personal semantic information pertains more to feelings of 'knowing' or of a familiarity with the content, whereas personal episodic information necessitates calling to mind and re-experiencing specific past events (Wheeler, Stuss, & Tulving, 1997), and as such incorporates details from a number of different information sources (e.g., sensory details, verbal content, emotion, etc.) (Rubin, 2006).

Conway and Rubin (1993) note that autobiographical memory '*constitutes a major crossroad in human cognition where considerations relating to the self, emotion, goals, and personal meanings all intersect*' (p. 103). As such, personal past experiences, as suggested by the term autobiographical memory, has been noted as vital in regards to self-knowledge, social-functioning and goals/values following (e.g., Brewer, 1996; Conway & Pleydell-Pearce, 2000; Rubin, Schrauf, & Greenberg, 2003). Recent reviews by Bluck, (2003) and Bluck, Habermas and Rubin (2005) suggest that the wide range of autobiographical memory functions can be compiled into the three categories of self, social, and directive. The self category aids to maintain a consistent sense of self over time which facilitates a focus on personal advancement (see also Conway, 2005). The social category suggestively includes functions such as making verbal content available for conversation and social bonding (cf. Bluck et al. 2005). The directive category, on the other hand, comprises reasoning, problem solving and the direction of future behaviour (Pillemer, 2003). The advantage of being able to make use of information from past experiences becomes apparent when looking at examples in daily life where such strategies are implemented. For instance, following a failed job interview it is useful to obtain information about what went wrong at a subsequent date, so as to readjust future behaviour (Kahneman & Miller, 1986). In personal relationships it may also be useful to understand how certain behaviours led to the end of a romantic encounter (or indeed to appreciate that it was not personal responses that lead to the end of the relationship, but other contextual elements). As such the opportunity to reflect on past events and to construct ideals of future experiences is a unique prospect that allows us to learn from our mistakes (Taylor, Pham, Rivkin, & Armor, 1998; Taylor & Schneider, 1989).

However functional the mental time travel opportunity may be - it may inadvertently instigate behaviours where individuals attempt to generate meaning from past events, or even try to control their level of emotions pertaining to past events by piecing together optional versions of these events (Meyer & Taylor, 1986; Silver, Boon, & Stones, 1983; Taylor, 1983). For instance, following an episode experienced as a failed event, cognitions pertaining to alternate outcomes may arise such as *'I could/should have done X or Y'*. Conflicting information in regards to a person's self-perception and actual behaviour in such situations may lead to negative self evaluations (Meyer & Taylor, 1986). In this light, what offers to be a natural and adaptive experience becomes disordered through aversive elicitation. That is, by considering alternate event outcomes individuals may be searching for a 'better fit' of the past event to coincide with their current perceived sense of self or self-schema. In this regard, focusing on the outcome leads to attempts at 'problem solving', again this constitutes an inherently functional and adaptive approach, however, extensive problem solving, referred to as rumination in the literature, appears to concern worries about past outcomes more often than future outcomes (Papageorgiou & Wells, 2003; Watkins, Moulds & Mackintosh, 2005); and as such is a feature which is noted in depression symptomatology (e.g. Nolen-Hoeksema, 1991). As such depressed individuals markedly are found to ruminate over past events as well as demonstrating a preoccupation with the future, something which has been noted in the negative cognitive triad of depression, along with high rates of co-morbidity between depression and anxiety disorders (Beck, 1967). Individuals who entertain such 'ruling by emotions' and thoughts - relative to the experience in itself, more often represent with depressive symptoms; and it has been proposed that psychological flexibility in this regard, is inhibited by a loss of present moment contact as the individual becomes fused with a verbally-construed past and/or future (Davis & Nolen-Hoeksema, 2000).

1.4.1.1.1 *Depression and Deficits in Autobiographical Memory*

Deficits in autobiographical memory have been linked with depression with reference to a reduced ability to contact details of such past personal experiences, noted as an overgeneral memory approach. Williams and Broadbent (1986) were the first to address the phenomenon of overgeneral memory (OGM) in a sample of suicidal patients. The authors found that those with suicidal ideation were more likely to produce memories that were overgenral in their nature, that is, the retrieved events lacked specificity in details pertaining to the past experiences. Subsequent research has demonstrated that this lack of specificity is commonly denoted in samples with depressed individuals relative to healthy controls (see Williams et al., 2007 for a review). In this regard reduced autobiographical memory specificity (AMS) has been investigated as a risk factor proposed to precede the onset of depression and acting as a mediating factor in the progressive development of depression. Research into the AMS/OGM phenomenon has mainly made use of the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986) in discriminating between high and low levels of specificity in autobiographical recall. The AMT, presents participants with cue words within different valence categories (e.g. positive and negatively affected words such as happy/sad), and respondents are required to produce a specific memory related to the cue word within a given time limit (e.g., 60 seconds). A specific memory is defined as a memory for an event that occurred at a particular time and place and lasted less than one day, that is episodic information (e.g., 'I felt happy on the day of my university graduation'; Williams et al., 2007). In contrast, overgeneral memories include both categoric memories that refer to a class of generic events (e.g., 'I felt happy when I used to go partying with my friends') and extended memories that refer to an event lasting more than one day (e.g., 'I felt happy when I was on holiday last month').

This cue word methodology allows the analysis of the temporal distance of the recalled events, e.g. more proximate versus more distant events, as well as the latencies for recall of positive versus negative past events. More subjective features can also be examined, pertaining to phenomenological characteristics of the recalled experiences, such as affect, valence, vividness, etc (Brewer, 1996). In their seminal study Williams and Broadbent (1986) made use of the AMT in the presentation of 10 cue words, each one which was either a positive or a negative emotion. The study found reduced levels of AMS in response to positive and negative valence categories by the sample of suicide attempters, relative to a non-clinical sample. The phenomenon of overgeneral memory has been observed in many clinical groups and has been noted as of particular interest in the study of mental time travel (e.g., Croll & Bryant, 2000; Mackinger, Loschin, & Leibetseder, 2000; Mackinger, Pachinger, Leibetseter, & Fartacek, 2000; Scott, Stanton, Garland, & Ferrier, 2000; Goddard, Dritschel, & Burton, 1997; Moffitt, Singer, Nelligan, Carlson, & Vyse, 1994; Ramponi, Barnard, & Nimmo-Smith, 2004). However, the reduced AMS phenomenon has not been found to relate to all psychological disorders, rather it appeals more specifically to depression and suicidal ideation. Though, notably, links have been made for AMS and Post Traumatic Stress Disorder (PTSD), as well as acute stress disorder (e.g. Moore & Zoellner, 2007; Williams et al., 2007). Research into autobiographical recall has been facilitated by ratings of phenomenological characteristics pertaining to the past events retrieved (e.g., Johnson, Foley, Suengas, & Raye, 1988; Rubin, Schrauf, & Greenberg, 2003) and by reports of awareness during memory retrieval (e.g., Gardiner, 1988; Tulving, 1985).

In most of the research pertaining to AMS, specific (i.e. episodic) memories have most frequently been analyzed, although some have presented results for overgeneral memories more broadly (e.g., categoric and extended memories). The current thesis may refer interchangeably to either AMS and OGM, and subsequently either the retrieval of fewer specific past experiences or a more overgeneral representation of past events.

1.4.1.1.2 *Emotional Avoidance*

One mechanism proposed to underlie the overgeneral memory effect is that it is functional in regards to offering a strategy for emotional avoidance, that is, remaining at a general level of specificity during autobiographical retrieval allows the individual to circumvent recall of specific, negative and painful details (Williams et al., 2007). That is, continuous attempts to neglect painful past experiences may encourage a diminished effort in the advance to retrieve such past events, i.e. retrieval is not attempted from a bottom up approach but rather fluctuates across a more general level of knowledge pertaining to the past and self. Williams (1996) has referred to this approach as a 'mnemonic interlock'.

Conway and Pleydell-Pearce (2000) further propose that the functionality of reduced memory specificity pertains to personal goals and values. That is, memories which are not directly relevant to current goals will not be as easily accessible as more relevant past experiences. Notably, it is proposed that, irrespective of the past events relevance to present values, if certain past events 'clash' with an individual's current self-perception (e.g. if the memories are unpleasant or aversive), such past experiences will fail to be incorporated into the persons overall self image as held over time. As such it is believed that those presenting overgeneral memories prematurely end their search for a specific memory in an effort to avoid confrontation with the sensory, perceptual, and importantly – the *affective* features of an experience, especially if this may shift their focus in a current goal pursuit. In this regard it holds that even neutrally toned past experiences may bring about negative affect, particularly in individuals who have experienced some form of trauma related events. Therefore, avoidance is only functional if it is not only applied to negative memories, but all memories, regardless of affective relations at the time of the event. Furthermore, the recurring avoidance of such aversive memories, has been argued by Williams et al. (2007) as consequently leading to a more automatic and general (i.e. overgeneral) retrieval style. Hence, evidence from AMT research has observed such a lack of specificity in recall across valence categories (e.g. Williams & Broadbent, 1986; Williams, 1996).

Williams et al. (2007) have put forward the CaR-FA-X theory, which is consistent with Conway and Pleydell-Pearce's (2000) model of AM functionality. Williams et al. suggest that three different elements may contribute to overgeneral memory and propose these to be capture and rumination (CaR), functional avoidance (FA), and reduced executive control (X). The functional avoidance component is defined by Williams et al. as an emotion regulation strategy that reduces negative affect by limiting access to specific details of potentially emotional material. That is, individuals who are depressed or traumatized use a less specific retrieval style because it allows for the temporary relief of emotional suffering. Thus, in the short-term some cases of overgeneral memory serve a protective purpose. An experimental study consistent with this hypothesis, by Raes, Hermans, Decker, Eelen, and Williams (2003), found that mood disturbance, when completing a frustrating puzzle task, was higher in those with high levels of AMS. Low-specific individuals were less frustrated and scored lower on a self-report measure of unpleasantness. This has been taken as evidence that individuals with a less specific retrieval style are less emotionally aroused by a negative personal experience. Although OGM may be protective in the short term, and facilitate a reduction of negative emotions presently experienced, long term tendencies toward avoidance and non-acceptance of emotion can be damaging (Hayes, Strosahl, & Wilson, 1999).

In relation to this line of research, it has been proposed that reduced AMS is linked with avoidant strategies pertaining to cognitions overall (Hermans, Defranc, Raes, Williams, & Eelen, 2005). Specifically, Hermans et al. found low-specific participants to report using more avoidant coping methods to deal with negative emotions, which is consistent with the overall literature. This particular study, however, had some limitations, as it did not look at the association between depression and AMS in regards to such avoidance strategies. The findings from Hermans et al. as such requires further exploration with depressed samples before any conclusions can be made about the link between AMS and avoidance within such populations.

1.4.1.2 Future Thinking

Given that Tulving (1985) reformulated his theory of episodic memory 25 years ago, by including the ability to mentally project oneself into possible future events, surprisingly few studies initially examined the subjective experiences associated with episodic future thinking (Atance & O'Neill, 2001). Wheeler, Stuss and Tulvings' (1997), along with Suddendorf and Corballis' (1997), early analyses of the links between episodic memory and episodic future thinking have provided a format for many of the new or revised theories about the origin and function of mental time travel. Presently, there are two prominent suggestions accounting for such a parallel. One focus has been on how past and future thinking both draw on the same neurocognitive resources. With emphasis on shared underlying capacities, ranging from a specific kind of consciousness (i.e. based in Tulving's suggestion of an autonoetic consciousness) to shared processes required for episodic replication (e.g. Suddendorf & Corballis, 1997; Tulving, 2005; Buckner & Carroll, 2007; Schacter, Addis & Buckner, 2008; Hassabis, Maquire, 2007). However, such research has taken a separate direction in light of findings associating mental time travel abilities with e.g. theory of mind (Suddendorf & Corballis, 1997) and fiction (Hassabis, Maquire, 2007) along with other cognitive processes that exceed the present moment (Liberman & Trope, 2008).

The second focus sees episodic memory as an integral part of future projection and planning therein. According to this view, episodic memory provides the raw material used to construct potential future events (e.g. Suddendorf & Busby, 2003; Suddendorf & Corballis, 1997; Suddendorf & Corballis, 2007, Schacter & Addis, 2007; Schacter, Addis & Buckner, 2009). As such it can be said that episodic memory offers the vocabulary necessary for future thinking. In a review of the literature, Schacter Addis and Buckner (2007) proposed that in order for episodic memory to facilitate future projection through access to past experiences, the previously stored information must be flexible in its representation, in order for such details to be reinterpreted as future events yet to occur. In other words, a person's learning history provides the content that makes up their future expectations, i.e. the active behaviour of remembering is combined with the process of re-contextualising the content. Thus, past learning becomes present moment content that can be used to facilitate future projection. The fact that humans can relationally combine and recombine basic elements into novel scenarios and evaluate these in terms of their likelihood, desirability and so forth, has been used to explain why episodic memory is sometimes inaccurate, and why it presents related neural activity, as well as similar effects of various experimental manipulations, as episodic future thinking; indeed, future thinking may not be about accuracy, but rather about 'fitness' for purpose (Suddendorf, 2010). That is, the past content may be re-evaluated in relation to the current context.

As mentioned, converging evidence in the literature suggests that episodic remembering and episodic future thinking are supported by the same neurocognitive processes (e.g. Schacter et al., 2007). Thus, past and future cognition is constructed in a similar way. This is evident from phenomenological characteristics, such as the perspective taken in recall or simulation of events, as well as details and coherence. As such, thinking about the past as well as considerations about the future are affected by instructions to think of external versus internal events (Larsen, 1998), and a pattern for valence has been noted in both - in lieu of a positive bias (D'Argembeau & Van der Linden, 2004; Larsen, 1998), with temporal distance from the present being quite accurately predicted in one pertaining to the other (Addis, Wong, & Schacter, 2008;

Spreng & Levine, 2006), as more distant events tend to be conceptual and de-contextualized relative to more detail accounted for in events closer in time (D'Argembeau & Van der Linden, 2004; Trobe & Liberman, 2003). It is noted that automatic, as well as deliberate accounts of past and future thinking occur at a similar rate in both regards (Berntsen & Jacobsen, 2008).

In spite of marked similarities, a number of differences exist between episodic remembering and episodic future thinking. For instance, findings suggest that episodic future thinking is cognitively more demanding than past recall. Brain-imaging studies have shown more activity when subjects are generating future events, as compared with remembering past events (Addis et al., 2007; Szpunar et al., 2007). This is consistent with findings at the behavioural level, which implies a more schema associated account for episodic future thinking relative to episodic remembering. Support for this comes from studies showing reduced levels of sensory information in reports of future events (Addis et al., 2008; Berntsen & Jacobsen, 2008; D'Argembeau & Van der Linden, 2004; Larsen, 1998); along with reduced specificity in cognitions about future experiences (Addis et al., 2008; Berntsen & Jacobsen, 2008). In addition to this, future events are more often reported as seen from a third person perspective rather than as an event the individual is 'part of' (i.e. a pre-*experience*) (D'Argembeau & Van der Linden, 2004). These findings to some extent contrast evidence which suggest that future events are more personally significant than remembered past events (Addis et al., 2008; D'Argembeau & Van der Linden, 2004; Newby-Clark & Ross, 2003).

Furthermore, the positivity bias observed in autobiographical memory studies (e.g. Walker, Skowronski, & Thompson, 2003) is even more pronounced for episodic future thinking. For instance, Berntsen and Jacobsen (2008), in a diary study of involuntary and voluntary mental time travel into the past and future, found positive events to be dominant relative to negative ones in all four conditions of positive and negative past and future events, though a stronger divergence was observed for the two future than for the two past event conditions. This is supported by Newby-Clark and Ross (2003) who, in a sample of college students, found that future events were rated as significantly more positive than past events. Again it has been argued that construction of future events, in regards to relations with past experiences, may be guided more strongly by (social) schema and positive expectations than exact reconstruction of past events (Taylor & Brown, 1988). Berntsen and Bohn (2010) describes this bias in regards to the fact that past recall is a direct account of learned experiences, and it is commonly noted that affect during the instance of experience will be related to contextual elements such as the significance of the event in its original state (e.g., Pillemer, 1998; McGaugh, 2003, 2004). In particular, autobiographical memory research has seen that highly emotive and often unexpected events maintain a stable influence, for example, this has been noted in regards to 'first' experiences (Robinson, 1992), and experiences which were seen as 'turning points' and significant life events (Pillemer, 1998). A similar effect is observed in post traumatic stress disorder (PTSD) where a highly negative event holds a constant influence on a person's well-being and ways of thinking about the self and the world (e.g., Berntsen & Rubin, 2006, 2007; Ehlers & Clark, 2000; Janoff-Bulman, 1989).

Despite the fact that this is a relatively new area of research, and in spite of certain differences, the existing data overall conform to the view that the ability to remember the past and the ability to project oneself into the future are intimately related (e.g. Suddendorf, 2010; Szpunar, 2010).

1.4.1.2.1 *Depression and Deficits in Future Thinking*

As research in the area of depression and the understanding of its relation to reduced AMS expanded it became apparent that people experiencing a lack of AMS would often demonstrate similar difficulty in imagining their future. That is, Williams et al., (1996) found that people with reduced autobiographical memory specificity demonstrated a parallel difficulty pertaining to future events. Early studies, by Baumeister (1990) and MacLeod, Williams and Linehan (1992), also demonstrated such corresponding difficulties in presenting specific descriptions of past and potential future events in samples with suicidal individuals. As aforementioned, this is supported by findings pertaining to the wealth of phenomenological characteristics in remembered and imagined events, which have been noted in their similarity, and also demonstrate comparable deficits in mental disorders, such as depression and schizophrenia (D'Argembeau, Raffard, & Van der Linden, 2008; Williams et al., 1996). As was seen in the previous discussion relating to expectancies (see Section 1.4) attempts at 'problem solving' may lead to a focus on particular solutions and as such an individual may experience the perceived (lack of) choices available as inhibiting obstructions in personal progress (Lyuobmirsky & Nolen-Hoeksema, 1993). Such perceived confinement has been linked with psychological inflexibility and an unwillingness to commit to other actions (Ward, Lyubomirsky, Sousa & Nolen-Hoeksema, 2003). Thus, the proposed function of autobiographical memory, to provide information about what is likely to happen in the future, may be of clinical relevance.

1.4.1.2.2 *Valence of Future Expectations*

In research pertaining to depression, the role of positive (future) cognitions has received less attention than negative (future) cognitions. However, the correspondence between biased negative expectancies and behavioural dysfunction (e.g., job performance, emotional suffering, interference in personal relationships) marked by depression stand in contrast to biased positive expectancies that facilitate behaviour among healthy individuals, thus the functionality of expectancies reasonably biased toward optimism may be relevant in treatment of depression (Taylor & Brown, 1988). It has been argued that depressed people may form maladaptive and negative self-statements because they are unable to relate to and make use of experiences which elicit positive self-schemas (Ingram, Smith, & Brehm, 1983). Furthermore, it is proposed that the proportion of positive information accessible may be related to the presence of negative cognition, that is, it has been suggested that an essential quality in psychological dysfunction may be in regards to the *quantity* of positive relative to negative cognitions available (Kendall & Hollon, 1981; Schwartz, 1986; Schwartz & Garamoni, 1989).

With future thinking considered as one of the core verbal aspects of depression, negative future outlook has been particularly held as an important feature of depression (e.g., Abramson, Alloy, & Metalsky, 1989; Beck, Rush, Shaw, & Emery, 1979). Although a negative view of the future has been seen as also incorporating the absence of a positive future outlook (e.g. Abramson et al., 1989), the view that positive and negative future thinking may best be thought of as two separate components is gaining momentum (MacLeod, Byrne, & Valentine, 1996). Looking at positive and negative aspects of experience as two, somewhat, independent components allows research to draw from further theories, with different levels of analysis, including affect, motivation, and behaviour, as well as cognition (Clark, Watson, & Mineka, 1994; MacLeod et al., 1996). It has been suggested that thoughts about future events are often spontaneous (referred to by participants as a 'train of thought'), with the formation of such thoughts seen to occur in a similar fashion to the presentation of sudden memories (Berntsen & Jacobsen, 2008). In terms of emotionality, there is evidence to suggest that healthy people hold an optimistic view of their subjective future (cf. Sedikides & Gregg, 2008; Taylor & Brown, 1988). That is, individuals without depressive tendencies report a general expectation of more happiness in the future relative to the past or present (Robinson & Ryff, 1999). This suggestion is supported by findings of faster and extended responses by participants in the generation of positive relative to negative future events (Newby-Clark & Ross, 2003), and with positive events reported in more detail than negative events (D'Argembeau & Van der Linden, 2004; 2006).

MacLeod and colleagues have championed the view that depression is associated with reduced levels of positive future-directed cognitions, not merely with regards to an excess of negative cognitions, but with a deficit in relating to positive information (e.g. MacLeod & Byrne, 1996; MacLeod, Byrne, & Valentine, 1996; MacLeod & Cropley, 1995; MacLeod, Tata, Kentish, & Jacobsen, 1997; MacLeod & Cropley, 1995; MacLeod, Rose, & Williams, 1993). Thus, it has been inferred that hopelessness in particular is related to a lack of expectancies for positive events, but not increased expectancies for negative events, whereas worry may be related to an increased expectancy for negative events but not reduced expectancies for positive events (e.g. MacLeod, Byrne, & Valentine, 1996; Mowrer, 1960; Barlow, 1988).

MacLeod, Rose and Williams (1993) introduced what is now a common approach to studying future-directed cognitions. They developed a test to explore people's views of the future by assessing future thinking based on two separate dimensions of experience: one of positive affect and one of negative affect (MacLeod, Byrne, & Valentine, 1996). The Future Thinking Task (FTT; MacLeod, Pankhania, Lee, & Mitchell, 1997; MacLeod, Rose, & Williams, 1993) evaluates an individual's ability to generate both positive and negative thoughts about the future through instructing the participant's to generate thoughts within a set time period. Three time frames are used to assess the immediate future, the following 12 months, and the following 5-10 years. Although the Future Thinking Task was initially developed for work with paracuicidals, reduced generation of future positive events has also been found with depressed participants who do not necessarily hold suicidal ideations (MacLeod & Byrne, 1996), and with parasuicidal participants who were not depressed (MacLeod et al., 1997); More specifically, depressed participants responses on the FTT demonstrate a lower level of positive expectancies though a similar level of negative expectancies compared to healthy participants (i.e. MacLeod, Tata, Kentish & Jacobsen, 1997). Meanwhile, anxious participants have been found to show a higher level of negative expectancies but do not generate less positive future expectancy. Participants who are both anxious and depressed (mixed individuals) demonstrate more future negative expectancies and less positive expectancy (MacLeod & Byrne, 1996). This evidence further gives the FTT measure a wide applicability for clinical populations outside parasuicidals. In the revised version of the FTT (MacLeod et al., 1997), participants are further asked to rate each future thought generated in the time and valence instances, on how likely each event is to happen, and how they would feel at the time if the event was to occur in the future, on a seven-point scale. The FTT thus operationalise the ability to combine two important lines of research in the future thinking area by providing measures of fluency *and* probability.

Future thinking, with the FTT, has as such been studied in several clinical groups, including depressed patients (MacLeod & Salaminiou, 2001), anxious patients (MacLeod, Pankhania, Lee, & Mitchell, 1997; MacLeod, Tata, Kentish, & Jacobsen, 1997), suicide attempters (Hunter & O'Connor, 2003; O'Connor, Connery, & Cheyne, 2000), personality disordered individuals (McLeod et al., 2004), and healthy participants (MacLeod & Conway, 2005; Miles, MacLeod, & Pote, 2004) to mention but a few of the existing research studies reporting significant findings with the FTT. One of the most recent studies in this area was conducted by Bjärehead, Sarkohi and Andersson (2010), who explored if hopelessness, as a key aspect associated with suicidal ideation, is relevant to how well future events are generated. They focused on a depressed, non-suicidal population and made use of the future-thinking index in their analysis of results, the index score incorporates event likelihood evaluations (probability of event occurring) and ratings of expected emotional responses (feelings related to event occurring). Bjärehead et al. saw depressed participants reporting lower index scores relating to future positive events, with no group differences observed in regards to future negative events. This result is consistent with previous research and offers new support to the view that a lack of positive future events is typical of depression even in the absence of suicidal ideation. Additionally Bjärehead et al. present a previously unaccounted for finding with the FTT methodology; by making use of the FTT index score a significant time effect was seen, with differences between groups found for more proximate future events relative to future events in the upcoming 5 to 10 years. That is, distant future events rated as less likely to occur by both groups, though most notably so for the depressed group and relating to negative future events; though for the depressed sample this levelling refers to a decrease of negative aniticipation, whereas for the non-depressed sample an inflated expectancy was observed at more distant time points. Temporal distance could thus be important, and Bjärehead et al. suggests that more distant events may be interpreted as more neutral or isolated from affective relations, i.e. negative connotations of the events are weakened due to the remoteness of the event.

MacLeod and Salaminiou (2001) previously accounted for the relevance of temporal distance of negative events in terms of avoidance. That is, emotional avoidance ensues in a response to reduced approach behaviours (Macleod, 1999), a suggestion that is supported in behavioural theories of depression which view avoidance as a contributing factor for depression. It has been argued that behaviour is activated or inhibited not automatically through the occurrence of a positive or negative event, but through the *anticipation* that such an event will occur (Andersen, 1990; Andersen, Spielman, & Bargh, 1992; Andersen & Limpert, 2001). For example, a depressed individual may avoid asking for a promotion at work based on the belief that they are not worthy of such an endorsement, or they may leave their degree course as they experience thoughts telling them that they cannot accomplish anything significant when they are feeling sad as literal truths, and as they can not foresee the situation changing in the future (i.e. lack of positive expectancy) they form a firm belief in these thoughts.

1.4.1.2.3 *Future Expectancy and Personal Goals*

Within the literature on future expectancy recognition of the distinction between having goals and not engaging with goals has emerged. That is, hopelessness has been referred to as a state of having goals, believing these goals to be unobtainable and feeling helpless due to an inability to 'let go' of such goals (Melges & Bowlby, 1969). Similarly the goals set and pursued by individuals vulnerable to depression have been noted as detrimental in their form and process, as it has been noted that depressed individuals believe that *only* achievement of the goal will bring them happiness and well-being (i.e. 'conditional goal setting') (cf. Street, 2002). Unsurprisingly, such 'conditional goal setting' has been found to be strongly correlated with hopelessness (Hadley & MacLeod, 2010). Danchina, MacLeod and Tata (2010) examined conditional goal setting in parasuicides, by comparing responses from individuals attending hospital for a recent episode of parasuicide with controls attending hospital for minor injuries as well as a psychologically disordered but non-suicidal control group. Participants generated goals and subsequently rated goal likelihood, i.e. the extent to which those goals were seen as necessary for their future well-being (conditional goal setting), and also the extent to which the goals were seen as sufficient for their future well-being (goal sufficiency). Parasuicide patients showed a higher degree of both conditional goal setting and goal sufficiency than did both of the other groups, supporting a view of 'painful engagement' with personal goals, relative to disengagement, as characterising parasuicidals. McIntosh (1996), similarly, describes goals to be strongly dependent on a hierarchy of goals. For example, 'to be happy' would be strongly dependent on another goal, for example, 'to be promoted at work' or 'to be married'. In McIntosh's view individuals who rely on these 'linked' goals are vulnerable to depression, irrespective of goal achievement or failure. It is further argued that linkers 'put their happiness on hold' during the process of goal pursuit, and may ruminate about the lack goal success and a lack of happiness. McIntosh (1996) describes the problems of disengagement in lieu of the importance of the goal, a feature that has been emphasized by O'Connor et al. (2008) in the context of parasuicide. In this regard it seems that appreciating the link between future thinking and personal values and goals may be useful in understanding the apparent paradox of depressed and parasuicidal individuals maintaining an investment in goals they believe they are unlikely to attain.

1.5 Methods in Depression Research

1.5.1 *Self-Report Measures*

The use of self-report measures is common in research on depression (Boyle, 1985). However, self-report measures have received much criticism, particularly in regards to their susceptibility to demand characteristics such as social desirability, self-deception, subjectivity, and experimental demand (e.g. Cronbach, 1990; Paulhus, 1989). Experimental demand characteristics are particularly pertinent in studies that re-administer the same measure (Gemar, Segal, Sagrati, & Kennedy, 2001). Underreporting of depressive symptoms may occur in order to avoid judgment by others (Eysenck, 1991; Rudman, Greenwald, Mellott, & Schwartz, 1999). As such it has been found that many self-report measures pertaining to depression and anxiety are relatively highly associated with social desirability (Tanaka-Matsumi & Kameoka, 1986). According to Shedler, Mayman, and Manis, (1993), self-deception, pertaining to an illusion of mental health, may fail to be accounted for in self-report measures. Similarly it is argued that schema, or relational networks, due to their proposed automatic and non-conscious presentation, cannot be accurately acknowledged as even existent, nor the processes involved therein, with self-report measures (Gotlib & Krasnoperova, 1998). In this regard individuals may not be consciously aware of such automatic cognitions, even when they are motivated to do so and as such will not accurately report these (Higgins & King, 1981; Nisbett & Wilson, 1977; Wilson & Schooler, 1991; Wilson, 2009). Nisbett and Wilson (1977) similarly argue that there exists, in many instances, a relative lack of awareness of private responses to unrecognised stimuli. As such individuals may implicitly make a judgment without explicitly having evaluated the decision. Depressed participants may also be seen to offer socially learned information relative to their personal implicit beliefs about their symptoms and as such provide an unintentional inaccurate rationale for their symptoms.

The lack of confidence in self-reports is particularly notable in regards to measures of suicidal ideation as these individuals tend to be motivated to deny or conceal suicidal thoughts to avoid intervention or hospitalization. For instance, Busch, Fawcett and Jacobs (2003), found that explicit denial of any suicidal ideation was reported in the last verbal statements of as many as 78% of individuals before killing themselves. Similarly, Qin and Nordentoft (2005) found that the risk of suicide is significantly increased directly upon discharge from hospital care, doubtlessly the discharge had been evaluated in conjunction with verbal reports by the individual, pertaining to the fact that that they no longer consider killing themselves.

1.5.2 *Accounting for Demand Characteristics*

Although the future thinking literature has made a significant contribution to research in the area of depression, the studies conducted have commonly made use of explicit measures of fluency and probability, via self-report procedures. Despite efforts to increase the validity of explicit self-report measures, such as controlling for these tendencies by using social desirability scales (Paulhus, 1988), only limited progress has been made in this direction, and efforts to cope with the problem of voluntary distortion or controllability of questionnaire data have met with only moderate success (Holden, Book, Edwards, Wasylkiw & Starzyk, 2003). Deception is of particular concern in psychopathology as the sorts of socially undesirable attitudes people hide from others are the same attitudes they may be motivated to hide from themselves (Greenwald, Banaji, Rudman, Farnham, Nosek, & Mellott, 2002). Such pretence may lead to denial, thought suppression, avoidance and other unhealthy strategies of coping with detrimental thoughts of the self and the future (Hayes, 1994; Hayes et al., 2001). Thus, implicit measures may come closer to assessing these processes.

1.6 Depression and Implicit Attitudes/Beliefs

The majority of theories pertaining to depression appears to concur that negative, or in some proposals - reduced positive self perception play an important role in depression. Although discrepancies arise as to how such cognitions influence behaviour. Some argue that the risk of depression is greater when individuals are consciously engaged in negative self-referential beliefs (e.g., Alloy et al., 2000; Nolen-Hoeksema, 2000). Others argue that depression is brought on by the influence negative self-schemas have on automatic, subconscious cognitions to experiences (for reviews, see Ingram et al., 1998; Scher, Ingram, & Segal, 2005).

In an early account by Nisbett and Wilson (1977), pertaining to expectancies, it was proposed that most behaviour is guided by implicitly held expectancies. In their view expectancies that are offered explicitly most often occur due to direct questioning by others, or when explicit elaboration is needed in reaching personal goals. It is further noted that expectancies of the explicit nature are influenced by relations to external stimuli as well as self-promoting and self-presentational strategies, and as such may distort or conceal the accurate expression of expectancy. In some instances, as in the case of racial stereotypes, individuals may be reluctant to express their true attitudes even if they are aware of their nature. On other occasions it may be that someone simply is unable to introspect, and as such fails to identify the implicit expectations that guide their behaviour. Thus, cognitive models looking at vulnerability to depression have inferred that reasonably stable negative self-referential implicit cognitions are held by individual's displaying such depression-vulnerability, and that until they are triggered by environmental stress such cognitions stay latent (Beck, 1967; Beevers, 2005). However, when stimulated, it is conceived that such cognitions influence all aspects of information processing (Beck, 2008; Bower, 1981; Ingram et al., 1998; Teasdale, 1988). Recent proposals of a dual-process in depression activation has suggested that implicit cognitions are triggered when they are not sufficiently regulated by explicit processing (Beevers, 2005; Haeffel, Abramson, Brazy, Teachman, & Nosek, 2007).

Following on from this proposed relation (or lack thereof) between implicit and explicit cognitions, there currently exist a debate on how to best conceptualize and measure cognitive vulnerability to depression. That is, in regards to the two views that have been offered within the cognitive theories of depression have been offered, some researchers focus on targeting explicit cognitions (e.g., cognitive products) whereas others argue for the importance of targeting implicit cognitions (e.g., cognitive processes/information-processing). To this end a dual-process framework has been proposed within the depression literature, in order to explain how people generate cognitive interpretations of stressful life events; this framework stems from social psychology research where the dual-process framework has been used to explain e.g. stereotyping, person perception, and social decision-making (e.g., Devine, 1989; Gilbert, Pelham, & Krull, 1988; Wilson, Lindsey, & Schooler, 2000). From those favoring the explicit side of the argument, research has aimed to examine specific categories of negative cognitions supposed to increase vulnerability to depression (e.g., hopelessness theory Abramson, Metalsky, & Alloy 1989). These theories have focused on attributions and reasoning generated by individuals in response to stressful life events as determinants of depression; with research in this domain facilitated by the use of self-report questionnaires as measures of such cognitive vulnerability. Individual differences are as such examined on these measures in order to predict the prospective development of depressive symptoms and depressive disorders (see Abramson et al., 2002 for review). On the other side of the debate, researchers who are interested in implicit cognitions argue for the relevance of negative schemas, i.e. subconscious, latent cognitive frameworks, which are activated by stressful events (see Scher, Ingram, & Segal, 2005 for a review). As was discussed above (see Section 1.3.1), due to such schemas operating outside of the individual's awareness, arguably self-report questionnaires would not be capable of detecting cognitive vulnerability, and as such other means of assessment are required. Empirical support has been found for both explicit and implicit theoretical frameworks, though few studies have tried to integrate these relatively independent lines of research. As such currently there is a lack of clear understanding about the exclusive contribution of explicit and implicit processes to cognitive vulnerability to depression (Haeffel et al., 2007), as it is not known whether cognitions that confer risk for depression are generated explicitly and deliberately or whether they are generated automatically from implicit schemas (i.e., without conscious control). Though, the results from a recent meta-analysis have found evidence consistent with Haeffel et al's (2007) proposed dual-process model, which posit dysfunctional explicit processing as the primary determinant of depression. The predicament, in recognition of implicit versus explicit reports, has been noted as the "unwilling and unable" problem, and is a longstanding dilemma seen in research on attitudes (Eagly & Chaiken, 1993). This dilemma has led to an abundance of measurement techniques designed to 'get around' the reluctance, as well as the inability, to respond accurately; with a recent rise in available indirect measures (Fazio et al., 1995; see Fazio & Olson, 2003 for a review of indirect measures).

1.6.1 *Implicit Attitudes*

Implicit attitudes have been noted as beliefs which an individual has no conscious access to or control over. According to Greenwald and Banaji (1995, p. 8) such implicit beliefs are '*introspective occurrences of past experience that facilitate evaluative feelings, thoughts, or actions toward ones social world*'. Implicit beliefs in this regard are understood as representatives of past experiences, and thus implicitly influence attention, processing, and, ultimately emotion and behaviour (Greenwald & Banaji, 1995). However, individuals are unable to explicitly acknowledge these without introspection. Some of the first developments pertaining to research on implicit attitudes and beliefs in general came from studies on racial prejudice. The research on implicit prejudice found that some individuals who did not explicitly report any racial biases nonetheless where found to demonstrate implicit biases towards the specific racial groups (for a review, see Greenwald & Banaji, 1995). Thus highlighting an explicit/implicit discrepancy, by recognition of such potentially conflicting attitudes, and stirring debate about the nature, 'truthfulness' and influence of explicit versus implicit accounts of personal attitudes and beliefs. In the context of depression, a depressed individual's emotions and behaviour may be prone to influence by implicitly held beliefs. For instance, there is ample opportunity to challenge or distract from explicitly held beliefs of, for example, the future as negative. On the contrary, implicit beliefs pertaining to a negative future outlook may serve to weaken the incentive to engage in future or goal oriented behaviours, as such implicit beliefs do not present the opportunity for the individual to challenge or distract from such beliefs, subsequently reducing goal-oriented behaviour and serve to maintain depressed mood.

1.6.2 *Automaticity of Beliefs about the Future*

It is currently uncertain if models of future thinking function at an implicit level, targeting automatic reactions to stimuli. Cognitive theories of depression assume that dysfunctional schemata, even when activated, are not always consciously accessible and can therefore not be reported (e.g. Beck, Rush, Shaw, & Emery, 1979; Beevers, 2005). Given that recent research suggests implicit and explicit measures may be assessing different components of cognitive processes in depression (e.g. Beevers, 2005; Haeffel, Abramson, Brazy, Teachman, & Nosek, 2007), given the link between future cognitions and depression - exploring implicit future thinking may be of importance, particularly in light of suggestions that implicit measures could be better predictors of distress and psychopathology than explicit measures (e.g., Nock & Banaji, 2007).

1.7 Methods Targeting Implicit Cognitions in Depression Research

The core postulate behind implicit measures suggests that individuals are often unaware of the implicit beliefs which may subsequently influence their behaviour (Greenwald & Banaji, 1995). When asked to provide a response to questions about future expectations participants often engage in deliberate, propositional processes in an effort to provide the most 'suitable' and socially relevant responses, with such processing seen to denote people's explicit attitudes. Contrary to such contemplative representation, implicit attitudes are seen as more spontaneous, automatic, and affective responses, resulting from individual relations derived from memory cues (Gawronski & Bodenhausen, 2006). As implied by the depression and future thinking literature, affective evaluations are important determinants of behaviour, and subsequently behaviour modification, as they form the basis of our emotions (e.g., Beck 1967; O'Connor et al. 2008; De Houwer, Thomas, & Baeyens, 2001).Thus, implicit cognitions rely on contextual factors contributing to certain stimuli *automatically* activating associations in memory (e.g., Fazio, 2001) and as such may represent an important approach-avoidance function (e.g., Wilson, Lindsey, & Schooler, 2000).

Implicit measures operate as an indicator of implicit cognitions when, for example, in a given context the participant is naive of the cognitions to be assessed or hold no control over the outcome (De Houwer, 2009). So far implicit measures have been able to provide predictability of impulsive behaviours which self-report measures have previously found it difficult to anticipate (for a review, see De Houwer, 2006; De Houwer, Teige-Mocigemba, Spruyt, & Moors, in press; Gawronski, in press). The autonomous nature of these two types of methods has been implied by Bosson, Swann, and Pennebaker (2000) who see the non-significant, but positive associations between implicit and explicit measures as supporting this postulate.

1.7.1 *The Implicit Association Test*

One approach towards examining non-conscious processes in cognition that shows promise in investigation of implicit biases is the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). Originally designed to assess implicit prejudicial attitudes, the IAT measures the relative strength of participants' automatic associations between pairs of concepts. To that end, the IAT measures concepts that participants associate together (Olson & Fazio, 2001). The IAT is based on the assumption that a person's responses should be faster when associating items that they would pre-experimentally pair together such as 'young' and 'good' as opposed to pre-experimentally not pair together such as 'young' and 'bad' (Nosek & Hansen, 2008). In a typical IAT preparation, participants are required to pair two target concepts with a particular attribute. Better performance, with regards to decreased reaction times and increased accuracy, are generally reported when associated concepts are assigned to the same evaluative compatible response (e.g., young-good/old-bad) as opposed to when associated responses are assigned to different responses (e.g., young-bad/old-good; Greenwald et al., 1998).

1.7.1.1 *Clinical use of the IAT*

Recently the IAT has been more specifically made use of in the examination of automatic implicit attitudes with clinical populations (e.g., Egloff & Schmukle, 2002; Gemar, Segal, Sagrati, & Kennedy, 2001; Meites, Deveny, Steele, Holmes & Pizzagalli, 2008; Risch, Buba, Birk, Morina, Steffens & Stangier, 2010). The extensive evidence supporting a subjective 'positivity bias', and the application by cognitive models of this inverse bias as a marker of depression, i.e. that depressed individuals, instead show a negative bias toward the self (e.g., Clark et al., 1999), suggests that negative self-related schemata may play an important role in the maintenance of depression (Williams, 1997). These schemata have been considered to be automatically activated and as such not representative of more deliberate processes or so called 'logic reasoning' which would include a level of social desirability. Referred to as 'implicit self-esteem', indirect measures have been increasingly applied in order to assess the self-related implicit pathological attitudes underlying such schemata. Gemar, Segal, Sagrati, and Kennedy (2001) used an IAT consisting of the target categories 'me' and 'not me', and positive and negative attributes in an early attempt to assess implicit self-esteem in the context of depression. In Gemar et al's study the IAT was completed by formerly and never depressed individuals before and after a negative mood induction. Interestingly, prior to the mood induction, formerly depressed individuals demonstrated more positive implicit self-esteem than never depressed individuals, however, after the mood induction, no group differences were observed. The results were interpreted to suggest that, contrary to cognitive theory, negative implicit self-related attitudes may not be characteristic of formerly, nor currently depressed individuals.

Looking at healthy versus depressed participants, De Raedt, Schacht, Franck, and De Houwer (2006) used several implicit methods to assess implicit-self-esteem, including the IAT and the The Extrinsic Affective Simon Task (EAST) (De Houwer, 2003). The EAST is based on the assumption that performance is facilitated when items associated in memory share a response key and typically involves the classification of colored adjectives. In their study depressed and healthy participants demonstrated a similarly strong positivity bias on the IAT, whereas on the EAST the depressed individuals showed a significantly *stronger* positivity bias than the healthy controls. De Raedt et al. (2006) explain their findings in light of research suggesting implicit reports of self-esteem may be representative of previous learning/developmental history, whereas explicit, deliberated attitudes are under stronger contextual control with regards to a self-view related to more recent experiences, or indeed, current mood. The authors provide further explanation of their findings based on the suggestion that 'inconsistent' self-esteem, rather than positive or negative self-esteem *per se*, may mark depression. That is, pathology may incur as a result of inconsistencies stemming from high implicit self-esteem in combination with low explicit self-esteem. This possibility was tested by asking groups of depressed individuals with suicidal ideation, without suicidal ideation and a healthy control group, to complete a self-esteem IAT (Franck, De Raedt, & De Houwer, 2008). The explicit and implicit responses only diverged for the depressed sample with suicidal thoughts, leading the authors to conclude that such discrepancies between implicit and explicit assessments may pertain to one relating more strongly to previous experiences and as such the past learning history of individuals, whereas the other, i.e. explicit task, measures more recent experiences. It can be inferred that this inconsistency between past and present experiences likely influences thoughts of 'entrapment', i.e. a state of hopelessness as past experiences are not concurring to expectancies of the present with escalating inferences of the future offering more of the same.

In an attempt to further explain their findings, Franck et al., (2008) allude to research suggestive of a diminished ability in processing negations relative to affirmations (e.g., Deutsch, Gawronski, & Strack, 2006), as at an automatic level, the ''not me'' associative content-based element of refusal (as presented in the self-esteem IAT) would be subjective to an established learning history of this relation (i.e. consistent 'training' of this relation based on repeated pairing of positive stimuli with 'not me'). The authors propose that this is not the case for habitual, rule-based components, and as such the intended self-related concepts can be implied only after extended practice. This conception, however, may only be of limited availability in this study due to restrictions of the IAT procedure itself, as the relative strength of relations is not able to be discriminated. Thus, methods pertaining to more direct measures of implicit belief may be able to offer further insight to this data.

1.7.1.2 *Predictive Ability of the IAT*

Improved success for the predictive abilities of the IAT over explicit methods has been reported in several studies (e.g. Haeffel et al., 2007). Recently, the implicit literature has also attempted to extend this new methodology to research within clinical groups. The Implicit Association Test has been particularly popular in such regard, pertaining to self-esteem and anxiety research particularly and branching in to depression and self-harm populations. Steinberg, Karpinki and Alloy (2007) found low positive implicit self-esteem interacting with recent stressful life events as predictive of depressive symptoms in undergraduates. Whereas depressed individuals were found to show increased implicit hopelessness by Friedman, Nosek, Miller, Gordon and Banaji (2001). The IAT test scores have been found to offer improved detection of non-suicidal self-injury, in samples of self-injurers and non-injurers, more so than demographic and clinical factors.

One of the most recent IAT studies by Nock, Park, Finn, Deliberto, Dour and Banaji (2010) aimed to determine a behavioural marker for suicidal behaviour via the IAT. Their findings suggested that IAT responses associated with death/suicide were greater for subsequent suicide attempters relative to psychologically distressed individuals who had not attempted suicide. The likelihood of a suicide attempt by those who showed such robust associations was reported to be six times greater than those who demonstrated a weaker association with self and death/suicide. The IAT effect was seen to be a better predictor in this instance than that of the clinician and the patients themselves, as well as depression levels and previous history of suicide attempts. The authors emphasize the implications of these findings by suggesting that implicit measures may be utilized in the detection in a range of clinically sensitive behaviours. Thus, it may be possible to address the limitations of explicit measures in dealing with participants concealing information (Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

1.7.1.3 *IAT Suitability in a Future Thinking Paradigm*

Despite its widespread use and applicability for examining individuals pre-experimental associations the IAT paradigm is limited in that it only allows the measurement of associations between categories. Specifically, it is very useful in measuring stimuli categorised as the same as or opposite to each other (such as young is the same as good and old is the same as bad). However, if a researcher wants to examine future expectancies (i.e., expectancy relations) merely pairing associatively "self" with positive events such as "wealth" "happiness" and so forth, only affords information about how one directly pairs themselves with these events. Specifically, such a test only allows measurement of the strength of association between the self and these stimuli as demonstrated in the study by Franck et al. (2008); and though Meities et al. (2008) adequately improved on specificity - future relations remained unaccounted for by a lack of significant findings. Thus, measurement of associations in this way does not provide information about the nature or direction of the association.

With regards to pathology, and specifically here considering hopelessness in the anticipation of future events, as demonstrated in MacLeod et al's., (1993, 1997) findings with the Future Thinking Task (i.e. the FTT) it has been demonstrated that the presence of negative future expectancies is not functionally equivalent to the absence of positive future expectancies. For example, suicidal individuals, when compared with controls or depressed individuals who are not suicidal, are impaired in their ability to generate positive thoughts for the future but do not differ in terms of the number of negative thoughts that they are worried about (MacLeod et al., 1997; see also O'Connor & Sheehy, 2000). The findings from the future thinking literature are also analogous to those from Clark and Watson's (1991) seminal, tripartite model of depression. Specifically, Clark and Watson argue that depression (but not anxiety) is characterised by the presence of negative affectivity and the absence of positive affectivity, whereas anxiety is driven by negative affectivity, physiological tension and hyperarousal (Clark & Watson, 1991; Watson, Clark, Weber, Assenheimer, Strauss, & McCormick, 1995). Similarly, within the future thinking area, it is positive thinking (not negative future thinking) that distinguishes between depression and hopelessness/suicidality. The literature thus support the prevailing premise that the presence of negativity and the absence of positivity are not simply opposites, but functionally distinct.

On an operational level it has been argued that the behavioural effect inferred from associative measures, such as the IAT, merely make the *assumption* that the implicit attitudes observed are formed through associations in memory (Hughes, Barnes-

Holmes, & De Houwer, 2010). As such, stating that implicit attitudes are associative can imply various consequences. For instance, inferring that the behavioural effect produced is associative suggests that the procedural outcome stems from individuals accurately and confidently associating stimuli. Although, this reference would submit more to the outcome of an association and does not lend information to the process involved in generating such effects, e.g. the relational networks (Hughes et al., 2010). The implication of the distinctions, between positive and negative anticipation and probability, renders adopting the IAT procedure to measure future thinking inadequate. However, recent research stemming from Behavioural Psychology has extended on the implicit methods to allow for the inclusion of relations other than pure associations (Barnes-Holmes Barnes-Holmes, Barnes-Holmes, Hayden, Milne, Power & Stewart, 2006). In contrast to the IAT, the Implicit Relational Assessment Procedure (IRAP) involves presenting participants with specific relational terms (e.g., similar, opposite, better, worse) so that the relations between and among the chosen stimuli can be assessed. As such, the IRAP aims to provide a method that addresses many of the interpretative complications experienced by the IAT and other previous implicit methodologies. The IRAP facilitates this by increased experimental control, and by looking at the relations between stimuli rather than mere associative response biases (Barnes-Holmes, Barnes-Holmes, Stewart, & Boles, 2010; Barnes-Holmes, Hayden, et al., 2008).

1.7.2 *The Implicit Relational Assessment Procedure*

The Relational Elaboration and Coherence (REC) model (Barnes-Holmes, Barnes-Holmes, Stewart, & Boles, 2010) accounts for the empirical and conceptual diverges noted between implicit and explicit attitudes, in particular in regards to IRAP effects .According to the REC model explicit measures merely capture more carefully considered reactions relative to the IRAP, which is able to detect spontaneous and automatic evaluations consistent with a pre-established learning history. The divergence between implicit and explicit measures of psychologically sensitive attitudes is explained by the REC model as pertaining to the participants' deliberation process enabled with the use of explicit methods, where individuals are able to "reject" their immediate and brief relational responses (or automatic evaluations) if they do not cohere with more elaborate and extended relational responding. The REC model suggests that explicit and implicit procedures reflect the same behavioural functions, i.e. relational responding. That is, events can be related even in the absence of a direct learning history, the transformation of stimulus functions, through derived relations with other stimuli, may be particularly pertinent in evaluation of behavioural functions (as discussed in Section 1.3.2 and 1.3.3). As such the REC emphasizes that the procedures obtain two differing patterns of relational responding, i.e., brief and immediate (implicit) or extended and elaborated (explicit) (Hughes et al., 2010).

The Implicit Relational Assessment Procedure (IRAP) (Barnes-Holmes et al., 2006) accommodates for higher order psychological constructs to be evaluated as the stimuli need not be wholly equivalent or the same as each other, that is, the response options can be representative of other such functional relations, e.g. a 'more or less' preference. The rationale behind the IRAP is that immediate and apparent relational responses to the IRAP stimuli are expected to be emitted first, as such relatively fast responses will occur for IRAP trials that match an individual's immediate responses, e.g. for healthy individuals the literature support a 'positivity bias' pertaining to future expectancy, thus based on this notion healthy persons presented with stimuli pertaining to positive future expectancy on the IRAP would be presumed to demonstrate a fairly fast relational reaction for the relation of 'positive future event' and 'true'; IRAP trials opposing such immediate relational reactions in a healthy sample, i.e. necessitating a response that contest the initial positive future expectancy relation, would facilitate a slower reaction, e.g. a healthy individual with a positive bias would not be expected to show the same strength of belief for negative expectancies as these would not be as readily available and thus not immediate, relative to positive expectancies. Thus when participants are put under time pressure to respond quickly and accurately such immediate and brief relational responding is reported across multiple trials, resulting in longer average latency for inconsistent (e.g. as in the example above a negative bias of future expectancies would be inconsistent to that which is expected of a healthy sample) than for consistent blocks of trials (e.g. positive expectancy is recorded as faster due to stronger subjective relativity) (Barnes-Holmes et al., in press; Barnes-Holmes, Hayden et al., 2008; O'Toole & Barnes-Holmes, 2009). As such, a behavioural bias will affect the ease of which responses to consistent relative to inconsistent trials are made (i.e. the IRAP effect) (Barnes-Holmes et al., 2006). If no response time difference is found between consistent and inconsistent responses (i.e. there is no IRAP effect *per se*) the respondent's verbal history is likely not consequential to the relations assessed; as such it is possible to infer prospective verbal behaviour on the basis of the relative strength of the IRAP effect. To that end it is proposed that similarities can be drawn between the IRAP effect and the original conception of attitudes as *behavioural biases* (cf. Fazio & Petty, 2008).

In the current context it is important to note that Barnes-Holmes et al. (2010) emphasise that *'the REC model does not predict that additional relational activity will always produce a positive response in a psychologically sensitive area'*. For some individuals, additional responding may produce a negative response that coheres with the initial negative evaluation (e.g. with regards to the future thinking literature, a negative future outlook is bad and positive events do occur). Alternatively, additional responding may produce a relational response that allows two initially incoherent networks to come together (e.g., a negative future outlook is bad, positive events do occur, but I don't expect positive events to occur for me).

1.7.2.1 *The IRAP Effect and Predictability*

This basic IRAP effect has been presented in a number of studies and across various domains, e.g. the IRAP has been seen to compare well with the IAT as a measure of individual differences (Barnes-Holmes, Murtagh, Barnes-Holmes & Stewart, in press;

Barnes-Holmes, Waldron, Barnes-Holmes & Stewart, 2009; Roddy, Stewart & Barnes-Holmes, in press); it has been demonstrated that the IRAP effect is not easily faked (McKenna, Barnes-Holmes, Barnes-Holmes & Stewart, 2007); the IRAP effect has been noted in measures of implicit self-esteem (Vahey, Barnes-Holmes, Barnes-Holmes &Stewart, 2009); the IRAP produces effects which clearly diverge from those obtained with explicit measures of socially sensitive attitudes (Power, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009); the IRAP has been supported as demonstrating a predictive validity in regards to anxiety and willingness to perform a public speech (Ohtsuki, Kishita, Kubo, Takahashi & Shimada, 2010); implicit attitudes to work and leisure (Chan, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009), implicit ageism (Cullen, Barnes- Holmes, Barnes-Holmes Stewart, 2009); deviant implicit attitudes in child sex offenders (Dawson, Barnes-Holmes, Gresswell, Hart & Gore, 2009).

1.8. Raising Awareness of Implicit Cognitions

As implicit cognitions are inherently automatic and not conscious to the individual it seems likely that in order to exert influence over such implicit beliefs it is necessary to alert people the nature and impact of such cognitions. Once a person is aware of the occurrence of such thought processes (e.g., learns to recognise thought patterns and functions), they can become more aware of the effect such implicit cognitions have on their conscious thoughts and behaviours and begin to make the automatic nature of these processes more controlled. Thus, by increasing awareness of non-conscious information processing it is inferred that it will be possible to address the influence these processes hold over conscious thought and behaviour (Greenwald & Banaji, 1995).

1.8.1 *Altering Cognitive Vulnerability*

Current treatment packages for depression have, stemming from cognitive theories of depression, focused on altering negative beliefs and the emotional engagement with such beliefs (for review, see Hollon, Thase, & Markowitz, 2002); with Cognitive Behaviour Therapy (CBT) found to be one of the main approaches in this domain. CBT is based on the idea that modifying explicit negative beliefs will break habitual cognitive cycles associated with depression (e.g. Beck et al., 1979; Beck, 1999). This general approach has been supported by findings of negative interpretation and self-beliefs serving as risk factors to depression relative to negative biases in attention, memory or self-esteem. However, many limitations of such treatments are surfacing and a renewed outlook pertaining to models of depression along with its accompanying treatment options are fast arising. For instance, the two year relapse/recurrence rates following such cognitive therapies can be as high as 73% for certain patient groups (Bockting, Schene, Spinhoven, Koeter, Wouters, Huyser, & Kamphuis, 2005; Tang, DeRubeis, Hollon, Amsterdam, & Shelton, 2007).

Recent research has suggested that the efficacy of cognitive therapies may likely be shaped by the indirectly increased conscious awareness of an individual (Phillips et al., 2010). In such a case it constitutes that low levels of awareness of more implicit cognitions may be instrumental in episodes of relapse (Teasdale, Moore, Hayhurst, Pope, Williams, & Segal, 2002). With this, the proposal that increased awareness may hold the key to modifying implicit cognitions (Beevers, 2005; Phillips et al., 2010) has been supported by the construction of more mindfulness based therapies (Segal, Williams, & Teasdale, 2002; Hayes et al., 1999). The focus on mindful awareness in therapy may serve to preserve positive conscious expectancies, by instructing individuals to observe their implicit reactions. In this regard, understanding of how implicit responses may appear as incompatible to personal values, would likely elicit corrective explicit processing in vulnerable individuals.

Acceptance and Commitment Therapy is a form of third wave cognitive behaviour therapy which focuses on enhancing psychological flexibility in the service of achieving core life values. Recent studies have shown the efficacy of ACT approaches over more traditional CBT interventions in the treatment of depression (Zettle & Hayes, 2002; Zettle, 2004). Perhaps the most important feature of ACT, however, is that it is underpinned by Relational Frame Theory (see Sections 1.3.3 and 1.3.4 for an account). This grounding in basic theory warrant ACT processes to be coherent and evidence based, but also allows for the continued improvement of the therapy at the process level, thus facilitating the ongoing progress of this form of therapy.

1.8.1.1 *Acknowledging Implicit Cognitions - Acceptance and Commitment Therapy*

From an ACT perspective depression is likely the result of experiential avoidance (Hayes et al., 1999; Hayes, Strosahl, Bunting, Twohig, & Wilson, 2005). Experiential avoidance is a process which facilitates individual attempts to change private experiences. For instance, an individual may try to avoid thinking about a negative past experience, avoid contexts which elicit such thoughts, despite the personal consequences suffered by such social, emotional, and behavioural withdrawal (Blackledge & Hayes, 2001; Hayes, 2004; Hayes et al., 1999; Wilson & Murrell, 2003).

The ACT model comprises of six processes that are represented in the ACT Hexaflex. These processes contribute towards the reduction of emotional avoidance and are as follows: Acceptance, Cognitive Defusion, Contact with the Present Moment (i.e., mindfulness), Self as Context, Values and Committed Action. Acceptance in the ACT model refers the way in which clients should embrace private events, and to be willing to have them when attempts at changing their frequency might seem more natural. Cognitive Defusion techniques encourage clients to step away from, or not to buy into their thoughts. This attempt at de-literalisation, via a variety of metaphors (Hayes & Strosahl, 2004), displays how the ACT model tries to change the way in which the client will interact with private events, by altering the underlying function of undesirable thoughts. Whilst Being Present (i.e. mindfulness) encourages the client to maintain non judgemental contact with psychological and environmental events that occur, this is often accomplished through mindfulness exercises. Self as context is a critical process, as without it the processes of mindfulness and defusion are not fostered. Specifically, self as context refers to the way in which clients are encouraged to take a number of different perspectives, allowing them to be aware of one's flow of experiences without becoming too attached to them. Values are critical to the ACT model (cf. Plumb et al., 2009) and through the processes of mindfulness and defusion clients are encouraged not to act on the basis of their thoughts but rather to act in a value consistent manner. Without the specification of such values, the guide to action remains unclear. Finally, Committed Action refers to way in which ACT encourages the development of larger patterns of behaviour that are consistent with the clients chosen values.

1.8.1.1.2 *Mindfulness of Implicit Cognitions*

A promising approach towards the increased awareness of implicit factors which aid to reinforce behaviour comes from mindfully paying attention to personal thoughts, emotions and physical sensations. That is, mindful processing has been noted as focused attention on present moment experiences (Brown & Ryan, 2003; Kabat-Zinn, 1990; Linehan, 1993a; Marlatt & Kristeller, 1999). In this regard individuals are required to explicitly direct their attention inwards in order to experience personal cognitions and external influences and accept these as they are experienced in the present moment (Kabat-Zinn, 1994), thus acceptance and contact with the present moment are intended to facilitate responding to private experiences without avoidance. Individuals are encouraged to actively contact internal and external stimuli, respectively, without attempting to change the presentation of the stimuli or the frequency of such events. As has been discussed, cognitions in depression likely dwell in past outcomes or worries about future outcomes, though mindfulness promotes a gentle shift in the appearance of cognitions back to the current experience. Kabat-Zinn describes mindfulness simply as, *'paying attention in a particular way: on purpose, in the present moment.'* (Kabat-Zinn, 1994, p.4).

Defusion is an important part of the mindfulness process, as this involves altering the psychological context of unhelpful rule following. In ACT defusion is a skill which can be learned, and which necessitate active rehearsal. Mastery of this ability has been shown to increase overall well-being (Masuda, Twohig, Stormoa, Feinsteina, Choua, & Wendel, 2010; Masuda, Hayes, Twohig, Drossel, Lillis, & Washio, 2009; Masuda, Hayes, Sackett, & Twohig, 2004; Bach & Hayes, 2002). ACT sees psychological suffering as related to attempts to control or avoid negative thoughts or emotions. In this regard ACT aims to address such experiential avoidance by behavioural tools that aid the ability to recognise, as well as alter, the presentation of such cognitions as well as the contexts in which they arise (Hayes et al., 1999, p. 58). Defusion in this regard works by developing awareness the self as separate from one's thoughts. This de-contextualisation further promotes acceptance of 'unwanted' thoughts and beliefs through a loss of the literal meaning of such cognitions.

While long-term practice of defusion is beneficial, the use of a single, brief period of defusion practice have also been found to be advantageous to psychological well-being. Previous research by Arch and Craske (2006) found a 15 minute focused breathing exercise to be effective in increasing willingness to approach negatively valenced images relative to a similarly brief unfocused attention exercise and a worry exercise. Participants in the Arch and Craske study were assigned at random to one of the three groups, and all participants viewed positively, negatively, and neutrally valenced slides from the International Affective Picture System (IAPS, Lang, Bradley, & Cuthbert, 1999) before and after the laboratory induction. The authors found that, following the induction, the focused breathing group maintained reasonably positive responses to neutrally valenced slides throughout the exercise, while the unfocused attention and worry groups responded negatively to neutrally valenced slides. The focused breathing group further reported lower overall negative affect in response to the aversive images relative to the other groups. The focused breathing group further reported overall greater positive affect in response to the positive slides following the induction. Thus, overall the focused breathing induction appeared to facilitate a greater willingness to view more negatively valenced images. These findings support the claim that mindfulness may facilitate greater awareness and subsequently control over emotions, as evident here in regards to reductions of negative affect. It is further implied that enhanced acceptance of difficult stimuli may be related to such a decrease in negative affect.

1.9 The Current Thesis

Although research has begun to investigate the link between past and future thinking in depression there currently remains limited knowledge about the mechanisms underlying these processes. Due to the link between future expectancies and suicide (that is, potentially the least functional anticipated future outcome) expectancy is receiving increasing attention in the clinical literature (e.g. O'Connor et al., 2008). However, the main focus within the current thesis will not be on suicidality *per se*, rather the focus is on depression and the sub feature of hopelessness about the future, which have both been commonly related to suicidal ideation. Watson and colleagues have argued that a 'fundamental continuity between normal and abnormal psychological processes' exist (Watson, Gamez, & Simms, 2005, p.46); with supporting evidence arguably confirming a relation between both positive and negative affectivity and psychopathology. Similarly, Clark, Beck, and Alford (1999) argue that a dimensional, rather than categorical, view of depression is supported in the literature, and that cognitive deficits present in clinical conditions also exist as marked vulnerabilities in individuals with non-clinical dysphoria (for a discussion on the dimensional view see Chapter 8, Section 8.6).

Most research on depression-related cognitions has involved cross-sectional designs to identify differences between depressed and non-depressed individuals (Abramson et al., 2002; Ingram et al., 1998; Scher et al., 2005). However, it has been argued that cross-sectional designs and those which include formerly- and non-depressed groups (i.e., Remitted designs) cannot fully address vulnerability assumptions of cognitive models of depression (Lewinsohn, Steinmetz, Larson, & Franklin, 1981). As such it has been proposed that in order to offer empirical support for cognitive vulnerability, it is important to demonstrate that the cognition temporally precedes the initial onset or recurrence of depression (Ingram et al., 1998) and is not a transitory effect or symptom of the disorder (Riskind & Alloy, 2006). To this end, designs that measure cognitive vulnerability factors prior to depression onset are often considered most suitable for assessing vulnerability theories as they can determine both temporal precedence and independence from symptoms. Beevers (2005, p.22), in relation to the link between associative and reflective cognitions proposed in dual processing model of depression, has suggested that: '*analogous research conducted with depression vulnerable individuals could be particularly helpful for understanding of how cognitive vulnerabilities relate to interpersonal factors that also contribute vulnerability to depression*'.

The current thesis has three main aims. First, it aims to determine the differences, or as the emerging literature suggests, the similarities, in thinking about the future and the past in sub clinically depressed versus non-depressed individuals. Specifically, it is hypothesized that sub clinically depressed individuals will show more difficulties in recall of past events and that this lack of contact with autobiographical past experiences inform patterns of behaviour relevant to future thinking. The second aim of the current work is to offer an alternative to the use of self report measures in the future and past thinking literature. To that end, a robust and accurate implicit measure of positive future expectations in depression is tested in a sub clinical sample. Finally, the thesis aims to provide analogue evidence of techniques that may be useful in the remediation of pessimistic thinking as is characteristic in depression, namely mindfulness and values clarification.

Chapter 2

Memory for the Future:

The Relation between Autobiographical Memory and Episodic Future Thinking

2.1. General Introduction

In the last two decades research has consistently demonstrated that individuals who present with depressive symptoms commonly also report experiencing difficulties in retrieving specific autobiographical memories. Crucially, such reduced autobiographical memory specificity (AMS) has been recognised as a vulnerability factor for depression as well as a predictive feature in prolonged and more severe cases of depression. The affect-regulation model (Williams et al., 2007) is a widely used account of AMS. Williams' model proposes that reduced specificity in autobiographical memory may be an avoidance strategy to reduce negative or painful cognitions. Such an avoidant memory style may be successful in the short term (i.e. less contact with negative events) but is harmful in the long term. Previous studies have focused on AMS as a vulnerability factor in depression (see Williams, 2007 for a review). It seems reasonable to assume, in light of recent research, that a reduction in overgenreal memory (OGM) is an important factor to target in treatment. Indeed, research in the last two years is now aiming to address such specificity deficits in depression by employing specific intervention procedures aimed at targeting the underlying cognitive processes presumed to be involved.

In recent research pertaining to the phenomenology of memory for past events it has been demonstrated that 'openness to feelings', as assessed by the NEO Personality Inventory (Costa & McCrae, 1992), was strongly related to past events, as evident by correlations with measures of belief in the accuracy of memories, sense of recollection, amount of sensory details, and feeling of emotions while remembering (Rubin & Siegler, 2004). In an effort to extend on their findings to emotion regulation strategies, Rubin and Siegler (2004) propose that suppression of emotions is the opposite to openness of feelings and as such relate their findings to those of Richards and Gross (2000) who found that individuals noted to make use of emotion suppression strategies also reported reduced memory for conversations and recall past episodes involving emotion regulation relative to individuals who do not habitually make use of such emotion suppression strategies. As such the findings by Rubin and Siegler (2004) and Richards and Gross (2000) propose that avoidant coping strategies, in lieu of emotional suppression, affects the subjective experience associated with past recall. More recent evidence in this regard comes from D'Argembeau and Van der Linden (2006), who extend on the work by Rubin and Siegler (2004) and Richards and Gross (2000), by showing that individual differences in suppression affect not only the phenomenology of memory for past events but also the phenomenology associated with mental time travel into the future.

With the recent advent of a link between past and future thinking (cf. Chapter 1, Section 1.4.1) many of the associated deficits pertaining to AMS have been assumed to also be relevant for specificity of future events (e.g. Williams, 1996). Given the clinical relevance of autobiographical memory (AM) research, it is particularly important to examine the relation between past and future thinking. That is, in order to ensure treatment correctly targets the underlying features of depression it is necessary to understand how deficits in past and future thinking are manifested in depressive populations and, to recognise if the behaviour that needs targeting pertains to memory or cognitions of a more anticipatory nature.

Analogue studies of depression have the potential to inform understanding of the initial development of depression symptoms (Ruscio & Ruscio, 2000; Pennebaker, Colder & Sharp, 1990). As there have been inconsistencies in findings with non-clinical and dysporic samples in relation to research on past and future thinking, it may be relevant to explore these phenomena in a relatively homogeneous sample. An analogue sample of depression in a student population offers an efficient sample to further investigate this phenomenon.

To this end the experiments presented in Chapter 2 are designed to look at deficits in episodic autobiographical accounts of past and future experiences in a sample of sub-clinically depressed individuals relative to non-depressed individuals. The individual past and future experiences are explored in an effort to shed light on the use of avoidant coping strategies as a related function to overgenerality in such accounts. Experiments 1a and 2a aim to examine OGM, whereas Experiments 1b and 2b examine specificity in future thinking. All experiments will involve a sub clinical sample.

2.2 Experiment 1a

The parallel between reduced AMS and depression appears not only to be limited to a state of mood. Indeed, it has been noted that recovering depressed individuals as well as those in remission from depression similarly report a sustained level of reduced AMS (e.g., Brittlebank, Scott, Williams, & Ferrier, 1993; Raes, Hermans, Williams, Beyers, et al., 2006). With individuals who have previously experienced depressive episodes similarly demonstrating low AMS, i.e. levels of AMS in these studies have been reported as similar to currently depressed patients, and in contrast to those of never depressed controls (e.g., Mackinger, Pachinger, Leibetseder, & Fartacek, 2000; Park, Goodyer, & Teasdale, 2002; Williams & Dritschel, 1988).

The predictive significance of AMS in the progressive path of depression has further been recognized in the level of AMS reported, i.e. the lower AMS is reported to be, the more prolonged the improvement in depressive symptoms have been seen to be (e.g., Brittlebank et al., 1993; Peeters, Wessel, Merckelbach & Boon-Vermeeren, 2002; Raes, Hermans, Williams, Beyers, et al., 2006). With such predictive value noted also for non-clinical samples, where reduced AMS denotes increased depressed symptomatology in response to stressful life-events (e.g., Bryant, Sutherland & Guthrie, 2007; Gibbs & Rude, 2004; Mackinger, Loschin & Leibetseder, 2000; Van Minnen, Wessel, Verhaak & Smeenk, 2005; for a review, see Raes, Hermans, Williams & Eelen, 2007).

In contrast to studies of individuals with clinical depression, there is, however, less consistency in findings from studies with non-clinical samples (e.g., Schacter, Addis & Buckner, 2007). For instance, some studies report dysphoric individuals as less specific in retrieval than non-dysphoric respondents (e.g., Goddard, Dritschel, & Burton, 1997), whereas other studies fail to detect this trend in such samples (e.g., Raes, Pousset, & Hermans, 2004). It has been noted that this inconsistent pattern of results may be due to an insensitivity of the AMT as a measure of OGM in non-clinical samples rather than the non-existence of OGM altogether in these samples. For example, item response theory analyses of AMT performance, as a framework for evaluating how well the assessment works in non-clinical groups, suggested that the AMT might not be sufficiently sensitive within such samples (Griffith et al., 2009). As such it is pertinent to further explore the use of the AMT within such non-clinical samples.

As discussed in Chapter 1 (see Section1.4.1.1.1), one way in which reduced AMS may be seen to add to depression refers to the reduced experimental exposure to past negative experiences (see Hermans et al., 2005). As noted, exposure to such cognitions is related to good psychological health (e.g., Littrell, 1998; Pennebaker & Seagal, 1999). With the absence of this inherent contact with negative past experiences prevalent in individuals with OGM it has been suggested that the process aids deliberate effects to avoid such cognitions, with the assumed functional outcome of experiential avoidance (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). A lack of exposure may initially be advantageous, however, prolonged avoidance generates the risk of intensifying the depressive course (see e.g., Hayes et al., 1996; see also Golden, Dalgleish, & Mackintosh, 2007).

Although there is some evidence of individual differences in emotion regulation strategies affecting AMS (e.g. D'Argembeau & Van der Linden, 2006; Rubin & Siegler, 2004; Richards & Gross, 2000), to date, only one known study has specifically looked at emotional avoidance in relation to AMS as measured by the AMT. The study by Hermans et al. (2005) tested the functional avoidance / OGM paradigm correlating AMS with several measures of avoidant coping strategies, including the Acceptance and Action Questionnaire. Findings from this work indicated that participants who demonstrated reduced AMS also reported use of more avoidant coping strategies. It is worth noting that in the Hermans et al. study they did not look at depression *per se*. Therefore, there has been no systematic test of emotional avoidance and AMS in relation to depression within one experiment.

Experiment 1a is an analogue study of depression and aims to test autobiographical memory specificity (AMS) as measured by the AMT in a sub-clinical student population. The experiment has three main aims; (1) to investigate the specificity of assessment for the autobiographical memory test in a sub-clinical sample. Due to inconsistencies in findings with non-clinical samples predicted outcomes are tentative, however, based on clinical findings, it is predicted that participants who display increased depression levels, as measured by the Beck Depression Inventory (BDI-II), will demonstrate differing levels of memory specificity as reported on the AMT, relative to a sample of participants reporting healthy levels of depression. Experiment 1a further aims to (2) examine reported levels of emotional avoidance, as measured by the Acceptance and Action Questionnaire (AAQ-II), in relation to reported phenomenological characteristics of positive and negative past events specificity as measured by the Memory Characteristics Questionnaire (MCQ). It is predicted that there will be a relationship between expressions of positive and negative past event phenomenological characteristics and levels of emotional avoidance emotional avoidance as measured by the AAQ-II. Lastly, Experiment 1a aims to (3) examine emotional avoidance, as measured by the AAQ-II, in relation to positive and negative past event recall specificity. It is predicted that there is a relationship between AMS and level of avoidant emotional coping style as measured by the AAQ-II. Specifically it is sought to extend on Hermans et al.'s (2005) findings by inclusion of a sub-clinical sample, and to replicate their findings of a relationship between overgeneral memory in recall and emotional avoidance.

2.2.1. Method

2.2.1.1. Participants

Forty students from Swansea University volunteered to take part in the present experiment, though after exclusion criteria pertaining to BDI-II scores (criteria for inclusion is detailed in section 2.2.2.1). Only data from thirty-three participants was utilised in the following analysis. As such the current study reports findings from 20 females and 13 males, who took part in return for course related subject pool credit. The ages of the included participants ranged from 19 to 34 years, with a mean of 24.33 years of age (σ =3.51).

2.2.1.2 Apparatus and Materials

Measures

Participants completed a series of self-report questionnaires to assess psychological health. The measures included are reported below.

The Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer & Brown, 1996). The BDI-II is a 21-item self-report instrument intended to assess the existence and severity of symptoms of depression as listed in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* Fourth Edition (DSM-IV; 1994). When presented with the BDI-II, respondents are asked to consider each statement as it relates to the way they have felt for the past two weeks, to more accurately correspond to the DSM-IV criteria. Each of the 21 items corresponding to a symptom of depression is summed to give a single score for the BDI-II. There is a four-point scale for each item ranging from 0 to 3. Scores are cumulative, with higher scores indicating greater levels of depression.

The BDI is one of the most commonly used measures of depression and often used to provide a clinical cutoff for depression in lieu of, or in combination with, other diagnostic tools. Cut score guidelines for the BDI-II are given with the recommendation that thresholds be adjusted based on the characteristics of the sample, and the purpose for use. It is generally considered that a score of less than 9 indicates no or minimal depression, scores in the range of 10–18 indicate mild-to-moderate depression, and scores from 19–29 indicate more moderate-to-severe depression, whereas scores on the BDI-II above 30 are taken to indicate severe levels of depression. However, it has been noted that a score of 0–4 may suggest possible denial of depression and a score of 40–63 may suggest possible exaggeration of depression or a histrionic or borderline personality disorder. The BDI-II is based largely on the first edition of the BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), which has indicated good reliability and strong validity in clinical and non-clinical samples (cf. Beck, Steer & Garbin, 1988 for a review). For the BDI-II the coefficient alphas have been found to be .92 for outpatients and .93 for undergraduate university level students (Beck et al., 1988).

The Beck Hopelessness Scale (BHS; Beck & Steer, 1988) is a self-report tool designed to assess the extent of positive and negative beliefs about the future during the past week. The BHS has been used in numerous studies involving suicide ideation or behaviour and is recommended for measuring the extent of negative attitudes in clinical *and* research settings (Beck et al., 1974; Beck & Steer, 1988). The BHS consists of 20 true-false statements, with each statement scored as 0 or 1. A total score is calculated by summing the pessimistic responses for each of the 20 items with BHS scores ranging from 0 to 20. The accompanying manual contains general cutoff guidelines for use in research, although it is recommended that cut-off scores should be based upon clinical decisions; patients who score 9 or above on the BHS have been found to be around 11 times more likely to commit suicide than patients who score 8 or below (Beck et al., 1989). Beck and Steer (1988) have reported high internal reliability, with Kuder-Richardson reliabilities ranging from .87 to .93, across varied clinical and non-clinical samples. The BHS has been found to have sufficient one-week test-retest reliability in psychiatric outpatient samples (r = .69; Beck & Steer, 1988) and high three-week test-retest reliability with undergraduate university level students (r = .85; Holden & Fekken, 1988).

The State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI *state* version is a 20-item scale which provides information about a person's current level of anxiety; the scale is usually administered as a self-completion questionnaire. The STAI state scale is scored on four levels of anxiety intensity from 'not at all' (1) to 'very much' (4) and scores can range from 20 (no anxious symptoms) to 80 (high level of anxious symptoms). The 20 items are divided into two groups: ten items are formed to record the presence of anxiety symptoms and the other ten items are scored to record the absence of anxiety symptoms. The latter are inverted for the purpose of calculating the sum score (Spielberger et al., 1983). There is no clinical cut off score for the STAI, but population norms are available for comparison. The instrument is widely used in research on clinical and student populations and good internal consistency has been reported (0.85 to 0.95; Smith & Lay, 1974).

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS measures positive and negative constructs as both states and traits. The state version was utilized here. Ten descriptors are used for each Positive Affect (PA) scale and Negative Affect (NA) scale to define their meanings. Participants in the PANAS are thus required to respond to a 20-item test using a 5-point scale that ranges from 'very slightly' (1) to 'extremely' (5).

Reliability and Validity reported by Watson et al. (1988) has been noted as moderately good, for the Positive Affect Scale (PA), the Cronbach alpha coefficient was 0.86 to 0.90; relative to alphas of 0.84 to 0.87 for the Negative Affect Scale (NA). Over an 8-week time period, the test-retest correlations have been seen to be between 0.47-0.68 for the PA and 0.39-0.71 for the NA (Watson et al., 1988). The PANAS has strong reported validity with measures of general distress, dysfunction and depression, as well as state anxiety.

The Life Orientation Test – Revised (LOT-R; Scheier, Carver, & Bridges, 1994). The LOT-R is a 10-item scale, with four filler items and six scale items. Respondents are asked to indicate their level of agreement with each of the items on a 4-point scale, using the response format, 'strongly agree' (1) to 'strongly disagree' (4). This gives a possible range of scores from 6-24, with higher scores indicating more optimism. LOT-R total scores are calculated by summing three positively worded and three negatively worded items (the negative items are reverse coded). Scheier, Carver and Bridges (1994) report an internal reliability coefficient of .78 for an undergraduate sample with the LOT-R.

The Acceptance and Action Questionnaire-II (AAQ-II; Bond, Hayes, Baer, Carpenter, Orcutt, Waltz, & Zettle (Submitted); Hayes, Strosahl, et al., 2004). The AAQ-II is a 10-item self report scale designed to measure experiential avoidance, that is, the extent to which respondents are willing to experience difficult psychological events such as thoughts and feelings, and the extent to which experiential avoidance is a barrier to functional behaviour. Items are rated on a 7-point Likert-type scale ranging from 'never true' (1) to 'always true' (7); the possible range of scores on the AAQ-II is 10–70, with higher scores indicating greater levels of psychological flexibility and as such lower levels of experiential avoidance. The AAQ-II has been shown to mediate outcomes in a wide range of areas including worksite stress, depression, diabetes management, and psychosis and studies have found changes in AAQ-II scores to be associated with good outcomes in anxious clients, polysubstance users, clients with emotional dysregulation, and OCD (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The AAQ-II has demonstrated very good internal consistency, and has adequate criterion-related, predictive, and convergent validities (Hayes, Strosahl, et al., 2004).

Verbal Fluency Control Task (Lezak, 1976). The verbal fluency task looks at general cognitive processing. The task require participants to think of, and to report out loud, as many words as possible beginning with certain letters from the alphabet, i.e. (and as for this study) the three letters F, A, S, as are commonly used. Participants are typically given one minute for each letter, in which to state aloud as many words as they can, excluding repetitions, proper nouns, names, numbers and sequences which involve the same basic word (i.e., swim, swimming, swimmer). The score is the mean of all the words generated (minus any exclusions) within the given time.

The Autobiographical Memory Task (AMT; Williams & Broadbent, 1986; Williams et al, 1996). The AMT is a standard memory task which requires participants to retrieve a specific autobiographical memory event from the past, in response to memory cues. Participants are typically given one minute to think of and report out loud a specific time and place when something happened to them in their past in relation to the cue words presented. Participants are informed that the memory they retrieve could be an important or trivial event, but that the memory should be something that happened on a particular time on a particular day. That is, participants are told that the memories they report should describe an event that lasted no longer than a day, and they should try to think of a different memory for each word. Examples of specific and non-specific memories are given in the instructions. Twelve words chosen from Williams et al's (1996) A&B list were used as cues to prompt participants for responses (for a full list of cue words cf. Williams et al., 1996). Of these cue words six were positively framed (i.e. success, friendship, love, happiness, wealth and enjoyment) and six were negatively framed (i.e. worry, loneliness, failure, stress, sadness and illness). The cues were presented following a standard procedure where the participants are verbally instructed to: *'Try to remember an occasion in the past when you felt* (e.g. *successful*)'.

All cue responses were recorded on a Dictaphone (Olympus VN-2100PC) and inter-rated for consistency in coding. The recorded memories were coded as being either specific or non-specific. All analyses focus on numbers of specific memories; in other words, AMS scores refer to number of specific memories generated to the entire set of words, or as split up by valence with AMS scores for positive vs. negative cues. Memories coded as specific refer to a particular event that lasted less than one day. Memories coded as non-specific were coded as either categoric, referring to an event that happened on more than one occasion (e.g., '*When I visit my parents on the weekends')* or extended, referring to an event that lasted for longer than a day (e.g., '*When I went on holiday with my boyfriend for a week to Spain'*). Additionally, 'no memory' was coded when participants either failed to report a memory or used the same memory more than once. An inter-rater reliability analysis using the Kappa statistic was performed to determine consistency among raters. A sample of 75% of the responses was rated by a second independent rater, and an inter-rater reliability of 95% (k = .95) was obtained.

The Memory Characteristics Questionnaire (MCQ; Johnson, Foley, Suengas & Raye, 1988; Johnson, Nolde, & De Leonardis, 1996). Qualitative features of memories were assessed using a modified version of the memory characteristics questionnaire. The modified version in all consisted of twelve questions. The information sought was concerned with dimensions such as sensory details of the event (i.e. visual; for example, '*My memory for this event is'. . .*', evaluated on a scale from 1 (Dim) to 7 (Sharp/Clear); '*My memory for this event involves visual detail...'* evaluated from 1 (Little or none) to 7 (A lot of detail); information about the frequency of recall since the event (e.g. '*Since it happened, I have thought[talked] about the event...'*, evaluated from 1 (not at all) to 7(many times); emotions (e.g. '*The overall tone of the memory is'. . .*', evaluated from 1 (not clear at all) to 7 (very clear); and the general vividness of the memory (e.g. '*My memory for this event is. . .*', evaluated from 1 (Sketchy) to 7 (Very detailed). All dimensions are rated on 7-point Likert scales. Participants are further required to indicate the perspective of their memory (i.e. first person versus third person observer view). The temporal distance of each particular memory is recorded, i.e. by participants responding to the question of '*About when did the event happen?'*, by indicating if the memory was from: *Just today (1), Yesterday (2), A Few days ago (3), Last week (4), A Few weeks ago (5), Last month (6), A Few months ago (7), Last year (8), In the last 5-10 years (9), or Longer than 10 years ago (10)* (if the event is a childhood memory participants are asked to indicate their age at the time of the event).The individual questions pertaining to each dimension are summed to represent assessments of the three dimensions of clarity, valence and frequency of recall, along with separate variables recorded for temporal distance and perspective.

2.2.1.3 Experimental Overview

Experiment 1a used a 2 x 2 mixed participants design, with Group (Low Depression scores vs. High Depression scores) as the between participant variable and Autobiographical Memory Specificity (overgeneral vs. specific) as the within-participant variable. All participants received the same instructions and completed the Verbal Fluency Control Task, followed by both sections of the AMT, i.e. Positive and Negative past recall, along with the MCQ. All participants completed all questionnaires, i.e. the AAQ-II, the BDI-II, the BHS, the LOT-R, the PANAS and the STAI. Participant data was categorised and analysed based on their Beck Depression Inventory responses (see Section 2.2.2.1 for group allocations to the Depressed and Non-Depressed groups). Figure 1 summarises the experimental sequence utilised for Experiment 1a.

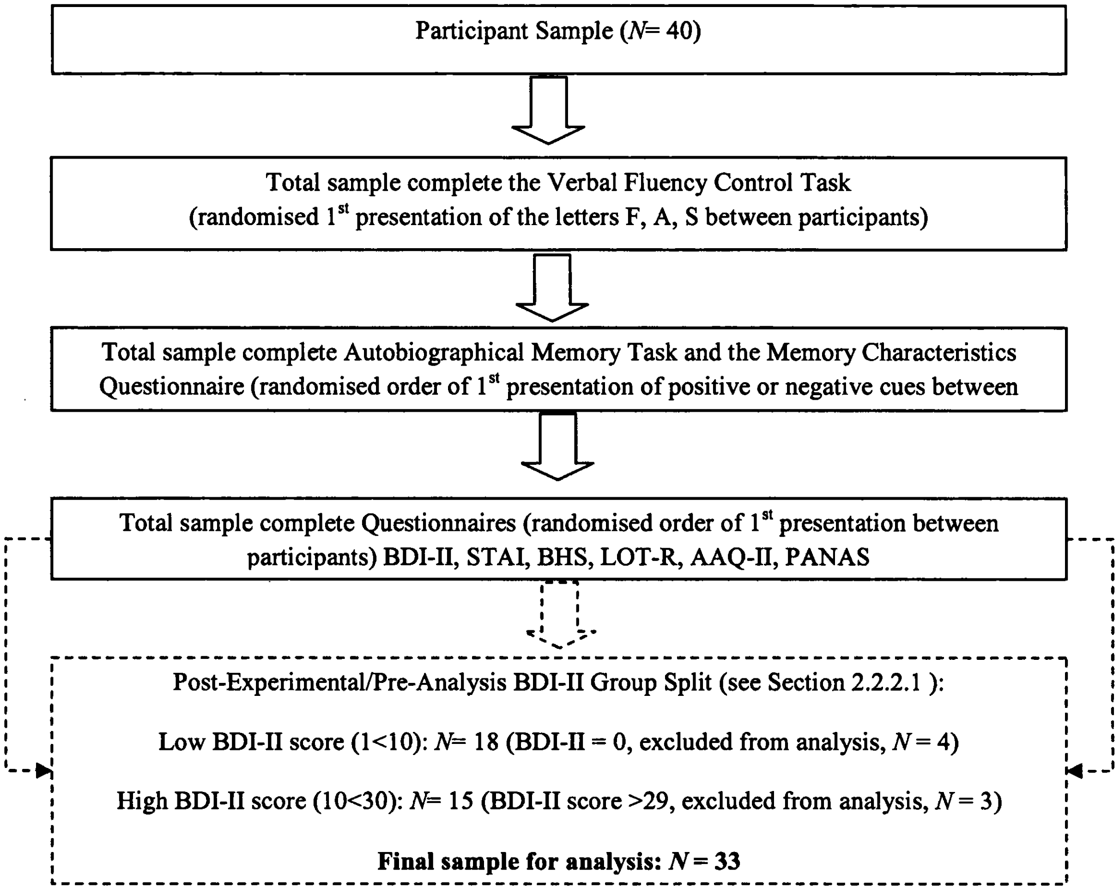


Figure 1. Overview of the Experimental Sequence for Experiment 1a.

2.2.1.4 Ethical Issues

The current experiment raised a number of ethical considerations with reference to recall of negative past events. Such past events could involve former traumatic events, or evoke a negative mood or an emotional response. In order to conduct the experiment within the appropriate ethical guidelines (The British Psychological Society, 2006), precautionary measures were taken with all participants. *Prior to* agreement to take part in the experiment each participant was presented with a written information sheet detailing the experiment aims and procedures. A minimum 24 hour 'cooling off' period followed the invitation to take part in the study and to allow volunteers to consider the written information detailing the experiment. All participants who subsequently expressed an interest in participating in the experiment received an additional verbal briefing as to the nature of the experiment. If, at this point, participants agreed to take part, they were requested to sign a consent form detailing their participant rights; i.e. all participants were informed that they were not required to proceed; that they could withdraw from the study *at any point*; and that they would not be contacted again. The consent form was counter-signed by the experimenter.

The pre-experimental briefing included details about the psychological measures to be utilised, and the experimental sequence. Participants were informed that the questionnaires contained questions that they might find personal and/or distressing. In order to address potential anxieties concerning questionnaires, it was emphasised that: (i) participants were not required to disclose any information they wanted to maintain private, as such questions could be left unanswered; (ii) there were no right or wrong answers to the questions; and (iii) that the questionnaires served merely to enable the experimenter to note individual differences that might influence performances related to the experimental procedure and it was emphasised that these would not be used in a diagnostic capacity.

Participants were informed that as part of the experimental procedure they would be asked to recall a number of positive and negative past events, some of which they may find distressing. All participants were clearly informed that, in accordance with guidelines, all data would be kept on file at Swansea Psychology Department for approximately 5 years. It was clarified that all aspects of their participation in the experiment would remain confidential, their data would not be identified by name in the final report and all data would be coded with an individual participant number. It was emphasised that data would only be disclosed to the thesis supervisor in the event of exceptional circumstances (e.g. in the event of a participant becoming distressed or expressing a wish to see the supervisor). After their participation in the experiment all participants were debriefed as to the nature and rationale of the experiment. All participants were made aware that if any psychological issues arose *directly* from the study, they could contact the thesis supervisor, whose name and contact details appeared on the written debrief sheet. The written debrief restated details provided in the verbal debrief, such as the aims and rationale of the experiment. The debrief further included information of counselling services available from Swansea University, as well as information and contact details for other local and national agencies who specialise in psychological issues. As such, further arrangements, where appropriate could be made free of charge as a forum for the discussion of any issues which may arise. No participants reported recalling a traumatic past event during the Autobiographical Memory Task. No participants reported a deflated mood or a negative emotional response upon departure. At no point during the experiment did any participants withdraw from the experiment or express dissatisfaction or distress of any kind. Prior to commencement the experiment was approved by the Department of Psychology, Swansea University Ethics Committee.

2.2.1.5 Procedure

Prior to commencement of the experiment participants were all briefed as to the nature of the study and asked to sign a consent form. Due to the fact that the study involved the recall of negative events from the past special emphasis was put on reminding participants of their right to withdraw from the study at any time without providing a reason. The Verbal Fluency Control Task (VFCT) was firstly completed, with participants given 60 seconds to provide responses to the letters F, A and S consecutively. Upon completion of the VFCT the Autobiographical Memory Task (AMT) commenced, with participants instructed that the memory they recalled could be an important or trivial event and that the memory should be of something that happened at a particular time on a particular day. To ensure that participants understood the instructions, examples of specific and non-specific replies to two practice cues (*relieved* and *tired*) were presented by the experimenter. A printed version of the instructions was given to the participants to read, this was followed by verbal instructions from the researcher. Participants were given 60 seconds in each case to retrieve a specific autobiographical memory, that is, of a specific event at a given time and place. Words were presented in a separate random cue and valence order for each participant. The cues were stated out load by the experimenter and participant responses, in form of verbal presentation, was recorded on a digital Dictaphone (Olympus VN-2100PC) and transcribed for coding according to the criteria outlined by Williams (1992). If the type of memory that the participants recalled was unclear, or if participants retrieved the same memory to more than one cue, or offered responses that related to future events, they were prompted with the words *'What is the memory that you are thinking of there?'* or *'Can you tell me a bit more about that memory?'*. Following each AMT cue word retrieval participants were asked to complete the MCQ in writing, detailing phenomenological characteristics pertaining to that particular memory. Upon completion of the AMT and MCQ participants completed the set of psychometric self-report measures and wellbeing questionnaires after which they were suitably debriefed and thanked for their participation.

2.2.2 Results and Discussion

2.2.2.1. *Group Allocation*

The current study aimed to examine performance on the Autobiographical Memory Test in a sample of sub-clinically depressed participants relative to healthy controls. Group allocation was determined via discriminating scores on the Beck Depression Inventory (BDI-II). Beck ruled out strict adhesion to cut-off points for the BDI, preferring that they be chosen according to the type of study. Beck suggested that total scores of less than 10 do not show depressive disorders; with scores of 10 to 18 indicative of mild to moderate depression, whereas scores between 19 and 29 are suggestive of moderate to severe depression. Scores of more than 30 has been suggested as symptomatic of severe depression. Further suggestions, pertaining to scores below 4, have been that such low scores may be evident of denial of depressive symptoms. Taking these suggestions into account, whilst retaining an adequate sample, the current study opted to remove any participants with a score of 0 (N= 4) or above 29 (N= 3, M= 31) in order to more accurately capture healthy participants and those at a sub-clinical level of depression. The cut off point for inclusion in the no depression group was a score of 1< 10, thus participants presenting scores of 1-9 (N= 18; M= 5.16, σ=2.28) on the BDI-II were included in this group (Non-Depressed Group). For inclusion in the sub-clinical depression group BDI-II scores recorded where 10 < 30 (N= 15; M= 13.93, σ= 3.45; Depressed Group).

2.2.2.2 *Demographics and Psychometrics*

The two groups were found to report significantly different depression levels on the BDI-II, with participants in the Non-Depressed group reporting significantly lower scores on the BDI-II than the corresponding Depressed group, $t(31) = -8.736$, $p<.001$. Similar divergence between the groups were found in relation to the other well-being measures with the depressed group consistently reporting higher levels of anxiety (STAI, $t(31) = -4.337$, $p<.001$), increased hopelessness (BHS, $t(31)= -3.582$, $p =.001$), deflated life optimism (LOT-R, $t(31) = 3.609$, $p=.001$) and reduced psychological flexibility (AAQ, $t(31) = 3.897$, $p<.001$). Mood was not found to be significantly different between the groups (PA: $p =.382$; NA: $p =.072$), though there is a clear trend indicating some level of mood variance. The psychometric means are presented with the participant demographics in Table 1. As depicted in Table 1, Depressed and Non-Depressed participants did not differ with respect to age, $t(31) =.196$, $p =.846$, representation of gender, $\chi 2$ (1) =. 609, $p =.435$, or verbal fluency, $t(31) =.160$, $p =.874$. Thus the results show that the two groups were well matched on age, gender and cognitive abilities with group differences pertaining to levels of depression, anxiety, hopelessness, optimism and emotional avoidance commonly noted to co-occur within clinical groups.

2.2.2.3 *The Autobiographical Memory Test*

To provide an idea of the content of the events that were recalled in the present experiment, the descriptions of events were classified into broad categories.

Table 1. Means and Standard Deviation (SD) of the reported Demographic information and Psychometric results for the Depressed and Non-Depressed groups in Experiment 1a.

Variable	**Depressed *(SD)***	**Non-Depressed *(SD)***
Gender: Females **(Males)**	8 (7)	12(6)
Age	24.20 *(3.29)*	24.44 *(3.76)*
VFCT	13.08 *(2.88)*	13.25 *(3.37)*
BDI	13.93 *(3.45)*	5.16 *(2.28)*
BHS	6.20 *(3.64)*	2.77 *(1.63)*
STAI	45.06 *(9.68)*	31.33 *(8.51)*
LOT-R	12.46 *(4.79)*	17.55 *(3.27)*
AAQ-II	45.40 *(5.05)*	52.72 *(5.62)*
PA	31.93 *(6.86)*	34.11 *(7.16)*
NA	17.93 *(4.87)*	14.38 *(5.86)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

2.2.2.4 *Content of Autobiographical Events*

Results of the brief content review found participants to be generating levels of experience that were life-time appropriate, and consistent with non-traumatic life time events.

Old positive memories (i.e., of events that happened over a year ago) involved episodes at parties (25%), episodes during leisure activities (including going on holiday and times with friends; 35%), romantic episodes (28%), and episodes of academic success (6%); 6% of the events reported could not be classified in these categories. Old negative memories involved accidents, illnesses, or deaths of relatives (19%); arguments with relatives or close friends (45%); the end of a romantic relationship (13%); accidents, illness, or aggression involving the participants themselves (16%); and episodes of academic failure (7%).

Recent positive memories (i.e., of events that happened within the last month) involved episodes at parties (28%), episodes of academic success (17%), romantic episodes (23%), and episodes during leisure activities (32%). Recent negative memories involved accidents, illness, or deaths of relatives (5%); episodes of academic failures (23%); accidents or illnesses involving the participants themselves (17%); conflict within and/or the end of a romantic relationship (22%); and arguments with relatives or close friends (33%).

2.2.2.5 ***Autobiographical Memory Specificity***

Following common practice in investigations of autobiographical memory specificity (AMS) (cf. Williams et al., 2006, 2007), the first response across the 12 trials, that is, memories that participants retrieved in response to the 12 AMT cue words that were specific, was used to index AMS (this variable is referred to here as memory specificity, with higher scores indicating increased specificity).

High positive correlations were seen between the number of specific memories produced under each valence category with the overall number of specific recall across valence categories (Non-Depressed group, Positive cues, r=.903, and Negative cues r=.858; Depressed group, Positive cues r=.880 and Negative cues r=.962). On average, retrieved memories for participants in the Non-Depressed group were specific 74.07% of the time across the 12 trials; whereas the Depressed participants showed somewhat diminished specificity in retrieval overall with 61.66% of the 12 trials noted as specific. Differences in specificity were noted for positive cues, with the Non-Depressed group retrieving marginally more specific memories relative to the Depressed group (M = 4.77, σ = 1.35 and M = 4.00, σ = .93 respectively; $t(31)$ = 1.887 p =.069). For negative cues specificity was again similar for both groups, with a marginal difference pertaining to the Non-Depressed group being slightly more specific in their recall (Non-Depressed group, $M = 4.11$, $\sigma = 1.13$; Depressed group, $M = 3.20$, $\sigma = 1.61$; $t(31) = 1.902$, $p = .066$). Verbal fluency scores did not correlate with the total number of cues for either group (Non-Depressed, $p = .986$; Depressed, $p = .471$).

Table 2 presents the AMT performance by both groups and as can be seen omissions were rare. It is important to acknowledge that the number of specific memories retrieved on the AMT (i.e., the level of AMS) is a direct reflection of the number of "errors" on the AMT (as the sum of number-correct scores and errors is a constant across participants). For instance, producing 6 specific memories to 12 word cues on the AMT reflects the fact that to 6 of the cue words the participant failed to generate a specific memory within the time limit.

Memory specificity was subjected to a 2 (Group: Depressed/Non-Depressed) x 2 (Cue valence: Positive/Negative) mixed analyses of variance (ANOVA). A main effect for Valence was found, with both groups retrieving more specific positive memories ($F(1, 31) = 12.868$ $p = .001$, $\eta p^2 = .293$). A main effect was also seen for group with the Non-Depressed individuals being more specific in recall overall ($F(1, 31) = 4.517$, $p = .042$, $\eta p^2 = .127$). No interaction effect was observed ($F(1, 31) = .106$, $p = .747$, $\eta p^2 = .003$). The results show that a group difference pertaining to AMS was present at a general level across valence categories.

Table 2. Autobiographical Memory Test Performance presented as Percentage of Specificity across the 12 cue words, with Mean number and Standard Deviation (SD), of Memory Specificity responses across the six cue words for each valence category as reported by the Depressed and Non-Depressed groups in Experiment 1a. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	***t*(31)**	***P***
Total % of specific memories	74.07*(18.27)*	61.66 *(19.11)*		
Total % of omissions	1.14 *(2.31)*	2.05 *(2.11)*		
Total cues	8.88 *(2.19)*	7.20 *(2.36)*	2.125	*0.042**
Positive cues	4.77 *(1.35)*	4.00 *(0.93)*	1.887	*0.069*
Negative cues	4.11 *(1.13)*	3.20 *(1.61)*	1.902	*0.066*

Note. * $p<.05$. Positive/Negative cues = Number of specific first memories relative to the detailed valence category on the Autobiographical Memory Test.

2.2.2.6 *Memory Characteristics*

Phenomenological characteristics were recorded, for each memory cued on the AMT, by the Memory Characteristics Questionnaire (MCQ). Participant responses to questions about valence, frequency and clarity of the cued memory were noted. Within group analysis found that clarity was greater for positive relative to negative cue recall for both groups (Non-Depressed group, $t(17)=3.391$, $p = .003$; Depressed group, $t(14) = 3.108$, $p = .008$). Strong congruency was seen for cue and valence within both groups, with positive memories being described with high affect relative to low affect recorded for negative memories (Non-Depressed group, $t(17) = 12.146$, $p < .001$; Depressed group, $t(14) = 6.200$, $p < .001$). However, with regards to frequency of recall – the Non-depressed group reported more frequent recall of positive relative to negative memories ($t(17) = 2.561$, $p = .020$), whereas no significant difference in frequency of recall was found for the Depressed group ($t(14) = -.479$, $p = .639$). The mean MCQ scores are reported in Table 3 below. As can be seen from Table 3 a trend indicating marginal between group differences are apparent for all the phenomenological memory characteristics, though a significant group difference was only observed for positive frequency. That is, participants in the Non-Depressed group reported recalling and talking about positive memories more frequently than the Depressed group ($t(31) = 2.070$, $p = .047$). The results demonstrate that a positive valence effect is prominent within the sample pertaining to the reported characteristics at large, though the groups diverge in response to frequency of recall, with the Non-Depressed group reporting greater consideration of positive past events relative to the Depressed group.

The results show that the Non-Depressed group reported more frequent recall of positive past events, as well as such events being from the more proximate past, relative to the Depressed group..

Table 3. Mean group scores and Standard Deviations (SD) of Phenomenological reports of Clarity, Valence and Frequency as measured by the Memory Characteristics Questionnaire for Non-Depressed and Depressed participants in Experiment 1a. T-Test score and statistical value (*p*) from between group comparisons are presented.

Memory Characteristics	**Non-Depressed (18)**	**Depressed (15)**		
	Mean *(SD)*	**Mean *(SD)***	***t*(31)**	***P***
Positive Clarity	5.83 *(1.01)*	5.79 *(0.72)*	0.121	*0.904*
Negative Clarity	4.83 *(1.26)*	4.65 *(1.27)*	0.384	*0.704*
Positive Valence	6.57 *(0.67)*	6.63 *(0.66)*	-0.248	*0.806*
Negative Valence	2.04 *(1.34)*	2.74 *(1.92)*	-1.241	*0.224*
Positive Frequency	5.36 *(1.03)*	4.66 *(0.82)*	2.070	*0.047**
Negative Frequency	4.44 *(1.07)*	4.91 *(1.77)*	-0.932	*0.358*

Note. * $p<.05$

2.2.2.7. *Temporal Distance of Recall*

The MCQ further recorded the temporal distance of the memories cued. No participants from either group reported memories recalled as being from earlier that day or from longer than 5 years ago, thus these variables are not presented nor included in any statistical calculations.

As can be seen from Table 4 the Non-Depressed group reported a high number of positive events to be from the near past, with a total of 88.8 percent of the events recalled occurring within the last month. The Depressed group reported 60 percent of the positive events recalled to have occurred within the timeframe of the last month. In regards to negative events the Non-Depressed group reported 55.6 percent of the events to have occurred within the last month relative to the Depressed group whom reported 70 percent of the negatively cued events to have occurred within this period. A One-way ANOVA found the difference in the time of event occurrence to be significant for the positively cued events, with the Non-Depressed group recalling significantly more positive events from the near past relative to the Depressed group ($F(1,31) = 11.155$, $p = .002$). No statistical significance was found between the two groups pertaining to time of events in negatively cued recall ($F(1, 31) = .595$, $p = .447$).

Table 4. Mean percentage of reported Temporal Distance of events recalled to Positive and Negative Cues for the Depressed and Non-Depressed groups in Experiment 1a.

Time of Event	**Temporal Distance of Positive Events (Mean %)**		**Temporal Distance of Negative Events (Mean %)**	
	Non-Depressed	**Depressed**	**Non-Depressed**	**Depressed**
Yesterday	11.1			
Few days ago	11.1		5.6	6.7
Last week	33.3		16.7	20.0
Few weeks ago	22.2	26.7	22.2	26.7
Last month	11.1	33.3	11.1	13.3
Few months ago	5.6	13.3	22.2	20.0
Last year	5.6	13.3	11.1	13.3
Last 5 years		13.3	11.1	

2.2.2.8. *Recall Vantage Point*

The vantage point from which participants re-experienced the autobiographical events were recorded as either from a field (first person) perspective, or as an observer (third person) perspective. Participants overall reported 69.46 % of recall of events to be from a field perspective. Of these the first person perspective was reported to be found for 77.77% of the positive events relative to 61.14% for the negative events. At a split group level of analysis the Non-Depressed group was found to recall past events form a first person perspective in 77.77 % of the 12 cued scenarios, whereas the Depressed group reported 59.47% of the cued events to be from this perspective.

Table 5. Mean Percentage of Past Events Recall observed from a First Person Perspective as reported by the Depressed and Non-Depressed groups in Experiment 1a. T-Test score and statistical value (*p*) from between group comparisons are presented.

	Percentage of Recall from of a 1st Person Perspective			
Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	***t*(31)**	***p***
Total for all cues	77.77 (12.45)	59.47 (10.37)	4.526	*0.001****
Positive events	89.81 (11.63)	63.33 (19.10)	4.899	*0.001****
Negative cues	65.74 (17.59)	55.62 (15.04)	1.755	*0.089*

Note. ****p* = .001

As can be seen from Table 5, the recall vantage point was seen to significantly differ between the two groups with the Non-Depressed group reporting significantly more past events overall to be viewed from a first person perspective relative to the Depression group. It was further seen that this group difference was retained for recall of positive events, where again the Non-Depressed group appeared to recall more positive past events from the field perspective relative to the Depressed sample, no differences were found between the groups in regards to vantage point in recall of negative past events.

First person perspective in negative event recall was found to correlate with clarity of recall of negative past events (r = .360, p = .040). No other correlations were observed for vantage point and phenomenological characteristics of past events. Relations between recall vantage point and psychometric scores found recall of positive past events from a first person perspective to correlate with lower levels of depression (BDI-II; r =-.564, p = .001) and reduced anxiety (STAI; r =-.365, p = .037), though no significance was found in correlations with hopelessness or optimism. First person perspective in negative recall was not found to correlate with either of the psychometric measures. The recall vantage point was seen to diverge between groups in regards to valence of event, with the Non-Depressed group reporting greater amounts of observations to be from a first person perspective in recall of positive events.

2.2.2.9 *Emotional Avoidance*

An interesting picture emerged when looking at the AMT data in relation to emotional avoidance, as measured by the AAQ-2. Firstly, as expected it was seen that those who reported lower depression levels were also found to report a reduced use of avoidant coping strategies, as indicated by a higher score on the AAQ-2 (BDI-II; r =-.498, p = .003). Secondly, corresponding to the AMT finding of participants in the Non-Depression group being more specific in positive recall, it was also seen that cue specificity pertaining to positive past events correlated with low emotional avoidance (r =.381, p = .029). This was supported by those low in emotional avoidance reporting more frequent thought and consideration of past positive events (r =.394, p = .023). Use of avoidant strategies was also found to correlate with the proximity of the positive past events, with higher levels of psychological flexibility related to positive events from the near past (r = -.334, p = .058). Low levels of avoidances was found to relate to increased reports of positive events as recalled from a first person perspective (r =.359, p = .040). Together these reports indicate that an increased use of avoidant strategies relates to reduced contact with, as well as reduced specificity in recall for positive past events specifically. Overall the findings pertaining to levels of emotional avoidance were seen to relate to levels of AMS.

2.2.3 Summary

In the current experiment, the relationship between overgeneral memories, sub-clinical levels of depression, and avoidant coping methods were examined in relation to phenomenological characteristics of the recalled events. In line with previous research on clinical samples it was found that the AMT was able to predict depression scores at a sub-clinical level, with Non-Depressed respondents generating more specific past events relative to the Depressed group. The effect was stable across the two valence categories with the Non-Depressed sample demonstrating greater specificity in recall of both positive and negative past events. The key findings from Experiment 1a are presented in Table 6 and as can be seen within group valence discrepancies were observed for both the Non-Depressed and the Depressed groups, with recall of positive events more clearly detailed. Affective content pertaining to negative past events was reported as more intense relative to positive events within both groups. The Non-Depressed group additionally reported more frequent consideration of past positive events; whereas the Depressed group's reported recall for positive and negative past events were of equivalent levels. A between group difference was observed with regards to frequency of recall, where the Non-Depressed group were found to report recall of positive past events as more frequent than was noted in the corresponding reports by the Depressed group. This valence discrepancy between the two groups, i.e. pertaining to frequency of positive events recall, was supported by proximity reports, with the Non-Depressed group recalling more positive events from the near past relative to the Depressed group who reported positive events recalled being of a greater temporal distance from the present. Vantage point of recall was found to relate to specificity and depression levels, with individuals who reported recalling positive past events from a first person perspective recalling a greater level of specific positive past events, as well as demonstrating lower levels of depression.

Emotional avoidance was further seen to correlate with recall of positive events as well as frequency of recall for positive past events and temporal distance of positive recall. Lower levels of emotional avoidance was seen in those who recalled positive events from the more recent past and negative events from the more distant past. Recall of positive past events from the first person perspective was seen to correlate with lower levels of emotional avoidance. Thus, the use of avoidant strategies appears to be related to deficits in contacting and elucidating positive past events in particular.

The results from Experiment 1a provide evidence of reduced levels of AMS in sub-clinical groups as supported by phenomenological reports of decreased recall from a first person perspective, reduced event clarity and affect, along with frequency of rehearsal of such past events. Emotionally avoidant individuals also displayed higher levels of depression and reduced specificity in recall of positive past events. These results support the hypothesis that reduced autobiographical memory specificity might be used as a way of regulating affect. However, in contrast to previous findings, the adoption of a less specific memory retrieval style was found to ward off the affective impact of positive relative to negative past experiences.

Experiment 1a offers support towards the AMT as an appropriate measure of AMS in a sub-clinically depressed sample. In regards to theories of mental time travel it is of interest to see if these results extend to a future thinking paradigm, as it has been noted that deficits in past recall extends to deficits in future generation. For instance, suicidal patients who present with deficits pertaining to memory specificity have been reported to similarly demonstrate such deficiencies relating to future events specificity (e.g., Williams et al., 2007). Experiment 1b employs a future thinking paradigm (Williams, Ellis, Tyers, & Healy, 1996) in an attempt to examine specificity of future events in a sub-clinical population.

Table 6. Summary of Main Aims and Findings from Experiment 1a.

	Research Aim	Hypothesis	Main Findings
1	Examine the AMT level of sensitivity in relation to sub-clinical depression.	*Sub-clinically depressed individuals will demonstrate differing levels of AMS relative to non-depressed individuals.*	*The hypothesis is supported.* The Depressed sample demonstrating a reduced level of overall AMS relative to the Non-Depressed sample (p<.05).
2	Examine reported levels of emotional avoidance (AAQ-II) in relation to phenomenological characteristics of positive and negative past events specificity as measured by the Memory Characteristics Questionnaire (MCQ).	*There is a relationship between expressions of positive and negative past event phenomenological characteristics, as measured by the MCQ and levels of emotional avoidance emotional avoidance as measured by the AAQ-II.*	*The hypothesis is supported.* A positive relationship was found for emotional avoidance and frequency of reference to past positive events (p<.05). A negative relationship was found for emotional avoidance and proximity of positive past events (p=.058). A positive relationship was found for emotional avoidance and observation al perspective of positive past events (p<.05).
3	Examine emotional avoidance (AAQ-II) in relation to positive and negative past event recall specificity (AMS).	*There is a relationship between AMS and level of avoidant emotional coping style as measured by the AAQ-II.*	*The hypothesis is partially supported.* Total past recall specificity did not relate to emotional avoidance. The relationship between AAQ-II and AMS was found to be *valence specific* with: A positive relationship was found for emotional avoidance and positive AMS (p <.029). No relationship was found in relation to emotional avoidance with recall and specificity of negative past events.

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

2.3 Experiment 1b

The deficits observed in relation to overgeneral memory specificity have also been associated with similar difficulties in imagining the future, for instance, in their study Williams et al. (1996) found that suicidal individuals, relative to non-depressed controls, demonstrated reduced AMS *and* reduced levels of specificity in relation to the generation of possible future events. According to Evans et al. (1992) both the definition of a problem and the generation of alternative solutions rely on the ability by an individual to amply address their memory 'database', and thus the ability to contact specific memories. Williams et al. (1996) suggest that the reason patients with suicidal ideation experience an insufficiency in the solving of daily tasks may be related to an inability to imagine specific events in the future. As such, in a clinical setting, future thinking deficits may work to intensify depressive symptoms, thus increasing the feeling of hopelessness (Williams, Ellis, Tyers, & Healy, 1996). This suggestion can be appreciated in light of Conway's cognitive model of autobiographical memory (e.g., Conway & Pleydell-Pearce, 2000).

As previously discussed (see Section 1.4.1.1), according to Conway's model, autobiographical memory is formally structured, with more general information (e.g. lifetime periods, e.g. teenage years) at the top, intermediate knowledge (general or extended events, e.g. the first year at university) at the second level and more specific information (event specific knowledge, e.g. graduation day) at the lowest level. If, as Conway suggests, access to specific memories of how one has coped with past situations are interrupted and the search is made short (e.g. stagnant at the intermediate level) and as such not accessible, it follows that the specific (and significantly useful) information inherent to these events cannot be employed in dealing with present problems (Evans et al., 1992). It is as such inferred in the literature that deficits in autobiographical recall will likely influence performance on tasks pertaining to future events generation.

It has further been hypothesized, in relation to deficits in AMS, that depressed individuals adopt a generic retrieval style to reduce the possibility of evoking potentially threatening (i.e., specific) memories (Williams, 1996, 2006). Williams and his colleagues have argued that the general level at which the contents of memory are accessed in depressed individuals influences the level of specificity with which those individuals can construct personal future episodes. In further support for this assumption, Williams et al. demonstrated that inducing a generic retrieval style in control participants led them to later imagine future scenarios that were also lacking in specific detail. In light of these findings and the functional avoidance theories pertaining to reduced AMS, it is likely that such avoidant coping strategies are also found in generation of future events.

Similarly to its role in autobiographical memory retrieval, recent research suggests that subjective experiences play a significant role in projections of the future also. With regards to the valence effect noted in past recall, it has been argued that a positive bias exists with the function of sustaining a positive self-concept (Baumeister, 1998; Taylor & Brown, 1988). Evidence in support of this bias has been taken from studies reporting positive experiences as incorporating more sensorial and contextual details relative to negative past experiences (Byrne, Hyman, & Scott, 2001; D'Argembeau, Comblain, & Van der Linden, 2003; Destun & Kuiper, 1999). If future thinking is inhibited by deficits in retrieval of past experiences, factors seen to influence the qualitative aspects of memory, such as the valence of an event, would likely affect representations of possible future events.

A relatively large body of evidence exists in regards to *quantitative* differences relating to the valence of imagined future events. For instance, MacLeod and Byrne (1996) found that healthy control participants were inclined to generate more positive than negative experiences in a measure of future thinking relative to depressed paracuicidal participants (see also MacLeod, Tata, Kentish, & Jacobsen, 1997). Just as Weinstein (1980) reported that individuals consistently predicted being more likely than their peers to experience positive events in the future (e.g., having a good job, owning their own home) and less likely to experience negative occurrences (e.g., being fired from a job, divorce). However, qualitative measures of the subjective experience pertaining to future events are sparse. As such there is a need to examine whether event valence similarly affects the subjective experiences of imagining the future as has been seen in studies pertaining to past recall.

Previous findings indicate that a temporal bias exists in the retrieval of past events, that is, more recent past experiences typically contain more sensorial and contextual details than memories of more remote experiences (Johnson et al., 1988). Although phenomenological characteristics in representations of future events noticeably cannot be forgotten, because these events have not yet occurred, temporal distance from the present might still be seen to affect the subjective experience associated with the thoughts of future happenings. In fact, Trope and Liberman (2003) have proposed that *'the greater the temporal distance from a future event, the more likely is the event to be represented abstractly in terms of a few general features that convey the perceived essence of the events rather than in terms of concrete and more incidental details of the event'* (p. 405). Projection into more proximate future events may, as such, come with more relative ease, as they may already have clear representations of the kinds of events that are likely to occur in the near future; with individuals likely to already have considered some kinds of projects and decisions they intend to make within a proximate time frame. In comparison, the distant future may be more ambiguous and undecided upon, thus making it more difficult to clearly construct images thereof.

A clear rationale for examining phenomenological characteristics relates to the inherent difference between past and future cognitions, with future scenarios being entirely imaginary. As such, if deficits in specificity of future events exist it is imperative to understand how. Such a deficit is related to episodic memory deficits. In this regard investigation into qualitative information relevant to the specificity of episodic future events is needed. With recent indications from the future thinking literature suggesting that deficits in positive future thinking is a feature of depression, it was anticipated that participants may diverge in terms of specificity of positively cued future events relative to negative and overall specificity. To this end Experiment 1b has three main aims, first (1) to investigate the specificity of assessment by the future cuing task in a sub-clinical sample; it is predicted that Experiment 1b would replicate findings from the future thinking literature demonstrating a relationship between depression and future event specificity. It is predicted that expression of positive and negative future event phenomenological characteristics will differ between those who report higher levels of emotional avoidance relative to those who report low levels of emotional avoidance as measured by the AAQ-II. Experiment 1b further sought to (2) examine reported levels of emotional avoidance as measured by the Acceptance and Action Questionnaire (AAQ-II) in relation to phenomenological characteristics of positive and negative future events specificity, as measured by the Future Characteristics Questionnaire (FCQ).; and (3) to investigate emotional avoidance (AAQ-II) in relation to positive and negative future event specificity (FES) as measured by the Future Cueing Task (FCT). It is predicted that FES and level of avoidant emotional coping (AAQ-II) will be related.

2.3.1 Method

2.3.1.1 Participants

Thirty-three adults from Swansea University volunteered to take part in the current study, though after exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in section 2.3.2.1), only data from thirty participants was utilised in the following analysis. As such, the subsequent information pertains to the thirty participants included, of which 11 were male and 19 female. The ages of the participants ranged from 19 to 29 years, with a mean of 23.26 (σ = 3.25) years of age. All participants were either undergraduate or postgraduate students at Swansea University recruited through advertisement within the Psychology Department.

2.3.1.2 Apparatus and Materials

The apparatus and materials were identical to those employed in Experiment 1a, inclusive of all psychometric and well being self-report questionnaires (BDI-II; BHS;

STAI; AAQ-2; LOT-R; PANAS; Verbal Fluency) with the exception of the future oriented materials. The shift in focus from autobiographical recall to autobiographical future thinking necessitated the use of future oriented materials, that is, the AMT was replaced here by the Future Cueing Task and the MCQ was modified to allow for phenomenological characteristics of future events to be assessed, by the specifically constructed Future Characteristics Questionnaire (FCQ).

The Autobiographical Future Cuing Task (FCT; Williams et al., 1996). The future cuing task was designed after the AMT, and is thus identical in regards to the process and procedures involved. In the FCT version, as a future thinking paradigm, respondents are cued by the use of positive and negatively framed cue words to imagine a specific moment in the future when they will experience events related to the presented cue. The cues are read aloud by the experimenter and typically preceded by practice words. Participants are given 60 seconds to generate and report the future event. Twelve words chosen from Williams et al's (1996) A&B list were used as cues with which to prompt participants for responses (for a full list of cue words cf. Williams et al, 1996). The cue words where the same as those utilized for the AMT test in experiment 1a, that is, six were positively framed (i.e. success, friendship, love, happiness, wealth and enjoyment) and six were negatively framed (i.e. worry, loneliness, failure, stress, sadness and illness). The cues were presented following the same standard procedure as for the AMT though the prefix of *'Try to remember an occasion in the past when you felt...'* was replaced with *'Try to think of **a time in the future** when you may feel...'* (e.g., *'successful'*).

All cue responses were recorded on a Dictaphone (Olympus VN-2100PC) and inter-rated for consistency in coding. As with the AMT, a specific event was defined as an event that would happen on a particular day, and lasting no longer than a day. The recorded future events were then coded as either specific or non-specific. Future events coded as non-specific were coded as either categoric, referring to an event that may happen on more than one occasion (e.g., *'When I have children')* or extended, referring to an event that may last for longer than a day (e.g., *'When I go on holiday with my* *family'*). Additionally, experimenters coded 'no event' when participants either failed to produce a future event or used the same event more than once. An inter-rater reliability analysis using the Kappa statistic was performed to determine consistency among raters. A sample of 85% of the responses was rated by a second independent rater, and an inter-rater reliability of 93% ($k = .93$) was obtained.

The Future Characteristics Questionnaire (FCQ; cf. MCQ: Johnson, Foley, Suengas & Raye, 1988; Johnson, Nolde, & De Leonardis, 1996). The Future Characteristics Questionnaire was designed after the Memory Characteristics Questionnaire to assess qualitative features of perceived autobiographical *future* events. The modified FCQ in all consist of twelve questions. These questions make up information about dimensions such as sensory details of the event (visual; for example, '*My image for this event is'*. . .', evaluated from 1(Dim) to 7 (Sharp/Clear); information about the frequency of recall since the event: *('I have thought about this event before/ I have talked to someone about this event occurring ... '*, evaluated from 1 (Not at all) to 7 (Many times); emotions (e.g. '*The overall tone of the event is'*. . .', evaluated from 1(Negative) to 7 (Positive); and the general vividness of the future event (e.g. '*The overall vividness of this event is... '*, evaluated from 1(Vague) to 7 (Very Vivid). All dimensions are rated on 7-point Likert scales. Participants are required to indicate their subjective perspective taken when envisaging the event, i.e. first person versus third person observer view, or neither. Participants are also asked to indicate the temporal distance of the future event ('*about when will the event happen?'* With participants asked to indicate if the event is thought to occur: *Later today (1), Tomorrow (2), In a few days (3), Next week (4) , In a few weeks (5), Next month (6), In a few months (7), Next year (8), In the next 5-10 years (9), or further than 10 years away (10).* Participants are further requested to indicate how likely they think it is that the event will occur on a 7-point Likert scale, evaluated from 1 (Not at all likely) to 7 (Very likely).

The individual questions pertaining to each dimension are summed to represent composite assessments of clarity, valence and frequency of the future events, along with separate variables recorded for temporal distance, likelihood and subjective perspective.

2.3.1.3 Experimental Overview

Experiment 1b used a 2 x 2 mixed participants design, with Group (Low Depression scores vs. High Depression scores) as the between participant variable and Autobiographical Memory Specificity (overgeneral vs. specific) as the within-participant variable. All participants received the same instructions and completed the Verbal Fluency Control Task, followed by both sections of the FCT, i.e. Positive and Negative future event generation, along with the MCQ. All participants completed all questionnaires, i.e. the AAQ-II, the BDI-II, the BHS, the LOT-R, the PANAS and the STAI. Participant data was categorised and analysed based on their Beck Depression Inventory responses (see Section 2.2.2.1 for group allocations to the Depressed and Non-Depressed groups). Figure 2 summarises the experimental sequence utilised for Experiment 1b.

2.3.1.4 Ethical Issues

The current experiment raised a number of ethical considerations, similarly to recall of negative past events in Experiment 1a, generation of negative future events could bring about a negative mood or an emotional response. The same ethical guidelines (The British Psychological Society, 2006) and sequential steps were followed as in Experiment 1a, with precautionary measures taken with all participants (see Section 2.2.1.4). That is, (I) *prior to* agreement to take part in the experiment each participant was presented with a written information sheet detailing the experiment aims and procedures. A minimum 24 hour cooling off period followed the invitation to take part and deliberation of the written information. (II) All participants who subsequently expressed an interest in participating in the experiment received an additional verbal briefing as to the nature of the experiment. (III) If, at this point, participants agreed to take part, they were requested to sign a consent form detailing their participant rights; i.e. all participants were informed that they were not required to proceed; that they could withdraw from the study *at any point*; and that they would not be contacted again. The consent form was counter-signed by the experimenter. The briefing included details about the psychological measures to be utilised in the experimental sequence and participants were informed that the questionnaires contained questions that they might find personal and/or distressing. In order to address potential anxieties concerning questionnaires, it was emphasised that: (i) participants were not required to disclose any information they wanted to maintain private, as such questions could be left unanswered; (ii) there were no right or wrong answers to the questions; and (iii) that the questionnaires served merely to enable the experimenter to note individual differences that might influence performances during the experimental procedure and would not be used in a diagnostic capacity.

(IV) Participants were informed that as part of the experimental procedure they would be asked to recall a number of positive and negative past events, some of which they may find distressing. All participants were clearly informed that, in accordance with guidelines, all data would be kept on file at Swansea Psychology Department for approximately 5 years. (V) It was clarified that all aspects of their participation in the experiment would remain confidential, their data would not be identified by name in the final report and all data would be coded with an individual participant number. It was emphasised that data would only be disclosed to the thesis supervisor in the event of exceptional circumstances (e.g. in the event of a participant becoming distressed or expressing a wish to see the supervisor). (VI) After their participation in the experiment all participants were debriefed as to the nature and rationale of the experiment. All participants were made aware that if any psychological issues arose *directly* from the study, they could contact the thesis supervisor, whose name and contact details was provided on a written debrief sheet. The written debrief restated details provided in the verbal debrief, such as the aims and rationale of experiment. The debrief further contained information of counselling services available from Swansea University, as well as information and contact details for other local and national agencies who specialise in psychological issues. As such, further arrangements, where appropriate could be made free of charge as a forum for the discussion of any issues which may arise. No participants reported feeling upset by the generation of a negative future event during the Future Cuing Task. At no point during the experiment did any participant withdraw from the experiment or express dissatisfaction or distress of any kind; no participants reported a deflated mood or having experienced a negative emotional response upon departure. The experiment was ethically approved by the Department of Psychology Ethics Committee prior to commencement.

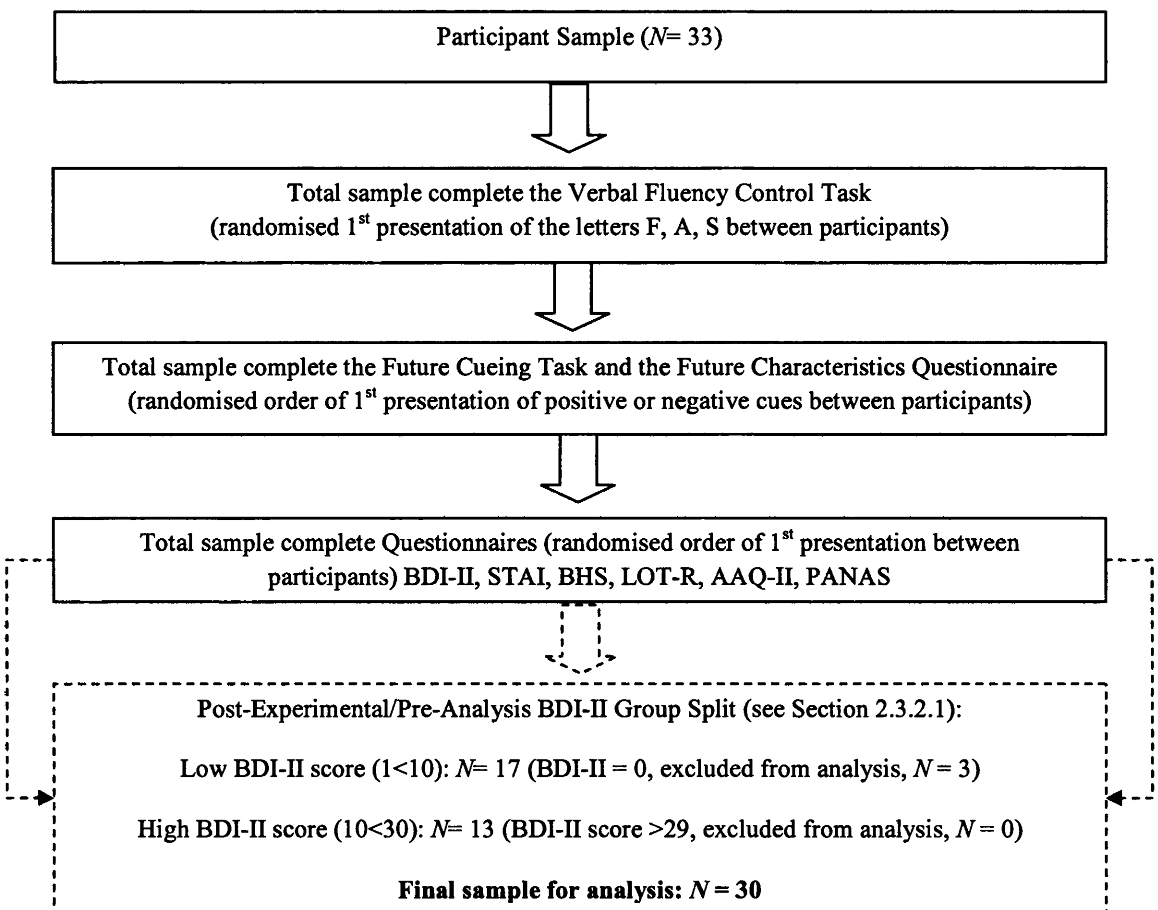


Figure 2. Overview of the Experimental Sequence for Experiment 1b.

2.3.1.5 Procedure

Participants were invited to complete the experiment in specifically designated psychology laboratories consisting only of a desk and chair. Prior to commencement participants were briefed as to the nature of the study and asked to sign a consent form. Due to the nature of the study concerning anticipation of negative future events, emphasis was put on the participants' right to withdraw from the study at any time without giving a reason. The Verbal Fluency Control Task (VFCT) was firstly completed by requesting participants to state aloud responses to the letter cues F, A and S within the given time frame of 60 seconds per letter. Upon completion of the VFCT the Future Cueing Task (FCT) commenced. Participants were informed that for the FCT the event they generated could be an important or trivial event, though that the future event should be of something that may happen, and to be restricted to a particular time on a particular day. To ensure that participants understood the instructions, examples of specific and non-specific replies to two practice cues (*relieved* and *tired*) were presented by the experimenter. Verbal and printed instructions were provided. Participants were given 60 seconds in each case to generate a specific autobiographical future event, that is, a specific event at a given time and place. The positive and negative cue words were presented in a separate and random order for each participant. The cues were stated aloud by the experimenter and participant responses, in form of verbal generation, were recorded on a digital Dictaphone and transcribed for coding according to the criteria set by Williams (1992). If the type of future event that the participants generated was unclear, or if participants produced the same event to more than one cue, or offered responses that related to past events, they were prompted with the words *'What is the future event that you are thinking of there?'* or *'Can you tell me a bit more about this future event?'*. If the participants failed to generate an event within the time limit or talked about things that were not future events (e.g., an opinion that is associated with the cue), their responses were classed as 'no event'. Following each FCT cue word participants were asked to complete the FCQ in writing, detailing phenomenological characteristics pertaining to that particular future event. Upon completion of the FCT and

FCQ participants completed the set of psychometric self-report measures and wellbeing questionnaires after which they were suitably debriefed and tanked for their participation.

2.3.2 Results and Discussion

2.3.2.1 *Group Allocation*

The current study sought to examine performance on the Future Cueing Task in a sample of sub-clinically depressed participants relative to healthy controls. Group allocation was decided via discriminating scores on the Beck Depression Inventory (BDI-II). As in Experiment 1a, consideration was given to Beck's suggestive cut-off criteria, thus participants with a score of 0 ($N = 3$) or above 29 ($N = 0$) where excluded from the analysis. As before the BDI-II inclusion criteria for the Non-Depressed group was a score of 1< 10, thus participants presenting scores of 1-9 ($N = 17$; $M = 5.38$, $\sigma = 2.75$) whereas inclusion in the sub-clinical depression group required BDI-II scores of 10 < 30 ($N = 13$; $M = 15.11$, $\sigma = 2.66$; Depressed Group).

2.3.2.2 *Demographics and Psychometrics*

The two groups were found to report significantly different depression levels on the BDI-II, with participants in the Non-Depression group reporting significantly lower BDI-II scores than the corresponding Depression group, $t(28) = -9.767$, $p<.001$. Similar divergence between the groups were found in relation to the other well-being measures with the Depression group consistently reporting higher levels of anxiety (STAI, $t(28) = -2.009$, $p = .054$), increased hopelessness (BHS, $t(28) = -2.304$, $p = .029$), deflated life optimism (LOT-R, $t(28) = 2.100$, $p = .045$) and reduced psychological flexibility (AAQ, $t(28) = 3.663$, $p = .001$). Mood was not found to be significantly different between the groups (PA: $p=.104$; NA: $p=.113$). The psychometric means are presented with the participant demographics in Table 7. As depicted in Table 7, Depressed and Non-Depressed participants did not differ with respect to age, $t(28) = -.498$, $p=.622$ representation of gender, $\chi 2$ (1) =. 889, $p = .346$ or verbal fluency, $t(28) = -.273$, $p = .787$.

It can be seen that the groups were well matched for age, gender and cognitive abilities as well as mood level. Between group differences pertain to the psychometric assessments and the findings are consistent with the depression literature of which the co-occurrence of increased levels of depression, anxiety, hopelessness and lower levels of optimism and emotional avoidance is denoted within clinical groups.

2.3.2.3 *Content of Autobiographical Future Events*

An indication of the future events generated was noted and categorized similarly to the past events in Experiment 1a. Positive events that might happen in the near future (i.e., in the next few months) were such things as academic or career success (50%), leisure activities (18%), romantic events (10%), parties (10%); though 12% of the events could not be classified in these categories. Negative events that might happen in the near future were such things as academic failure (50%), conflict within and/or the end of a romantic relationship (18%), illness, accidents or deaths of relatives (8%), illness or accidents involving the participants themselves (12%), and arguments with relatives or close friends (14%). Positive events that might happen in the distant future (i.e., in the next 5–10 years) were such things as weddings (34%), starting a family or the birth of a child (25%), academic and career success (21%), and buying a house (13%); with 7% of the events unable to be classified in these categories. Finally, negative events that might happen in the distant future were such things as accidents, severe illnesses or deaths of relatives (50%); accidents or severe illnesses involving the participants themselves (15%); failure at work (10%); and relationship problems/breakdown (15%); with 10% of the events reported not fitting either of the categories.

The brief content overview demonstrates that the events generated to the presented cues are sample appropriate to socially conceived probable future outlooks, with the inclusion of such perceived 'milestones' as marriage, career development and family life, as well as lifetime expectancies such as illness and the inevitable event of death (here pertaining to relatives or other loved ones, no participants reported thoughts of own death).

Table 7. Demographics and Psychometric tests Mean scores and Standard Deviations (SD) as reported by the Depressed and Non-Depressed groups in Experiment 1b.

Variable	Depressed *(SD)*	Non-Depressed *(SD)*
Gender: Females **(Males)**	12 **(5)**	7**(6)**
Age	23.53 *(3.28)*	22.92 *(3.32)*
VFCT	12.86 *(1.91)*	12.68 *(1.49)*
BDI	15.11 *(2.66)*	5.38 *(2.75)*
BHS	5.41 *(3.89)*	2.84 *(1.06)*
STAI	42.64 *(11.43)*	34.92 *(8.92)*
LOT-R	12.52 *(3.71)*	15.31 *(3.42)*
AAQ-II	40.53 *(10.72)*	53.23 *(7.31)*
PA	28.88 *(9.02)*	34.00 *(7.10)*
NA	15.76 *(6.64)*	12.46 *(3.30)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

2.3.2.4 *The Future Cueing Task*

The common practice for investigations of autobiographical memory specificity (AMS) (see Williams et al., 2006, 2007), was adopted for use with the FCT, thus the first response across the 12 trials, that is, future events that participants generated in response to the 12 FCT cue words that were specific, were used to index Future Event Specificity (FES; this variable is referred to here as future event specificity, with higher scores indicating increased specificity).

High positive correlations were seen between the number of specific future events produced under each valence category with the total number of specific future events across the valence categories (Non-Depressed group positive cues, r=.809, and negative cues r=.909; Depressed group, positive cues r=.827 and negative cues r=.922).

On average, future events generated by participants in the Non-Depressed group were specific 69.87% of the time across the 12 trials; whereas the Depressed participants showed somewhat diminished specificity in their production of future events overall, with 58.82% of the 12 trials noted as specific. Differences in specificity were predominantly noted for positive cues, with the Non-Depressed group more specific in relation to future events relative to the Depressed group (M = 4.84, σ = .98 and M = 4.06, σ = 1.08 respectively; $t(28)$ =2.043 p=.051). Specificity in response to negative cues was similar within both groups with a marginal difference pertaining to the Non-Depressed group being slightly more specific in their description of events relative to the Depressed group (Non-Depressed group, M = 3.53, σ = 1.39; Depressed group, M = 3.00, σ = 1.58); though this difference was not found to be statistically significant, $t(28)$ =.973, p =.339). Verbal fluency scores did not correlate with the total number of cues for either group (Non-Depressed, p=.750; Depressed, p=.422).

Table 8 presents performance on the FCT for both groups, and as can be seen omissions were rare. It is important to acknowledge, as with the AMT, that the number of specific events generated on the FCT (i.e., level of FES) is a direct reflection of the number of "errors" on the FCT (as the sum of number-correct scores and errors is a constant across participants). For instance, producing 8 specific future events to 12 word cues on the FCT reflects the fact that to 8 of the cue words the participant failed to generate a specific future event within the time limit.

Future event specificity was subjected to a 2 (Group: Depressed/Non-Depressed) x 2 (Cue valence: Positive/Negative) mixed analyses of variance (ANOVA). A main effect for Valence was found, with both groups producing more specific positive future events ($F(1, 28)$ = 24.212, p<.001, ηp^{2} = .464). No main effect was seen for group ($F(1, 28)$ = 2.589, p =.119, ηp^2 =.085). Nor was an interaction effect observed ($F(1, 28)$ = .268, p =.609, ηp^2 =.009). These results indicate that FES as such may not be a discriminating factor relating to depression; however a positivity bias is observed for the healthy controls in line with previous research pertaining to such a self-serving optimistic predisposition.

Table 8. Performance on the Future Cueing Task presented as Mean Percentage of Memory Specificity, Mean number and Standard Deviation of Future Event Specificity responses across the six cue words for each valence category within the Depressed and Non-Depressed groups in Experiment 1b. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	***t*(28)**	***p***
Total % of specific memories	69.87*(17.19)*	58.82 *(19.64)*		
Total % of omissions	1.11*(2.31)*	2.74*(1.97)*		
Total cues	8.88 *(2.19)*	7.20 *(2.36)*	1.609	*0.119*
Positive cues	4.84 *(0.98)*	4.06 *1.08)*	2.043	*0.051**
Negative cues	3.54 *(1.39)*	3.00*(1.58)*	0.973	*0.339*

Note. **p* =.051. Positive/Negative cues = number of specific future events relative to the detailed valence category on the Future Cueing Test.

2.3.2.5 *Future Event Characteristics*

Phenomenological characteristics were recorded for each future event cued on the FCT, by the Future Characteristics Questionnaire (FCQ). Participant responses to questions about valence, frequency and clarity of the cued event were recorded. Within group analysis found that participants in the Non-Depressed group reported greater clarity for positively (M = 5.8, σ =.62) relative to negatively (M = 4.7, σ = 1.36; $t(12)$ = 2.524, p =. 027) cued future events. Whereas no significant valence difference was observed for clarity in the Depressed group ($t(16)$ = 1.825, p = .087). Strong congruency was seen for cue and valence with positive future events being described with high affect ratings relative to low affect recorded for negative events within both groups (Non-Depressed, $t(12)$ = 16.528, p<.001; Depressed group, $t(16)$ = 24.846, p<.001). With regards to frequency of thoughts about the future event – the Non-Depressed group reported more frequent thoughts about positive relative to negative future events ($t(12)$ = 2.877, p=.014), whereas no significant valence difference pertaining to frequency of future thinking was found for the Depressed group ($t(16)$ = -1.330, p=.202).

The FCQ mean scores are reported in Table 9. As can be seen from Table 9 marginal between group differences are apparent for all the phenomenological future event characteristics, though a significant group difference was only observed for positive frequency. That is, participants in the Non-Depressed group reported thinking and talking about positive future events more frequently than the Depressed group ($t(28) = 3.065, p = .005$).

Table 9. Mean scores and Standard Deviations (SD) for the three dimensions of Clarity, Valence and Frequency as assessed by the Future Event Characteristics Questionnaire within the Depressed and Non-Depressed groups in Experiment 1b. T-Test score and statistical value (*p*) from between group comparisons are presented.

Memory Characteristics	Non-Depressed (13)	Depressed (17)		
	Mean *(SD)*	**Mean *(SD)***	***t*(28)**	***p***
Positive Clarity	5.76 *(0.61)*	5.28 *(1.22)*	1.284	*0.210*
Negative Clarity	4.72 *(1.36)*	4.70 *(1.52)*	0.014	*0.989*
Positive Valence	6.76 *(0.40)*	6.78 *(0.49)*	-0.127	*0.899*
Negative Valence	2.03 *(1.02)*	1.67 *(1.92)*	1.123	*0.271*
Positive Frequency	5.31 *(1.03)*	3.96 *(1.30)*	3.065	*0.005***
Negative Frequency	3.74 *(1.29)*	4.41 *(1.10)*	1.521	*0.139*

Note. $^{**}p<.01$

2.3.2.6 *Temporal Distance*

The FCQ recorded the temporal distance of the future events cued. Participants from neither groups reported future events as generally occurring 'later today', 'tomorrow', 'in a few days' or 'further than 10 years' (i.e. 1 person described 2 positively cued event as occurring in the next day, no individuals referred to events occurring that day or in a few days, and 3 people referred to 1 negative event occurring in further than 10 years time), thus upon averaging the total future distance reports these variables were omitted, and are not presented in Table 10, nor separately included in any statistical calculations. As can be seen from Table 10 the Non-Depressed group reported more events for the near future in response to positive cues, with a total of 92.3 percent of the events generated occurring within the next few months. The Depressed group reported 47.1 percent of the positive events generated to be occurring within the same time-frame.

In regards to negative events the Non-Depressed group anticipated 77 percent of the events generated to take place within the next few months, relative to the Depressed group whom anticipated 82.2 percent of the negatively cued events to occur within this period. A One-way ANOVA found the difference in the time of event occurrence to be significant for the positively cued events, with the Non-Depressed group anticipating significantly more positive events to take place in the near future relative to the Depressed group ($F(1,28) = 32.399$, $p < .001$). No statistical significance was found between the two groups pertaining to time of occurrence of negative future events ($F(1,28) = 1.299$, $p = .264$).

The BDI-II and the STAI was found to correlate with positive event distance, that is the closer in time positive events were perceived to be the lower participants ratings of depression and anxiety were (BDI-II; $r = .645$, $p < .001$; STAI, $r = .370$ $p = .044$). No correlations were found for hopelessness, nor for optimism and temporal distance, nor were any correlations found for negative event distance with any of the psychometric measures.

Table 10. Mean Percentage of reported Temporal Distance of Events generated to Positive and Negative Cues as reported by the Depressed and Non-Depressed groups in Experiment 1b.

Time of Event	Temporal Distance of Positive Events (Mean %)		Temporal Distance of Negative Events (Mean %)	
	Non-Depressed	**Depressed**	**Non-Depressed**	**Depressed**
Next week	38.5		7.7	17.6
In a few weeks	23.1	5.9	15.4	23.5
Next month	30.8	5.9	15.4	17.6
In a few months		35.3	38.5	23.5
Next year	7.7	35.3	7.7	11.8
Next 5-10 years		17.6	15.4	5.9

Temporal distance of negative future events was found to correlate with FES for positive events ($r = .372$, $p = .043$); that is, the more distant a negative future event was placed to be, the more specific participants were in their generation of positive events. Temporal distance of negative events also approached significance in relation to FES for negative future events (r = .343, p =.063), thus the more distant the negative event was placed to be the more likely participants were to be specific in its depiction. Temporal distance of positive future events was found to correlate with the frequency of thinking or talking about positive future events (r = -.410, p =.025), that is, events anticipated to occur in the near future were reported to be recurrently considered in thought or conversation by the participants.

2.3.2.7 *Likelihood of Events Occurring*

The FCQ further recorded the participants' likelihood rating of the future events occurring. One way ANOVA analysis found a significant difference between groups in relation to positive future events, with the Non-Depressed group rating these as more likely to occur (M = 5.54, σ = .88) relative to the Depressed group (M = 4.88, σ = 91; F(1, 28) = 3.971, p =.056). The Depressed group reported marginally stronger belief in negative events occurring (M = 5.1, σ = .67) relative to the Non-Depressed group (M = 4.94, σ = .93), though this difference was not found to be significant, F(1, 28) =.258, p =.615. No correlations were found for event specificity and likelihood ratings.

2.3.2.8 *Future Event Vantage Point*

The vantage point of participants pre-experience of the autobiographical future events were recorded as either from a field (first person) perspective, or as an observer (third person) perspective. Participants overall reported 68.61 % of recall of events to be from a field perspective. Of these the first person perspective was reported to be found for 69.99% of the positive events relative to 67.22% for the negative events. At a split group level of analysis the Non-Depressed group was found to perceive future events form a first person perspective for 73.07 % of the 12 cues, whereas the Depressed group reported 65.19% of the future events to be from this perspective.

As can be seen from Table 11, the future event vantage point was not significantly different for the two groups. It was, however, found that the Non-Depressed group perceived a greater degree of future positive events to be observed from a first person perspective relative to the Depressed group.

No differences were found between the groups in regards to vantage point in generation of negative future events. Positive event specificity was found to correlate with first person perspective, that is individuals whom perceived positive future events from a first person perspective were more specific in their generation of positive future events ($r = .417$, $p = .022$). A first person view of positive events was further related to increased clarity ($r = .359$, $p = .052$) and frequency in consideration ($r = .488$, $p = .006$) of positive future events. Proximity of future events generated were also seen to relate to use of first person perspective ($r = -.520$, $p = .003$). Interestingly first person vantage point in negative projection was found to relate to reduced specificity of negative future events ($r = -.373$ $p = .042$). No other correlations were observed for vantage point and phenomenological characteristics of future events.

Table 11. Mean Percentage of Future Events observed from a First Person Perspective within the Depressed and Non-Depressed groups in Experiment 1a. T-Test score and statistical value (*p*) from between group comparisons are presented.

	Percentage of Future Events Perceived from 1st Person Perspective			
Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	***t*(28)**	***p***
Total for all Events	73.07 (13.24)	65.19 (11.50)	1.742	*0.092*
Positive Events	82.05 (14.37)	60.78 (15.52)	3.837	*0.001******
Negative Events	64.11 (19.05)	69.61 (14.71)	-0.894	*0.379*

Note. ***p=.001

Relations between event vantage point and psychometric scores found positive future events from a first person perspective to correlate with lower levels of depression (BDI-II; r =-.533, p = .002), though no significance was found in correlations with anxiety, hopelessness or optimism. First person perspective in negative future event generation was not found to correlate with either of the psychometric measures.

These results indicate that frequent consideration of positive events, from a self-in-context point of view, relate to the probability given of the proximity of such positive future events occurring. The relation to depression levels here is evident from the Depressed groups' failure to indicate the likely occurrence of such positive future events relative to the Non-Depressed group.

2.3.2.9. *Emotional Avoidance*

Given the proposed functions of deficits in specificity as pertaining to a level of functional avoidance it was of particular interest to explore the use of avoidant coping strategies in relation to future thinking. Emotional avoidance (as measured by the AAQ-2) was found to correlate negatively with the BDI-II (r = -.629, p <.001), that is, those who reported lower depression levels correspondingly reported low levels of emotional avoidance (represented as higher scores on the AAQ-2).

No correlations were found in relation to emotional avoidance and future event specificity *per se.* However, those who reported lower levels of emotional avoidance were more likely to view positive future events from a first person perspective (r = .377, p = .040), and also placed positive future events to occur in the more proximate future (r = -.353, p =.055). It was also seen that increased use of avoidant coping strategies related to reports of reduced consideration, in form of prior thoughts or conversation, for negative future events (r = -.361, p = .050).

Split group analysis found improved levels of clarity (r = .670, p =.012) and increased consideration (r = .560, p = .046) of positive future events in relation to lower levels of emotional avoidance reported within the Non-Depressed group. Whereas an interesting finding within the Depressed group was that increased use of avoidant coping strategies (as reflected in lower AAQ-2 scores) was related to the increased expectancy of negative future events occurring ($r = -.629, p < .001$).

These results indicate that emotional avoidance does not relate to specificity of future events *per se*, rather it appears that belief in the event occurring, with regards to conceived probability, holds stronger connotations for a relation with depression. This is evident from the relation observed within the Depressed group whose levels of emotional avoidance were seen to correspond to increased expectancy of negative events occurring in the future.

2.3.3 Summary

A group difference in future events specificity between the Depressed and Non-Depressed groups was found, with this diverge seen to be valence specific. That is, differences in future event specificity between the two groups was only seen in regards to positive future events, with the Non-Depressed individuals generating future events that were more specific relative to the depressed sample. The key findings from Experiment 1b are presented in Table 12 and as can be seen a clear valence effect was found within the Non-Depressed group. That is, the Non-Depressed respondents reported stronger clarity for positive future events along with increased frequency in talking and thinking about positive future events relative to the Depressed group. Both groups reported heightened intensity of affect in generation of positive future events relative to negative future events. Between group differences were noted for frequency of generating positive future events, with the Non-Depressed group reporting more frequent pre-consideration of the events generated in response to the cueing task. The Non-Depressed group also reported positive events as more likely to occur relative to the Depressed group.

The proximity of the anticipated events was found to be associated with levels of depression and anxiety as well as emotional avoidance. With the anticipation of close proximity for positive future events related to greater psychological well-being. Similarly, reports of observing positive events from a first person perspective were related to lower levels of depression and emotional avoidance as well as increased specificity, clarity, frequency and proximity of future events generated. Perceiving negative future events from a first person perspective were related to decreased levels of specificity in generation of negative future events.

No correlations were found for emotional avoidance and future event specificity on any level of analysis, although the phenomenological characteristics reported in correspondence to the future events were able to provide some insight. Here it was found that lower levels of emotional avoidance were related to clarity of positive events and frequency of negative future event generation. Thus, indicating that increased emotional flexibility relates to better imagery of positive events and reduced focus on negative event occurrence. Within group analysis further found that within the Non-Depressed group lower levels of emotional avoidance were related to improved clarity of future events. Interestingly, the Depressed group reported an increased use of avoidant coping strategies, which was seen to relate to a decreased expectancy of negative future events occurring.

Table 12. Summary of Main Aims and Findings from Experiment 1b.

	Research Aim	Hypothesis	Main Findings
1	Replicate findings from the clinical future thinking literature by examining autobiographical FES in participants who report higher levels of depression as measured by the BDI-II relative to those who score low on the BDI-II.	*Sub-clinically depressed individuals will demonstrate differing levels of FES relative to non-depressed individuals.*	*The hypothesis is partially supported.* The AMS difference was *valence specific* with: It was found that the Depressed group reported reduced specificity of positive future events relative to the Non-Depressed group (p=.051). The FCT appears sensitive in detecting FES at a sub-clinical level of depression.
2	Examine reported levels of emotional avoidance (AAQ-II) in relation to phenomenological characteristics of positive and negative future events specificity.	*Expression of positive and negative future event phenomenological characteristics will differ between those who report higher levels of emotional avoidance relative to those who report low levels of emotional avoidance as measured by the AAQ-II.*	*The hypothesis is supported.* A positive relationship was found for emotional avoidance and first person perspective in generation of future events (p<.05). A negative relationship was found for emotional avoidance and proximity of positive future events (p=.055). A negative relationship was found for emotional avoidance and frequency of reference to negative future events (p=.050). Within group relations were found, as for the Non-Depressed group a positive relationship was found for emotional avoidance and clarity (p<.05) and consideration (p<.05) of positive future events. Within the Depressed group a negative relationship was found for emotional avoidance and expectancy of negative future events occurring (p<.001).
3	Examine emotional avoidance (AAQ-II) in relation to positive and negative FES.	*There is a relationship between FES and level of avoidant emotional coping style as measured by the AAQ-II.*	*The hypothesis is not supported.* No relationship was found for emotional avoidance and future event specificity.

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

2.3.3.1 *Collated Summary for Experiment 1a and 1b*

In both Experiments 1a and 1b the subjective reports of how past and future events were experienced significantly added to the findings, with reported differences between Depressed and Non-Depressed individuals pertaining to clarity, valence and frequency noted in relation to both past and future events. The group differences in relation to phenomenological characteristics are particularly interesting given that no valence effect was found in relation to AMS relative to the strong positive valence effect found in FES. In view of the subjective experience of clarity, valence and frequency contributing to the overall group differences it necessitates that it is perhaps these qualities relative to emotional accessibility which facilitates the specificity feature. This suggestion is supported by the finding from Experiment 1b that emotional avoidance was not seen to correlate with FES. As such there is a call to explore these features further in regards to the nature of such abilities.

The suggestion that imagery is a necessary construct in autobiographical memory in particular is not new, and has recently been reviewed (Holmes & Matthews, 2010; cf. Conway, 1990). For instance, Brewer (1996) found that individuals reported images in most forms of recall. When responding to questions about recent personal events (e.g. 'who was the last person you talked to?') the respondents commonly describe recall of the event to include the presentation of an image of the event, and although not as prevalent, respondents frequently refer to visual presentations (i.e. imagery) in recall of semantic information as well (e.g. what is the capital of France?) (Holmes & Matthews, 2010). Mansell and Lam (2004) found that bipolar individuals reported 95% of all specific memories as constituting mental images, subsequent to such mental images occurring in no more than 56% of memories coded as general. As such, in most cases, imagery may be important for the retrieval of autobiographical memories.

Research on imagery has mostly been conducted within the cognitive arena and has surrounded topics such as *the nature* of mental imagery (Kosslyn, 1994) relative to *the experience* of generating mental images (Bywaters, Andrade, & Turpin, 2004). However, there is little information available regarding mental imagery ability within clinical samples. Cornoldi, de Beni and Cavedon (1992) suggested that vividness of imagery is shaped by individual shifts in the perceived characteristics of the colour, detail, context and outline linked to the supposed image, with vividness of images associated with overall performance on many cognitive and perceptual tasks (McKelvie, 1995).

Gold, Jarvin and Teague (2006) looked at details presented in positive fantasies to see if success in therapy was associated with the level of details generated in such imagery. Specifically, Gold et al (2006) sought to observe if there was a link between clarity of imagery and depression reduction and found that imagery ability significantly correlated with depression reduction. These findings suggest that visual imagery holds a role in depression, although the exact nature of this relationship between depression and imagery cannot be drawn due to the correlational nature of the study. Conway & Pleydell-Pearce (2000) have noted that event-specific knowledge, as in retrieval of episodic memory, is related to contextual information of a sensory and perceptual nature, which again is a basis for vividness in visual imagery. Given that the recent focus on deficits pertaining to past and future thinking in mental time travel has focused on episodic memory and future thinking, that is *event specific* knowledge, related to these time frames, it may be inferred that visual imagery ability plays a role in such specificity deficits. Specifically, individuals demonstrating difficulties in imagining personal past and future events would likely report less vividness in general mental imagery.

Although the MCQ and FCQ collect subjective details' about the vividness of personal events it would be advantageous to be able to discriminate if such a deficit exists more generally, separately to autobiographical accounts. If specificity is related to imagery abilities *per se* this has implications for theories linking specificity to functional avoidance. Further, if the production of images (imagery) is a separate ability to the construction of specificity in autobiographical accounts this may be one reason why emotional avoidance was not seen to correlate with future events specificity in Experiment 1b. That is, specificity may relate to imagery and not as such to the functional suppression of painful personal content.

To this end Experiments 2a and 2b aimed to investigate the role of mental imagery abilities in the construction of past and future events. Specifically, Experiment 2a and 2b sought to investigate whether variance in specificity of past recall and future anticipation are related to the ability to prospectively visualize such events. Imagery was isolated by taking a measure of the subjective abilities to generate images for neutral events within both the Depressed and Non-Depressed groups.

2.4 Experiment 2a

Experiment 2a will examine the ability to generate vivid images in response to cued scenarios. Participants will complete the Vividness of Visual Imagery Questionnaire (Marks, 1989) which requests participants to form visual images using cues high and low in imaginability (Paivio, Yuille, & Madigan, 1968) with the performance on the VVIQ examined in relation to mental time travel tasks. The focus will be on imagery and past event recall, in an attempt to examine whether the findings from Experiment 1a might be explained in terms of visual imagery abilities.

Experiment 2a sought to (1) replicate and support the findings from Experiment 1a. It is predicted that sub clinically depressed participants will be less specific than their non-depressed counterparts in subjective recall relating to cue words in general. (2) Explore independently measured imagery abilities as measured by the Vividness for Visual Imagery Questionnaire (VVIQ) in relation to phenomenological characteristics of past recall as measured by the Memory Characteristics Questionnaire (MCQ). Given the fact that individuals with a higher capacity for visual imagery reportedly also *experience* more visual and other sensory details when remembering past it is predicted that expression of positive and negative past event phenomenological characteristics will differ between those who report high levels of vividness in imagery as measured by the VVIQ relative to those who report low levels of VVIQ. Experiment 2a further aims to (3) examine imagery abilities as measured by the VVIQ in a sub-clinical population. It is predicted that sub-clinically depressed individuals, as measured by the Beck Depression

Inventory (BDI-II) will differ from healthy participants in their imagery abilities as measured by the VVIQ. Experiment 2a further sought to (4) examine the relationship between emotional avoidance, as measured by the AAQ-II, and imagery ability, as measured by the VVIQ. It was predicted that there would be a relationship between imagery ability and emotional coping style as measured by the AAQ-II.

2.4.1 Method

2.4.1.1 Participants

Undergraduate students at Swansea University (N=34) volunteered to take part in this study in return for course credit, though following the exclusion criteria pertaining to BDI-II scores (criteria for inclusion is detailed in section 2.4.2.1.), only data from thirty-one participants was utilised in the following analysis. As such the current study reports findings from 10 males and 21 females ranging in age from 19 to 29 years, with a mean age of 22.48 years ($\sigma = 2.27$).

2.4.1.2 Apparatus and Materials

The materials utilized in this study were identical to those of study 1a (BDI-II; BHS; STAI; AAQ-2; LOT-R; PANAS; Verbal Fluency), inclusive of the AMT and the MCQ and with the addition of the Vividness of Visual Imagery Questionnaire.

In regards to the AMT specificity ratings an inter-rater reliability analysis using the Kappa statistic was performed to determine consistency among raters for Autobiographical Memory Specificity as measured by the AMT. A sample of 80% of the responses was rated by a second independent rater, and an inter-rater reliability of 96% (k = .96) was obtained.

The Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973). The VVIQ consists of 16 items in four groups of 4 items in which the participant is invited to consider an image and to form visual details pertaining to this image by thinking about a specific scene and/or situation. Participants are asked to imagine four separate images representing various domains, i.e. A) *'A relative or friend',* B) *'The rising sun',* C) *'A shop which you often go to'* and D) *'A country scene which includes trees, mountains and a lake'.* Within each category, of *A, B, C* and *D,* participants are presented with four statements and asked to rate the vividness of imagery in regards to each statement, for example, when presented with domain *A* (a friend or relative) participants are asked to notice and generate an image for the following statements: 1) *The exact contours of [their] face, head shoulders and body.* 2) *Characteristic poses of head, attitudes of body etc.* 3) *The precise carriage, length of step etcetera in walking.* 4) *The different colour worn in some familiar clothes.* The vividness of the image is rated along 5-points. For example; a rating of 5 would represent finding the image generated as '*Perfectly clear and as vivid as normal vision',* a rating of 3 would indicate a *'Moderately clear and vivid'* image representation, whereas a rating of 1 would represent finding their efforts to produce '*No image at all, [you] only "know" that you are thinking of an object'.* Participants rate all statements individually. The questionnaire has been widely used as a measure of individual differences in vividness of visual imagery and there is a large body of evidence confirming that the VVIQ is a valid and reliable measure of visual image vividness (Campos & Pérez-Fabello, 2009).

2.4.1.3 Experimental Overview

Experiment 2a used a 2 x 2 mixed participants design, with Beck Depression Inventory Scores (Sub-clinically Depressed and Non-Depressed) as the between participant variable, and Autobiographical Memory Specificity (Overgenral, Specific) as the within-participant variable. A correlational design was further employed for examination of relationships between the AMT, VVIQ and AAQ-II measures. All participants received the same instructions and completed the Verbal Fluency Control Task, followed by both sections of the AMT, i.e. Positive and Negative past recall, along with the MCQ. All participants completed all measures and questionnaires, i.e. the AAQ-II, the BDI-II, the BHS, the LOT-R, the PANAS and the STAI. Participants all completed all items of the VVIQ, with randomised order of first presentation of items A, B, C and D between participants. Participant data was categorised and analysed based on their Beck Depression Inventory responses (see Section 2.4.2.1 for group allocations to the Depressed and Non-Depressed groups). Figure 3 summarises the experimental sequence utilised for Experiment 2a.

2.4.1.4 Ethical Issues

Experiment 2a raised the same ethical considerations as noted for Experiment 1a, with consideration given to recall of negative past events potentially evoking past traumatic events, or initiating a negative mood or emotional response. In order to conduct the experiment within the appropriate ethical guidelines (The British Psychological Society, 2006), precautionary measures were taken with all participants following the exact same procedures as detailed in Experiment 1a (see Section 2.2.1.4). No participants reported recalling a traumatic past event during the Autobiographical Memory Task. At no point during the experiment did any participant withdraw from the experiment or express dissatisfaction or distress of any kind. No participants reported a deflated mood or a negative emotional response upon completion of the experimental procedures. The experiment was approved prior to commencement by the Psychology Department Ethics Committee at Swansea University.

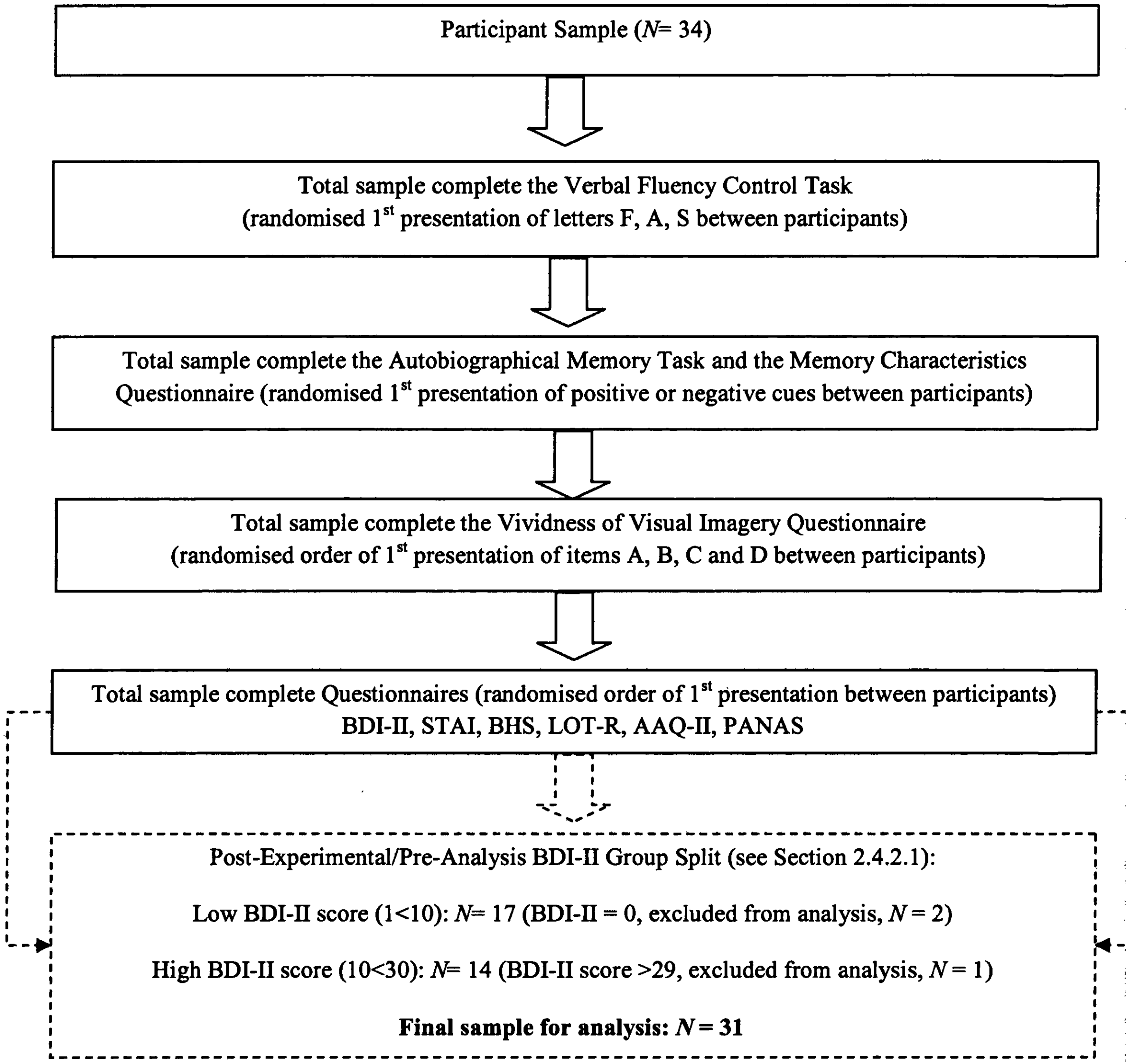


Figure 3. Overview of the Experimental Sequence for Experiment 2a.

2.4.1.5 Procedure

The experiment took place in a specifically allocated psychology laboratory. Prior to commencement of the study participants were informed about the nature of the study and briefed about the procedures. A consent form was signed upon confirmation by participants that they understood the experimental process. Participants firstly completed the Verbal Fluency Control Task followed by the Autobiographical Memory Task (AMT) and the accompanying Memory Characteristics Questionnaire (MCQ), the procedures were all the same for these measures as detailed in Experiment 1a (see Section 2.2.1.2) and did not deviate from this previous practice. Upon completion of the AMT, and the accompanying MCQ, participants were presented with the Vividness of Visual Imagery Questionnaire (VVIQ) items A through to D; all participants completed all imagery categories, though the order of presentation was alternated for each participant. Participants were asked to complete the imagery items with their eyes open as this corresponds to the general performance on the AMT. The experimenter read all cue items and statements relating to the task out load to the participants, who were asked to follow instructions to the best of their ability. The ratings of ability and effort in generating the images were noted out loud by the participants and recorded by the experimenter. No time limit was enforced for imagery of the VVIQ items. Participants lastly completed the psychometric and wellbeing self-report questionnaires in their own time. Upon completion of all tasks participants were suitably debriefed and thanked for taking part.

2.4.2 Results and Discussion

2.4.2.1 *Group Allocation*

As in Experiments 1a and 1b participants with a score of 0 ($N = 2$) or above 29 ($N = 1$, $M = 30$) where excluded from the analysis. As before the BDI-II inclusion criteria for the no depression group was a score of 1< 10, thus participants presenting scores of 1-9 ($N = 17$; $M = 3.82$, $\sigma = 1.97$) were allocated to this group. Inclusion in the sub-clinical depression group required BDI-II scores of 10 < 30 ($N = 14$; $M = 12.92$, $\sigma = 3.58$; Depressed Group).

2.4.2.2 *Demographics and Psychometrics*

The two groups were found to report significantly different depression levels on the BDI-II, with participants in the Non-Depressed group reporting significantly lower BDI-II scores than the Depressed group, $t(29) = -8.970$, $p<.001$. Similar divergence between the groups were found in relation to the other well-being measures with the Depressed group consistently reporting higher levels of anxiety (STAI, $t(29) = -4.043$, $p<.001$), deflated life optimism (LOT-R, $t(29) = 2.159$, $p=.039$) and reduced psychological flexibility (AAQ, $t(29) = 5.206$, $p<.001$). Hopelessness reports were also moderately increased for the Depressed group and approaching significance (BHS, $t(29) = -1.931$, $p=.063$). Mood was not found to be significantly different between the groups (PA: $p=.826$; NA: $p=.127$).

The psychometric means are presented with the participant demographics in Table 13. As depicted in Table 13, Depressed and Non-Depressed participants did not differ with respect to age, ($t(29) = -1.491$, $p = .147$) representation of gender, $\chi2$ (1) =. 159, $p = .690$ or verbal fluency, $t(29) = -.286$, $p = .777$. As such the groups were found to be well matched on age, gender and cognitive ability with group divergence relating to the targeted areas of measures of psychological health. The co-occurring levels of depression, anxiety, hopelessness, optimism and emotional avoidance seen within the Depression group are consistent with previous findings within the clinical literature.

Table 13. Mean scores and Standard Deviations (SD) for participant Demographics and reported Psychometric tests results for the Depressed and Non-Depressed groups in Experiment 2a.

Variable	Depressed *(SD)*	Non-Depressed *(SD)*
Gender: Females **(Males)**	10 **(4)**	11**(6)**
Age	23.14 *(2.71)*	21.94 *(1.74)*
VFCT	13.93 *(2.64)*	13.61 *(3.41)*
BDI	12.92 *(3.58)*	3.82 *(1.97)*
BHS	4.42 *(2.79)*	2.82 *(1.81)*
STAI	41.78 *(10.87)*	28.88 *(6.75)*
LOT-R	13.92 *(4.68)*	17.05 *(3.38)*
AAQ-II	42.35 *(7.14)*	54.29 *(5.63)*
PA	34.07 *(7.07)*	33.47 *(7.32)*
NA	14.57 *(3.43)*	12.88 *(2.54)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

2.4.2.3. *Content of Autobiographical Events*

A brief content review was performed on the events that were recalled on the AMT, the descriptions of events were classified into broad categories. The categories found were consistent with expected life time experiences within an undergraduate sample, with no severe historical or traumatic occurrences reported. 'Old' positive memories (i.e., of events that happened longer than 1 month ago) involved episodes at parties (20%), episodes during leisure activities (including going on holiday and times with friends; 35%), romantic episodes (20%), and episodes of academic success (11%); 14% of the events reported could not be classified in these categories. 'Old' negative memories involved accidents, (severe) illnesses, or deaths of relatives (19%); arguments with relatives or close friends (45%); the end of a romantic relationship (13%); accidents, illnesses, or aggression involving the participants themselves (15%); and episodes of academic failure (8%). Recent positive memories (i.e., of events that happened within the last month) involved episodes at parties (19%), episodes of academic success (22%), romantic episodes (23%), and episodes during leisure activities (32%). 4 % of the events reported could not be classified in these categories. Recent negative memories involved accidents, illnesses, or deaths of relatives (8%); episodes of academic failure (23%); accidents or illnesses involving the participants themselves (17%); the end of a romantic relationship (17%); and arguments with relatives or close friends (35%).

2.4.2.4. *The Autobiographical Memory Test*

As in Experiment 1a the AMT analysis presently followed common practice in investigations of autobiographical memory specificity (cf. Williams et al., 2006, 2007), with the first response across the 12 trials used to index AMS. High positive correlations were seen between the number of specific memories produced under each valence category with the total number of specific recall (Non-Depressed group, positive cues, $r = .668$, and negative cues $r = .671$; Depressed group, positive cues $r = .900$ and negative cues $r = .888$).

On average, retrieved memories for participants in the Non-Depressed group were specific 81.86% of the time across the 12 trials; whereas the Depressed group showed somewhat diminished specificity in retrieval overall with 69.64% of the 12 trials noted as specific. Differences in specificity were noted for positive past experiences, with the Non-Depressed group retrieving marginally more specific memories relative to the Depressed group ($M = 5.05$, $\sigma = 1.02$ and $M = 4.28$, $\sigma = 1.20$ respectively; $t(29) = 1.928$ $p = .064$). For past experiences reported to negative cues specificity was again similar within both groups with a marginal, though not significant, difference pertaining to the Non-Depressed group being slightly more specific in their recall (Non-Depressed group, $M = 4.76$, $\sigma = 1.03$; Depressed group, $M = 4.07$, $\sigma = 1.14$; $t(29) = 1.774$, $p = .086$). Table 14 presents the AMT performance for both groups and as can be seen omissions were rare. As before it is recognized that the number of specific memories retrieved on the AMT (i.e., level of AMS) is a direct reflection of the number of "errors" on the AMT. Verbal fluency scores did not correlate with the total number of cues for either group (Non-Depressed, $p = .115$; Depressed, $p = .374$).

Memory specificity was subjected to a 2 (Group: Depressed/Non-Depressed) x 2 (Cue Valence: Positive/Negative) mixed analyses of variance (ANOVA). No main effect for valence was found, $F(1,29) = 1.109, p = .301, \eta p^2 = .037$). A main effect was seen for group, with the Non-Depressed group being more specific in recall overall ($F(1,29) = 5.460, p = .027, \eta p^2 = .158$). No interaction effect was observed ($F(1,29) = .027, p = .870, \eta p^2 = .001$).

These findings are consistent with results from Experiment 1a, as it was found that AMS did differ between groups, though in the present experiment specificity in positive recall is approaching significance.

Table 14. Autobiographical Memory Test Performance presented as Percentage of Memory Specificity, Mean number and Standard Deviation (SD) of Memory Specificity responses across the six cue words in each valence category as reported within the Depressed and Non-Depressed groups in Experiment 2a. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	***t*(29)**	***p***
Total % of specific memories	81.86 *(11.50)*	69.64 *(17.48)*		
Total % of omissions	N/A	1.32 *(0.81)*		
Total cues	9.82 *(1.38)*	8.35 *(2.09)*	1.928	*0.027**
Positive cues	5.06 *(1.02)*	4.28 *(1.20)*	1.774	*0.064*
Negative cues	4.76 *(1.03)*	4.07 *(1.14)*	2.336	*0.086*

Note. *$p<.05$. Positive/Negative Cues = number of specific first memories relative to the detailed valence category on the Autobiographical Memory Test.

2.4.2.5. *Memory Characteristics*

Phenomenological characteristics were recorded for each memory cued on the AMT, by the Memory Characteristics Questionnaire (MCQ). Participant responses to questions about valence, frequency and clarity of the cued memory were collated to represent responses within these three domains. Within group analysis found that the Non-Depressed group reported moderately more clarity of memory in recall of positive relative to negative cues, $t(16) = 2.047, p = .057$. No such difference in clarity of positive relative to negative recall was fund for the Depressed group, $t(13) = -.400$ $p = .695$. Strong congruency was seen for cue and valence with positive memories being described with high affect relative to low affect recorded for negative memories for the Non-Depressed group ($t(16) = 23.957$ $p < .001$), as well as the Depressed group ($t(13) = 13.255$, $p < .001$). With regards to frequency of recall the Non-Depressed group reported comparable occurrences of talking and thinking about positive and negative memories ($t(16) = 1.447$, $p = .167$). Whereas the Depressed group reported increased occurrences of talking and thinking about negative relative to positive past events, ($t(13) = -2.071$, $p = .059$). The mean MCQ scores are reported in Table 15 below.

Table 15. Mean group scores and Standard Deviations (SD) of Phenomenological reports from the three domains encapsulating Clarity, Valence and Frequency as measured by the Memory Characteristics Questionnaire for Non-Depressed and Depressed participants in Experiment 2a. T-Test score and statistical value (*p*) from between group comparisons are presented.

Memory Characteristics	**Non-Depressed (17)**	**Depressed (14)**		
	Mean *(SD)*	**Mean *(SD)***	***t*(29)**	***p***
Positive Clarity	6.01 *(1.08)*	5.71 *(1.36)*	0.693	*0.494*
Negative Clarity	5.50 *(1.44)*	5.81 *(0.86)*	-0.709	*0.484*
Positive Valence	6.61 *(0.64)*	6.45 *(0.85)*	0.605	*0.550*
Negative Valence	1.82 *(0.66)*	2.36 *(0.75)*	-2.120	*0.043**
Positive Frequency	4.41 *(1.14)*	3.48 *(1.35)*	2.078	*0.047**
Negative Frequency	3.87 *(1.29)*	4.04 *(1.41)*	-0.344	*0.733*

Note. *$p < .05$

As can be seen from Table 15 significant group differences were only found for negative valence and positive frequency. That is, participants in the Non-Depressed group experienced the negatively cued events as more negative in affect ($t(29) = -2.120$, $p = .043$) and reported recalling and talking about positive memories more frequently than the Depressed group ($t(29) = 2.078$, $p = .047$).

The results show that group differences were present pertaining to valence, with the Depressed group reporting higher levels of negative affect for past negative events. Divergence was also seen in regards to frequency in recall of positive events, with the

Non-Depressed group reporting recurrent contact with such events relative to lower reports of frequency of recall by the Depressed group.

2.4.2.6. *Temporal Distance*

The MCQ further recorded the temporal distance of the memories cued. No participants from either group reported memories recalled as being from earlier that day or from longer than 5 years ago, thus these variables are not presented here nor included in any statistical calculations.

As can be seen from Table 16 the Non-Depressed group reported more events from the near past in response to positive cues, with a total of 94.2 percent of the events recalled occurring within the last month. The Depressed group reported 50 percent of the positive events recalled to have occurred within the timeframe of the last month. In regards to negative events, the Non-Depressed group reported 58.8 percent of the events to have occurred within the last month, relative to the Depressed group who reported 85.7 percent of the negatively cued events to have occurred within this period. A One-way ANOVA found the difference in the time of event occurrence to be significant for the positively cued events, with the Non-Depressed group recalling significantly more positive events from the near past relative to the Depressed group ($F(1,29)=19.052$, $p<.001$). No statistical significance was found between the two groups pertaining to time of events in negatively cued recall ($F(1, 29) =.798$, $p=.379$).

Temporal distance was associated with subjective reports on the psychometric measures, with close proximity of positive past events found to correlate with lower levels of depression (BDI-II; $r=.812$, $p<.001$), anxiety ($r=.458$, $p=.010$) and hopelessness (BHS; $r=.354$, $p=.050$), and with higher levels of optimism (LOT-R; $r= -.457$, $p=.010$). Whereas close proximity of negative past events were only found to correlate with increased levels of anxiety ($r=-.389$, $p=.031$). No correlations were found for temporal distance of past events and specificity of recall for either of the FCQ domains of clarity, valence or frequency within this sample.

The findings indicate that group differences were present in regards to valence and temporal distance of events, with the Non-Depressed group retrieving more positive events from the more proximate past relative to the Depressed group. Findings pertaining to the psychometric reports also suggest that increased proximity of recalled positive past events relate to greater levels of psychological well being.

Table 16. Mean Percentage of the Temporal Distance for events recalled from Positive and Negative Cues as reported by the Depressed and Non-Depressed groups in Experiment 2a.

Time of Event	**Temporal Distance of Positive Events (Mean %)**		**Temporal Distance of Negative Events (Mean %)**	
	Non-Depressed	**Depressed**	**Non-Depressed**	**Depressed**
Yesterday	5.9			
Few days ago	5.9			7.1
Last week	41.2		17.6	28.6
Few weeks ago	29.4	21.4	29.4	21.4
Last month	11.8	28.6	11.8	28.6
Few months ago		21.4	17.6	14.3
Last year	5.9	21.4	11.8	
Last 5 years		7.1	11.8	

2.4.2.7. *Recall Vantage Point*

The vantage point of participants re-experience of the autobiographical events were recorded as either from a field (first person) perspective, or as an observer (third person) perspective. Participants overall reported 70.98 % of events recalled to be from a field perspective. Of these the first person perspective was reported to be found for 76.34% of the positive events relative to 65.62% for the negative events. At a split group level of analysis the Non-Depressed group was found to recall past events form a first person perspective for 79.41 % of the 12 cues, whereas the Depressed group reported 60.75% events to be from this perspective. As can be seen from Table 17, the recall vantage point was seen to significantly differ between the two groups with the Non-Depressed group reporting significantly more past events overall as viewed from a first person perspective relative to the Depression group. It was further seen that this group difference was consistent for recall of positive events, where again the Non-Depressed group appeared to recall more positive past events from the first person perspective relative to the Depressed sample. No differences were found between the groups in regards to vantage point in recall of negative past events. First person perspective in negative event recall was found to correlate with negative event specificity (r = .380, p = .035). Whereas first person perspective in positive recall was found to correlate with the proximity of positive events (r = -.432, p = .015). No other correlations were observed for vantage point and phenomenological characteristics of past events.

Relations between recall vantage point and psychometric scores found recall of positive past events from a first person perspective to correlate with lower levels of depression (BDI-II; r = -.712, p < .001) and anxiety (STAI; r = -.464, p = .009), though no significance was found in correlations with hopelessness or optimism. First person perspective in negative recall was also found to correlate with reduced levels of anxiety (STAI; r = -.508, p = .004), though it was not found to correlate with any of the other psychometric measures. The results suggest that group differences pertaining to vantage point in recall of past events are related to psychological well being, with reports of self-in-context view relating to increased levels of well being.

Table 17. Mean Percentage of Past Events recall observed from a First Person Perspective within the Depressed and Non-Depressed groups in Experiment 2a. T-Test score and statistical value (*p*) from between group comparisons are presented.

Percentage of Recall from of 1st Person Perspective

Variable	**Non-Depressed**	**Depressed**		
	Mean % *(SD)*	**Mean % *(SD)***	***t*(29)**	***P***
Total for all Events	79.41 (10.25)	60.75 (6.03)	5.995	*0.001****
Positive Events	89.21 (11.69)	60.71 (10.55)	7.050	*0.001****
Negative Events	69.60 (16.90)	60.79 (12.45)	1.622	*0.116*

Note. ***p = .001.

2.4.2.8. *Vividness of Visual Imagery Questionnaire*

Participants in both groups completed the four imagery categories of the VVIQ. Initial results saw that overall participants found it easier to generate images of a 'relative or friend' (M= 15.74, σ = 3.56) and a 'sun rise' (M=15.45, σ = 3.15) relative to 'a shop frequently visited' (M= 15.00, σ = 2.96) and 'a country scene' (M=14.22, σ = 2.84). No significant group differences were found pertaining to visual imagery of a friend/relative ($t(29)$ =-.663, p=.513), a sun rise ($t(29)$ = 1.437, p=.162), a familiar shop ($t(29)$ =-.120 p=.906) or a country scene ($t(29)$ =.905, p=.373).

A total VVIQ score was compiled by collating the scores across the four VVIQ categories for further analysis. No group differences were found on the total imagery score ($t(29)$ =.531, p=.600). The VVIQ total score was not found to correlate with AMT recall specificity, nor was any of the individual imagery domains. Interestingly, only one correlation was found when imagery was compared with the MCQ characteristics, that is, imagery correlated positively with clarity of recall reported to positive cues (r=.365, p=.043). Imagery was not found to correlate with any of the psychometric measures pertaining to depression, hopelessness, anxiety and optimism. Nor did imagery correlate with temporal distance of past events recalled.

The VVIQ scores were dichotomised to allow for analysis of those high and low in imagery independently of BDI-II categories. The mean score of 60 was used to create the high vs. low imagery categories; the low imagery category (N=12) averaging a score of 52.00 (σ =3.62) relative to the high imagery group (N=19) whose group mean score was 65.74 (σ =4.56). The scores were found to be significantly different between the two groups ($t(29)$ = -8.800 p<.001). A One-way ANOVA found no significant difference between the high and low imagery groups pertaining to specificity of negatively cued recall ($F(1, 29)$ = -.729, p=.435). Nor was any such difference observed in relation to positive event recall ($F(1, 29)$ = -.161, p=.873). The results suggest that depression levels are related to imagery abilities, though this is not reflected in representation of specificity in recall.

2.4.2.9. *Emotional Avoidance*

Lower levels of emotional avoidance (as represented by higher scores on the AAQ-2) were found to correlate with the BDI-II (r = -.662, p <.001). The AAQ-2 was found to correlate negatively with the temporal distance of positive past events (r = -.543, p = .002), that is, those who reported less use of avoidant strategies were more likely to report positive events from the more recent past. The perception of recall of positive past events from a first person vantage point was found to relate to lower levels of emotional avoidance (r = .510, p = .003). At a group split level of analysis the AAQ-2 was found to correlate with overall cue specificity within the Non-Depressed group (r = .498, p = .042), thus a reduced use of avoidant strategies was seen to be related to overall memory specificity. Positive valence was also found to correlate with emotional avoidance within the Non-Depressed group (r = -.579, p = .015), thus indicating that lower levels of emotional avoidance relate to greater positive affect in the recall of positive memories. Only two correlations with the AAQ-2 where found within the Depressed group, these were for frequency of recall of positive (r = -.610, p = .020), and negative (r = -.564, p = .036) past events, with low emotional avoidance relating to high frequency of recall of both positive and negative past events. No correlations were found for the AAQ-2 and either of the imagery domains from the VVIQ, neither at a general nor at a split level of analysis. The results indicate that emotional avoidance is related to vantage point and temporal distance in recall of positive past events. Lower levels of emotional avoidance were seen to allow for reports of greater valence effects and specificity of in positive recall.

2.4.3 Summary

It has long been established that people with depression tend to have difficulties in providing specific autobiographical memories (Williams & Broadbent, 1986) and that there is also an association between visual imagery activates other than sensory information, thus giving more details about a specific event (Greenberg & Rubin, 2003). Experiment 2a aimed specifically to (3) investigate whether variable imagery abilities can explain the level of specificity of autobiographical memories in a sub-clinically depressed group. However, in this experiment no group differences were found in terms of vividness of visual imagery and specificity in autobiographical recall, with both the Non-Depressed and Depressed groups reporting similar levels of detail and depiction in response to the VVIQ dimensions. Imagery was not found to relate to level of specificity reported on the AMT, although interestingly, (2) imagery was found to positively correlate with clarity in recall of past positive events. Emotional avoidance was not found to relate to imagery abilities overall nor at a group level for this sample. Table 18 summarises key findings from Experiment 2a.

In line with Experiment 1a, a group difference was noted for specificity of recall with the Non-Depressed group retrieving more specific autobiographical events relative to the Depressed group. Group differences were pronounced in terms of phenomenological characteristics, with the Non-Depressed group more likely to report memories to be viewed from a first person perspective overall. A valance bias was observed in this regard with first person perspective emerging for recall of positive past events in particular, relative to reports by the Depressed group.

Table 18. Summary of Main Aims and Findings from Experiment 2a.

	Research Aim	Hypothesis	Main Findings
1	Replicating and supporting the findings from Experiment 1a.	*Sub-clinically depressed individuals will demonstrate differing levels of AMS relative to non-depressed individuals.*	*The hypothesis is supported.* Findings from Experiment 1a were supported by observed group difference for overall AMS ($p<.05$).
2	Explore independently measured imagery abilities (VVIQ) in relation to phenomenological characteristics of past recall.	*Expression of positive and negative past event phenomenological characteristics will differ between those who report high levels of vividness in imagery as measured by the VVIQ relative to those who report low levels of VVIQ.*	*The hypothesis is partially supported. The relationship was found to be valence specific:* A positive relationship was found for imagery abilities and clarity in recall of positive past events ($p<.05$).
3	Examine VVIQ levels in sub-clinical population.	*Sub-clinically depressed individuals will differ from healthy participants in their imagery abilities as measured by the VVIQ.*	*The hypothesis is not supported.* No group differences were found for the VVIQ.
4	Examine the relationship between emotional avoidance, as measured by the AAQ-II, and imagery ability, as measured by the VVIQ.	*There is a relationship between imagery ability and emotional avoidance as measured by the AAQ-II.*	*The hypothesis is not supported.* No relationship was found for emotional avoidance and imagery ability.

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

Memory vantage point for negative events was found to correlate with specificity in recall of negative events, with participants who reported the events from a first person perspective found to be more specific in negative recall. Marginal within group differences pertaining to valence of recall specificity was found with positive past events vaguely more specific in recall by the Non-Depressed group. Further, within group assessment of the phenomenological characteristics related to the past events indicated that the Non-Depressed group reported greater clarity in recall of past positive events, whereas the Depressed group reported thinking and talking about past negative events more readily. Between groups analysis saw the Depressed group reporting negative affect as more intensely experienced in relation to past negative experiences relative to the Non-Depressed group. With the Non-Depressed group indicating that they had thought and talked about positive past events more readily than the Depressed group. The temporal distance of such past positive events diverged for the two groups, with the Depressed group recalling more distant positive events that were at least one year post occurrence, relative to the Non-Depressed group, who retrieved more positive events from the last month.

As in Experiment 1a, those who were less avoidant were more likely to report positive events to be from the more recent past. Positive valence was also found to correlate with emotional avoidance within the Non-Depressed group, thus indicating that lower levels of emotional avoidance relate to a greater experience of positive affect in recall of positive memories. Lower levels of emotional avoidance were seen to be related to overall increased memory specificity within the Non-Depressed group. Within the Depressed group frequency of recall of positive and negative past events were found to correlate with emotional avoidance, that is, low emotional avoidance was seen to correspond with more frequent recall of both positive and negative past events. The current findings are in contrast with previous literature looking at imagery abilities in recall (cf. Bywaters, Andrade & Turpin, 2004). However, the memory specificity findings are in line with previous research (e.g. Williams et al., 1986; 1996). The findings support the proposed role of reduced AMS as an emotion regulation strategy pertaining to functional avoidance of content which hold emotional impact.

According to the phenomenological data, it is the contextual details of the events, such as feelings at the time, that are seen to fully restore the impression of such past events and link with current emotions. In this regard imagery may play a provisional role in the progression of depressive symptomatology. This suggestion would fit with the automaticity of recall with individual recall often prompted by smells, sounds and other visual cues (e.g., Willander & Larsson, 2006; Rusted, Marsh, Bledski, & Sheppard, 1997; Johnson, 1988; Larsen, 1998). As such the common recurrence of depression can be viewed in light of the equally recurrent exposure to such cues, inevitable in day to day settings. This is particularly evident in the withdrawal from social contexts that is characteristic of depression. As engagement with such settings would inadvertently lead to exposure to certain sets of cues which, in regards to sensory and visual impact, would likely trigger recall of past events to some extent.

In light of these findings it is particularly interesting to look at specificity in future thinking, as it has been found that using visual imagery can increase the perceived probability that an imagined event will occur (Sherman, Cialdini, Schwarztman & Reynolds, 1985), *and* increase the likelihood of action (Libby et al., 2007; Pham & Taylor, 1999). In fact, it has been noted that the more vivid the imagery, the greater the effect (Gonsalves et al., 2004; Johnson, 2006). Hence, more vivid future emotional images would be evaluated as being more likely to occur.

2.5 Experiment 2b

The impact of mental imagery ability may be a critical and confounding variable in tests assessing the generation of future events. Thinking about the future necessitates a greater use of imagery due to the nature of such events being, in the present, merely confabulated probabilities of future experiences (Markman, Gavanski, Sherman, & McMullen, 1993). As such the ability to simulate the future through imagination has been found to be adaptive for evaluating future outcomes, ascertaining the likelihood of such events, and planning subsequent behaviour in this regard (e.g. Markman et al., 1993; Schacter, Addis, & Buckner, 2007). Notably, Sharot, Riccardi, Raio, and Phelps (2007) report that dysphoric individuals appear to be lacking in their ability to imagine (or can only vaguely 'see') positive future events, despite images of negative future outcomes presenting themselves as 'crystal clear'. In this regard such an inconsistency in imagery abilities may consequently bias future outlook and affect the dysphoric individuals' capacity to be optimistic about future outcomes (Sharot, Riccardi, Raio, & Phelps, 2007). Typically, such individuals may consider future positive events as less likely to occur, as well as finding such considerations to be less believable, thus resulting in reduced action in response to positive images, relative to more vivid negative future descriptions.

In this regard MacLeod and colleagues have argued that depression is associated with a deficit in processing positive information *per se*, relative to merely increased negative thoughts (MacLeod & Byrne, 1996; MacLeod, Byrne, & Valentine, 1996; MacLeod & Cropley, 1995; MacLeod, Tata, Kentish, & Jacobsen, 1997). In particular, they have proposed that depression is more specifically associated with reduced levels of positive future-directed cognitions. In support of this proposal suicidal depressed patients have been reported to demonstrate more abstract (i.e., less imagery based) representations of the future relative to non-depressed controls (Williams et al., 1996). The inability to be specific about the future is also central in Williams' model of suicidality (Williams, 2001). In relation to Sharot et al's findings, it has also been noted that suicidal individuals sometimes experience intrusive and vivid negative future imagery of committing suicide (Holmes, Crane, Fennell, & Williams, 2007).

Although at present there is a lack of complete understanding about the role of positive imagery in the context of depression, some research exists that offers some insight. For instance, in an effort to examine the relationship between imagery and psychopathology, Stöber (2000) asked healthy volunteers to imagine positive (e.g., 'you will make good lasting friendships') or negative (e.g., 'you will fall badly behind in your work') future events. Participants were then asked to rate the subjective characteristics of their experienced images, e.g. the perceived vividness of the event. As predicted, depressed mood (but not anxiety) was correlated with reduced imagery of positive, but not negative, future events. Similarly, in another non-clinical sample, Bywaters, Andrade and Turpin (2004) found that depressed mood correlated with increased vividness of imagery in picture recall. Although, in the study by Bywaters et al., no valence discrepancies were observed, with depressed mood found to relate to improved vividness in recall for both negatively and positively valenced stimuli. In this regard it has been argued that methodological differences may account for the observed discrepancy in findings pertaining to imagery vividness. Specifically, it is possible that the recall of vivid imagery from pictures (e.g., Bywaters et al., 2004) differs from the vividness seen in generation as a response to short verbal scenarios. The relationship between imagery and depression therefore remains unclear, and Stöber's results require replication and methodological extension

Experiment 2b aims to (1) replicate and support the findings from Experiment 1b. It is predicted that sub-clinically depressed individuals, as measured by the BDI-II, will differ in FES relative to non-depressed individuals. It was further sought to (2) replicate Stöbers findings from a healthy population with a sub-clinical population. It is predicted that sub-clinically depressed individuals, as measured by the BDI-II, will differ from healthy participants in their imagery abilities as measured by the VVIQ. Experiment 2b also aim to (3) explore independently measured imagery abilities (VVIQ) in relation to phenomenological characteristics of future events. It is predicted that expression of positive and negative future event phenomenological characteristics will differ between those who report high levels of vividness in imagery as measured by the VVIQ relative to those who report low levels of VVIQ. Experiment 2b further sought to (4) examine the relationship between emotional avoidance, as measured by the AAQ-II, and imagery ability, as measured by the VVIQ. It was predicted that there would be a relationship between imagery ability and emotional coping style as measured by the AAQ-II.

2.5.1 Method

2.5.1.1 Participants

Thirty-six students from Swansea University volunteered to take part in the experiment, though following the exclusion criteria pertaining to BDI-II scores (criteria for inclusion is detailed in section 2.5.2.1) only data from thirty-two participants was utilised in the following analysis. All the included participants were undergraduate students (19 female and 13 male) whom received course credits in return for their participation. The participant ages ranged from 18 to 27 years of age with a mean age of 20.96 ($\sigma = 2.34$).

2.5.1.2 Apparatus and Materials

The material used was identical to that in Experiment 1b (i.e. the BDI-II; BHS; STAI; LOT-R; PANAS; AAQ-2; and verbal fluency task), inclusive of the Future Cuing Task and the Future Event Characteristics Questionnaire, with the addition of the Vividness of Visual Images Questionnaire utilized in Experiment 2a. The presentation and process related to materials from Experiment 1b were adhered with for the FCT and FCQ, whereas the VVIQ representation and method was identical to that of Experiment 2a.

2.5.1.3 Experimental Overview

Experiment 2b used a 2 x 2 mixed participants design, with Beck Depression Inventory Scores (Sub-clinically Depressed and Non-Depressed) as the between participant variable, and Autobiographical Future Event Specificity (Positive Future Event Specificity, Negative Future Event Specificity) as the as within-participant variable. A correlational design was further employed for examination of relationships between the FCT, VVIQ and AAQ-II measures. All participants completed all measures and questionnaires, i.e. the Verbal Fluency Control Task, the AAQ-II, the BDI-II, the BHS, the LOT-R, the PANAS and the STAI. All participants received the same instructions and completed both sections of the FCT, i.e. Positive and Negative future events along with the FCQ. Participants all completed the VVIQ, all items were completed, with randomised order of first presentation of items A, B, C and D between participants. Participant data was categorised and analysed based on their Beck Depression Inventory responses (see Section 2.5.2.1 for group allocations to the

Depressed and Non-Depressed groups). Figure 4 summarises the experimental sequence utilised for Experiment 2b.

2.5.1.4 Ethical Issues

The current experiment raised the same ethical considerations as noted for Experiment 1b, with consideration given to generation of negative future events potentially evoking an emotional response or a negative mood. In order to conduct the experiment within the appropriate ethical guidelines (The British Psychological Society, 2006), precautionary measures were taken with all participants following the exact same procedures as detailed in Section 2.3.1.4. None of the participants reported feeling upset by the generation of a negative future event during the Future Cuing Task. At no point during the experiment did any participant withdraw from the experiment or express dissatisfaction or distress of any kind; no participants reported a deflated mood or having experienced a negative emotional response upon departure. The experiment was approved by the Psychology Department Ethics Committee at Swansea University.

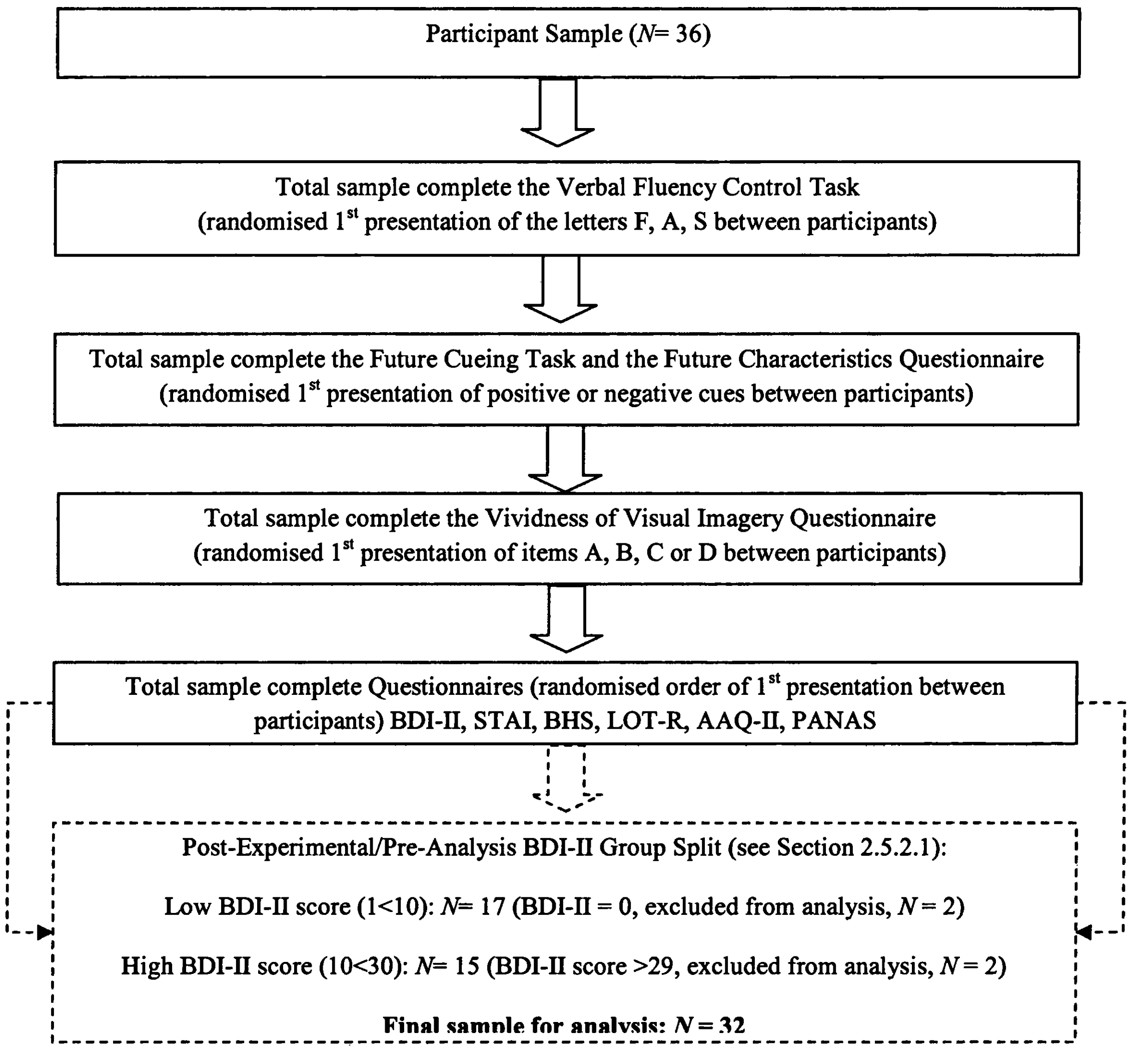


Figure 4. Overview of the Experimental Sequence for Experiment 2b.

2.5.1.5 Procedure

Participants were invited to complete the experiment in specifically allocated psychology laboratories which consisted of a small room inhabiting only a plain desk and chair. Prior to commencement participants were briefed about the nature of the study and were asked to complete a consent form to acknowledge their willingness to participate. Due to the nature of the study with regards to emotional content of future negative events participants were specifically reminded of their right to withdraw from the study at any time without providing any reason. The study commenced with the Verbal Fluency Control Task (VFCT) subsequently followed by the Future Cueing Task (FCT) and accompanying Future Cueing Questionnaire (FCQ); participants were provided with verbal and written instructions as to the process of this task as in Experiment 1b. FCT responses were recorded by the use of a Dictaphone as in the previous experiments. Upon completion of the FCT and FCQ participants were cycled in to the visual imagery session where they were presented with the Vividness of Visual Images Questionnaire (VVIQ). Written and verbal instructions were provided and participants were presented with the VVIQ items A through to D in the same procedural fashion as utilised for Experiment 2a (see Section 2.4.1.2). Participants lastly completed the psychometric and wellbeing self-report questionnaires in their own time. Upon completion of all tasks participants were suitably debriefed and thanked for their participation in the study.

2.5.2 Results and Discussion

2.5.2.1. *Group Allocation*

In line with the foregoing experiments participants with a score of 0 ($N = 2$) or above 29 ($N = 2$, $M = 30$) were excluded from the analysis. As before the BDI-II inclusion criteria for the No-Depression group was a score of 1< 10, thus participants presenting scores of 1-9 ($N = 17$; $M = 3.23$, $\sigma = 1.92$); whereas inclusion in the sub-clinical depression group required BDI-II scores of 10 < 30 ($N = 15$; $M = 14.86$, $\sigma = 5.50$; Depressed Group).

2.5.2.2. *Demographics and Psychometrics*

The two groups were found to report significantly different depression levels on the BDI-II, with participants in the Non-Depressed group reporting lower BDI-II scores relative to the corresponding Depressed group, $t(30) = -8.185$, $p<.001$. Similar divergence between the groups were found in relation to the other well-being measures with the Depressed group consistently reporting higher levels of anxiety (STAI, $t(30)$ = -

3.533, p=.001), increased hopelessness (BHS, $t(30) = -2.487$, p =.019), deflated life optimism (LOT-R, $t(30) = 2.828$, p =.008) and reduced psychological flexibility (AAQ, $t(30) = 2.608$, p =.014). Mood was not found to be significantly different between the groups (PA: $p=.760$; NA: $p=.106$). The psychometric means are presented with the participant demographics in Table 19. As depicted in Table 19, Depressed and Non-Depressed participants did not differ with respect to age, $t(30)$ =.377, p =.709 representation of gender, $\chi 2$ (1) =. 005, p =.946 or verbal fluency, $t(30)$ = -.315, p =.755.

The groups were well matched for age, gender and cognitive abilities with between group differences pertaining to psychometric measures and demonstrating co-occurring levels of depression, anxiety, hopelessness, optimism and emotional avoidance corresponding with previous research in clinical groups.

Table 19. BDI-II group split differences on Demographics and Psychometric tests with Mean scores and Standard Deviations (SD) for the Depressed and Non-Depressed groups in Experiment 2b.

Variable	**Depressed *(SD)***	**Non-Depressed *(SD)***
Gender: Females **(Males)**	9(6)	10(7)
Age	20.80 *(1.93)*	21.11 *(2.71)*
VFCT	13.81 *(2.92)*	13.48 *(2.94)*
BDI	14.86 *(5.50)*	3.23 *(1.92)*
BHS	5.67 *(4.40)*	2.71 *(2.05)*
STAI	44.80 *(9.92)*	32.54 *(9.67)*
LOT-R	12.80 *(4.37)*	17.52 *(5.00)*
AAQ-II	44.13 *(8.08)*	50.88 *(6.54)*
PA	32.06 *(8.92)*	31.23 *(6.25)*
NA	15.20 *(5.28)*	12.71 *(2.99)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

2.5.2.3 *Autobiographical Future Event Content*

As in Experiment 1b the content of the future events generated in the present study, i.e. descriptions of events were classified into broad categories to present an outline of the content of the events generated. Consistent with findings from experiment 1b participants were found to produce events in line with common life developments. That is, positive events that might happen in the future were such things as episodes of academic or career success (40%), episodes during leisure activities (13%), romantic episodes (10%), parties (10%), and the birth of a child or episodes involving a child (5%); weddings (7%); buying a house (7%); 8% of the events could not be classified in these categories. Whereas, negative events that might happen in the future included episodes of academic and/or career failure (50%), relationship problems and/or the end of a romantic relationship (13%), accidents, severe illness or deaths of friends and/or relatives (13%), accidents or severe illness involving the participants themselves (10%), and arguments with relatives or close friends (8%); 6% of the events could not be classified in these categories.

2.5.2.4 *The Future Cueing Task*

As in Experiment 1b common AMT practice was adopted for the FCT, that is, the first cued response across the 12 trials was used to index Future Event Specificity (FES), with higher scores indicating increased levels of FES. High positive correlations were seen between the number of specific future events produced under each valence category with the total number of specific generated events (Non-Depressed group positive cues, r=.787, and negative cues r=.882; Depressed group, positive cues r=.896 and negative cues r=.926).

On average, future events for participants in the Non-Depressed group were specific 75.48% of the time across the 12 trials; whereas the depressed participants showed somewhat diminished specificity in generation of future events overall with 58.89% of the 12 trials noted as specific. Differences in specificity were predominantly noted for positive cues, with the Non-Depressed group marginally more specific in relation to future events relative to the Depressed group (M = 4.94, σ= 1.03 and M = 4.00, σ=1.69 respectively; t(30) = 1.928, p =.063). For negative cues, specificity was again similar for both groups, with a marginal difference pertaining to the Non-Depressed group being slightly more specific in their description of events (Non-Depressed group, M = 3.94, σ = 1.34; Depressed group, M = 3.07, σ = 1.98); though this difference was not found to be statistically significant, t(30) = 1.476, p =.150). Table 20 presents the FCT performance for both groups, and as can be seen omissions were rare. The number of specific events generated on the FCT (i.e., level of FES) is a direct reflection of the number of "errors" on the FCT (as the sum of number-correct scores and errors is a constant across participants). Verbal fluency scores did not correlate with the total number of specific events for either group (Non-Depressed, p=*.512;* Depressed, p=*.180*).

Future event specificity was subjected to a 2 (Group: Depressed/Non-Depressed) x 2 (Cue valence: Positive/Negative) mixed analyses of variance (ANOVA). A main effect for valence was found, with both groups producing more specific positive future events (F(1,30) = 14.665, p=.001, ηp^2 =.328). A marginal main effect was seen for group (F(1, 30) = 3.571, p=.068, ηp^2 =.106), with the Non-Depressed group being more specific overall relative to the Depressed group. No interaction effect was observed (F(1,30) =.017, p =.896, ηp^2 =.001).

These results correspond to findings from study 1b and show that on a general level specificity pertaining to future events was not found to vary between groups.

Table 20. Future Cueing Test Performance presented as Mean Percentage of Specificity, Mean number and Standard Deviation of Future Event Specificity responses across the six cue words for each valence category as reported by the Depressed and Non-Depressed groups in Experiment 2b. T-Test score and statistical value *(p)* from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	$t(30)$	p
Total % of specific memories	75.48*(15.44)*	58.89*(27.89)*		
Total % of omissions	1.20*(1.30)*	2.34*(1.58)*		
Total cues	8.88 *(1.99)*	7.06 *(3.34)*	1.890	*0.068*
Positive cues	4.94 *(1.02)*	4.00 *(1.69)*	1.928	*0.063*
Negative cues	3.94 *(1.34)*	3.07*(1.98)*	1.476	*0.150*

Note. Positive/Negative cues = number of specific future events relative to the detailed valence category on the Future Cueing Test.

2.5.2.5. *Future Event Characteristics*

Phenomenological characteristics, for each future event cued on the FCT, were assessed by the Future Characteristics Questionnaire (FCQ). Participant responses to questions about valence, frequency and clarity of the cued event were recorded and collated within these three domains. Within group analysis found that participants in the Non-Depressed group reported greater clarity for positively relative to negatively cued future events, $t(16) = 5.081$, $p<.001$. Moderate significant valence differences were also observed for clarity in the Depressed group ($t(14) = 2.102$, $p=.054$). Strong congruency was seen for cue and valence with positive future events being described with high affect ratings relative to low affect recorded for negative events within both groups (Non-Depressed, $t(16)= 10.570$, $p<.001$; Depressed group, $t(14)= 7.387$, $p<.001$). With regards to frequency of thoughts about future events the Non-Depressed group reported more frequent thoughts about positive relative to negative future events ($t(16)= 2.888$, $p=.011$), whereas no significant valence difference pertaining to frequency of future thinking was found for the Depressed group ($t(14)= -1.038$, $p=.317$). The FCQ mean scores are reported in Table 21 below. As can be seen from Table 21 a significant group difference was only observed for positive frequency. That is, participants in the Non-Depressed group reported thinking and talking about positive future events more frequently than the Depressed group ($t(30) = 2.086, p = .046$).

Table 21. Mean scores and Standard Deviations (SD) for the three dimensions of Clarity, Valence and Frequency as assessed by the Future Event Characteristics Questionnaire for the Depressed and Non-Depressed groups in Experiment 2b. T-Test score and statistical value (*p*) from between group comparisons are presented.

Memory Characteristics	**Non-Depressed (18)**	**Depressed (15)**		
	Mean *(SD)*	**Mean *(SD)***	***t*(30)**	***p***
Positive Clarity	5.80*(0.77)*	5.48 *(1.18)*	0.889	*0.381*
Negative Clarity	4.61 *0.89)*	4.90*(1.61)*	-0.632	*0.532*
Positive Valence	6.64 *(0.62)*	6.53 *(0.72)*	0.480	*0.635*
Negative Valence	1.95*(1.43)*	2.72 *(1.95)*	-1.279	*0.211*
Positive Frequency	5.28 *(1.19)*	4.45 *(1.04)*	2.086	*0.046**
Negative Frequency	4.08 *(1.10)*	4.99 *(1.66)*	-1.847	*0.075*

Note. *$p<.05$

2.5.2.6. *Likelihood Ratings*

The FCQ further recorded the participants' likelihood rating of the future events occurring. One way ANOVA analysis found a significant difference between groups in relation to positive future events, with the Non-Depressed group rating these as more likely to occur ($M = 5.59$, $\sigma = .731$) relative to the Depressed group ($M = 4.94$, $\sigma = 1.03$; $F(1, 30)= 2.079$, $p=.046$). Similarly the Non-Depressed group reported somewhat stronger belief in negative events occurring ($M = 5.06$, $\sigma = .832$) relative to the Depressed group ($M = 4.77$, $\sigma =.972$) though this difference was not found to be significant, $F(1, 30) =.893$, $p=.379$. No correlations were found for event specificity and likelihood ratings. These results show that group differences were present in regards to positive future vents generation, with the Non-Depressed group demonstrating greater clarity, frequency of consideration and expectancy of occurrence pertaining to such events relative to the Depressed group.

2.5.2.7 *Temporal Distance*

Analysis of the reported temporal distance of future events found participants from neither the Non-Depression nor the Depression group to report the anticipated future events as generally occurring 'later today', 'tomorrow', 'in a few days' or 'in further than 10 years' (i.e. no individuals referred to positive events occurring that day, the next day or in the next few days, 1 person reported 2 positive events occurring in further than 10 years time; 1 person referred to 1 negative event occurring in the next few days), thus upon averaging, the total future distance reports these variables were omitted, and are not individually presented in Table 22, nor included independently in any statistical calculations. As can be seen from Table 22 the Non-Depressed group reported more events from the near past in response to positive cues, with a total of 88.1 percent of the events generated occurring within the next few months. The Depressed group reported only 6.7 percent of the positive events generated to be occurring within the same time-frame. In regards to negative events the Non-Depressed group anticipated 76.5 percent of the events generated to take place within the next few months, relative to the Depressed group whom anticipated 73.3 percent of the negatively cued events to occur within this period. A One-way ANOVA found the difference in the time of event occurrence to be significant for the positively cued events, with the Non-Depressed group anticipating significantly more positive events to take place in the near future relative to the Depressed group ($F(1,30) = 42.374$, $p < .001$). No statistical significance was found between the two groups pertaining to time of negative future events ($F(1, 30) = .106$, $p = .747$).

Table 22. Mean Percentage of reported Temporal Distance of Future Events generated to Positive and Negative Cues as reported by the Depressed and Non-Depressed groups in Experiment 2b.

Time of Event	**Temporal Distance of Positive Events (Mean %)**		**Temporal Distance of Negative Events (Mean %)**	
	Non-Depressed	**Depressed**	**Non-Depressed**	**Depressed**
Next week	23.5		11.8	13.3
In a few weeks	17.6		11.8	26.7
Next month	29.4		17.6	13.3
In a few months	17.6	6.7	35.3	20.0
Next year	11.8	66.7	11.8	6.7
Next 5-10 years		26.7	11.8	20.0

The psychometric measures were all seen to correlate with the temporal distance of positive future events. Lower levels of depression (BDI-II, r = *.710 p<.001*), hopelessness (BHS, r = *.370,* p=.037) and anxiety (STAI, r = *.488* p=.005), were associated with positive future events anticipated as occurring in the near future (in the next few months). Higher levels of optimism (LOT-R, r = -.467 p=.007) were also associated with closer proximity of positive future events. Temporal distance of positive events was found to correlate with specificity in the generation of negative future events (r = -.345 p=.053), that is, closer proximity of positive anticipated events were associated with greater specificity of negative future events. Proximity of negative events was not found to relate to the psychometric measures nor FES; nor was there any association found between negative event proximity and clarity, valence or frequency of future events.

The findings here further demonstrates the overall positivity bias held by the Non-Depressed group, with positive future events found to be of closer proximity relative to negative events and in contrast to reports by the Depressed group. Proximity of positive events also related to increased specificity in anticipation of negative events.

2.5.2.8 *Future Event Vantage Point*

The vantage point of participants pre-experience of the autobiographical future events were recorded as either from a field (first person) perspective, or as an observer (third person) perspective. Participants overall reported 62.24 % of the future events generated to be from a field perspective. Of these the first person perspective was reported to be found for 65.62% of the positive events relative to 58.85% for the negative events. At a split group level of analysis the Non-Depressed group was found to generate future events form a first person perspective to 67.64 % of the 12 cues, whereas the Depressed group reported 56.11% of the events to be from this perspective. As can be seen from Table 23, the recall vantage point was found to differ significantly between the two groups, with the Non-Depressed group reporting the field perspective significantly more in future generation relative to the Depression group. It can be seen that this group difference was consistent for generation of positive events, where again the Non-Depressed group appeared to perceive more positive past events from the field perspective relative to the Depressed sample. No differences were found between the groups in regards to vantage point in the generation of negative future events.

Overall, the first person perspective was found to correlate with specificity of positive ($r = .540, p < .001$) and negative future events ($r = .553, p < .001$). Proximity of positive future events were also found to correlate with increased reports of the first person perspective view overall ($r = -.385$, $p = .030$). No other correlations were observed for vantage point and phenomenological characteristics of future events. Relations between vantage point and psychometric scores found generation of positive future events from a first person perspective to correlate with lower levels of depression (BDI-II; $r = -.545, p = .001$), hopelessness (BHS; $r = -.462, p = .008$) and anxiety (STAI; $r = -.381$, $p = .032$) and higher levels of optimism (LOT-R; $r = .387$, $p = .029$). First person perspective in negative future generation was not found to correlate with either of the psychometric measures. These findings show that a self-in-context perspective was related to increased specificity of anticipated future events across valence categories, and specifically for positive future events within the Non-Depressed group.

Table 23. Mean Percentage of Future Events observed from a First Person Perspective within the Depressed and Non-Depressed groups in Experiment 2b. T-Test score and statistical value (*p*) from between group comparisons are presented.

	Percentage of Future events Perceived from 1st Person Perspective			
Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	**t(30)**	***p***
Total for all cues	72.54 (22.78)	57.12 (12.38)	2.247	*0.032**
Positive events	62.74 (17.21)	54.44 (9.89)	2.234	*0.033**
Negative cues	67.64 (17.65)	56.11 (9.69)	1.642	*0.111*

Note. *p<.05.

2.5.2.9 *Vividness of Visual Imagery Questionnaire*

Participants in both groups completed the four imagery categories of the VVIQ. Initial results showed that on the whole participants found it easier to generate images of a 'relative or friend' (M = 16.06, σ = 2.57) and a 'sun rise' (M = 15.56, σ = 3.08) relative to 'a shop frequently visited' (M = 14.56, σ = 3.07) and 'a country scene' (M=14.62, σ =2.83). No significant group differences were found pertaining to visual imagery of a friend/relative (t(30) =-.829, p=.414), a sun rise (t(30) = .966, p = .342), a familiar shop (t(30) =.970 p =.340) or a country scene (t(30) =.046, p =.964).

A total VVIQ score was compiled by collating the scores across the four VVIQ categories for further analysis. No group differences was found on the collated score (t(30) =.428, p=.672). The VVIQ total score was found to correlate negatively with specificity of negatively cued future events (r= -.362, p=.042), though no correlation was observed for positive specificity (p=.520) nor for total future event specificity (p=.123). Interestingly only one correlation was found when compared with the FCQ characteristics, that is, imagery ability correlated positively with frequency of negative thought (r=.362, p=.042). Imagery was not found to correlate with either of the psychometric measures of depression, hopelessness, anxiety, or optimism.

The VVIQ scores were dichotomised to allow for analysis of those high and low in imagery independently of BDI-II categories. The total mean score of 60 was used to create the high vs. low imagery categories, with the low imagery category averaging a score of 53.31 (σ = 3.77) relative to the high imagery group whose average score was 68.31 (σ = 6.19). The scores were found to be significantly different between the two groups ($t(30) = -8.274$ $p<.001$).

A One-way ANOVA found a significant difference between the high and low imagery groups pertaining to negatively cued future thinking ($F(1, 30)= 6.753$, p=.014), with the low imagery group being more specific in their generation of negative future events (M=4.25, σ = 1.57) relative to the high imagery group (M= 2.81, σ = 1.60). No such difference was observed in relation to positive future thinking (p=.630). These results show high imagery abilities as related to decreased specificity in generation of negative relative to positive future events. This ability was further qualified by those high in imagery reporting increased frequency of consideration for such negative events. No relation was observed pertaining to depression levels, though the Depression group was seen to consider negative events more frequently than the Non-Depression group.

2.5.2.10 ***Emotional Avoidance***

The AAQ-2 was found to correlate negatively with the BDI-II (r = -.369, p = .037), that is, those displaying low levels of emotional avoidance (as represented by a high score on the AAQ-2) were found to report low levels of depression. Though, no correlations were found for the AAQ-2 scores and future event specificity on any level of analysis. A marginal negative correlation was observed for the AAQ-2 and increased reports of previous recall of negative future events (r = -.348, p = .061). The near proximity of positive future events was found to be related to reduced emotional avoidance (r = -.341, p = .056). Similarly, vantage point in future events experienced from a first person perspective was found to relate to low emotional avoidance (r = .376,

p = .034). A split group analysis found an approaching correlation for the AAQ-2 and positive frequency (r = .456, p = .078) within the Non-Depressed group. For the Depressed group the only correlation found with the AAQ-2 was a marginal relation with the reported level of expectancy for negative events occurring (r = -.471, p < .070).

Emotional avoidance was found to correlate with category D of the VVIQ (r = -.333, p = .062), namely *'a country scene which involves trees, mountains and a lake'*. Here, less emotional avoidance corresponded to higher reports of visual imagery of the described occurrence. No such correlation was found at the split level of analysis for the Non-Depressed group, however, within the Depression group a negative correlation was found for the AAQ-2 and category D of the VVIQ (r = -.636, p = .011). These findings show that, as in Experiment 1b, emotional avoidance did not relate to FES *per se*. Though, proximity and positive valence of future events, along with first person perspective was related to lower levels of emotional avoidance.

2.5.3 Summary

No group differences were found for mental imagery as assessed by the VVIQ. These findings are in contrast to those of Stöber (2000), who found depressed mood to pertain to decreased imagery of positive future events. Nor are the findings from Bywaters, Andrade and Turpin (2004) supported in regards to improved vividness of imagery for either valence category. Interestingly, a relationship was observed for imagery and level of specificity to negatively cued future events. By dichotomising the imagery scores high and low imagery groups were compared on their level of specificity; and a significant difference between these groups was found for negatively cued future thinking, with the high imagery group being less specific in their generation of negative future events. Imagery ability also correlated with rate of previous consideration of negative future events. Table 24 summarises key findings from Experiment 2b.

As in Experiment 1b FES differences emerged for positive future events, with the Non-Depressed group demonstrating a greater ability to generate such events relative to the Depressed group. The subjective characteristics further informed this finding with a group difference observed in relation to vantage point of the future event generated, as the Non-Depressed group reported a first person perspective in their perception of future events overall. A valence bias was observed in this regard with positive future events more notably experienced from the first person vantage point. Both groups demonstrated a valence discrepancy in terms of reports of more clarity of detail and stronger affect related to positive future events. However, only the Non-Depressed group reported increased episodes of thinking about positive future events relative to negative future events. This positivity bias in the Non-Depressed group was further extended by reports of a stronger belief in the likelihood of such positive events occurring relative to the Depressed group. Thus, the Non-Depressed group anticipated significantly more positive events to take place in the near future relative to the Depressed group.

No correlations were found for emotional avoidance and future event specificity on any level of analysis. However, from phenomenological characteristics, in form of reports based on the subjective experience of the prospective events, it was seen that low emotional avoidance related to events experienced from a first person perspective, as well as increased cognitions pertaining to negative future experiences. Similarly, low emotional avoidance correlated with the increased proximity of positive events. Within the Non-Depressed group it was also seen that low emotional avoidance related to increased consideration of positive events. For the Depressed group, it was again found that reported use of avoidant strategies were associated with increased expectancy of negative events occurring. Within the Depressed group a negative relationship for emotional avoidance and imagery ability was found, however this was limited to correlations with category D of the VVIQ specifically.

Overall, these findings may serve some purpose in explaining the relative lack of correlation between emotional avoidance and specificity in future thinking as seen in Experiment 1b and 2b, as it appears here that constructing images of future experiences may pertain more to an overall ability to assemble such images rather than the emotional content of such events. It may be that future events are more schema based and omit any painful personal material and thus lack subjective experiential content which is found in personal recall. That is, as future events are inherently fictional, fusion with such content may as such occur to a lesser degree than events from the past, that entail a 'true' quality. These findings are particularly relevant in regards to the development of hopelessness about the future, which is a recognised feature in depression. As hopelessness has been noted to occur in relation to the predictive certainty of future events occurring it appears that specificity of future events may be measuring a different quality to such expected likelihood of events occurring. As such the FCT may not be able to detect the features associated with the development of this predictive certainty.

Table 24. Summary of Main Aims and Findings from Experiment 2b.

	Research Aim	Hypothesis	Main Findings
1	Replicating and supporting the findings from Experiment 1b.	*Sub-clinically depressed individuals will demonstrate differing levels of FES relative to non-depressed individuals.*	*The hypothesis is partially supported.* Marginal group differences were found for total FES (*p*=.068) and Positive FES (*p*=.063), with the Depressed group demonstrating reduced FES relative to the Non-Depressed group.
2	Examine VVIQ levels in a sub-clinical population.	*Sub-clinically depressed individuals will differ from healthy participants in their imagery abilities as measured by the VVIQ.*	*The hypothesis is not supported.* No group differences were found for VVIQ.
3	Explore independently measured imagery abilities (VVIQ) in relation to phenomenological characteristics of future events.	*Expression of positive and negative future event phenomenological characteristics will differ between those who report high levels of vividness in imagery as measured by the VVIQ relative to those who report low levels of VVIQ.*	*The hypothesis is partially supported.* The relationship was found to be *valence specific:* A negative relationship was found between VVIQ total scores and specificity of negatively cued future events (*p*<.05). The VVIQ was not found to relate to positive specificity or total future event specificity. A positive relationship was found for imagery ability and frequency of negative thought (*p*=.05). A significant difference was found between the high and low imagery groups with the low imagery group being more specific in their generation of negative future events (*p*=.05). No such difference was observed in relation to positive future events.
4	Examine the relationship between emotional avoidance, as measured by the AAQ-II, and imagery ability, as measured by the VVIQ.	*There is a relationship between imagery ability and emotional avoidance as measured by the AAQ-II.*	*The hypothesis is supported.* A negative relationship approached significance for emotional avoidance and category D of the VVIQ (*p*=.062). Within group analysis found a negative relationship for emotional avoidance and category D of the VVIQ (*p*<.05) within the Depressed group.

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

2.6. General Discussion

Experiment 1a and 1b had three main aims: (1) to examine the AMT level of sensitivity in relation to sub-clinical depression; (2) to examine reported levels of emotional avoidance (AAQ-II) in relation to phenomenological characteristics of positive and negative past events specificity as measured by the Memory Characteristics Questionnaire (MCQ) in relation to the valence of thoughts about the past (Experiment 1a) and for the future (Experiment 1b); and (3) to examine emotional avoidance (AAQ-II) in relation to past and future positive and negative event specificity. The results for memory specificity in sub-clinically depressed persons were similar to previous research with depressed individuals (cf. Williams, 2007 for a review). Although, the present findings suggest there may be an event valence effect interacting with specificity of recall. However, findings in relation to specificity in future episodic thinking were more ambiguous and not in line with previous findings in the literature (e.g. Williams, 1996). A possible confounding variable in Experiments 1a and 1b was individual differences in mental imagery ability. In order to control for such individual differences Experiments 2a and 2b aimed to examine the role of imagery in the construction of past and future events. The main aim for Experiment 2a and 2b was to (1) independently account for imagery abilities by use of an independent imagery ability measure, the VVIQ, and to explore the VVIQ responses in regards to specificity of past recall and future thinking as measured by the AMT and FCT respectively.

The findings from Experiment 2b indicated no differences between sub-clinically Depressed and Non-Depressed individuals in the ability to generate visual images. However, looking at imagery as separate from depression it was observed that some differences emerged in terms of imagery ability and the specificity of future events generated. Specifically, the results showed low imagery abilities to be related to increased specificity in generation of negative relative to positive future events. A brief content analysis of the future events generated revealed that participants reported future experiences pertaining to typical of events socially expected to occur within a lifetime. This may indicate that the constructed images were schema-consistent relative to more elaborative personal accounts of future events. In such a case, those who were low in imagery abilities may likely have made more extensive use of such commonly expected life events, relative to more personal content, in their reports of future scenarios. In particular, increased specificity may come from the contextual information and repeated rehearsal through presentation of such socially expected events in common conversations, media and other vicarious circumstances. In comparison, those high in imagery may have been more hesitant in their description of future negative events due to the connotations associated with such more personal descriptions, that is, mood regulation strategies may have been induced in an attempt to diffuse the emerging picture so as to restore the commonly denoted positivity bias individuals hold in regards to future expectations (Taylor & Brown, 1988). A commonly denoted problem with explicit tasks is that they allow participants to elaborate on responses rather than provide the more instant responses, as such demand characteristics pertaining to social desirability is a common problem in research on socially sensitive issues. Specifically the suppression on ratings for phenomenal characteristics associated with mental time travel may be influenced by self-presentation or self-disclosure, which have notably been found to correlate with suppression (see Gross & John, 2003).

On a related note, it may be suggested here that more specific negative events emerged for the low imagery compared to the high imagery group as the latter were less able to focus on negative events as they 'automatically' conjure up positive alternatives and find it easier to imagine a wider range of outcomes. It may also be that no such difference was found for generated positive events, because there is a stronger tendency to engage in problem solving strategies, and as such imagine various alternatives, in response to negative outcomes. This suggestion is supported by the finding that those high in imagery were also seen to previously have talked or thought about negative future events more frequently than those low in imagery. Raes et al. (2005) have shown that rumination is negatively correlated with problem-solving effectiveness and that OGM has been seen to mediate the relationship between rumination and effective problem solving. Secondly, imagery ability was not found to affect past recall, debatably as past content is more personal. Thus it can be argued that imagery would be seen to affect such previously experienced descriptions to a lesser extent than future events.

The degree of AMS in the current series of experiments was notably restricted by emotional avoidance as pertaining to experiential avoidance and suppression of personal past experiences. However, the reduction of specificity in regards to positive events relative to negative events was unexpected in regards to the literature (e.g. Williams, 2007 for a review). This may be a relevant finding for the future thinking literature where it has been suggested that reduced positive expectations is a prominent feature of depression (e.g. Macleod et al., 1997). In this respect it may be inferred that reduced future expectancy arises from an initial obstruction of positive event details in memory and as such inhibits the capacity to form future event scenarios, as access to the knowledge of such scenarios is limited. This finding fits with theories suggesting that the core feature of autobiographical memory is to instruct future thinking (e.g. Addis, Wong, & Schacter, 2007; Schacter & Addis, 2007).

However, the question as to why positive event specificity is reduced, relative to negative events, still remains. One potential explanation may come from theories on mood congruence in memory (e.g. Bower, 1981). According to Bower (1981) current levels of mood bias the retrieval of memories consistent with current mood. Teasdale (1988) has suggested that mood state is linked to depression vulnerability and serves as an attentional bias towards negative memories. This bias subsequently works to enhance and prolong such depressive mood. As such depressed mood would be seen to facilitate the retrieval of negative events prior to retrieval of positive events. This is linked to theories which suggest that across time people prefer to maintain a coherent sense of self, be it positive or negative, and any past recall or future scenario would be adopted that incorporates such coherence, particularly pertaining to goal-directed behaviours (e.g. Conway & Pleydell-Pearce, 2000). In this regard Conway (2001), suggest that episodic memory serve the function of keeping track of ongoing goal processing, whereof mental images, with reference to visual imagery, play an important role in representing information about such personal goals (Conway, Meares, & Standart, 2004). As such episodic future thinking is also closely related to personal goals, as thinking about the future involves generating future states of the self related to current goals, that is, perceived success or failure to attain personal goals, which are believable in relation to the self image the individual perceived in the current context (Atance & O'Neill, 2001).

One characteristic noted in depression is reduced engagement in a social context, the potential development of this (lack of) behaviour may be noted in terms of a lack of exposure to positive cues as seen for the Depression group in Experiment 2a who were noted to be less specific in positive event recall. Overall, the findings from the AMT experiments (i.e. 1a and 2a) were somewhat consistent with the existing literature that emphasizes the use of past experiences in construction of future experiences. That is, if someone is suppressing details of past experiences this likely expands to future thinking, and positive as well as negative emotional content as these are relationally framed in an 'if - then' comparison, i.e. 'if negative now it will be negative then [in the future]'. This extends to the relation between valence categories as it can be denoted that if something is seen as negative it is also seen as not positive, as such it may be that the way this is manifested in verbal behaviour is through rule governed behaviour, that is, pessimism *per se* is not commonly reinforced, thus the expression of such thoughts become re-framed as *less positive* rather than *more negative* per se.

Across all four experiments an emotion regulation strategy (i.e. high versus low avoidant) and visual imagery ability (high versus low) affected the phenomenological characteristics associated with past and future cognition in a similar way. These results extend previous studies (e.g. D'Argembeau & Van der Linden, 2006; Richards & Gross, 2000; Rubin & Siegler, 2004) by showing that individual differences in adopted avoidance coping strategies, in form of emotional inhibition, affect not only the subjective experience of memory for past events but also the phenomenology associated with mental time travel into the future.

The content of the past and future events generated by the participants were seen to relate to similar domains (e.g. education or work, parties, exchanges with relatives or friends, romantic relationships, illness), with the exception of the birth of a child or episodes with a child, which were only noted in response to cues for the future thinking paradigm. Overall, it can be said that the past and future events formed a fairly typical sample of events that characterize general life experiences (D'Argembeau & Van der Linden, 2006). Further investigation of the phenomenological characteristics pertaining to the generated events found that for both future thinking experiments a clear valence bias was observed, with apparent group differences. That is, the Non-Depressed participants reported more clarity, greater affect and more frequent consideration of positive future events. Additionally, the Non-Depressed group reported viewing these positive events from a first person perspective to a greater degree, as well as perceiving positive events to be more likely to occur, and for such events to be occurring in the near future. A similar pattern was observed in regards to the two memory experiments, that is, the positivity effect was again clearly notable within the Non-Depressed group. With positive memories reported to be of events within the recent past and having retrieved positive past events more frequently than negative events. While Depressed individuals were seen to respond to these characteristics by an inverse pattern relative to the Non-Depressed individuals, in parallel across past and future measures. Overall these results are consistent with previous findings which have reported subjective phenomenological characteristics related to remembering past events to similarly affect the experience associated with future thinking (e.g. D'Argembeau & Van der Linden, 2006); thus supporting the suggestion that mental time travel into the past and into the future are related (e.g. Atance & O'Neill, 2001; Suddendorf & Corballis, 1997). However two notable points from the investigation of the subjective experience of past and future events relates to the perceived vantage point and frequency of thought. That is, whereas in normal perception events are more often viewed from the field perspective, i.e., from a person's own standpoint (Nigro & Neisser, 1983), it is argued that perceptual alteration is adopted as an initially adaptive strategy to detach oneself from stress and negative emotions evoked by the event (Spiegel & Cardeña, 1991), as such a variation in perspective to an observer point of view, i.e., experienced as if the person is watching the event from an outsiders point of view (Yuille & Daylen, 1998) was noted in the

Depression group relative to the Non-Depressed group in relation to both past and future events. This postulate is supported across experiments as it was consistently found that emotional avoidance correlated with perceived perceptual vantage point, with those high in emotional avoidance more likely to report observing past and future events from an observer perspective.

Second, in reference to past events, the frequency of recall (e.g. previous consideration of events by discussion or private thought) is known to influence the strength of memory of events, and as such can improve representation of that event (Read & Connolly, 2005). Such persistent thoughts, or rumination over events, may act as a type of rehearsal which infers greater retention of past event details (Scrivner & Safer, 1988; Yuille & Daylen, 1998). However, the adoption of avoidant strategies where events are consciously suppressed may lead to reduced details in relation to recall (Cooper, 2004). Although, Wegner (1989, 1994) has argued for the opposite result, where thought avoidance could lead to a 'rebound' effect, where such attempts of cognitive avoidance may in fact lead to increased thoughts about the event. Rumination has been noted in depressive samples and as such one may have expected there to be a group difference in relation to consideration of negative events between the sub clinically Depressed and Non-Depressed samples within the foregoing experiments (e.g. Experiments 1a and 2a), however, it was seen that no differences were observed in regards to negative frequency of thought between groups, however, positive frequency markedly differed between groups in relation to past and future events; with the Non-Depressed group reporting more frequent consideration of positive past and future events. As such it appears that emotional avoidance as a mediating factor may be able to explain some of the variance between groups in regards to the subjective experience of past and future events.

In general the findings from Experiments 1a, 1b, 2a and 2b offer new evidence consistent with the suggestion that mental time travel into the past and into the future is related (Atance & O'Neill, 2001; Suddendorf & Corballis, 1997), by demonstrating that remembering past events is affected in a similar manner to projecting oneself into the future by individual difference dimensions that influence such subjective experiences. Overall the discrepancies observed in these experiments pertain mainly to the inconsistent findings from the FCT in relation to future cognitions. The experiments reported herein involved the experimentally cued projection of thoughts rather than personally cued future thoughts. However, future research should examine whether the use of personally constructed accounts of future events would provide more information about the link between future cognitions, depression and emotional avoidance.

Chapter 3

Positive vs. Negative Cognitions and Expectancy for the Future

3.1 General Introduction

The ability to anticipate future events in order to plan and organise ones actions is vital in many aspects of people's lives and in the past few years, future-oriented cognition has received a great deal of attention in various areas of psychology (for reviews, see e.g. Atance & O'Neill, 2001; Schacter, Addis, & Buckner, 2008; Suddendorf & Corballis, 2007; Szpunar, 2010). One of the major reasons for this research interest has been the emerging link between perceptions of future thinking and psychological disorders such as depression and anxiety (MacLeod, Pankhania, Lee, & Mitchell, 1997). Specifically, perceptions of the future are one aspect of the concept hopelessness, which, in turn, is a prominent feature in many psychological disorders and is also linked to suicidal ideation (e.g. MacLeod, et al., 1997; MacLeod, Rose, & Williams, 1993; O'Connor & Sheehy, 2000). That is, a pessimistic and negative view of one's personal future is commonly observed in people suffering from depression, something that has been emphasised in several efforts to formulate depression (e.g. Abramson, Alloy, & Metalsky, 1989; Beck, Rush, Shaw, & Emery, 1979).

As with autobiographical knowledge regarding the past, knowledge relating to personal futures (e.g. thoughts of anticipated lifetime events) can be accessed without necessarily generating mental representations of specific events. That is, people may generate a positive or negative general view of the future, in terms of an optimistic or pessimistic outlook based on abstract knowledge regarding personal future experiences in relation to their awareness of goals and expected lifetime periods. Research show that people reportedly spend almost twice as much time thinking about the future as they do the past (38% vs. 21% of their time; Jason, Schade, Furo, Reichler & Brickman, 1989). As seen in Chapter 2 (see Section 2.3) laboratory studies of episodic future thought have also borrowed from the autobiographical memory literature, but have been more concerned with examining the specific content of experimenter cued future scenarios. However it is likely that many future-oriented thoughts consist of more abstract representations (D'Argembeau, Renaud, & Van der Linden, 2009). Though, recent research have for the most part focused on episodic forms of future thinking (i.e. the mental simulation of *specific* future events) (e.g. Addis, Wong, & Schacter, 2008; D'Argembeau & Van der Linden, 2006; Hunter & O'Connor, 2003; MacLeod, Pankhania, Lee, & Mitchell, 1997; MacLeod, Rose, & Williams, 1993; MacLeod et al., 1998; O'Connor, Connery, & Cheyne, 2000; Szpunar & McDermott, 2008).

A wealth of research looking into optimism versus pessimism in relation to future thinking originated with MacLeod and colleagues, who were interested in determining whether hopelessness, characterised by negative future expectancies, was functionally equivalent, to the lack of positive future expectations, beyond its original formulation by Beck and colleagues (Beck, Weissman, Lester, & Trexler, 1974; Conway & Pleydell-Pearce, 2000). That is, MacLeod and colleagues were interested in understanding if worry about the future (i.e. negative expectations) denoted a different experience than foreseeing no positive events occurring in the future. MacLeod and colleagues found that reduced positive future expectancy is related to hopelessness and depression whereas increased negative future expectancy is related to worry and anxiety. According to these authors the experiences are functionally different, something which may have implications for understanding how to target such behaviours in intervention and treatment approaches.

Researchers in the area of future-thinking have followed two lines of investigation in the exploration of its links with pathology and psychological disorders, namely specificity and fluency of episodic future events (e.g. Williams et al., 1996; MacLeod et al., 1993, 1997) with the fluency literature increasingly also attending to the belief in such anticipated events occurring (e.g. MacLeod et al., 1997; O'Connor et al., 2000, 2008). More specifically, several studies have been looking at subjective abilities in the generation of positive and negative future events with a given time limit. Findings from this work have suggested that fluency for positive future events is reduced in depressed and suicidal individuals, whereas fluency for negative future events appears to be increased for anxious individuals (e.g. MacLeod et al. 1997; Conaghan & Davidson, 2002; Hunter & O'Connor, 2003). In this work hopelessness has been termed a 'characteristic orientation to the future in depression' (Beck, Riskind, Brown, & Steer, 1988) whereas worry is seen as a characteristic of anxiety (Barlow, 1988; Molina &

Borkovec, 1994). Although a negative view of the future has been seen as also incorporating the absence of a positive future outlook (e.g., Abramson, Alloy, & Metalsky, 1989), and a negative view of the future is believed to be an important feature of depression (e.g., Abramson et al., 1989; Beck, Rush, Shaw, & Emery, 1979); there is increasing evidence to suggest that positive and negative cognitions concerning the future may best be thought of as two separate dimensions of experience (MacLeod, Byrne, & Valentine, 1996). Furthermore, attention has been directed to accounts of the belief in future events occurring, i.e. individual *expectancies* have been investigated in the future thinking field. By employing a method that asks participants to rate how likely they believe particular hypothetical events are to happen in their personal future, an individual future probability measure is obtained. For example, research has shown that healthy individuals believe good things are more likely to happen to them than bad things (Sedikides & Gregg, 2008; Taylor & Brown, 1988; Robinson & Ryff, 1999; Weinstein, 1980); though the same is seemingly not true for dysphoric groups (e.g. MacLeod & Cropley, 1995). That is to say, mixed findings were reported in some early studies looking to compare clinical and non-clinical groups in their estimates of negative future event likelihood, with individuals with dysphoric mood giving higher likelihood estimates than controls with regards to negative future events (depressed patients: Butler & Mathews, 1983; MacLeod et al., 1997; dysphoric students: Anderson, Spielman, & Bargh, 1992; Pietromonaco & Markus, 1985). However, more recent samples from the literature have demonstrated reports of individuals with mood disturbance as offering lower estimates of positive future events than controls (depressed patients; MacLeod & Cropley, 1995; Pysczcynski & Greenberg, 1987; dysphoric students: Andersen, et al. 1992).

Experiment 1b and 2b in Chapter 2 present interesting results with regards to the additional inclusion of the FCQ, that is, likelihood ratings (i.e. the belief in events actually occurring) were seen to correlate with emotional avoidance and levels of depression, relative to future specificity. Results from the FCT utilised in Experiments 1b and 2b follows the line of investigations looking at specificity, and in its own regard is unable to account for fluency *per se,* nor expectancy. Furthermore, the literature pertaining to fluency has paid more close attention to the valence of events, something which arose as a relevant factor in the foregoing experiments (1b and 2b). These findings are in line with MacLeod and colleagues who designed a task that would specifically target valence differences in participant samples, i.e. the 'Future Thinking Task (FTT: see Sections 1.4.1.2.2 and 3.2.1.2) (MacLeod, Rose & Williams, 1993; MacLeod et al., 1997). The valence diverge was initially noted in work with suicidal samples, where it was found that reduced generation of positive future events may be characteristic of depressed and suicidal ideation, whereas fluency for negative future events appear to be related more notably to anxiety (e.g. MacLeod et al. 1997; Conaghan & Davidson, 2002; Hunter & O'Connor, 2003). Initial findings with the Future Thinking Task (e.g. MacLeod, Byrne, & Valentine, 1996) have supported the postulate that positive and negative cognitions concerning the future represent two separate aspects of experience. As such, the Future Thinking Task may be able to more clearly address one other finding within the foregoing experiments, that is, in relation to the strength of belief in events occurring. The findings from both Experiment 1b and 2b indicated that emotional avoidance was linked to an increased expectancy of negative events occurring amongst the sub clinically depressed samples. As the FTT incorporates an event probability rating pertaining to the personal events generated and this task may be able to offer greater insight in to the relation between emotional avoidance and future thinking. Thus, the FTT offers an account of individual expectancies, by asking participants to rate how likely they believe privately primed and generated events are to happen in their personal future, thus obtaining individual future probability measures. As noted, discrepancies have been observed between studies of healthy and dysphoric participants reported future expectancies, with an increased positive bias in the healthy population (e.g. MacLeod et al., 1996 and MacLeod & Cropley, 1995). There are two reasons why the FTT may address apparent shortcomings of the FCT in facilitating and accounting for contact with more personally relevant content for two reasons; first, the FTT addresses privately primed and not experimentally cued events. Second, the FTT captures reports of fluency *and* probability.

To this end, the series of experiments reported herein aim to evaluate a research method of future thinking, namely the Future Thinking Task (MacLeod et al. 1993; 1997) which allows one to more clearly obtain a measure of future *expectancy* in relation to depression.

3.2 Experiment 3

Given the inconsistencies in findings within the future thinking literature regarding dysphoric participants, Experiment 3 aims to investigate the application of the Future Thinking Task (MacLeod et al. 1993; 1997) across a sub-clinical sample of depressed and healthy control undergraduate students. More specifically Experiment 3 has four main aims, (1) to examine if the FTT is an efficient measure in its employment within a sub-clinical population; it is predicted that future thinking levels, as measured by the FTT, will differ between sub-clinically depressed individuals relative to non-depressed individuals, as measured by the BDI-II. If was further sought to (2) examine if the valence and group interaction found in previous clinical samples is present in a sub-clinical population. It is predicted, in line with previous clinical research on the Future Thinking Task, that there will be an interaction between valence (Positive/Negative) as measured by the FTT and group (Depressed/Non-Depressed) as measured by the BDI-II, in relation to future positive thinking. A further aim (3) is to determine if future expectancy, relative to fluency in generation of future events, would offer further insight to the role of cognitions about the future in relation to depression; It is predicted that positive future expectancy, as measured by the FTT, will differ between sub-clinically depressed individuals relative to non-depressed individuals as measured by the BDI-II. Lastly (4), it was sought to examine the relationship between emotional avoidance (AAQ-II) and future expectancy (FTT). It is predicted that there will be a relationship between emotional avoidance and future expectancy.

3.2.1 Method

3.2.1.1 Participants

Thirty-one adults from Swansea University volunteered to take part in the current experiment in return for course credit, though after exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in section 3.2.2.1) data from five participants was removed, thus only data from twenty-six participants was utilised in the following analysis. As such, the subsequent information pertains to the included twenty six undergraduate students (18 female; 8 male) from Swansea University. The participants ages ranged from 18 to 26 years of age with a mean age of 20.57 (σ = 1.96).

3.2.1.2 Apparatus and Materials

Participants were requested to complete a set of psychological measures. These measures were the same as employed throughout the experimental series presented in Chapter 2, that is the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Trait Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983) , the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond, Hayes, Baer, Carpenter, Orcutt, Waltz & Zettle (Submitted); Hayes, Strosahl, et al., 2004), The Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and a verbal fluency measure (Lezak, 1976).

The Future Thinking Task (FTT; MacLeod et al. 1993; 1997). The FTT is an experimenter led task which requires participants to think of potential future experiences that they are looking forward to (i.e. positive future experiences; e.g., 'Please try to think of as many things as you can that you're looking forward to (things that you enjoy) over the next year') and not looking forward to (negative future experiences); with this request made in the context of three separate time periods, i.e. the next week (including 'today'), the next year and the next five to ten years). Thus participants have to promptly state out loud examples of events evaluated as good or bad that might occur in their own personal future (future event fluency). The order of completion of positive and negative conditions (Valence) is commonly counterbalanced, with half of the participants completing the positive condition first while the other half complete the negative condition first. The order of presentation of time periods within each condition is invariable (i.e., the next week, year, 5-10 years; Figure 5 presents the cycle of items as presented during the FTT). On each occasion, participants have 60 seconds to generate thoughts of future experiences for the set time period; this is repeated until all six Valence and Time Periods are assessed. Participants are informed that the responses can be trivial or important, and that they should report whatever comes to mind, though emphasis is put on considering events that are going to happen, or are reasonably likely to happen. Participants are told to persist in their attempts to generate responses until the time-limit elapse.

i) Evaluation of Future Events

In the revised version of the FTT (MacLeod et al., 1997), participants are further asked to rate each future experience generated, in the valence and time instances, on how likely each event is to happen (Likelihood rating), with response options of 'not at all' (1) to 'extremely' likely (7). The experimenter reads back to each participant the events they generated in the fluency task and make a note of the participant responses. Lastly, participants are again re-read the future events generated and asked to nominate how they would feel at the time if the described event was to occur in the future (Feeling value), on a seven-point scale ranging from 'extremely unhappy' (-3) to 'extremely happy' (+3). For both evaluation tasks participants first rate all events for positivity (negativity), and then all events for negativity (positivity), to ensure that they do not merely rate an event's negativity (positivity) by giving the inverse of its positivity (negativity) score. The constructs are measured separately; as research suggests that positive and negative affect are not uni-dimensional (MacLeod & Byrne, 1996; Watson, Clark, & Carey, 1988).

Verbal Fluency Control Task. In line with previous FTT studies (cf. MacLeod & Byrne, 1996; MacLeod et al., 1993; MacLeod, Tata et al., 1998; O'Connor et al., 2007; Bjärhead et al., 2010) prior to the FTT participants perform a standard Verbal Fluency Task (Lezak, 1976) in order to bring to light any likely differences between groups in general cognitive processing. The task requires the participants to think of, and to report out loud, as many words as possible beginning with certain letters from the alphabet, e.g. the three letters F, A, S are commonly used. Participants are typically given 60 seconds, for each letter, in which to state aloud as many words as they can, excluding repetitions, proper nouns, numbers and sequences which involve the same basic word (i.e., swim, swimming, swimmer). The score is the mean of all the words generated (minus any exclusions) within the given time frame.

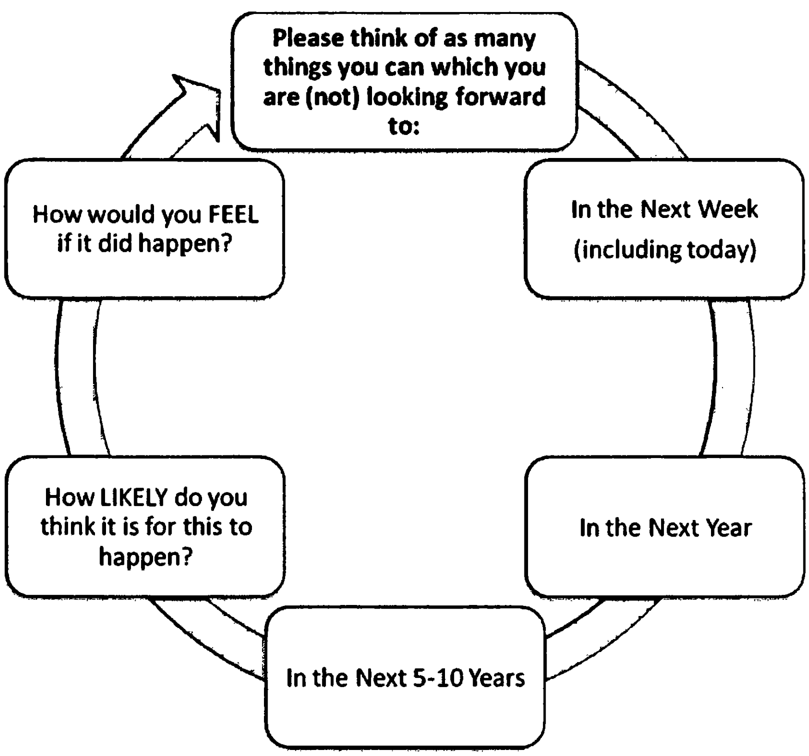


Figure 5. The Future Thinking Task: The cycle depicts the order of sequence for each of the Three Time Periods and the presentation of the Valence, Likelihood and Feeling Questions employed in Experiment 3.

3.2.1.3 Experimental Overview

The current study used a 2 x 2 x 3 mixed design, with Group (Depression: Low BDI-II, High BDI-II) as the between participant variable and Valence (Future Cognitions: Positive/Negative) and Period (Week, Year, 5-10 years) as the within participant variables. All participants completed all tasks and measures; the experimental sequence is depicted in Figure 6.

3.2.1.4 Ethical Issues

In order to conduct the experiment according to the appropriate ethical guidelines as identified by the British Psychological Society (2006), precautionary measures were explicitly employed in Experiment 3. The steps taken were consistent with those employed in previous experiments (i.e., Experiment 1a, 1b, 2a and 2b, see Section 2.2.1.4 for full details). The only variation implemented for Experiment 3 relate to the specific experiment information, i.e. the nature and procedural details of Experiment 3 as detailed in the written and verbal experimental briefs. A 'cooling off' period of a minimum 24 hours was implemented between receiving information about the experiment and participation commencement, as in the previous experiments. Emphasis was again given in the brief and debrief to any psychological distress that may arise following the experimental procedures. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the future events generated. The experiment was approved by the Psychology Department Ethics Committee at Swansea University prior to commencement of the study.

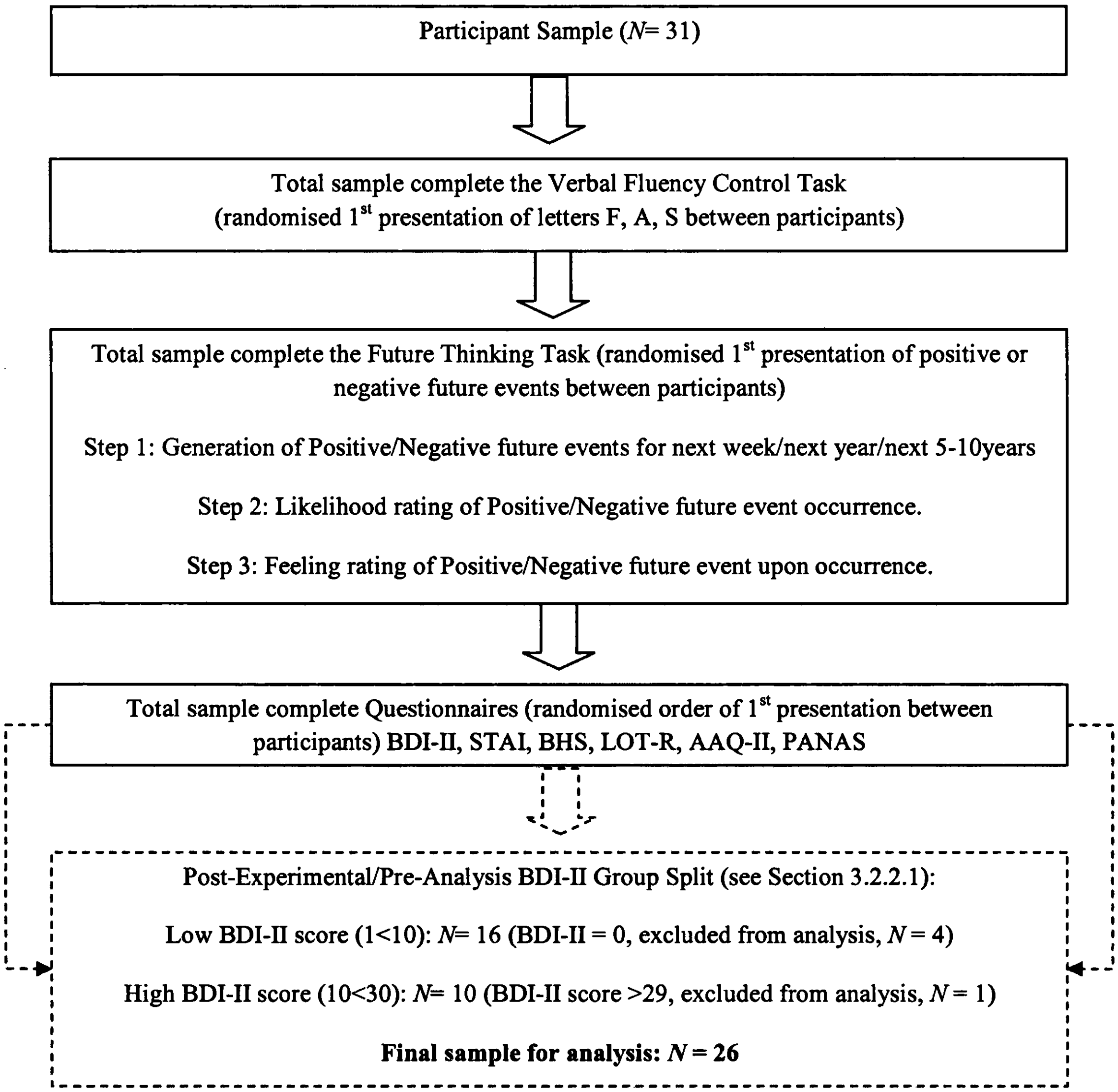


Figure 6. Overview of the Experimental Sequence for Experiment 3.

3.2.1.5 Procedure

Participants were welcomed and seated in a specifically utilized psychology lab consisting of only a table and chairs. Participants were informed as to the nature of the study and requested to complete a consent form prior to commencement of the study. All instructions were provided in writing and verbally.

Upon commencement of the study participants firstly completed the Verbal Fluency Control Task (VFCT) followed by the Future Thinking Task (FTT); participants were informed about the procedural sequence of the Future Thinking Task (MacLeod et al., 1998) and were presented with the three set time periods in which to generate future events: the next week, the next year, and the next 5–10 years, at separate intervals. The measure included positive (looking forward to/would like to happen) and negative (not looking forward to/would not like to happen) conditions, presented consecutively, such that the entire task was made up of six trials, three positive and three negative, across each of the three time periods. In accordance with previous research with the FTT each trial was completed in 60 seconds. Upon completion of the initial part of the FTT, that is after having generated future events for each of the three time frames across both valence categories, participants were firstly asked to rate how likely each event was to happen, using a scale of 1 (not at all) to 7 (extremely) and subsequently, upon rating events within both valence categories, participants were asked to rate how they would feel at the time of the event occurring, on a scale from -3 (very unhappy) to +3 (very happy). The events generated during the first phase of the experiment were read back to the participants in order for them to be able to conduct the likelihood and feeling ratings for each individual event generated, for instance if in the positive condition, in response to the time period of the next year, a participant responded: *'I look forward to getting my driver's license in the next year',* this reply was noted down by the experimenter and rephrased by the experimenter in phase two to provide for the evaluation of the anticipated events, e.g. *'How likely do you think it is that you will get your driver's license in the next year?'* and *'If you did get your license - How will you feel at the time when you know you have passed the test?.*

Following the FTT participants were asked to complete the set of questionnaires (BDI-II, BHS, AAQ-II, STAI, PANAS & LOT-R). The questionnaires were given out in a randomised order with no time restrictions set for completion. On completion of all tests, participants were thanked and suitably debriefed with additional reference to a written debriefing sheet provided for the participant to retain.

3.2.2 Results and Discussion

3.2.2.1 *Group Allocation*

As in Chapter 2 (see Section 2.2.2.1), in order to more accurately capture healthy participants and those at a sub-clinical level of depression, set cut off points were utilised in group categorisation. The cut off point for inclusion in the no depression group was a score of 1< 10, thus participants presenting scores of 1-9 (N = 16; M = 3.87) on the BDI-II were included in this group (Non-Depressed Group). For inclusion in the sub-clinical depression group BDI-II scores recorded where 10 < 30 (N= 10; M= 14.60; Depressed Group). Data from five participants were excluded from the statistical analysis as they were found to report a BDI-II score of 0 (N= 4) or above 29 (N= 1; M = 30).

Group differences were observed with respect to BDI-II scores, with participants in the Non-Depressed group reporting significantly lower BDI scores than the corresponding depressed group, $t(24)=-8.482$, $p<.001$. The two groups further diverged in their responses to measures of hopelessness (BHS; $t(24) = -3.833$, p =.001), life optimism (LOT-R; $t(24) = 2.573$, p =.017), experiential avoidance (AAQ-II; $t(24) = 2.043$, p =.052) and anxiety (STAI; $t(24) = -2.847$, p =.009). No mood differences were found between the two groups (PA: $p=.691$; NA: $p=.284$). The psychometric means are presented with the participant demographics in Table 25. As can be observed from Table 25, the two groups did not differ with respect to age, $t(24)$ =.357, p=.724, representation of gender, $\chi 2$ (2) =.650, p =.420, or verbal fluency, $t(24)$ =.216, p=*.831*.

Overall the two groups were well matched on age, gender and cognitive abilities. The group differences pertaining to psychometric measures are in line with common co-occurrences of depression, anxiety, hopelessness and emotional avoidance seen in the clinical literature.

Table 25. BDI group split presentation of Demographics and Psychometric tests, with Mean scores and Standard Deviations (SD) for the Depressed and Non-Depressed groups in Experiment 3.

Variable	**Non-Depressed** ***(SD)***	**Depressed** ***(SD)***
Gender: Females **(Males)**	12 **(4)**	6 **(4)**
Age	20.68 *(2.27)*	20.40 *(1.42)*
VFCT	11.04 *(2.15)*	10.83 *(2.69)*
BDI	3.87 *(2.94)*	14.60 *(3.4)*
BHS	2.37 *(1.02)*	5.10 *(2.55)*
STAI	33.06 *(8.65)*	43.90 *(10.62)*
LOT-R	17.50*(3.89)*	12.70 *(5.64)*
AAQ-II	55.81 *(7.29)*	48.90 *(9.12)*
PA	32.50 *(5.97)*	31.50 *(6.46)*
NA	12.93 *(5.09)*	15.20 *(5.15)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

3.2.2.2 *The Future Thinking Task*

Analysis of the Future thinking scores were performed following the standards set by MacLeod et al. (1998), with composite scores calculated for each period in each condition, by multiplying the number of responses generated in a period by the mean likelihood ratings given for those responses and by the mean feelings ratings given for those responses. For example, an individual who could think of eight things that they were looking forward to over the next year and who gave a mean likelihood rating of 6 (out of 7) and a mean feelings rating of 2 (out of 3) for those responses would have a composite score of 96 for positive expectancies over the next year. To allow comparisons to be carried out directly between the positive and negative scores, and for interactions to be examined meaningfully, in conjunction with previous studies (e.g. MacLeod et al 1998; Bjärehed et al., 2010) the mean feeling ratings for the negative valence conditions were changed to positive scores (i.e. a mean feelings rating of -2 for a negative condition became a mean rating of +2). Therefore, an individual who gave the same responses as in the example above in the negative condition, although with a mean feeling rating of -2, would have a composite score of 96 for negative expectancies over the next year, rather than a score of – 96. The composite scores from both groups of the overall positive and negative conditions are shown in Table 26.

3.2.2.3 *FTT Index Scores*

Analysis of the composite scores with a Group (Depression: Low BDI-II, High BDI-II) x Valence (Future Expectancy Index: Positive/Negative) x Period (Week, Year, 5-10 years) mixed model ANOVA produced only one significant effect. There was a significant main effect of Valence, with participants showing higher levels of future positive relative to negative expectancy ($F(1,24) = 75.779$, $p < .001$, $\eta p^2 = .759$). No significant main effect was found for Period ($F(2, 24) = 1.675$, $p = .198$, $\eta p^2 = .065$). Further no significant interaction effect was found for Period x Valence ($F(2, 24) = .039$, $p = .962$, $\eta p^2 = .002$). The predicted effect of a Group x Valence interaction was not found to be significant ($F(1, 242) = 2.402$ $p = .134$, $\eta p^2 = .091$), nor was there a main effect for Group ($F(1, 24) = 1.061$ $p = .313$, $\eta p^2 = .042$).The three-way interaction involving Group, Valence and Period did not approach significance ($F(2, 24) = 1.175$, $p = .318$, $\eta p^2 = .047$).

Thus, the FTT index scores suggest that the Depressed and Non-Depressed individuals held similar expectations with regards to their subjective future expectancies, with positive and negative expectancies consistently diverging across the three different periods for both groups.

Table 26. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task *Index* Scores; incorporating Fluency, Likelihood and Feeling Values for each Time Period for the Depressed and Non-Depressed groups in Experiment 3. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	Non-Depressed	Depressed		
	Mean (SD)	*Mean (SD)*	*t(24)*	*p*
Positive Responses				
Next Week	65.81 *(25.89)*	54.67 *(28.19)*	1.032	*0.312*
Next Year	76.34 *(32.52)*	56.86 *(30.77)*	1.516	*0.143*
Next 5-10 Years	68.10 *(23.66)*	62.11 *(24.71)*	0.618	*0.542*
Negative Responses				
Next Week	26.42 *(13.33)*	27.49 *(14.34)*	-0.193	*0.849*
Next Year	32.40 *(18.25)*	35.30 *(17.98)*	-0.396	*0.696*
Next 5-10 Years	32.86 *(18.22)*	28.11 *(16.97)*	0.663	*0.514*

3.2.2.4 *FTT Raw Scores*

It has proven common practice in the future thinking literature to make use of the raw FTT scores in presentation of data. Thus, raw scores of number of events generated, likelihood values, and feeling ratings were calculated and are presented in Table 27. The FTT data is most frequently presented in the literature with reference to fluency of number (N) of future thoughts produced (i.e. how many positive or negative events were generated over the different time periods) as such fluency was firstly examined.

A Group (Depression: Low BDI-II/High BDI-II) x Valence (Number of future events: Positive/Negative) x Period (Week, Year, 5-10 years) mixed-model ANOVA found a significant main effect for Valence, $F(1, 24)=46.611$, $p<.001$, $\eta p^2 =.634$); that is, participants generated significantly more positive events (M = 5.06, σ = 1.34) for the future relative to events they did not look forward to (M = 3.71, σ = 1.04; the mean number of future thoughts by time period and valence for the Depressed and Non-Depressed group are displayed in Table 27). Period did not produce a significant main effect ($F(2, 24) = .172$, $p=.842$, $\eta p^2 =.007$). Nor was a main effect for Group produced by the ANOVA ($F(1, 24)$ =2.771, p=*.1092*, ηp^2 = .104).The Valence x Group interaction was observed to approach significance ($F(2, 24)$ = 3.571, p=*.071*, ηp^2 =.130) with the Non-Depressed group generating a greater number of positive future events relative to negative events, $t(24)$ = 2.129, p =.044. In line with the literature the Depressed group did not produce more negative events than the Non-Depressed group $t(24)$ =.784, p =.441). No interaction effect was observed between Valence x Period ($F(2, 24)$ =1.399, p =.257, ηp^2 =.055) nor was there a three way interaction for Group x Valence x Period ($F(2, 24)$ =1.466, p=*.241*, ηp^2 =.058).

The results from the raw data show that the expected two-way interaction between valence and group was found to approach significance with the Non-Depressed group generating significantly more positive future vents relative to the Depressed group.

3.2.2.5 *Future Thinking Task measures of Expectancy Likelihood*

The most commonly denoted variable separately drawn from the FTT data looks at fluency, however the FTT also offers an independent measure of likelihood – that is, a measure indicating the subjective strength of belief of a specific positive/negative event occurring. In light of the diverge in the future thinking literature relating to fluency and probability it was of interest to explore the associated variable of likelihood with regards to these analyses. As the Likelihood measure focus on the participants' belief in the assured occurrence of the specific event generated during the fluency task, it is a more likely candidate in the context of reflecting subjective expectancies towards specific future events, as opposed to merely producing a number of potential events for the future. This independent measure is, however, a largely neglected component in the existing literature utilising the FTT, though in light of the current study it was explored to see if likelihood ratings may lend itself as a feature component in the measure of future expectancy.

As with the fluency data an analysis of variance (ANOVA) was conducted. The mixed-model ANOVA, Valence (Events likelihood: Positive/Negative) x Period (week, year, 5-10 years) x Group (Depression: Low BDI-II/High BDI-II), found a significant main effect for Valence, $F(1, 24) = 19.103, p <.001, \eta p^2 =.443$); that is, across all time periods participants generated significantly more positive expectations ($M = 5.45, \sigma = 0.53$) for the future relative to the events that they did not look forward to ($M = 4.56, \sigma = 0.93$). A significant main effect was found for Period ($F(2,24)=5.182, p= .009, \eta p^2 =.178$), that is participants rated future events for the more proximate future (i.e. in the next week and the next year) as more likely to occur relative to the more distant future events (in the next 5-10 years). No main effect was found for Group ($F(1,24)=.151, p = .701, \eta p^2 =.006$), further, no interaction effects were seen for Valence and Group ($F(2,24)=.002, p= .969, \eta p^2 =.000$), for Period and Group ($F(2,24)=.086, p=.918, \eta p^2 =.004$), nor for Valence and Period ($F(2,24)=1.998, p= .147, \eta^2 =.077$). The three way interaction of Valence x Period x Group ($F(2, 24) =.795, p= .458, \eta p^2 =.032$), further failed to produce any significant interaction effects.

The results show that the two groups did not diverge with regards to expectancy of positive of negative events occurring.

Table 27. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task *Raw Scores* for Fluency (number of events generated), Likelihood ratings (summed for all events) and Feeling ratings (summed for all events) for each Time Period within the Depressed and Non-Depressed groups in Experiment 3.

Variable	**Non-Depressed**	**Depressed**
	Mean *(SD)*	**Mean** *(SD)*
Positive Responses, *Next Week*		
Fluency (no. of events)	5.62 *(1.14)*	4.40 *(1.57)*
Likelihood	5.68*(0.91)*	5.85 *(1.02)*
Feeling	2.01 *(0.46)*	2.1 *(0.66)*
Positive Responses, *Next Year*		
Fluency (no. of events)	5.50 *(1.67)*	4.2 *(1.39)*
Likelihood	5.76 *(0.70)*	5.25 *(1.15)*
Feeling	2.36 *(0.42)*	2.50 *(0.40)*
Positive Responses, *Next 5-10 years*		
Fluency (no. of events)	5.31 *(1.49)*	4.60 *(1.57)*
Likelihood	5.01 *(0.84)*	5.05 *(1.11)*
Feeling	2.55 *(0.47)*	2.70 *(0.28)*
Negative Responses, *Next Week*		
Fluency (no. of events)	3.50 *(1.15)*	3.40 *(1.51)*
Likelihood	5.19 *(1.59)*	5.06 *(1.63)*
Feeling	1.55 *(0.62)*	1.65 *(0.56)*
Negative Responses, *Next Year*		
Fluency (no. of events)	3.93 *(1.12)*	3.60 *(1.42)*
Likelihood	4.69 *(1.78)*	4.31 *(1.25)*
Feeling	1.82*(0.63)*	2.33 *(0.55)*
Negative Responses, *Next 5-10 years*		
Fluency (no. of events)	4.06 *(1.57)*	3.50 *(1.26)*
Likelihood	3.90 *(1.49)*	4.16 *(1.30)*
Feeling	2.06 *(0.59)*	2.00 *(0.79)*

3.2.2.6 *Future Thinking Task measures of Event Affect*

The feeling values were explored in a similar fashion to the fluency and likelihood data, with an analysis of variance (ANOVA) completed with positive and negative future feeling raw scores (i.e., the mean total rating of positive and negative feeling per participant across the three time periods). A Valence (Feeling: Positive/Negative) x Period (week, year, 5-10 years) x Group (Depression: Low BDI-II/High BDI-II) mixed-model ANOVA found a significant main effect for Valence, $F(1, 24) = 35.666$, $p < .001$, $\eta p^2 = .598$); that is, across all time periods participants foresaw feeling more positive of future events they were looking forward to ($M = 2.35$, $\sigma = .28$) relative to reports of negative anticipation relating to events that they were worried about ($M = 1.88$, $\sigma = .37$). A significant main effect was also found for Period ($F(1, 24) = 11.675$, $p < .001$, $\eta p^2 = .327$) with participants reporting stronger affect related to events anticipated to occur in the next year and next 5-10 years vs. the next week. However, no main effect was seen for Group ($F(1, 24) = .169$, $p = .169$, $\eta p^2 = .077$). No interaction effects were found for Valence and Group ($F(2, 24) = .121$, $p = .731$, $\eta p^2 = .731$), nor did the Valence and Period interaction produce significant results ($F(2, 24) = .610$, $p = .548$, $\eta p^2 = .025$). No interaction was seen for Period and Group ($F(2, 24) = .922$, $p = .405$, $\eta p^2 = .037$), nor was there a three way interaction for Valence x Period x Group ($F(2, 24) = .969$, $p = .387$, $\eta p^2 = .039$) as produced by the ANOVA. The results show that there were no group differences pertaining to levels of affect pertaining to in the likelihood of positive or negative events occurring.

3.2.2.7 *Emotional Avoidance*

Of all the FTT components, including index and raw scores, the AAQ-2 was only found to correlate with the FTT index score for negative likelihood ($r = -.389$, $p = .049$). That is, participants whom reported low levels of emotional avoidance (as indicated by a higher score on the AAQ-2) were seen to rate negative future events as less likely to occur. Following a split level analysis it was found that this effect was only true within the Non-Depressed group (r = -.498, p = .050) as no correlations with either of the FTT variables was observed in a within group analysis for the Depressed group.

3.2.3 Summary

In relation to the four main aims of Experiment 3 it was found overall (1) that the FTT does not appear sensitive in a measure of future expectancy within a sub-clinical sample. (2) Group differences were found to approach significance pertaining to the number of events generated, however no such differences were found in relation to expectancies of how likely these events were to occur, or the anticipated emotional valence related to the events at the time of occurrence. The data further demonstrates that across groups an inflated number of events were generated for more distant future time periods. Although participants did not expect these more distant events to be more likely to occur, relative to events in closer proximity, they did expect to feel more/less happy in the more distant future relative to the things they were looking forward to or worried about respectively. These results are somewhat consistent with the existing literature in terms of group differences in the reported fluency of future events. However, (3) this was not supported by the expectancy ratings and as such the findings are inconsistent with the general view that those experiencing depressed mood states hold deflated positive future expectancies. This finding is in line with previous research that suggests that expectancy is a sub component of future thinking. However, it may also be that there are discrepancies pertaining to the measure generally, with mood effects accounting for the variance in fluency, relative to depression levels *per se*. (4) Emotional avoidance was not found to relate to fluency or feeling values, but did relate to expectancy of negative future events as more likely to occur. To this end, future expectancy may serve as a more reliant measure in relation to future thinking as a feature of depression. In this regard further assessment is required in relation to such potentially latent mood effects.

Table 28. Summary of Main Aims and Findings from Experiment 3.

	Research Aim	Hypothesis	Main Findings
1	Examine the FTT level of sensitivity in relation to sub-clinical depression as measured by the BDI-II.	*Future thinking, as measured by the FTT, will differ between sub-clinically depressed individuals relative to non-depressed individuals as measured by the BDI-II.*	*The hypothesis is not supported.* Depressed and Non-Depressed individuals held similar expectations with regards to their subjective future expectancies, with positive and negative expectancies consistently diverging across the three different periods for both groups.
2	Examine if the valence and group interaction found with clinical samples is present in a sub-clinically depressed sample.	*There will be an interaction between valence (Positive/Negative) and group (Depressed/Non-Depressed) in relation to future positive thinking.*	*The hypothesis is partially supported.* The expected two-way interaction between valence and group was found to approach significance for fluency for number of future events (p=.071), with the Non-Depressed group generating more positive future events relative to the Depressed group.
3	Examine future expectancy as measured by the FTT likelihood variable in relation to depression levels.	*Positive future expectancy, as measured by the FTT, will differ between sub-clinically depressed individuals relative to non-depressed individuals as measured by the BDI-II.*	*The hypothesis is not supported.* The two groups did not diverge with regards to expectancy of positive or negative events occurring.
		There will be an interaction between valence and group in relation to future positive expectancy.	*The hypothesis is not supported.* No interaction was found for valence and group in relation to future expectancy.
4	Examine the relationship between emotional avoidance (AAQ-II) and future expectancy (FTT).	*There will be a relationship between emotional avoidance and future expectancy.*	*The hypothesis is supported.* It was found that individuals whom reported low levels of emotional avoidance (AAQ-II) rated negative future events as less likely to occur (p<.05). A split level analysis found that this relationship was only observed within the Non-Depressed group (p=.050). No relationship with either of the FTT variables was found in a within group analysis for the Depressed group.

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

3.3 Experiment 4

Experiment 3 found that the ability to generate positive future events approached significance, with the Non-Depressed group producing marginally more positive events relative to the Depressed group. However, no differences were observed between Depressed and Non-Depressed samples with regards to expectancy, in terms of the likely occurrence of future events. Recent research has suggested that mood effects are common in such tasks (e.g. Johnson & Tversky, 1983; Hepburn, Barnhofer & Williams, 2006). Indeed in Chapter 2 affect regulation strategies were also discussed in relation to the FCT and FES (see Section 2.6). Given the recent focus on the role of future thinking in clinical settings it seems prudent to measure the impact of current mood on future thinking.

Johnson and Tversky (1983) have shown that manipulating people's mood affects their perception of the risk of negative future events. Subsequently, in a recent study by Hepburn, Barnhofer and Williams (2006), current mood was shown to affect participants' performance on future thinking tasks such as the FTT. Hepburn et al (2006) examined the effects of mood on cognitive processes that underlie future thinking using a mood induction procedure with non-depressed volunteers. In this instance, fluency for generating future events was affected by both positive and negative mood inductions, with each group showing reduced fluency for mood-incongruent events under induced mood compared to baseline. Hepburn et al. (2006), however, did not report participants' ratings pertaining to the likelihood of self-generated events occurring, and looked only at fluency for generation of events. Thus, the observed effects of mood were on fluency for generating positive and negative future events. While this indicates an effect of mood on fluency for future thinking, there is no evidence from this study that mood affects future expectations. Similarly, de Jong-Meyer et al. (2007), while reporting differences in generating positive and negative events between participants induced into positive and negative moods, report no findings pertaining to the likelihood or pleasure ratings made by a sample of dysphoric inpatient adolescents.

Results from future thinking studies with non-clinical samples have, however, compared participants' likelihood ratings of personal and illustrative future events with findings indicating that mood did not affect such expectancy ratings (Hepburn, Barnhofer & Williams, 2008). Hepburn et al. (2008) explain this lack of effect for likelihood ratings in terms of contextual detail and real life context. This suggests that likelihood ratings for positive events would be lower in clinically depressed participants who have a more pessimistic outlook and as such fewer positive expectations for the future. In non-depressed participants, real life context, due to more active involvement is more likely to be positive and optimistic merely due to exposure to more experiences. It was thus argued that likelihood ratings would not be affected by a negative mood state *per se* in healthy participants. General optimism, as is thought to exist in samples of non-depressed participants (MacLeod et al, 2006), has been considered as a stable trait and relevant to the context in which non-depressed participants make their judgments of likelihood. The results of these studies suggest that the FTT fluency component is relatively more susceptible to mood influence compared with likelihood. In this regard any effects of current mood on participants' performance would suggest that the FTT provides a measure of present mood state rather than stable, trait optimism (see Section 1.4.1.2.2).

Although previous research has found differences in perceived likelihood of future events between depressed and non-depressed individuals, such samples also differed in mood state, which was not controlled for by these studies. Hence the possibility remains that distinctions made in the existing literature are driven by differences in current mood (i.e. dysphoric in the depressed group, euthymic in controls). Therefore, Experiment 4 aims to (1) examine the potential role of mood in biasing future-oriented cognitions, as measured by the FTT Index score and Fluency variable; It is predicted that positive and negative induced mood will relate to differences in reported positive and negative future cognitions within and between groups. (2) Examine the potential role of mood in biasing future-oriented expectancy as measured by the FTT likelihood variable; It is predicted that positive and negative induced mood will relate to differences in reported positive and negative future expectations within and between groups. (3) Examine the relation between induced mood, emotional avoidance (AAQ-II) and future cognitions (FTT); it is predicted that there will be a relationship between emotional avoidance, mood and future expectancy.

3.3.1 Method

3.3.1.1 Participants

Thirty-one adults volunteered to take part in the current experiment though after exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in section 3.3.2.1) nine participants data was removed, thus only data from twenty-two participants was utilised in the following analysis. As such, the subsequent information pertains to the included twenty-two participants. Of the included participants there were 13 female and 9 male volunteers. Participants were young adults ranging in age from 19 to 28 years of age ($M = 23.31$, $\sigma = 1.41$) and recruited on a convenience base.

3.3.1.2 Apparatus and Materials

Participants were requested to complete a set of pre-experimental measures of psychological well being. These measures were the same as employed in Experiment 3, that is, the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Trait Anxiety Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983) , the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond, Hayes, Baer, Carpenter, Orcutt, Waltz & Zettle (Submitted); Hayes, Strosahl, et al., 2004), The Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and a Verbal Fluency Task (Lezak, 1976).

Mood induction. The Autobiographical Recall Task (Brewer, Doughtie & Lubin, 1980) was used to induce happy or unhappy mood in the participants. For this task participants are required to think about an event in their lives that made them either very happy or very sad and then to write about the event, giving a clear description of the event as vividly as they can, including all of the (subjectively) important details. Brewer, Doughtie and Lubin (1980) developed the autobiographical recall task in an effort to induce moods other than simply "positive" and "negative" mood, and found that this was facilitated following directed recall of events. In this regard participants have been found to report feeling lonely, defeated or hurt following instructions utilized with this procedure. The method has proven to be effective in 75% of cases, and successful in inducing happy and unhappy moods.

A common criticism, pertaining to the range of mood induction techniques available, is that the induced mood is relatively short lived. Though in the current context this is viewed as an advantage due to a short-lived mood state being what is required to complete the tasks. It would be not only inappropriate, but also unethical in the present context to induce a mood state that prevailed for an extensive period of time when the duration of the experiment is no longer than 30 minutes. This is also an advantage in research generally since it eradicates the necessity to spend time re-establishing a neutral mood state in participants following completion of the experimental tasks.

The Future Thinking Task (FTT; MacLeod et al. 1993; 1997).The FTT was the same in presentation and method as utilised in Experiment 3 (see Section 3.2.1.2).

Verbal Fluency Control Task (Lezak, 1976). As in Experiment 3 (see Section 3.2.1.3), and in line with previous FTT studies (cf. MacLeod & Byrne, 1996; MacLeod et al., 1993; MacLeod, Tata et al., 1998; O'Connor et al., 2007; Bjärhead et al., 2010) prior to the FTT participants completed a standard Verbal Fluency Control Task in order to account for any likely differences between groups in general cognitive processing. The process and method for the Verbal Fluency Control Task was the same as previously utilized, e.g. Experiment 3 (See Sections 3.2.1.2 and 3.2.1.3).

The Visual Analogue Scale (VAS; Wewers & Lowe, 1990) measures a characteristic believed to range across a continuum of values that cannot easily be directly measured. The VAS is a 100mm long horizontal line with word descriptors at each end, as illustrated in Figure 7. The word descriptors are dependent on the variable that is being assessed; in this case *"Unhappy"* and *"Happy"* were chosen. Participants mark on the line the point that they feel represents their perception of their current state.

How are you feeling at the moment? Place a vertical mark on the line below to indicate your mood at this present moment.

____

Unhappy Happy

Figure 7. Visual Analogue Scale (VAS) used to indicate participants' perception of their current mood. The VAS utilised in Experiment 4 measured exactly 100mm.

The VAS score is determined by measuring in millimetres from the left hand end of the line to the point that the participant marks, with 0 representing extremely unhappy and 100 representing extremely happy.

3.3.1.3 Experimental Overview

The current study used a 2 x 2 x 3 mixed design, with Group (Mood Induced: Positive, Negative) as the between participant variable and Valence (Future Cognitions: Positive/Negative) and Period (Week, Year, 5-10 years) as the within participant variables. All participants completed all tasks and measures; the experimental sequence is depicted in Figure 8.

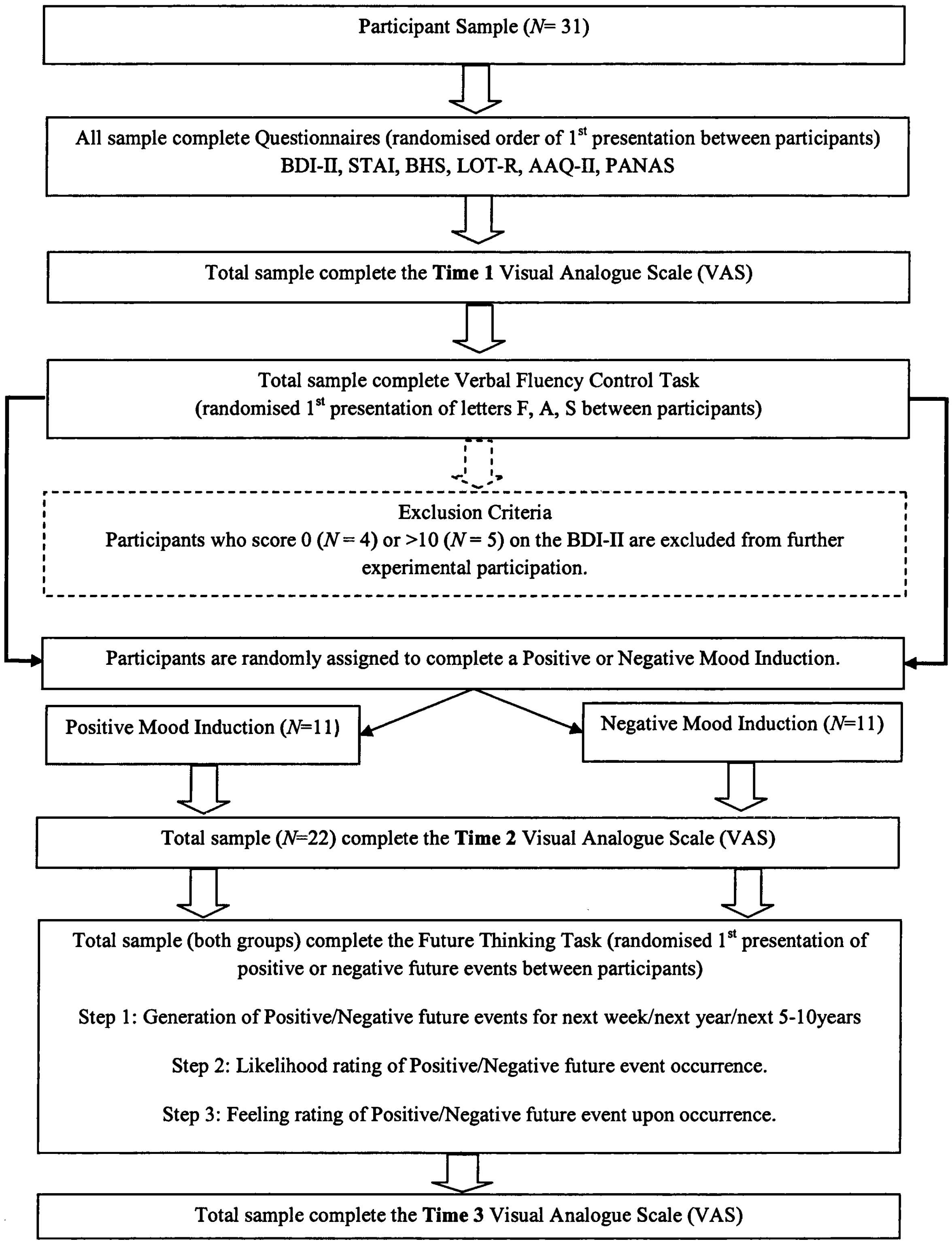


Figure 8. Overview of the Experimental Sequence for Experiment 4.

3.3.1.4 Ethical Issues

As in the previous experiments precautionary measures were explicitly employed in Experiment 4 to facilitate conducting the experiment according to the appropriate ethical guidelines as identified by the British Psychological Society (2006). The steps taken were consistent with those employed in Experiment 3 (see Section 3.2.1.4). There are several ethical considerations when applying a mood induction paradigm, especially with individuals that are at risk of depression, or currently depressed. This study took several recommendations into account (British Psychological Society, 2006). Firstly, participants were screened for depression by use of the Beck Depression Inventory (BDI-II) with the decision not to accept contribution to the experiment by anyone who reported depression levels of 10 or above as reported on the BDI-II. A 'cooling off' period of a minimum 24 hours was again implemented between receiving information about the experiment and participation commencement, as in the previous experiments. Due to the nature of Experiment 4 and the use of a mood induction paradigm particular emphasis was given in the brief and debrief to any psychological distress that may arise particularly following the mood induced, along with other experimental procedures. Notably, the nature of the mood induction was not formulated in the brief; here the mood induction task was introduced as a memory task with emphasis on the emotions related to the past event they recalled. The task aim, to bring out a happy or unhappy mood, was discussed during the post experimental debrief. None of the participants recalled traumatic events when describing a past event. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the mood induction procedure or to the future events generated. As in the previous experiments the written debrief sheet included contact details of the thesis supervisor, counseling services related to Swansea University along with local and national such service providers. The study was ethically approved by the Psychology Department Ethics Committee at Swansea University prior to commencement of the experimental process.

3.3.1.5 Procedure

The experiment was conducted in a small conference room in Century Wharf Apartments in Cardiff Bay. Prior to commencement all participants were briefed as to the nature of the study and asked to complete a consent form. The study commenced with participants completing the psychometric tests and well being questionnaires. This was followed by completion of Visual Analog Scale (VAS) to indicate how happy/sad they perceived themselves to be at the present moment. The Verbal Fluency Control Task (VFCT) subsequently commenced. The Verbal Fluency Control Task procedure was the same as reported in previous studies in Chapter 2 and in Experiment 3, where participants were instructed to state out loud as many words beginning with the letters F, A and S as they could at individual intervals and with a time frame of one minute for each letter. Following the VFCT participants BDI-II scores were examined and participants who were found to score above 10 on the BDI-II did not commence the mood induction task. These participants were thanked for their participation and debriefed by stating that the second part of the experiment was no longer being conducted and that data from the first section was all that was required in this instance. The BDI-II scores were not revealed to, nor discussed with, the participants.

For the include participants the mood induction procedure followed, with participants randomly assigned to a 'happy' or an 'unhappy' condition. Participants were asked to think of an event in their life that had made them extremely happy/unhappy for seven minutes and then write a description of the event as vividly and accurately as possible, including all of the important details, and focusing on their thoughts and feelings. Participants were provided a set of white A4 paper entitled "Personal Experience" on which to write about the event. Participants were naive as to the purpose of the mood induction and were told this was one phase of the overall task that pertained to memory as opposed to future thinking. Immediately upon completion of the mood induction, participants were asked to respond to another VAS, indicating how happy or unhappy they perceived themselves to be at that time. Participants then commenced the Future Thinking Task, the procedure for the FTT where the same as in Experiment 3 without any amendments. Upon completion of the FTT participants were again asked to rate their mood on the VAS. At the end of the experiment participants were thanked and fully debriefed.

3.3.2 Results and Discussion

3.3.2.1 *Exclusion Criteria*

As in the previous experiments herein, the current experiment opted to remove any participants with a score of 0 ($N = 4$). Due to the nature of the study, additionally it was also sought here not to include any participant displaying depression levels of 10 or above as reported on the BDI-II ($N = 5$, $M = 10.3$) in light of ethical recommendations and consequently to more accurately capture a sample of non-depressed participants. All the included participants reported a score of 9 or less ($M = 5.31$) on the BDI-II.

No group differences were observed with respect to pre-mood induction psychometric scores. Overall, the reported scores on the psychometric measures were consistent with those of a positive view of the future for each participant. The participants psychometric reports can be observed in Table 29 below, and as can be seen the two groups appeared well matched on all measures. No mood differences were found between the two groups pre-experimentally (PA: $p = .435$; NA: $p = .333$). The two groups did not differ with respect to age, $t(20) = .080$, $p = .937$; nor was there a significant difference between the two groups in regards to representation of gender, $\chi 2$ (2) $= .188$, $p = .665$, or verbal fluency, $t(20) = -.555$, $p = .558$.

Table 29. Demographics and Psychometric tests, presented as Mean scores and Standard Deviation (SD) for the Positive and Negative Mood Induction groups in Experiment 4. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Positive Mood**	**Negative Mood**		
	Mean *(SD)*	**Mean** *(SD)*	***t*(20)**	***p***
Gender: Females **(Males)**	7(4)	6(5)		
Age	23.27 *(1.67)*	23.36 *(3.35)*	0.080	*0.937*
VFCT	16.48 *(5.02)*	15.39 *(4.16)*	-0.555	*0.585*
BDI-II	5.27 *(2.64)*	5.36 *(2.24)*	0.087	*0.932*
BHS	1.90 *(1.86)*	2.36 *(1.43)*	0.640	*0.529*
STAI	36.54 *(7.77)*	36.63 *(5.14)*	0.032	*0.975*
LOT-R	17.36 *(4.24)*	16.81 *(3.48)*	-0.329	*0.746*
AAQ-II	51.36 *(5.61)*	51.40 *(4.22)*	0.001	*0.999*
PA	33.09 *(6.42)*	35.09 *(5.30)*	0.796	*0.435*
NA	16.48 *(5.02)*	15.39 *(4.16)*	-0.992	*0.333*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory-II; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

3.3.2.2 *Mood Induction*

Mood ratings were reported on the Visual Analogue Scale at 3 separate time points, i.e. pre-experimentally (Time 1), immediately following the mood induction (Time 2) and post experimentally upon completion of the FTT (Time 3). Content of recall was fond to be congruent to the task, i.e. participants asked to recall positive (negative) events wrote reports of events to this aim. No exceptionally traumatic events were recalled, that is the events reported in the negative, unhappy, condition reflected expected life time events of arguments, academic failures, romantic let downs, illness and un-dramatic deaths - with focus on the grief not the event of death.

One way Analysis of Variance (ANOVA), with mood induction as the between subjects variable and mood ratings as the dependent variable, found no group differences at Time 1, $F(1, 20) = 1.016$, $p=.325$. The mean mood reported by participants in the Positive group was 72.45 (with a higher score reflecting more positive mood), while the mean for participants in the Negative group was 64.72. Following the mood induction procedure a significant difference was found between groups at Time 2, $F(1, 20)=53.356$, $p<.001$, with the Negative mood induction group reporting lowered mood with a mean of 34.09 relative to the Positive mood induction group, who demonstrated an increase mood reported with a mean of 80.45. At Time 3, this mood difference was still present ($F(1, 20)=5.923$, $p=.024$) though it was evident that the moods were reverting back to baseline levels with the Positive mood group reporting a mean mood level of 74.09 and the Negative mood group an increased mood level from time 2, with a mean of 58.63.

Split plot paired sample t-tests revealed within group differences for the three time periods, with significant differences in mood reported for Time 1 and 2 in both groups (Positive mood induction, $t(20)=-2.995$, $p=.014$; Negative mood induction, $t(20)=4.650$, $p=.001$). Significant mood differences were also found between for the group whom received a positive mood induction ($t(20) =2.654$, $p=.024$), as well as for the negative mood induction group, $t(20) =-6.958$, $p<.001$). However no mood differences were observed for Time 1 and 3 within either of the two groups (Positive mood induction, $t(20) = -.703$, $p=.498$); Negative mood induction, $t(20) = 1.075$, $p=.308$). This implies that the mood induction procedure was successful in inducing a state mood which was apparent at the time of the experiment and returned to baseline post-experimentally. Specifically, the negative mood induction procedure resulted in significantly more negative ratings of mood compared with pre-mood induction ratings. The positive mood induction resulted in significantly more positive mood rating being made, the mood ratings are presented in Figure 9.

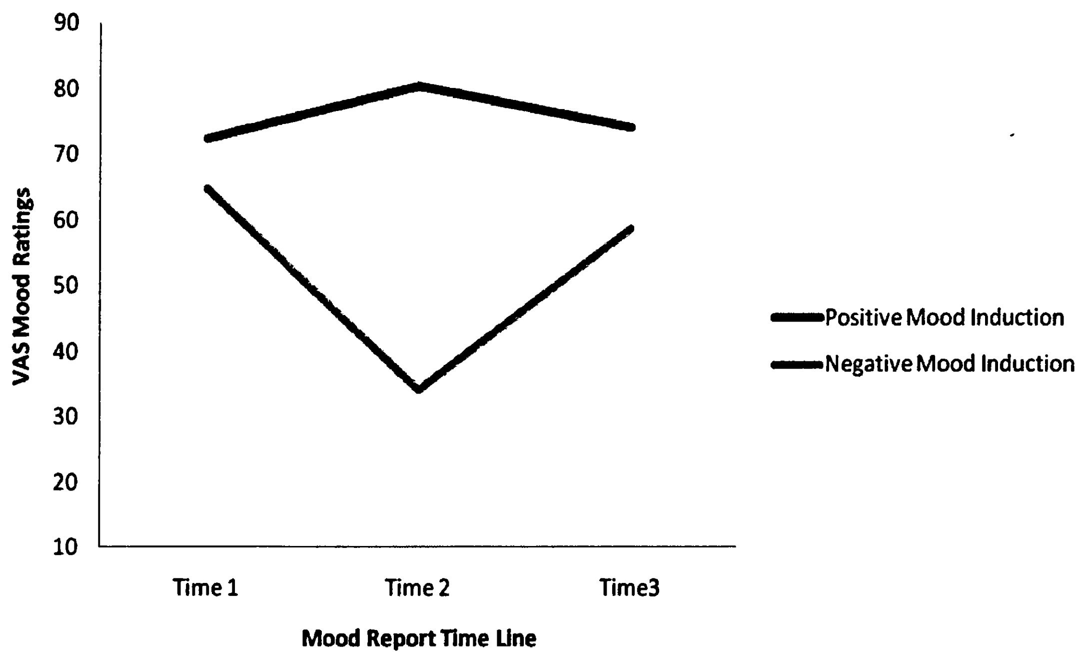


Figure 9. Mean Mood Ratings for participants completing the FTT task in Experiment 4. T1 indicates Pre-Experimental Mood. T2 indicates Mood Rating Immediately Following the Mood Induction procedure. T3 indicates Post-Experimental Mood Ratings.

3.3.2.3 *The Future Thinking Task*

As in Experiment 3 analysis of the Future Thinking Task scores were performed following the standards set by MacLeod et al. (1998), with composite scores calculated for each period in each condition, by multiplying the number of responses generated in a period by the mean likelihood ratings given for those responses and by the mean feelings ratings given for those responses. In conjunction with previous studies (e.g. MacLeod et al 1998; Godley et al, 2001; Bjärehed et al., 2010) the mean feeling ratings for the negative valence conditions were altered to reflect positive scores (i.e. a mean feelings rating of -2 for a negative condition became a mean rating of +2). The composite scores from both groups of the overall positive and negative conditions are shown in Table 30.

Table 30. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task Index Scores, incorporating Fluency, Likelihood and Feeling Values for each Time Period as reported by the Positive and Negative Mood Induction groups in Experiment 4. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Positive Mood**	**Negative Mood**		
	Mean *(SD)*	**Mean *(SD)***	***t(20)***	***P***
Positive Responses				
Next Week	127.06 *(52.04)*	72.34 *(28.58)*	-3.056	*0.006***
Next Year	111.49 *(56.15)*	67.79 *(30.31)*	-2.271	*0.034**
Next 5-10 Years	62.41 *(29.93)*	43.64 *(24.67)*	-1.605	*0.124*
Negative Responses				
Next Week	19.64 *(15.51)*	43.45 *(23.98)*	2.817	*0.011**
Next Year	27.44 *(18.47)*	39.52 *(18.05)*	1.551	*0.137*
Next 5-10 Years	37.05 *(13.51)*	58.98 *(23.02)*	2.724	*0.013**

Note. *p<.05; **p<.01.

3.3.2.4 *FTT Index Scores*

Analysis of the composite scores with a Group (Mood induced: Positive, Negative) x Valence (Future expectancy: Positive/Negative) x Period (Week, Year, 5-10 years) mixed model ANOVA produced four significant effects. There was a significant main effect of Valence, with all participants reporting greater levels of future positive relative to negative future thinking ($F(1,20) = 26.771$, $p < .001$, $\eta p^2 =.57$), as well as a significant main effect of Period, reflecting lower expectancies for the next 5–10 years vs. the next year and week ($F(2,20) = 4.435$, $p =.018$, $\eta p^2 =.18$). There was also a significant interaction effect found for Group x Valence ($F(1, 20) = 12.257$, $p =.002$, $\eta p^2 =.38$), with those in the positive mood group reporting greater positive future expectancies relative to negative expectancies ($t(10) =5.298$, $p<.001$); whereas no such within differences were found for the negative mood group ($t(10) = 1.457$, $p=.176$). An interaction effect was seen for Period x Valence ($F(2, 20) = 27.350, p<.001, \eta p^2 =.581$), with more positive events expected in the near future, i.e. the next week. No main effect was observed for Group ($F(1, 20) =2.634, p=.116, \eta p^2 =.001$), nor was there an interaction effect for Period and Group ($F(1, 20) =1.793, p=.180, \eta p^2 =.082$).The three-way interaction involving Group, Valence and Period did not reach significance ($F(2, 20) =2.204, p=.124, \eta p^2 =.099$).

Thus, the FTT index scores suggest that there was an interaction effect for mood induced with valence of future expectancies, with participants in the positive mood group reporting significantly greater levels of positive future expectancies relative to negative future expectancies; whereas those in the negative mood induction group reported comparable expectancies for positive and negative future events. These findings diverge from the results observed in Experiment 3 where no such interaction effect was apparent. The results are graphically depicted in Figure 10.

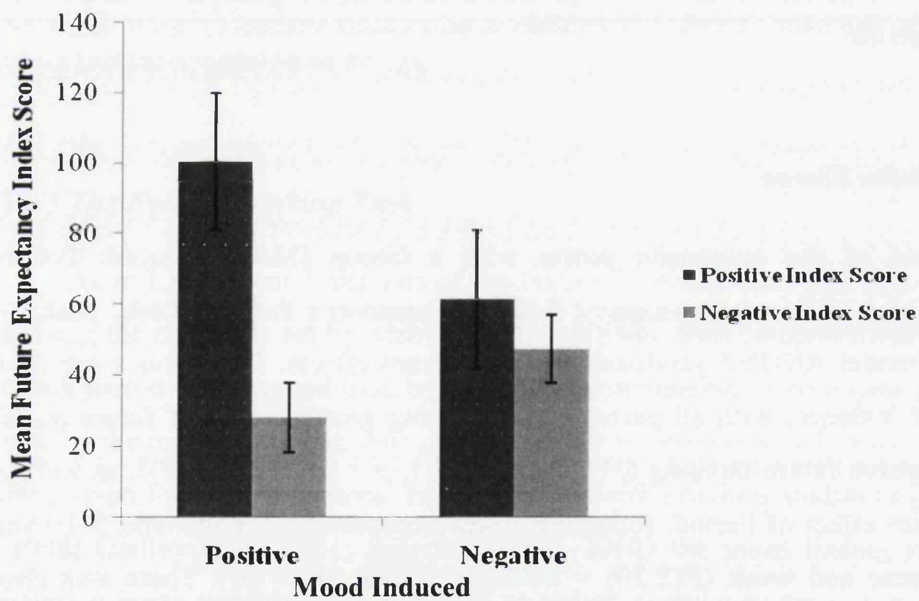


Figure 10. The FTT Index Scores collapsed across the time frames with Standard Error Bars (S.E), demonstrating overall Future Expectations for both Mood Induction groups in Experiment 4.

3.3.2.5 *FTT Raw Scores*

The raw FTT scores pertaining to separate measures of number of events generated, likelihood values, and feeling ratings were further considered and are presented in Table 31 below. As mentioned in Experiment 3, the FTT data is most frequently presented in the literature with reference to the number of future thoughts. As such, more in depth analysis was conducted to explore this level of evidence. The same analytic strategy was utilised with the raw data as for the FTT index scores.

A Group (Mood Induction: Positive, Negative) x Valence (Number of future thoughts: Positive/Negative) x Period (Week, Year, 5-10 years) mixed-model ANOVA found a significant main effect for Valence, $F(1, 20)=15.650, p=.001, \eta p^2 =.444$), that is, across groups positive events were generated more readily ($M = 5.83$, $\sigma =2.07$) for the future relative to events that they were not looking forward to ($M = 4.28$, $\sigma =1.19$; the mean number of future thoughts by time period and valence for the Positive and Negative Mood Induction group are displayed in Table 31). A significant main effect was also found for Period ($F(2, 20) = 11.107, p<.001, \eta p^2 =.362$) reflecting a greater number of events generated for the next week and the next year vs. the next 5-10 years. A main effect for Group was produced by the ANOVA ($F(1, 20) =4.459, p=.048, \eta p^2 = .181$), with the Positive Mood group generating more future events overall. Interaction effects were observed for Valence x Group ($F(2,20)=27.822, p<.001, \eta p^2 =.584$), with the positive mood group generating significantly more positive than negative future events ($t(10)= 5.719, p<.001$); whereas the Negative Mood group generated marginally more negative relative to positive future events this difference was not statistically significant ($t(10)= -1.117, p=.290$). An interaction effect was observed between Valence x Period ($F(2,20)=9.003, p=.001, \eta p^2 =.314$), with a greater number of positive future events generated for the near future relative to negative events and the more distant future. No three way interaction for Group x Valence x Period ($F(2, 20) = 1.938, p=.157, \eta p^2 =.095$) was observed.

The results show that at this level of analysis it is apparent that the two mood groups differ significantly in regards to their attempts to generate positive events for the future. The results also demonstrate within group differences, with the positive mood induction leading to an increase in positive future generation relative to decreased negative event generation; whereas the negative mood induction sees a decreased generation of positive future events relative to an increased generation of negative events.

Figure 11 depicts the mean number of events generated across the two valence categories by the two mood induction groups. As can be seen there is a difference in number of positive events envisaged by the two groups, with the positive mood group generating a significantly larger number of positive events for the future relative to the negative mood group, though between group analyses of negative future generation was not found to be significant. The within group differences can also be observed from Figure 11, with a clear positive bias in the positive mood group relative to a negative bias within the negative mood group.

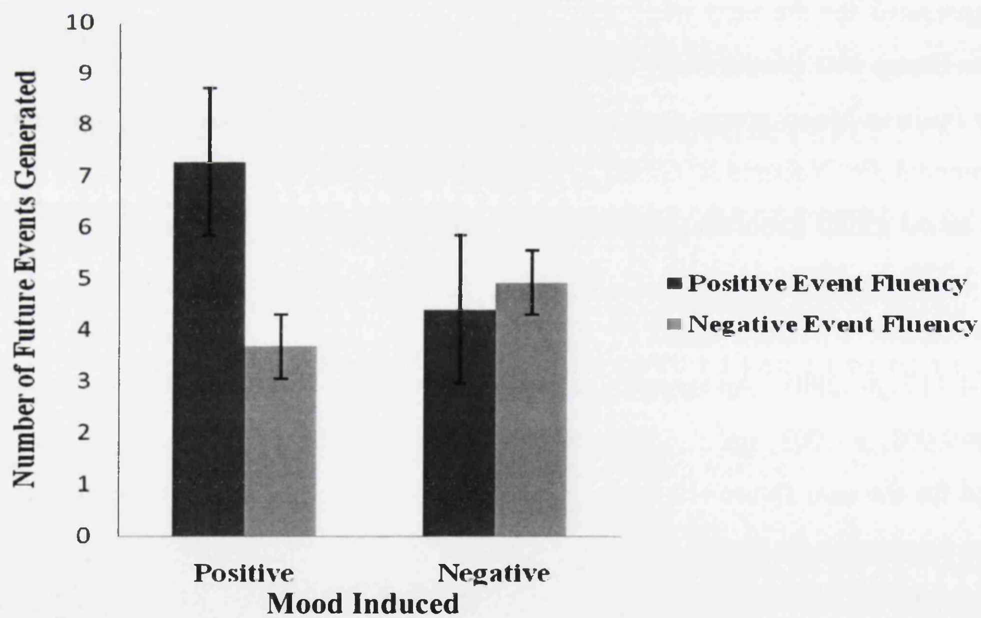


Figure 11. Mean number of Positive and Negative Future Events (fluency) with Standard Error Bars (S.E) as reported by the Positive and Negative Mood Induction groups in Experiment 4.

Table 31. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task Raw Scores for Fluency, Likelihood and Feeling ratings by Time Period as reported by the Positive and Negative Mood Induction groups in Experiment 4.

Variable	**Positive Mood**	**Negative Mood**
	Mean *(SD)*	**Mean** *(SD)*
Positive Responses, ***Next Week***		
Fluency (no. of events)	9.00 *(1.67)*	5.09 *(1.64)*
Likelihood	6.26 *(0.38)*	6.38 *(0.55)*
Feeling	2.13 *(0.57)*	2.03 *(0.51)*
Positive Responses, ***Next Year***		
Fluency (no. of events)	8.09 *(3.53)*	4.63 *(1.50)*
Likelihood	6.36 *(0.42)*	5.66 *(1.25)*
Feeling	2.13 *(0.54)*	2.54 *(0.43)*
Positive Responses, ***Next 5-10 years***		
Fluency (no. of events)	4.72 *(1.95)*	3.45 *(1.63)*
Likelihood	6.00 *(0.59)*	4.69 *(1.15)*
Feeling	2.23 *(0.61)*	2.59 *(0.45)*
Negative Responses, ***Next Week***		
Fluency (no. of events)	3.72 *(1.65)*	5.45 *(1.12)*
Likelihood	5.06 *(1.65)*	5.37 *(1.23)*
Feeling	1.33 *(0.94)*	1.42 *(0.43)*
Negative Responses, ***Next Year***		
Fluency (no. of events)	3.81 *(1.33)*	4.18 *(1.94)*
Likelihood	5.41 *(1.34)*	4.94 *(1.08)*
Feeling	1.33*(0.94)*	2.08 *(0.54)*
Negative Responses, ***Next 5-10 years***		
Fluency (no. of events)	3.45 *(1.36)*	5.09 *(1.37)*
Likelihood	5.59 *(0.99)*	4.67 *(0.94)*
Feeling	2.04 *(0.62)*	2.45 *(0.52)*

3.3.2.6 *Future Thinking Task measures of Event Likelihood*

As in Experiment 3 the current study sought to explore the associated variable of likelihood with regards to current analyses. The Likelihood of events occurring was not seen to differ between groups in Experiment 3 and may be taken as a more stable characteristic of future expectancy. As with the fluency data the present analysis made use of a mixed model approach. The Valence (Events likelihood: Positive/Negative) x Period (week, year, 5-10 years) x Group (Mood Induced: Positive, Negative) mixed-model ANOVA found a significant main effect for Valence, $F(1, 20) = 9.701, p=.005, \eta p^2 =.333$); that is, across all time periods participants generated significantly more positive expectations (M=5.89, σ =9.60) for the future relative to the events that they were worried about (M=5.17, σ =.811). Significant main effects were found for Period ($F(1, 20) = 3.971, p= .027, \eta p^2 =.166$), and Group ($F(1, 20) = 8.139, p=.010, \eta p^2 =.289$), with participants in the Positive Mood induction group reporting greater expectancy of events occurring overall and with all participants reporting events in the next week relative to the next 5 to 10 years as more likely to occur. No interaction effects were seen for Valence and Group ($F(1, 20) = .335, p= .569, \eta p^2 =.016$) nor for Valence and Period ($F(2, 20) = 2.100, p= .136, \eta p^2 =.095$). A significant interaction was observed for Period and Group ($F(2,20)= 6.066, p=.005, \eta p^2 =.233$), with the Positive Mood induction group reporting more distant future events as likely to occur relative to the Negative Mood induction group whom rated more proximate events as more likely to take place. The three way interaction of Valence x Period x Group ($F(2, 20) =.028, p= .972, \eta p^2 =.001$), failed to produce any significant interaction effects.

The results present somewhat differing findings from Experiment 3, with group differences prevalent at the more general future expectancy level, though no specific divergence pertaining to valence was observed. Thus it is clear that the positive mood induction did lead to an increased positivity bias, however, the negative mood induction, although prevalent in the fluency data, did not influence the expectancy variable. It can be seen from Figure 12 that the likelihood ratings of future events presents a rather different picture than the fluency data as seen in Figure 12, where a distinctive pattern could be observed between the two groups, such a pattern or any distinction is not apparent in Figure 12, nor can it be found in data analysis of likelihood ratings.

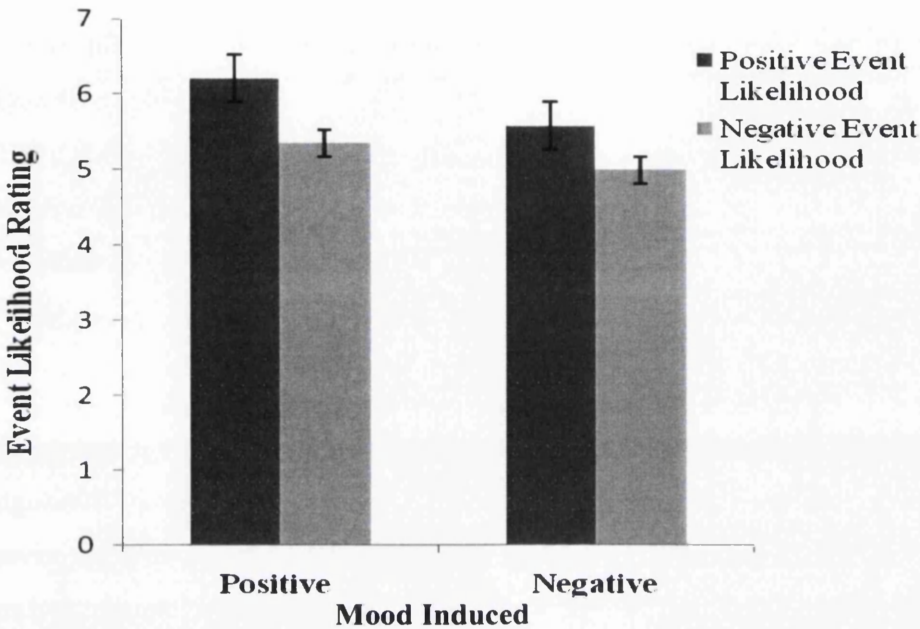


Figure 12. Mean Likelihod Ratings with Standard Error Bars (S.E) for Positive and Negative Future Events as reported by the Positive and Negative Mood Induction groups in Experiment 4.

3.3.2.7 *Future Thinking Task measures of Event Affect*

The feeling values were explored in a similar fashion to the fluency and likelihood data, with an analysis of variance (ANOVA) completed with positive and negative future feeling raw scores'. A Valence (Feeling: Positive/Negative) x Period (week, year, 5-10 years) x Group (Mood Induced: Positive, Negative) mixed-model ANOVA found a significant main effect for Valence, $F(1, 20)$ =20.585, $p<.001$, ηp^2 =. 507); that is, across all time periods participants foresaw feeling more positive of future events they were looking forward to (M = 2.27, σ =.382) relative to reports of negative anticipation relating to events that they were worried about (M= 1.78, σ =.453). A significant main effect was found for Period ($F(1, 20)$ =12.208, $p<.001$, ηp^2 =.379.) with participants reporting higher levels of affect in generation of more distant future events of the next year and next 5-10 years vs. the next week. A main effect was also seen for Group ($F(1, 20)$ =5.223, p=.033, ηp^2 =.207), with the negative mood induction group reporting greater intensity of affect pertaining to future events in general. No interaction effects were seen for Valence and Group ($F(1, 20)$ =.644, p=.432, ηp^2 =.031). Though Valence and Period saw an interaction effect ($F(2, 20)$ =3.571, p= .037, ηp^2 =.151), with greater positive affect reported for more distant future events. No interaction was seen for Period and Group ($F(2, 20)$ = 2.763, p=.075, ηp^2 =.121), nor was a three way interaction for Valence x Period x Group found ($F(2, 20)$ =.166, p=.848, ηp^2 =.008) as produced by the ANOVA.

The interesting finding here is that the Negative Mood group report greater levels of perceived affect in future experiences, relative to the Positive Mood group. Although, it is seen that for both groups there is a valence bias, with the positive events perceived with more intense affect relative to the negative events. Figure 13 show that the feeling ratings of future events, similar to the likelihood ratings, present a rather different picture to that of the fluency data. By referring back to Figure 11 a distinctive pattern can be observed between the two groups, such a pattern of responding is not apparent in Figure 13, nor is it found in data analysis of likelihood ratings. As in Experiment 3, the raw data analysis for the FTT was able to offer further insight to the future thinking phenomena by way of independently examining the variables comprising the FTT. The split periods revealed that an inflated number of events was generated for more distant future time periods, and although participants did not report to be expecting these more distant events to me more likely to occur, they did expect to feel better/worse in the more distant future relative to the things they were looking forward to or not respectively.

3.3.2.8 *Emotional Avoidance*

An interesting finding was observed in regards to correlations with pre-experimental reports of emotional avoidance and the FTT variables. Split level analysis found that within the Positive Mood group emotional avoidance correlated negatively with negative future expectancy (r = -.826, p = .002); this is consistent with the findings from Experiment 3 where within the Non-Depressed group it was similarly found that high levels of emotional avoidance (as indexed by a low score on the AAQ-2) was related to increased negative future expectancy. However, within the Negative Mood group, in the present experiment, an inverse relationship was observed, with emotional avoidance negatively correlated with positive future expectancy (r = -.656, p = .028); that is, those who pre-experimentally reported higher levels of emotional avoidance, following the negative mood induction rated positive expectancies as more likely to occur.

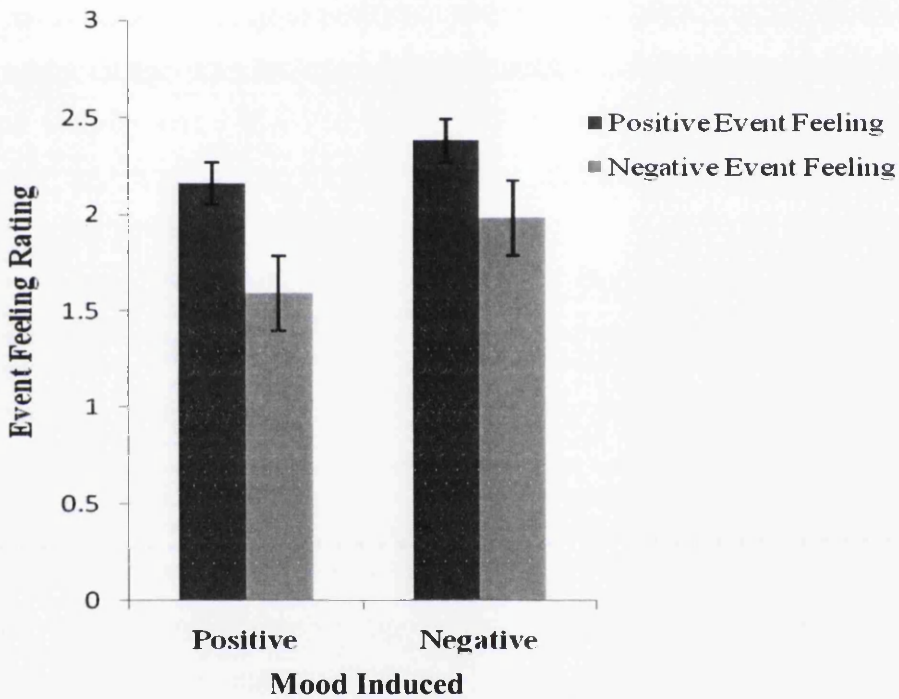


Figure 13. Mean Feeling Ratings for Positive and Negative Future Events and Standard Error Bars (S.E) as reported by the Positive and Negative Mood Induction groups in Experiment 4.

3.3.3 Summary

In relation to the experimental aims it was seen in these analyses that (1) the mood inductions did have diverse effects on the reporting of future experiences. An interaction effect for mood induced with valence of future expectancies was observed with the FTT index data, with the positive mood induction increasing the level of positive future expectancies reported and comparatively reducing the degree of negative future expectancies reported. Whereas the negative mood induction raised negative future expectancies and reduced positive expectancies, although this was not statistically significant. The results from the raw data found that the two mood groups differed significantly in regards to generation of positive and negative events for the future.

A further aim of Experiment 4 was to look at the expectancy variable in relation to potential mood resistance (2); as such, it was apparent that, at a within sample level of analysis, the positive mood induction produced an increased positivity bias, however, the negative mood induction, although prevalent in the fluency data, did not influence the expectancy variables. That is, the reported expectancies of positive and negative future events occurring were comparable within and between the two groups. One notable finding here is that the Negative Mood group reported greater levels of perceived affect in future experiences, relative to the Positive Mood group. Although, it is seen that for both groups there is a valence bias, with the positive events perceived with more intense affect relative to the negative events.

One interesting finding in relation to the experimental aim of investigating (3) the relationship between mood, emotional avoidance and future expectancy, was that following a negative mood induction those who had reported high levels of emotional avoidance at baseline were found to report increased expectancy of positive future events. There is extensive literature pertaining to mood effects on information processing and attitudes. One view is that a negative mood may have a positive effect in certain situations as it functions as a warning that something is wrong and as such instigates a more analytical approach to the present situation where individuals may even be more motivated to take action to avoid erroneous decisions and judgments (e.g. Schwarz, 1990). In this regard it may be that the participants in the negative mood group became more aware of their present situation and as such the mood induction may be argued to have increased defusion (see Sections 1.8.1.1 and 6.1for a definition of defusion). This suggestion may be supported by evidence that positive mood leads to an avoidance of cognitive effort in order to maintain the positive mood (Isen, 1984; Isen et al., 1982). As such mood is taken as information and applied in relation to the currently presenting situation, relative to a more analytical approach. Thus, those in a positive mood merely rejected negative expectancies, whereas those in a negative mood considered positive events and upon a possible deliberation found them to be likely to occur. In regards to affect regulation theories it may be inferred that as there were no correlations with negative expectancies in the negative mood group there may have been some attempt to control the perceived impact of such future events and in order to reinstate a positive mood the focus was on positive future expectancies. These findings may further lend some support to the postulate that positive and negative future expectations are functionally different. In this regard it appears that the mood effect found with the FTT index score is affected by the mood effect pertaining to fluency specifically, as this effect is not observed for likelihood nor feeling values. This has implications for previous findings based on fluency alone and also for studies that make use of the FTT index score as a compiled future thinking measure. The results demonstrate that the strength of belief in positive/negative outcomes is a more stable characteristic to measure in relation to frequency of positive/negative events generated and that emotional avoidance is implicated in this belief. Thus, indicating that the underlying features of optimism/pessimism may be a more stable behavioural characteristic. A summary of the key findings from Experiment 4 is depicted in Table 32.

Findings within the learned helplessness literature have proposed that depression arises from a perception that important environmental events cannot be controlled, and much success has been seen in inducing such depression levels within a laboratory setting (e.g. Maldonado, Martos, & Ramírez, 1991). Experiment 5 will follow on from these initial findings by employing a learned helplessness paradigm in order to systematically examine the expectancy component relative to more general future thinking and fluency for future events.

Table 32. Summary of Main Aims and Findings from Experiment 4.

	Research Aim	Hypothesis	Main Findings
1	Examine the potential role of mood in biasing future-oriented cognitions as measured by the FTT Index score and Fluency variable.	*Positive and negative induced mood will relate to differences in reported positive and negative future cognitions within and between groups.*	*The hypothesis is partially supported.* Within group differences were found for participants in the Positive Mood group, who reported significantly greater levels of positive future expectancy relative to negative future expectancy, as measured by the FTT index score (p<.05). The Positive Mood group generated more positive future events relative to the Negative Mood group (p<.001).
2	Examine the potential role of mood in biasing future-oriented expectancy, as measured by the FTT likelihood variable.	*Positive and negative induced mood will relate to differences in reported positive and negative future expectations within and between groups.*	*The hypothesis is partially supported.* Between group differences were found with the Positive Mood induction group reporting increased expectancy of overall future events occurring relative to the Negative Mood induction group (p=.01).
3	Examine the relationship between induced mood, emotional avoidance (AAQ-II) and future cognitions (FTT).	*There will be a relationship between emotional avoidance, mood and future expectancy.*	*The hypothesis is supported.* Within the Negative Mood group an inverse relationship was observed, with emotional avoidance negatively correlated with positive future expectancy (p<.05). No relationship was found for Positive mood, emotional avoidance and future expectancy.

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

3.4 Experiment 5

Experiment 5 aims to induce a depressed like state in a group of healthy participants in order to determine whether this induction (i.e., learned helplessness procedure) would impact on participant responding on the Future Thinking Task. To this end, seemingly successful experimental methods for use in the induction of a depressed-like state have been shown to involve exposing participants to an unsolvable task, or the experience of an uncontrollable relationship between an action and its outcome (Teasdale & Fogarty, 1979). Prior experience with uncontrollable events has been demonstrated to retard the acquisition of subsequent new responses (Overmier & Seligman, 1967; Seligman, 1975), such as response times to completion on a maze task (Reed, Frasquillo, Colkin, Liemann & Colbert, 2001), performance on discrimination tasks (Hiroto & Seligman, 1975), and judgment of control tasks (Maldonado, Martos, & Ramírez, 1991). In attempting to measure the effects of positive and negative future thinking in a sub clinical sample inducing a depressed like state at the analogue level seems like a worthwhile endeavor. If the learned helplessness induction really is an analogue of depression it would be expected that patterns would emerge in relation to the FTT similar to that of depressed participants. However, if the learned helplessness procedure is merely a mood altering tool it would be expected that participants patterns of responding would be similar to those observed in Experiment 4.

Experiment 5 has four main aims (1) to examine the potential role of analogue depressed mood, by use of a learned helplessness task (Solvable vs. Unsolvable Tasks), on future-oriented cognitions by looking at the FTT Index score and Fluency variable; It is predicted that Solvable and Unsolvable Task completion will relate to differences in reported positive and negative future cognitions within and between groups. A further aim is (2) to examine if the valence and group interaction found in previous clinical samples is demonstrable by an analogue depressed state; it is predicted that there will be an interaction between valence (Positive/Negative) and group (Solvable/Unsolvable Task) in relation to future positive thinking. (3) to explore if future expectancy, as measured by the FTT likelihood variable, is affected by the depressed mood induction. It is predicted that there will be a difference in levels of positive future expectancy, as measured by the FTT, for those who completed the Solvable Task relative to those who completed the Unsolvable Task and that there will be an interaction relating valence of future expectancy and group. Experiment 5 further aims to (4) examine the relationship between induced depressed mood, emotional avoidance (AAQ-II) and future expectancy

(FTT). It is predicted that there will be a relationship between emotional avoidance, induced depressed mood and future expectancy.

3.4.1 Method

3.4.1.1 Participants

Thirty-five adults volunteered to take part in the current experiment though following the established exclusion criteria, pertaining to the BDI-II scores (the criteria for exclusion is detailed in section 3.4.2.1) data from six participants was removed, thus data from the included twenty-nine participants was utilised in the following analysis. Participants were recruited through advertisement within the Psychology Department at Swansea University. In all sixteen females and thirteen males, ranging in age from 19 to 27 years of age (M =21.89, $\sigma = 2.25$) were included in the experimental analysis.

3.4.1.2 Apparatus and Materials

Participants were requested to complete a set of measures of psychological well being. These measures were the same as utilized in Experiments 3 and 5, that is, the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Trait Anxiety Inventory (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983) , the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond, Hayes, Baer, Carpenter, Orcutt, Waltz & Zettle (Submitted); Hayes, Strosahl, et al., 2004) ,the Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and a Verbal Fluency Control Task (Lezak, 1976).

The Learned Helplessness Task (Maldonado, Martos, & Ramirez, 1991). The learned helplessness task is a computerized program which includes a solvable and unsolvable task paradigm.The solvable and unsolvable discrimination tasks used the same stimuli. These consisted of four pattern pairs, which could vary along four dimensions, and which were similar to those used by Hiroto and Seligman (1975; based on a discrimination task designed by Levine, 1971). Each pattern consisted of a letter (A or T), which was coloured (black or red), of a particular type (capital or lower case), and had a border (circle or square). The borders were drawn in white, and the background was light grey throughout the pre-treatment condition. Each pattern measured approximately 5 cm high and 5 cm wide. The two patterns were displayed in pairs, in the central portion of the monitor, one on the left of the screen and the other on the right of the screen, separated by 7.5 cm. The pairs consisted of one "base" pattern (composed of one setting value for each of the four dimensions), and a complementary pattern (containing the other dimensional settings). Each pair, therefore, contained mutually exclusive, and jointly exhaustive, dimensional settings. The solvable and unsolvable task procedures were each composed of three sets of 10 problem trials (pairs of patterns), making a total of 30 stimulus displays (all had the same solution). Display pairs were allocated to each problem on a random basis. This procedure was adopted to allow systematic replication of the Maldonado et al. (1991) study, which also adopted this procedure. Feedback on the discrimination task was presented on the screen by the sounding of either a pleasant tone for "correct" selections, or an aversive tone for "incorrect" selections. The nature of the feedback given to the subject was determined in relation to whether the task was solvable or unsolvable.

The Maze Task (Boakes, 1984). The maze task was included as a measure of the implementation of the learned helplessness mood characteristics following the learned helplessness induction task. The maze is presented in printed format and participants' complete the task by marking a route with a pencil (See Figure 14 for a schematic plan of the maze, which measured 8cm by 12 cm). The time taken to complete the maze is typically recorded by a handheld stopwatch. The number of errors (defined as entering an incorrect, dead-end arm) is recorded.

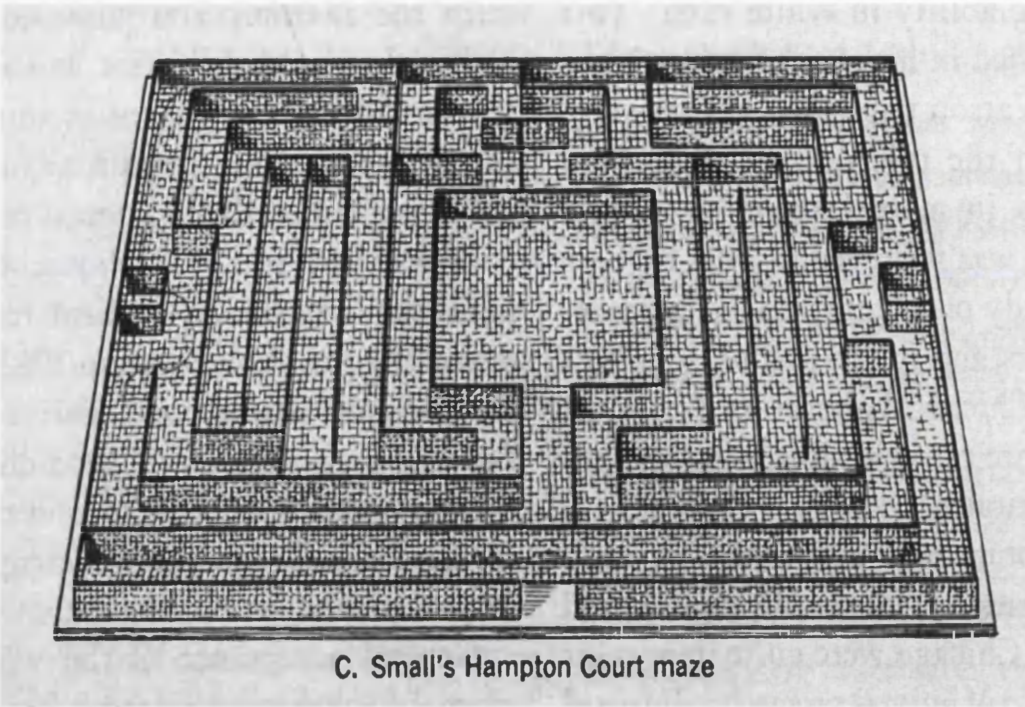


Figure 14. Schematic representation of the Maze employed in Experiment 5 for the Maze Task to be completed following both of the Maldonado Task (originally printed in Boakes, 1984, copied with permission).

3.4.1.3 Experimental Overview

The current study used a 2 x 2 x 3 mixed design, with Group (Solvable Task, Unsolvable Task) as the between participant variable and Valence (Future Cognitions: Positive/Negative) and Period (Week, Year, 5-10 years) as the within participant variables. All participants completed all tasks and measures; the experimental sequence is depicted in Figure 15.

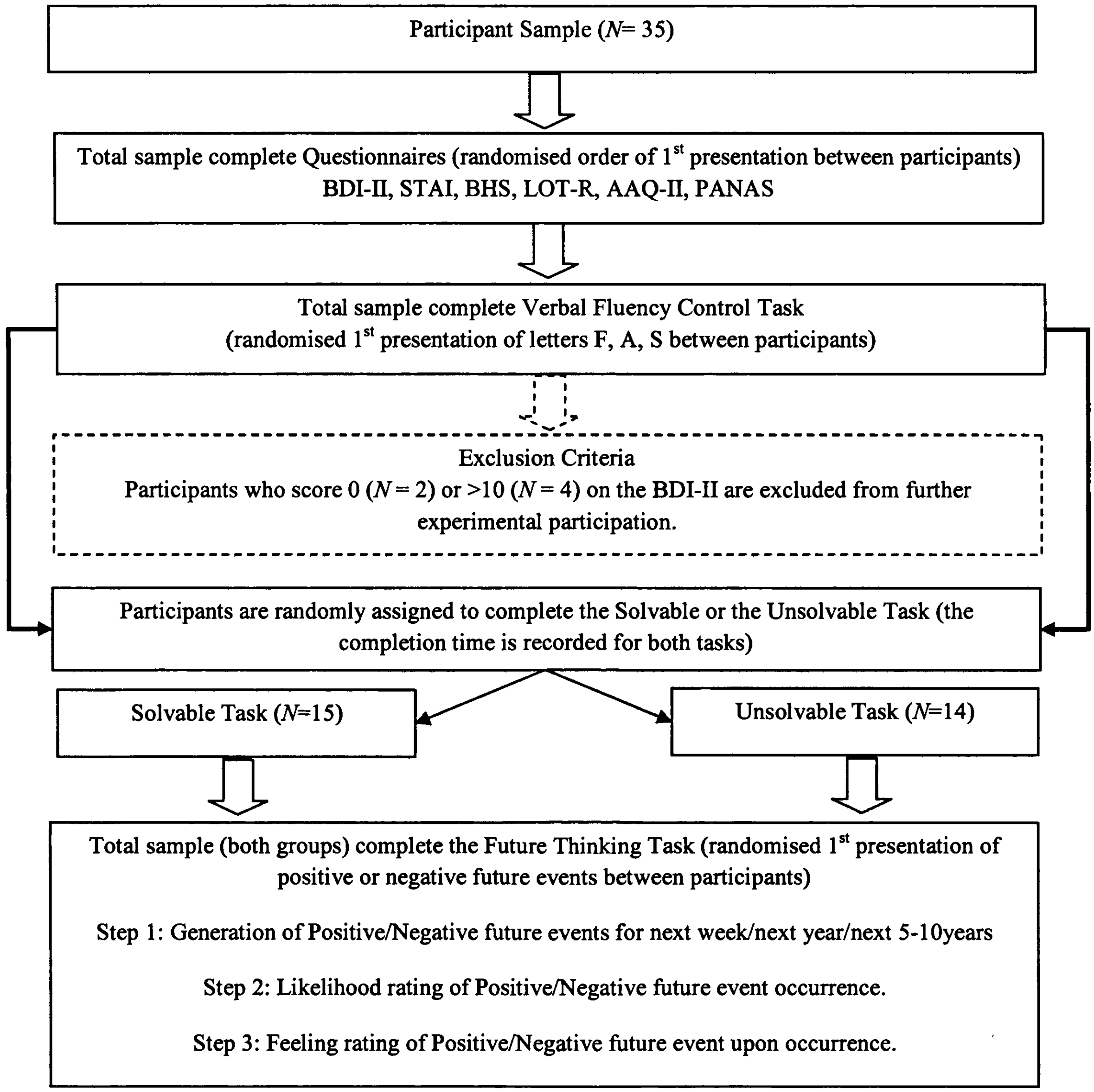


Figure 15. Overview of the Experimental Sequence for Experiment 5.

3.4.1.4 Ethical Issues

As in Experiment 4 precautionary measures were explicitly employed in Experiment 5 to facilitate conducting the experiment according to the appropriate ethical guidelines as identified by the British Psychological Society (2006). The steps taken were consistent with those employed in Experiment 4 (see Section 3.3.1.4). The ethical considerations identified in Experiment 4 as related to the application of a mood induction paradigm with individuals at risk of, or currently depressed, were adopted in Experiment 5 in relation to the induction of an analogue depressed mood. Recommendations by the British Psychological Society (2006) were explicitly taken into account. Firstly, participants were screened for depression by use of the Beck Depression Inventory (BDI-II) with the decision not to include anyone who reported depression levels of 10 or above as reported on the BDI-II. A 'cooling off' period of a minimum 24 hours was again implemented between receiving information about the experiment and participation commencement as in the previous experiments. Due to the nature of Experiment 5 and the use of a depressed mood induction paradigm particular emphasis was given in the brief and debrief to any psychological distress that may arise. The mood induction task was introduced as a cognitive ability (i.e. intelligence) test, and a thorough debrief, with particular focus on those participants who were assigned to the unsolvable task condition, emphasized that one of the task conditions in fact aimed to induce a learned helpless feeling in form of a depressed mood. No participants reported feeling undue stress as a result of attempting the unsolvable task. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the depressed mood induction procedure or to the future events generated. As in the previous experiments the written debrief sheet included details of the thesis supervisor, counseling services related to Swansea University and local and national such service providers. Prior to commencement the experiment was approved by the Ethics Committee at Swansea University Psychology Department.

3.4.1.5 Procedure

Prior to commencement of the study participants were instructed as to the nature of the task, omitting the expected effects of the Learned Helplessness induction. Upon consenting to take part participants completed the set of psychometrics questionnaires along with the verbal fluency task. Following the VFCT participants BDI-II scores were examined and participants who were found to score above 10 on the BDI-II did not commence the mood induction task. These participants were thanked for their participation and debriefed by stating that the second part of the experiment was no longer being conducted and that data from the first section was all that was required in this instance. The BDI-II scores were not revealed to, nor discussed with the participants.

The included participants were randomly allocated to complete either the Unsolvable or Solvable tasks as presented by the Maldonado computer based program. Instructions were presented on the computer screen (the preparation was a direct replication of that employed by Maldonado, Martos, & Ramirez, 1991) and read as follows:

> 'In this experiment you will be looking at a series of computer presented images. Each image will involve two stimulus patterns on it. One to the left, and another to the right. The stimulus patterns are composed of four different dimensions, with two values associated with each dimension. For each group of the ten images I have chosen one of the eight values as being correct. For each image I want you to choose which side contains this value. To do this, you must click on one of the buttons presented underneath the image (left or right). If your choice is incorrect, a noise comes out through the speakers, but if you choose the correct side there will be no noise. Your task is to learn the predetermined value by your response according to whether or not the noise is heard. The current experiment is adapted from a standard intelligence test. Most people learn to respond appropriately to the task with relative ease'.

In the unsolvable condition participants then completed four sets of ten trials, where there were 8 possible values to choose from (i.e., square, circle, red, black, the letter 'A', the letter 'T'). For each set of ten trials, a new value was assumed to be nominated as the 'correct' stimulus. Thus the task was to identify the 'correct' value for each block of ten trials; this was done under no further instruction but via trial and error. If participants chose the 'correct' value no noise occurred, however upon choosing an 'incorrect' value, a noise was played through the speakers of the computer. Participants were naive to the fact that they had no control over the exercise; in this regard the 'incorrect' noise was presented on 50% of the trials regardless of the buttons they pressed in an effort to induce a state of learned helplessness.

In the solvable condition the same format and procedure was presented, however in this case it was actually possible for the participants to respond in the correct manner and positive feedback in regards to a pleasant tone was frequently provided. Overall the task was of an unproblematic manner. Thus participants found it undemanding and straightforward to respond to the stimuli presented.

Upon completion of the learned helplessness task a printed maze task was presented to participants with instructions to complete the maze. Participants were told that their completion time would be recorded. Instructions on how to complete the maze were presented only in regards to start and finishing points. The instructions were presented verbally and in writing as follows:

> 'Please complete the maze on the table in front of you in the quickest time possible, your time will be recorded. In order to complete the maze task you have to begin at the X marked on the perimeter of the maze and work your way to the centre. As soon as you begin I will start the stop watch'.

The time it took each participant to complete the maze was recorded by a hand held stop watch. The maze task was directly observed by the researcher to provide a precise and accurate response time, and for those in the unsolvable task group, to further induce levels of stress associated with the learned helplessness state previously completed. Participants were immediately cycled in to completion of the verbal fluency task followed directly by the Future Thinking Task. The Verbal Fluency Control Task and the FTT were completed in the same manner as detailed in Experiment 3. Upon completion of all tasks participants were thanked and suitably debriefed as to the nature of the study. Participants whom had completed the unsolvable Maldonado task were informed about the actual characteristics of the task and of its intended use to induce a state of learned helplessness. Participants were further reassured that the performance on this task was not taken as a measure of intelligence, as instructed prior to the task commencements.

3.4.2 Results and Discussion

3.4.2.1 *Group Allocation*

As in the mood induction experiment, i.e. Experiment 4 (see Section 3.3.2.1), the current study opted to remove any participants with a score of 0 ($N = 2$) or above 10 ($N = 4$, $M = 10.75$) in order to more accurately capture a sample of non-depressed participants (remaining sample BDI-II: $M = 4.62$, $\sigma = 2.48$). No group differences were observed with respect to pre-induction reports on psychometric or well-being questionnaires. Overall reports from the psychometric measures were consistent with those of a healthy future outlook for all participants. The participant demographics and pre-experimental psychometric reports can be observed in Table 33 below, as can be seen the two experimental groups were well matched on all measures. No mood differences where found between the two groups pre-experimentally (PA: p=.222; NA: p=.473). The two groups did not differ with respect to age, $t(27)$ =.894, p =.379; nor was there a significant difference between the two groups in regards to representation of gender, $\chi2$ (1) =.293 p=.588, or verbal fluency, $t(27)$ =-.881, p=.386.

Table 33. Mean scores and Standard Deviations (SD) for the Demographics and Psychometric test results reported by the Solvable and Unsolvable Task groups in Experiment 5. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Solvable Task**	**Unsolvable Task**		
	Mean *(SD)*	**Mean** *(SD)*	t(27)	p
Gender: Females **(Males)**	9(6)	7(7)		
Age	21.53 *(2.06)*	22.28 *(2.46)*	0.894	*0.379*
VFCT	11.28 *(1.95)*	11.93*(2.02)*	0.881	*0.386*
BDI	5.26 *(2.63)*	3.92*(2.20)*	-1.480	*0.150*
BHS	3.13 *(1.30)*	3.21*(1.12)*	0.179	*0.859*
STAI	17.8 *(5.53)*	16.21 *(3.44)*	-0.918	*0.366*
LOT-R	14.53 *(2.13)*	16.21 *(3.23)*	1.662	*0.108*
AAQ-II	56.60 *(4.71)*	59.28*(4.21)*	1.612	*0.119*
PA	33.00 *(3.13)*	34.64*(3.91)*	1.251	*0.222*
NA	13.66 *(1.34)*	13.21 *(1.96)*	-0.727	*0.473*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

3.4.2.2 *Maze Task - measure of Learned Helplessness Induction*

The amount of time taken to complete the maze task was recorded and is presented in Figure 16. From Figure 16 it can be seen that the group completing the Solvable Task took less time (M = 44.06 seconds) to complete the maze relative to the Unsolvable Task group (M = 49.42 seconds). This was further confirmed by statistical analysis via a One way ANOVA, F (1, 27) = 6.902, p = .014. These results can be taken to suggest that the differences displayed in maze completion were experienced due to successful induction of learned helplessness, i.e. a depressed mood state.

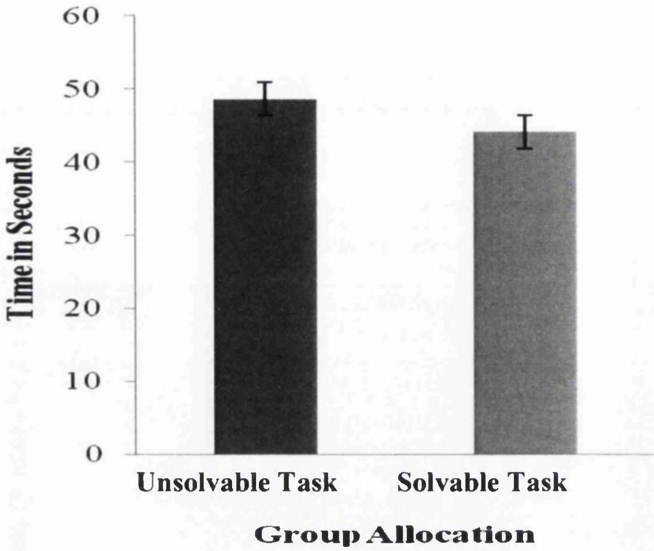


Figure 16. The amount of time (in seconds) taken by each task group to complete the maze in Experiment 5. Error Bars show Mean Standard Error (S.E).

3.4.2.3 *The Future Thinking Task*

Analysis of the Future thinking scores were performed following the standards set by MacLeod et al. (1998), and in correspondence with Experiments 3 and 4. The composite index scores from both groups, of the overall positive and negative conditions, are shown in Table 34. As can be seen from Table 34, with the exception of negative events occurring in the next 5-10 years, and positive events for the next year, the participants who completed the solvable task foresaw more positive *and* negative events to occur in the future relative to participants whom attempted the unsolvable task.

Table 34. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task Index Scores, incorporating Fluency, Likelihood and Feeling Values, for each Time Period as reported by the Solvable and Unsolvable Task groups in Experiment 5. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Solvable Task**	**Unsolvable Task**		
	Mean (SD)	***Mean (SD)***	***t(27)***	***p***
Positive Responses				
Next Week	56.06 *(22.64)*	37.34 *(18.89)*	-2.408	*0.023**
Next Year	43.95 *(11.55)*	42.11 *(14.21)*	-0.384	*0.704*
Next 5-10 Years	51.76 *(9.29)*	40.04 *(15.42)*	-2.498	*0.019**
Negative Responses				
Next Week	20.58 *(14.91)*	11.20 *(4.44)*	-2.260	*0.032**
Next Year	22.95 *(9.15)*	15.22 *(7.15)*	-2.520	*0.018**
Next 5-10 Years	14.54 *(6.61)*	15.38 *(10.02)*	0.267	*0.791*

Note. *p<.05

3.4.2.4 *FTT Index Scores*

Analysis of the composite scores with a Group (Depression induction; Solvable, Unsolvable) x Valence (Future expectancy: Positive/Negative) x Period (Week, Year, 5-10 years) mixed model ANOVA produced two significant effects. There was a significant main effect of Valence, with participants reporting higher levels of future positive than negative expectancy overall ($F(1, 27) = 303.245, p < .001, \eta p^2 = .918$). No significant main effect was seen for Period, $F(2, 27) = .065$, $p = .937$, $\eta p^2 = .002$). No significant interaction effect was found for Group x Valence ($F(1, 27) = 2.644, p = .116, \eta p^2 = .089$), or for Period x Valence ($F(2, 27) = 1.677, p = .197, \eta p^2 = .058$), nor was there an interaction effect for period and group ($F(1, 27) = 2.176, p = .123, \eta p^2 = .075$). A main effect was observed for group (F(1, 27) =10.253, p=.003, ηp^2 =.275). The three-way interaction involving Group, Valence and Period did not reach significance (F(2, 27) =2.538, p=.088, ηp^2 =.086).

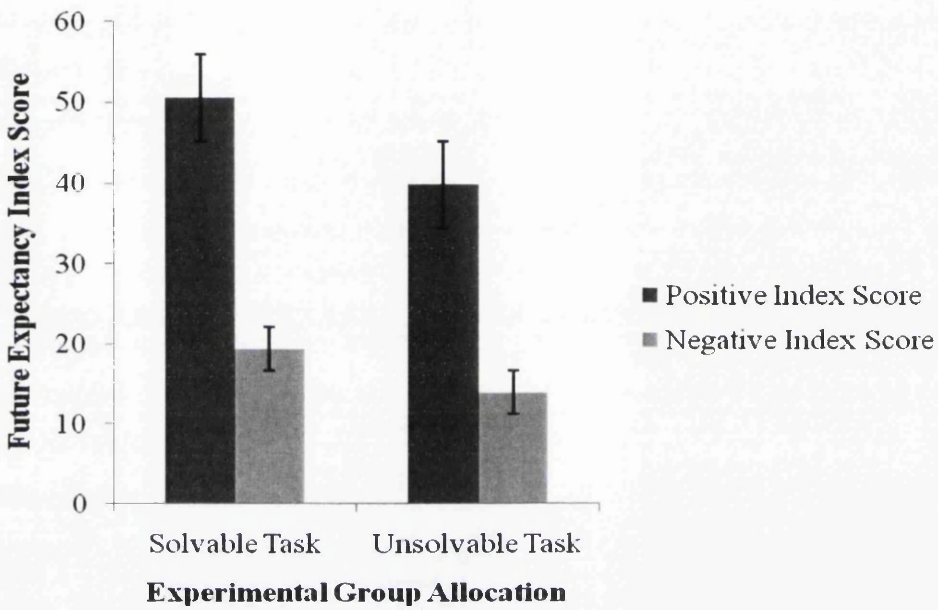


Figure 17. The FTT Index Scores collapsed across the Three Time Periods demonstrating overall Future Expectations for both groups in Experiment 5. Error Bars show Mean Standard Error (S.E).

Thus, it can be determined from the FTT index scores that though participants in both groups held more positive (Solvable, M = 50.95; Unsolvable, M = 39.83) relative to negative future expectations (Solvable, M = 19.36; Unsolvable, M = 13.93), the group whom completed the Solvable task were significantly more optimistic in their future outlook relative to the Unsolvable task group. FTT responses simulated those expected from a clinical sample, indicative of an induced helplessness effect. Figure 17 depicts the data graphically and it is evident from this figure that, although the response pattern was similar within both groups, the Unsolvable task group demonstrate somewhat deflated reports pertaining to future event occurrences relative to the Solvable task group.

3.4.2.5 *FTT Raw Scores*

Analysis of the raw FTT scores for number of events generated, likelihood values, and feeling ratings were calculated and are presented in Table 35. The same analytic strategy was employed with the raw data as for the FTT index scores. The analysis of the raw scores commenced with regards to number of events generated (fluency) with a Group (Depression Induction: Solvable vs. Unsolvable Task) x Valence (Number of future thoughts: Positive/Negative) x Period (Week, Year, 5-10 years) mixed-model ANOVA. A significant main effect for Valence was found, $F(1, 27) = 304.538$, $p<.001$, $\eta p^2 = .919$), that is, across groups participants generated significantly more positive events (M=3.64, σ=0.45) for the future relative to events that they were not looking forward to (M= 2.40, σ = 0.51; the mean number of future thoughts by time period and valence split by group are displayed in Table 35). No significant main effect was found for Period ($F(2, 27) = 1.088$, p=.344, $\eta p^2 = .039$). A main effect for Group was produced by the ANOVA ($F(1, 27) = 24.439$, $p<.001$, $\eta p^2 = .475$), with the groups differing in their reporting of positive and negative future events. Participants who completed the Solvable Task generated significantly more positive future events (M = 3.97, σ = 0.34) relative to those who attempted the Unsolvable Task (M = 3.28, σ = 0.22; $t(27) = -6.389$, $p<.001$). Similarly, the participants who completed the Solvable Task generated significantly less negative future events (M=2.14, σ = 0.50) relative to the Unsolvable Task group (M = 2.64, σ= 0.38; $t(27) = -3.026$, p=.005).

No interaction effects were observed for Valence x Group ($F(1, 27) = 1.802$, p=.191, $\eta p^2 = .063$), nor was any interaction effect observed between Valence x Period ($F(2, 27) = .293$, p=.747, $\eta p^2 = .011$). Though a three way interaction was found for Group x Valence x Period ($F(2,27) = 5.929$, p=.005, $\eta p^2 = .180$), with participants who attempted the Unsolvable Task generating significantly less positive events for the more distant future of the next 5-10 years relative to the more proximate future of the next week as compared to the Solvable Task group. Figure 18 depicts the mean number of events generated by the two groups.

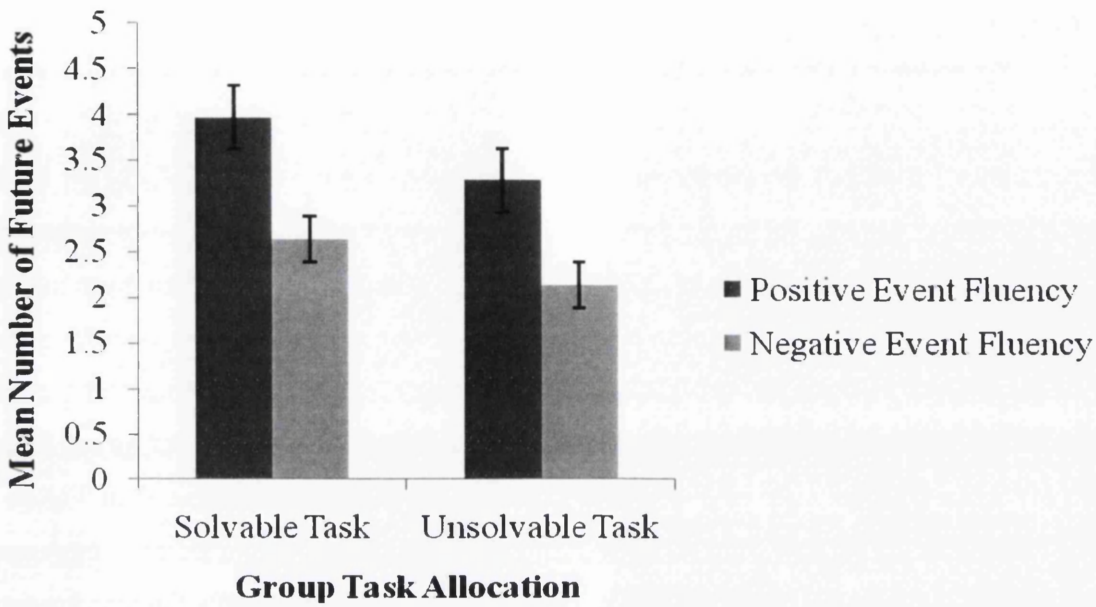


Figure 18. Mean number of Positive and Negative Future Events (fluency) reported by both the Solvable and Unsolvable Task groups in Experiment 5. Error Bars show Mean Standard Error (S.E).

3.6.2.6 *Future Thinking Task measures of Expectancy Likelihood*

The Future Thinking Likelihood values were similarly analysed to the Future thinking Number (and as described in Experiments 3 and 4), with regards to Valence (Positive/Negative) and across time Periods (week/year/5-10 years). A Valence (Events likelihood: Positive and Negative) x Period (week, year, 5-10 years) x Group (Depression Induction: Solvable vs. Unsolvable Task) mixed-model ANOVA found a significant main effect for Valence, $F(1, 27) = 65.782$, $p<.001$, $\eta p^2 = .703$); that is, across all time periods participants reported greater expectations of positive future events occurring ($M = 5.72$, $\sigma = 0.43$) relative to the events that they were worried about ($M = 4.52$, $\sigma = 0.73$). A significant main effect was found for Period ($F(1, 27) = 73.981$, $p<.001$, $\eta p^2 = .733$), with participants rating near future events, in the next week, as more likely to occur than those in the more distant future, of the next year and the next 5-10 years. No significant main effect was found for Group ($F(1,27)=1.978$, $p=.171$, $\eta p^2=.068$).

Further, no interaction effects were seen for Valence and Group ($F(1,27)=.214$, $p=.648$, $\eta p^2=.008$) or for Period and Group ($F(2,27)=.087$, $p=.916$, $\eta p^2=.003$). Though a significant interaction was found for Valence and Period ($F(2, 27) = 12.446$, $p=<.001$, $\eta p^2=.316$). A significant interaction was observed for the three way interaction of Valence x Period x Group ($F(2,27)=.6.529$, $p=.003$, $\eta p^2=.195$), with participants in the Solvable Task group reporting significantly lower expectations pertaining to more distant negative events occurring relative to positive events. Figure 19 presents the mean scores for the overall future expectancy ratings by each of the two groups. As can be seen the pattern of responses is less distinct relative to the results presented in Figure 18 pertaining to the fluency reports. Overall the results indicate that the learned helplessness effect is less evident when looking at expectancy ratings relative to fluency for future events.

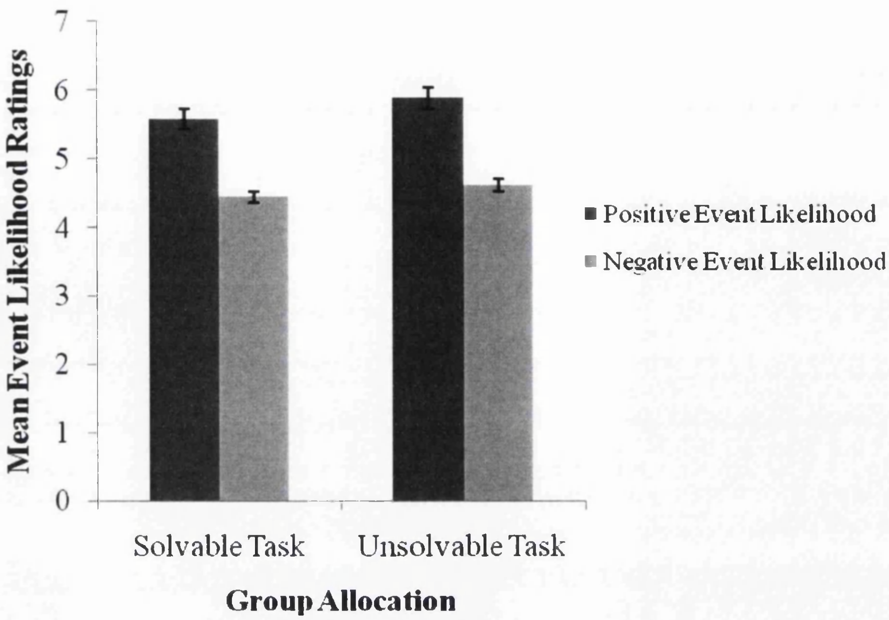


Figure 19. Mean Likelihod Ratings for Positive and Negative Future Events as reported by both the Solvable and Unsolvable Task groups in Experiment 5. Error Bars show Mean Standard Error (S.E).

3.4.2.7 *Future Thinking Task measures of Event Affect*

The feeling values were explored in a similar fashion to the fluency and likelihood data. A Valence (Feeling: Positive/Negative) x Period (week, year, 5-10 years) x Group (Depression Induction: Solvable vs. Unsolvable Task) mixed-model ANOVA found a significant main effect for Valence, $F(1, 27)$ =24.681, p<.001, ηp^2 =. 478); that is, across all time periods participants foresaw feeling more positive of future events they were looking forward to. A significant main effect was also found for Period ($F(1, 27)$ = 45.200, p<.001, ηp^2 =.626) with participants reporting greater levels of affect pertaining to the next year and next 5-10 years vs. the next week. No main effect was seen for Group ($F(1, 27)$ = 2.495, p=.126, ηp^2 =.085). Nor was an interaction effects found for Valence and Group ($F(1, 27)$ =.195, p=.662, ηp^2 =.007). Valence and Period were found to interact ($F(2, 27)$ = 7.849, p= .001, ηp^2 =.225) with greater positive affect reported to events occurring in the next year relative to the two other time periods and negative feeling reports.

An interaction was seen for Period and Group ($F(2, 27) = 10.800$, $p<.001$, $\eta p^2 =.286$), with the Solvable task group reporting greater affect for events occurring in the next year relative to the other time periods and those who attempted the Unsolvable Task. No three way interaction for Valence x Period x Group was found ($F(2, 27) =2.052$, $p=.138$, $\eta p^2 =.071$) as produced by the ANOVA. As can be seen in Figure 20 responses pertaining to feeling at the time of event occurring was similar in pattern to the likelihood reports. It appears that the helplessness induction did not influence ratings of such values between groups.

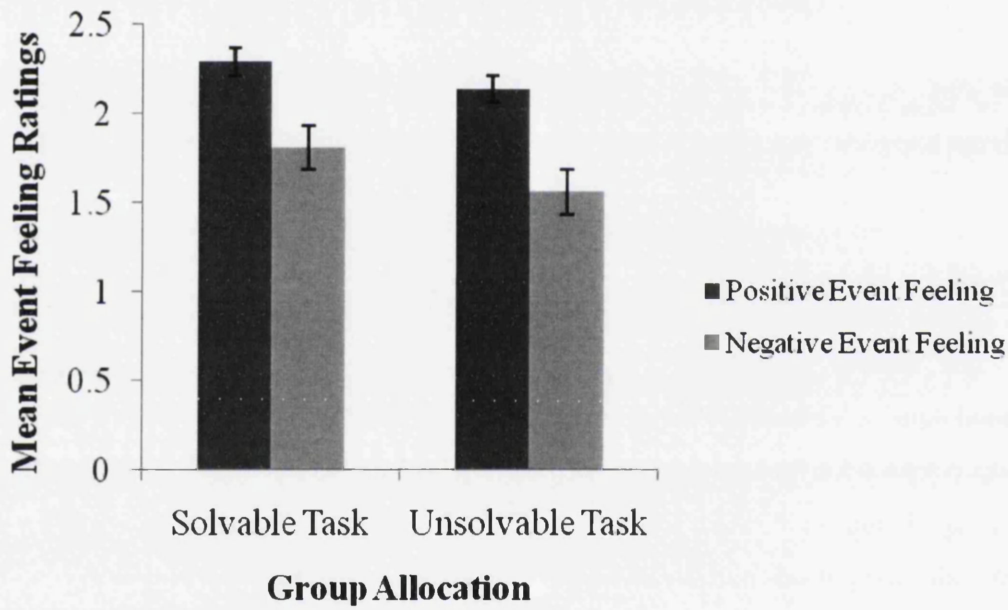


Figure 20. Mean Feeling Ratings for Positive and Negative Future Events, with Standard Error Bars (S.E), as reported by both the Solvable and Unsolvable Task groups in Experiment 5.

Table 35. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task Raw Scores for Fluency (number of events generated), Likelihood and Feeling Ratings for each Time Period as reported by the Solvable and Unsolvable Task groups in Experiment 5.

Variable	**Solvable Task**	**Unsolvable Task**
	Mean *(SD)*	**Mean** *(SD)*
Positive Responses, ***Next Week***		
Fluency (no. of events)	4.06 *(1.09)*	3.57 *(0.51)*
Likelihood	6.58*(0.39)*	6.28 *(0.54)*
Feeling	2.02*(0.47)*	1.67 *(0.83)*
Positive Responses, ***Next Year***		
Fluency (no. of events)	3.60 *(0.73)*	3.64 *(1.01)*
Likelihood	5.21 *(0.69)*	5.88 *(0.72)*
Feeling	2.37 *(0.40)*	2.04 *(0.68)*
Positive Responses, ***Next 5-10 years***		
Fluency (no. of events)	4.26 *(0.70)*	32.64 *(0.74)*
Likelihood	4.93 *(0.63)*	5.47 *(0.58)*
Feeling	2.48 *(0.29)*	2.70 *(0.66)*
Negative Responses, ***Next Week***		
Fluency (no. of events)	2.73 *(0.79)*	2.21 *(0.69)*
Likelihood	5.69 *(1.21)*	6.43 *(0.86)*
Feeling	4.00 *(3.20)*	1.14 *(1.17)*
Negative Responses, ***Next Year***		
Fluency (no. of events)	2.67 *(0.81)*	2.14 *(0.66)*
Likelihood	4.02 *(0.54)*	3.70 *(1.38)*
Feeling	5.66*(1.98)*	4.42 *(1.91)*
Negative Responses, ***Next 5-10 years***		
Fluency (no. of events)	2.53 *(0.52)*	2.07 *(0.91)*
Likelihood	3.63 *(1.11)*	3.71 *(1.38)*
Feeling	4.46 *(2.32)*	4.42 *(2.53)*

3.4.2.8 *Emotional Avoidance*

Split level analysis found that within the Unsolvable Task group emotional avoidance correlated negatively with positive future expectancy ($r = -.565$, $p = .035$); this is consistent with the findings from Experiment 4 where similar correlations were found within the Negative Mood group. However, no correlations were found within the Solvable Task group for either of the FTT variables.

3.4.3 Summary

In relation to the main aims of Experiment 5 it was found that (1) the depressed mood induction effectively influenced the overall responses to the FTT index score as a main group difference was observed, with the participants in the Unsolvable Task group demonstrating a reduced rate of responding overall, relative to increased representation by the Solvable Task group. However, this finding (2) did not extend to the group and valence interaction and as such no valence specific effect was observed. This finding stands in contrast to what has previously been presented in clinical data sets, where the valence specific representation has been noted in support of the proposal of a reduced positive future outlook as significant to depressed patients. The present finding was supported by a general non-valence specific significant finding for the fluency raw scores. However, neither main group, nor interaction effects were observed with regards to the future expectations of events occurring, nor ratings pertaining to the anticipated affect at the time of events occurring. (3) Participant responses on the expectancy and feeling components of the FTT did in their own right not differ between groups nor in terms of the emergent pattern shown by the index and fluency data; therefore, the compiled index data, as was seen in Experiment 4, appears highly influenced by the fluency reports in its composition. Thus, overall the results indicate that the learned helplessness effect is not evident when looking at expectancy ratings relative to fluency for future events. Additionally, it was found that (4) following the Learned Helplessness induction, those high in emotional avoidance reported increased expectancy of positive future experiences, whereas those high in emotional avoidance that completed the

Table 36. Summary of Main Aims and Findings from Experiment 5.

	Research Aim	Hypothesis	Main Findings
1	Examine the potential role of analogue depressed mood, by use of a learned helplessness task (Solvable vs. Unsolvable Tasks), on future-oriented cognitions by looking at the FTT Index score and Fluency variable.	*Solvable and Unsolvable Task completion will relate to differences in reported positive and negative future cognitions within and between groups.*	*The hypothesis is partially supported.* Within group differences were found for the Solvable Task group who reported greater expectancy of positive future events ($p<.05$). No within group differences were found for those who completed the Unsolvable Task. A between group difference was found, with participants who completed the Unsolvable Task demonstrating reduced FTT index score for positive future events relative to those who completed the Solvable Task ($p<.01$). A between group difference was found with the Solvable Task group generating a reduced number of positive future events relative to those in the Solvable Task group ($p<.05$).
2	Examine if the valence and group interaction found in previous clinical samples is demonstrable by an analogue depressed state.	*There will be an interaction between valence (Positive/Negative) and group (Solvable/Unsolvable Task) in relation to future positive thinking.*	*The hypothesis is not supported.* No significant interaction effect was found for Valence x Group in relation to the FTT index score. No interaction effects were observed for Valence x Group in relation to the FTT Fluency variable.
3	Examine future expectancy as measured by the FTT likelihood variable in relation to an induced depressed mood state.	*There will be a difference in levels of positive future expectancy, as measured by the FTT, for those who completed the Solvable Task relative to those who completed the Unsolvable Task.*	*The hypothesis is not supported.* No significant main effect was found for Group.
		There will be an interaction between valence of future expectancy and group.	*The hypothesis is not supported.* No interaction effects were seen for Valence x Group.
4	Examine group differences in relation to emotional avoidance (AAQ-II) and future expectancy (FTT).	*There will be a relationship between emotional avoidance, induced depressed mood and future expectancy.*	*The hypothesis is supported.* A positive relationship between emotional avoidance and positive future expectancy was found within the Unsolvable Task group ($p<.05$). No relationship was found for those in the Solvable Task group, emotional avoidance and future expectancy.

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

Solvable Task did not demonstrate any such biases in relation to future expectancy. Table 36 summarise the main findings from Experiment 5.

3.5 General Discussion

Together Experiments 3, 4 and 5 aimed to test the stability of the FTT as a measure of future thinking in a sub clinically depressed population. The findings indicate that the FTT lacks specificity in its detection of sub clinical levels of depression (Experiment 3), is susceptible to current mood effects (Experiment 4) and a short depression induction produced false positives (Experiment 5). Indeed the contamination of the FTT fluency variable by a mood induction may indicate that it is a measure of current mood state rather than depression *per se*. These findings are consistent with those of de Jong-Meyer et al (2007) who investigated the accessibility of positive and negative future events in dysphoric adolescent in-patients and revealed that a mood induction procedure had significant effects on the accessibility of events. This was particularly evident in the negative mood induction where the pattern of responses demonstrated an increased fluency for negative events. Such mood congruency is noted in the literature pertaining to attitudes and decision making, where mood has consistently been noted to influence subsequent task performance (e.g. Schwarts, 1990). Interestingly, in the depressed mood induction those who completed the Unsolvable Task, and as such were exposed to the learned helplessness influence, did not respond with increased negative fluency, rather an overall reduced fluency rate was seen in relation to the Unsolvable Task group. Thus, it appears that the learned helplessness task affected participant responses in a different manner to the negative mood induction; as such the depressed mood induction likely mimics a depressed mood state. Likelihood ratings across all three experiments were the most stable component of the Future Thinking Task. This is surprising given that in previous studies the focus has been on number of reported positive and negative events (e.g. de Jong-Meyer et al., 2007; O'Connor, Connery & Cheyne, 2000; MacLeod et al., 2006) with likelihood ratings often not even reported in the findings. MacLeod & Salminiou (2001) suggest that there is a lack of availability of positive anticipated experiences in depression. This same general lack of availability would not exist in non-depressed samples, however does appear to be affected by mood state. It appears from the current study, and from previous research, that mood impacts on the availability of positive anticipated experiences, however this effect has been argued in clinical samples to be indicative of a depressed state.

This effect of mood on the availability of positive experiences suggests that fluency for generating future events is not a robust measure of depression levels. It indicates that fluency for positive future events cannot accurately distinguish between depressed and non-depressed samples if mood is not taken into account. This also suggests the importance and the utility of the likelihood ratings in the assessment of clinical depression, since evidence to date suggest that these are resistant to mood effects and therefore a better indicator of a negative thinking style. Therefore, further research into likelihood ratings appears to be an important focus for research into mental time travel.

Interpretation of the current findings relating to emotional avoidance may suggest that high levels of emotional avoidance emerged as a mediating factor in relation how future cognitions are constructed under distress, i.e. as influenced by negative recall or a learned helplessness task. A relationship between positive future thinking and emotional avoidance was only fund within the negative mood group (Experiment 4) and the Unsolvable task group (Experiment 5), with those reporting high emotional avoidance seen to report an increased level of positive future events. It may be inferred from this that emotional avoidance renders an individual susceptible to perceived distress in situations which challenge their positive future outlook. The increased expectancies of positive future experiences seen within these two groups, may be indicative of the mood regulation effect that has been proposed, where in the short term individuals may successfully suppress any negative future connotations and focus on expectancies that elicit a more immediate positive affect. As such what is observed in Experiments 4 and 5 is a direct result of application of such emotionally avoidant coping strategies, where an negative emotional content is avoided and positive evaluations are exaggerated .This suggestion is supported by a similar sample of healthy participants in Experiment 3, who reported higher levels of emotional avoidance though was not exposed to any mood altering inductions and as such no relationship was found with future thinking. Similarly, those who reported high emotional avoidance but received a positive mood induction and completed a solvable task (Experiments 4 and 5) were found to relate to negative future expectancies. That is no mood regulation strategies were implements here in regards to avoidance of valenced content; thus it may be inferred that for those high in emotional avoidance an increased risk of reduced positive future thinking emerge following exposure to a stressful event (i.e. recalling a negative past experience or completing an unsolvable task). It is evident from the present experiments that the role of emotional avoidance in depression and cognitions about the future warrant further exploration.

It is important to make note of one potentially confounding variable pertaining to Experiment 4, where the mood induction method used was that of recalling an affective autobiographical episode. This is a widely used and highly successful method, as seen from Experiment 4 itself, and was considered for use in this experiment due to its ease of use and good rate of effect. However, given recent findings in the mental time travel literature, and specifically a very recent article by Szpunar (2010) it may be that the personal recall implicitly influenced the directionality of the subsequent future thoughts as recorded by the FTT. Szpunar specifically notes how the last or most recent instance of recall may serve to influence the subsequent future thoughts. It is further suggested that the nature of this influence is implicit, as the individual holds no conscious awareness of utilizing the past experience in any strategic manner. As such Szpunar argues that there is a separate case for considering implicit memory in research pertaining to future thinking, as implicit memory appears to be operationalised in a separate approach to the link that has previously been suggested by autobiographical and episodic memory functions. These have been consciously accessed in order to facilitate planning, problem solving or the like, in an effort to work towards personal goals, for example. Szpunar's findings are in its infancy and as such not elaborated on greatly, the suggestion is more to raise awareness of such implicit functions, and to spur further research of this phenomenon in the ongoing mental time travel debate. It should be noted that in terms of the link between past and future thinking, the valence congruency found between past recall and subsequent increase in future cognitions presented in Experiment 4 may provide further support to the existence of a direct relationship of cognitions about the past / future.

One potential weakness of the current experimental series pertains to the use of explicit self report measures. Given Szpunar's (2010) recent suggestion that future thinking may be influenced implicitly, and that a number of researchers have argued that the study of implicit cognition could be important in the analysis and treatment of psychopathology (e.g. Wiers, Teachman, & De Houwer, 2007). That is, early detection of depression may be available via implicit methodologies which may not become overt until prolonged suffering has been endures, i.e. when sufficient cognitive resources are available vulnerable individuals may successfully suppress implicit negative biases, but the ability to self-regulate may be impaired when cognitive resources are depleted (e.g., by life stress or as induced by learned helplessness tasks in a lab setting). Evidence suggests that the dispositional tendency to suppress unwanted thoughts may perform a protective function at low levels of life stress, but may present an increased risk for depression as life stress increases (Beevers & Meyer, 2004). Future research on implicit measures of future thinking in depression would be advantageous as the self report nature of tests such as the FTT and the FCT render it easy for participants to conceal information from assessors thus limiting their value as clinical tools.

Chapter 4

Designing an Implicit Measure of Future Expectancies

4.1 General Introduction

There is a burgeoning literature on future thinking in depression (cf. Szpunar, 2010). However, the common use of self-report measures may limit this body of work. Attempts have been made in order to account for many of the shortcomings associated with use of such direct measures (see Sections 1.5.1 and 1.5.2); although at best these efforts have offered limited improvements (Holden, Book, Edwards, Wasylkiw, & Starzyk, 2003). This is particularly of concern in clinical research, pertaining to the motivation behind self-report responses, as the thoughts and beliefs people tend to conceal in such measures may be reflections of the cognitions they attempt to screen at a more personal level (Greenwald, Banaji, Rudman, Farnham, Nosek, & Mellott, 2002). 'Pretence' at this level, even if subconscious (Beck, Rush, Shaw, & Emery, 1979; Beevers, 2005), may lead to the adoption of unhealthy coping strategies, and act to accumulate and endorse negative thoughts of the self and the future (Hayes, 1994; Hayes et al., 2001).

Given the recent advancement of implicit methodologies (see Section 1.7) and the advantages of their use in the analysis of psychological disorders (e.g., Wiers, Teachman, & De Houwer, 2007), it may be that implicit measures could provide a more accurate and sensitive measure of future cognition in depression. In addition to this they may improve assessment and detection of depression (e.g., Nock & Banaji, 2007). Indeed, as noted in Chapter 1, the Implicit Association Test (IAT) has out preformed explicit methods in terms of predictive power across several studies, for example, self-esteem (Haeffel et al., 2007; Steinberg, Karpinki, & Alloy, 2007); hopelessness (Meites, Deveney, Steele, Holmes, & Pizzagalli, 2008; Friedman, Nosek, Miller, Gordon, & Banaji, 2001); self-injurious thoughts (Nock & Banaji, 2007); and death/suicide (Nock, Park, Finn, Deliberto, Dour, & Banaji, 2010) (see Section 1.7.1).

Previous IAT research of particular relevance to the current work, applied the IAT as an implicit measure of future expectations and hopelessness (Meites, Deveney, Steele, Holmes, & Pizzagalli, 2008). In this study Meites et al. compared a sample of remitted depressed (RD) and healthy participants on two separate IAT's. First, a 'depression IAT' aimed to assess associations between the self and mood state, whereas the second task, the 'hopelessness IAT', aimed to obtain a measure of future thought and mood state. These tests were reviewed prior to and following a negative mood induction. The 'depression IAT' was found to show between group differences, with the RD participants demonstrating weaker associations between self with happiness relative to the healthy controls prior to the mood induction. Whereas following the negative mood induction no such differences remained. However, the 'hopelessness IAT' did not manage to produce any significant findings as both participant groups showed an implicit bias towards associating the future with happiness. That is, RD individuals did not demonstrate decreased positive future expectancies relative to control participants, even after a negative mood induction. Thus, these findings contradict previous research by Friedman et al., (2001) where implicit hopelessness biases were observed in a sample of currently depressed individuals. Meites et al.'s findings are also in contrast to a study by Hepburn, Barnhofer and Williams (2006) who found greater levels of explicit hopelessness in healthy controls after a negative mood induction, with overall increased implicit depression in the same population. However, there are some limitations to the IAT as an implicit measure (see Section 1.7.1.2 for a description of such limitations). Barnes-Holmes et al. (2006) have extended the IAT paradigm, in a novel procedure referred to as the Implicit Relations Assessment Procedure (IRAP), which involves the presentation of specific relational terms (e.g., similar, opposite, better, worse) that allow for the relations between and among stimuli to be considered in their own right rather than just associations between stimuli (see Sections 1.7.2, 1.7.2.1 and 4.2.1.4 for a description of the IRAP construction and effect).

The measurement of specific relations rather than merely associations between the self and future events is of particular relevance to the current work. Imagine for example, in the examination of future expectancies (i.e., expectancy relations) associatively pairing "future expectations" with positive events such as "wealth" or "happiness" and so forth, only informs the researcher about the direct pairing of expectations with these events. Specifically, information is only gained pertaining to the strength of association between the personal future and these stimuli. As such an understanding about the nature or direction of the association is lacking. However, by directly targeting the relations between stimuli, other than associations, the IRAP offers a direct examination of the relational nature of an individual's pre-existing beliefs. The basic IRAP effect has been replicated across a number of studies (cf. Section 1.7.2.1 for a presentation of such IRAP studies) and is regarded as a stable measure of individual differences. As such the IRAP appears a more suited implicit measure for the investigation of future expectancies. The current chapter reports on a series of experiments that aim to design and evaluate an IRAP task to measure positive and negative future experiences across a sub clinical sample of depressed and healthy control undergraduate students.

4.2 Experiment 6

Experiment 6 aims to adopt the IRAP in order to construct an implicit future thinking task, more specifically, an implicit version of the FTT (MacLeod et al., 1998) with an emphasis on the expectancy component. Therefore, the implicit future thinking measure, the Future Thinking IRAP (FT IRAP), will be designed specifically to measure future positive and negative expectancies. To this end Experiment 6 has two main aims, (1) examine implicit future thinking by use of the FT-IRAP in relation to sub-clinical depression. It is predicted that implicit future thinking, as measured by the FT-IRAP, will differ between sub-clinically depressed individuals relative to non-depressed individuals, as measured by the BDI-II. A further aim of Experiment 6 is (2) to examine implicit future expectancy as measured by the FT-IRAP in relation to the role of emotional avoidance, as measured by the AAQ-II, in future thinking; it is predicted that there will be a relationship between emotional avoidance and implicit future expectancy.

4.2.1 Method

4.2.1.1 Participants

Thirty-eight adults from Swansea University volunteered to take part in the current experiment in return for course credit, though after exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in Section 4.2.2.1) data from eight participants was removed, thus only data from thirty participants was utilised in the following analysis. As such, the subsequent information pertains to the included 23 females and 7 males who were recruited via advertisements within the Psychology Department at Swansea University. The participants ranged in age from 18 to 28 years ($M = 21.1$, $\sigma = 2.56$).

4.2.1.2 Apparatus and Materials

Participants were requested to complete a set of experimental measures of psychological well being. These measures were the same as utilized in Experiment 1a (see Section 2.2.1.2, and subsequently all the foregoing experiments to Experiment 6), that is the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Trait Anxiety Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983), the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004), The Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and the Verbal Fluency Control Task (Lezak, 1976).

4.2.1.3 Implicit Relational Assessment Procedure: Piloting of Stimuli

Pilot Study

Original data, in form of participant responses, from previous studies with the Future Thinking Task was acquired following private correspondence with Andrew MacLeod (February, 2006). A number of commonly generated positive and negative future experiences were pooled and assessed for general probability. The collated data was compiled and presented in a survey, comprising a total of 92 future events for evaluation. Respondents were asked to state whether the event 'could possibly happen to them in the future' and rate this as very unlikely (1) to very likely (7); and also rate 'how negative (1) or positive (7) they deemed the event to be'. Based on these survey ratings, from 120 participants, the six positive and six negative future events with the highest likelihood of occurrence were selected as stimuli for use in an implicit measure targeting future expectancies, namely the specifically composed Future Thinking-Implicit Relational Assessment Procedure (FT-IRAP; see Table 37 for an illustration of the selected FT-IRAP stimuli).

Table 37. FT-IRAP stimuli words derived from the FTT stimuli Pilot Study and employed in Experiment 6.

Positive Future Events	Negative Future Events
Friendship	Worry
Enjoyment	Loneliness
Happiness	Failure
Wealth	Stress
Success	Sadness
Love	Illness

4.2.1.4 *Future Thinking-Implicit Relational Assessment Procedure*

The IRAP (Barnes-Holmes et al., 2006) aims to target implicit cognitions, (i.e. thoughts, feelings, and beliefs) which may be underreported due to an attempt to conceal such cognitions or due to a lack of conscious awareness of such beliefs by the participants themselves. The IRAP is a computer based measure and the participant responses to the tasks and stimuli presented on a computer screen are automatically recorded. The IRAP trial types are created by presenting relationally opposing labels in conjunction with sets of target words deemed as consistent or inconsistent in relation to the verbal function of these labels. The IRAP has been designed to allow for the use of labels and target words that are specific to each experimental investigation, and as such a multitude of relational targets can be utilized. For the composition of the Future Thinking IRAP (FT-IRAP) the FT-IRAP labels were intentionally designed to promote relational responding consistent with personal future optimism. The stimuli selected for the FT-IRAP consist entirely of words. The *sample stimuli* consist of two phrases presented as 'I expect' (sample 1 label) and 'I don't expect' (sample 2 label). The pilot data based on the FTT event ratings was converted and employed to develop the specific FT-IRAP target words; i.e. the *target stimuli* were all single nouns. Six had positive connotations, that is the six positive future expectancies (sample 1 target words) were 'Friendship', 'Enjoyment', 'Happiness', 'Wealth', 'Success' and 'Love'; and six had negative connotations, i.e. the six negative future expectancies (sample 2 target words) were 'Worry', 'Loneliness', 'Failure', 'Stress', 'Sadness' and 'Illness' The two *response options* consisted of the relational terms TRUE and FALSE. The stimulus arrangements for the IRAP are presented in Table 30 (i.e. the positive and negative FT-IRAP target words presented with the sample labels).

The Implicit Relational Assessment Procedure typically consists of a minimum of two practice blocks and a fixed set of six test blocks. Each block presents the same number of trials, comprised of what are defined as four different trial types (Barnes-Holmes et al, 2006; see Figure 21 for an example of the four FT-IRAP trial types). In order to complete the FT-IRAP participants are required to choose between two response options (i.e. 'true' and 'false'), by pressing either the 'D' or 'K' key. The response options appear at the bottom left and right of the screen and switch randomly from trial-to-trial. Consistent with previous IRAP presentations, a block of consistent trials, which reflects an optimistic future outlook on the FT-IRAP, requires the following pattern of responses: I expect– Positive – *True*; I expect–Negative– *False;* I don't expect – Positive – *False;* I don't expect – Negative – *True*. A block of inconsistent trials requires the reverse response pattern (denoting a pessimistic future outlook; I expect – Positive – *False;* I expect – Negative – *True,* etc). Participants are put through an alternating series of consistent and inconsistent blocks as the IRAP program reverses the feedback contingencies across the repeated blocks. The order of sequence, consistent followed by inconsistent or inconsistent followed by consistent, is further counterbalanced across participants.

Table 38. The Stimulus Arrangements Employed in Experiment 6. The Positive and Negative FT-IRAP Target Words presented with the Sample Labels 'I expect' and 'I don't expect' along with the corresponding Response Options of 'true' and 'false'; i.e. the Four Stimulus-response Combinations deemed Consistent in the Future Thinking-IRAP.

Sample 1	**Positive Targets**	**Sample 2**	**Negative Targets**	**Sample 1**	**Negative Targets**	**Sample 2**	**Positive Targets**
I expect	*Love*	**I don't expect**	*Worry*	**I expect**	*Worry*	**I don't expect**	*Love*
	Friendship		Loneliness		Loneliness		Friendship
	Enjoyment		Failure		Failure		Enjoyment
	Happiness		Stress		Stress		Happiness
	Wealth		Sadness		Sadness		Wealth
	Success		Illness		Illness		Success
Response option 1		Response option 1		**Response option 2**		Response option 2	
True		True		**False**		False	

Note. By implication all of the other four possible stimulus-response combinations are deemed inconsistent.

Participants are informed that they will complete a practice phase and errors are expected for these practice blocks. Onscreen feedback is provided after each block, presenting the participant with a statement of their percentage of correct responses and median response latency for that block. Subsequent to each block of the IRAP, participants are informed that the previously correct and wrong answers will be reversed in the next block, thus removing any need for trial-and-error learning after the first block. The trials are presented quasi-randomly with the typical constraint that none of the four trial types are offered twice in succession. The positioning of the two response options is also quasi-random in that typically they cannot appear in the same left-right position three times in succession.

The procedure for the test blocks is similar to the practice blocks, except that onscreen instructions inform participants that each block is a test and to *"go quickly,"* although making *"a few errors are okay."* The same alternating sequence employed with the practice blocks is also used with the test blocks. Thus, if a participant is exposed to a consistent-inconsistent sequence during practice, test blocks 1, 3, and 5 are consistent and test blocks 2, 4, and 6 are inconsistent; If practice involved an inconsistent-consistent sequence, then test blocks 1, 3, and 5 are inconsistent and 2, 4, and 6 are consistent.

The FT-IRAP requires participants to reach a standard of 80% correct responses, and a median response time of less than 3000ms. These criteria ensure that participants understand and comply with the IRAP instructions. If participants fail to achieve the criteria for either of the two practice blocks, the required standard, along with the standard of responding they have achieved, are presented on the screen, and they are invited to try again. Participants are allowed three attempts to achieve the practice criteria (a total of six practice blocks); if they fail to do so any data are discarded. Only participants who achieve the practice criteria proceed to the six test blocks. No performance criteria are applied during the test blocks in order to proceed, but if a participant's performance falls below the practice accuracy criterion (e.g., 80%) across the test blocks the data for that participant are normally discarded. When all six test blocks have been presented the IRAP is complete. The primary data from the IRAP is response latency, defined as the time in milliseconds (ms) that elapses between the onset of the trial and a correct response emitted by a participant. The FT-IRAP was written in Microsoft Visual Basic 6.0 and administered to participants on a Toshiba portable computer with a colour monitor, Intel Pentium 1500MHz processor, and Windows XP operating system (software available from http://psychology.nuim.ie/IRAP/IRAP_1.shtml; cf. Barnes-Holmes et al, 2006).

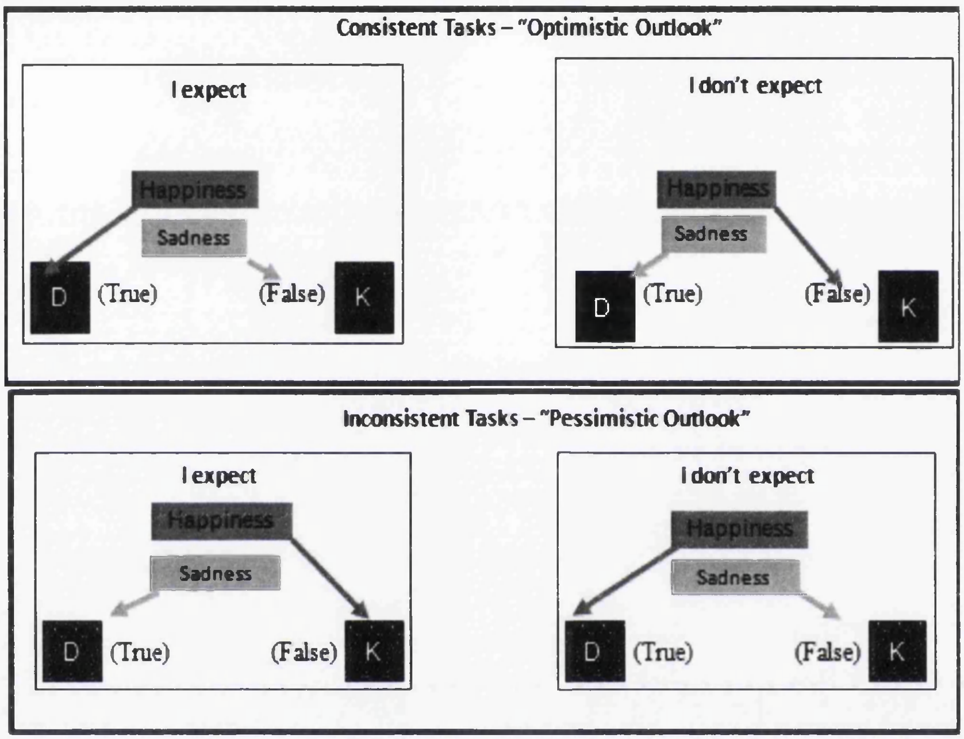


Figure 21. The Four FT-IRAP Trial Types employed in Experiment 6. The Trial Type distinctions are based on the requested Response Options.

4.2.1.5 Experimental Overview

The current study used a 2 x 2 mixed design, with Group (Depression: High BDI-II, Low BDI-II) as the between participant variable and Valence (Implicit Future

Cognitions: Positive/Negative) as the within participant variable. All participants completed all tasks and measures; the experimental sequence is depicted in Figure 22.

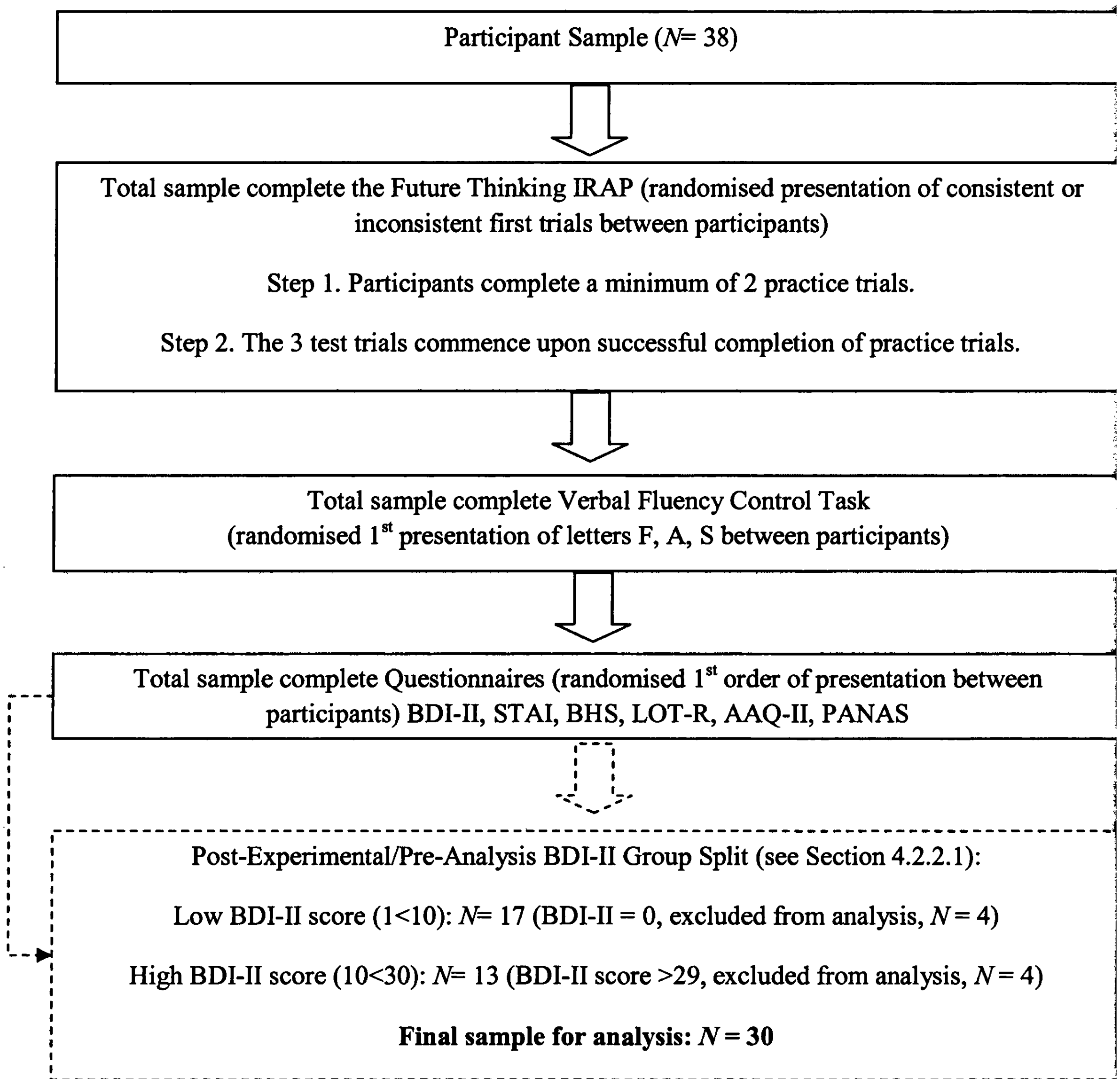


Figure 22. Overview of the Experimental Sequence for Experiment 6.

4.2.1.6 Ethical Issues

In order to conduct the study according to all of the appropriate ethical guidelines as identified by the British Psychological Society (2006), a number of specific measures were put in place. These measures were consistent with those outlined previously for Experiment 3 and Experiment 1a specifically (see Section 2.2.1.4), with only minor adjustments made in order to facilitate the change in methodologies to tailor instructions to the current experiment. Emphasis was put on assuring participants that the computer task was not a measure of how quick they were at responding but that the focus was on the responses made. This emphasis was made to deter distress related to feelings of inept computer skills.

4.2.1.7 Procedure

Participation took place in a controlled environment in the form of a standard psychology research laboratory with the provision of a table, chair and portable computer. Prior to commencing the FT-IRAP participants were provided with automated visual explanations supplemented by verbal instructions relating to the task. The IRAP program commenced with a series of automated ethical guidelines and instructions as follows (adapted from standard guidelines provided by Barnes-Holmes for use with the IRAP procedure):

> Our research investigates cognitive processes that are used in decisions that involve memory. We are seeking to develop and test theories of cognitive processes that occur inside and outside of awareness in the routine use of memory.
>
> Stimuli will be presented on this display screen and your responses will be entered on the keyboard.
>
> The research assumes that you can read English fluently and that your vision is normal or corrected-to-normal. If you do not consider yourself fluent in English, or if your vision is not normal or corrected-to-normal and ESPECIALLY IF YOU ARE HAVING SOME DIFFICULTY

READING THIS DESCRIPTION, please ask the Experimenter now whether or not you should continue.

Your identity as a participant is confidential. Further, you are free to discontinue participation at any time, without penalty. In keeping with standard practice, your data may be retained for 5 years or so, during which time only the investigators on this or successor projects will have access to them.

PLEASE NOW READ THE STATEMENT BELOW, WHERE YOU WILL BE ASKED TO RESPOND TO A STANDARD INFORMED CONSENT QUESTION.

I have read the description of the procedure. I understand that the questions I may have about this research will be answered by Liv Kosnes or one of the other researchers working on this project.

If you consent to participate in the research that has been described on the preceding display pages you should now read the Instructions for the sorting tasks below.

[INSTRUCTION: If you wish to ask any questions first, alert the experimenter now. IF YOU WISH NOT TO PROCEED, you should inform the experimenter].

Once participants had read this information and consented to continue with the experiment, further instructions for task completion were presented with illustrated on-screen examples as follows:

Shown below are illustrations of the four different types of task that will be presented repeatedly in this part of the experiment. To help you understand the tasks, each of the four illustrations is explained immediately underneath. Please examine each illustration and then read carefully the explanation attached to it. Please make sure that you understand each task before continuing with the experiment.

IMPORTANT: From trial to trial the positioning of the response options (True and False) will vary randomly between left and right. NOTE: During the experiment a range of other words apart from "Happiness" and "Sadness" will also be presented.

> **REMEMBER: From trial to trial the positioning of the response options (True and False) will vary randomly between left and right.**

Participants were presented with the onscreen example of the four IRAP trial types with corresponding instructions detailing the response options and their concurrent relations. For illustrative purposes, on-screen examples are presented in Figure 23a, b, c & d. An explanation accompanied each of the four illustrations in order to ensure that participants understood the appropriate responses that were required. I.e. for Sample-1 with Target-1, as presented in Figure 23a), the instructions read: *"If you select 'True' by pressing the 'D' key, you are stating that 'I expect happiness.' If you select 'False' by pressing the 'K' key, you are stating that there is 'No expectancy of happiness'."* Figure 23b) shows Sample-2 with Target-1 as it would have been presented to participants with the corresponding instructions: *"If you select 'True' by pressing the 'D' key, you are stating that 'I don't expect happiness'. If you select 'False' by pressing the 'K' key, you are stating that 'I DO expect happiness'."* Similarly, as can be seen in Figure 23c), Sample-1 with Target-2 incurred the instructions: *"If you select 'True' by pressing the 'D' key, you are stating 'I do expect sadness'. If you select 'False' by pressing the 'K' key, you are stating 'I do not expect sadness'."* And for the fourth trial type explanation, as depicted in Figure 23d), participants were presented with an example of Sample-2 with Target-2 encountering the following instructions: *"If you select 'True' by pressing the 'D' key, you are stating that 'I do not expect sadness'. If you select 'False' by pressing the 'K' key, you are stating that 'I do expect sadness'."*

Immediately after this, the following automated instructions were presented:

> During the experiment you will be asked to respond as **quickly and accurately** as you can across all trials.
>
> The relating tasks will be presented in short ***sessions*** that are separated by the appearance of instructions on the computer screen. You can take a short break if you like while the instructions are on on-screen.

During each short session the relating task follows one general rule. An incorrect response on any trial is signalled by the appearance of a red 'X' in the centre of the screen. To remove the red 'X' and move on to the next trial please press the correct response key quickly.

After each session, further instructions will appear and they will tell you that the general rule that applied in the previous session is now completely reversed. Please pay close attention to these instructions and do your best to follow them.

So, just to clarify, there will be only ***two*** general relating rules and so the first thing you should do at the beginning of each session is to discover the rule by using the feedback you get in the form of the red 'X'. It is very important to understand that sometimes you will be required to respond to the tasks in a way that ***agrees*** with what you believe and at other times you will be required to respond in a way that ***disagrees*** with what you believe. **This is part of the experiment.**

The first two sessions are for ***practice*** only and these are repeated until you respond accurately on at least 80% of the relating trials and respond faster, on average, than 3000 milliseconds (i.e. 3 seconds). When you complete the practice phase, the ***test-phase*** will then start. Remember, you should try to make your responses as **accurately and quickly** as possible.

This point in the procedure marked the beginning of the automated practice FT-IRAP trials. Each trial was presented as a single screen and the format of all trials was identical. On each trial, one sample label, one target stimulus and the two response options were presented simultaneously on-screen. The FT-IRAP program consisted of a minimum of one practice block followed by three test blocks. Each block comprised of one consistent and one inconsistent trial. Participants were required to achieve at least 80% accuracy for both trials within 3000ms in the practice block. Before each test trial began, participants were presented with a screen that read:

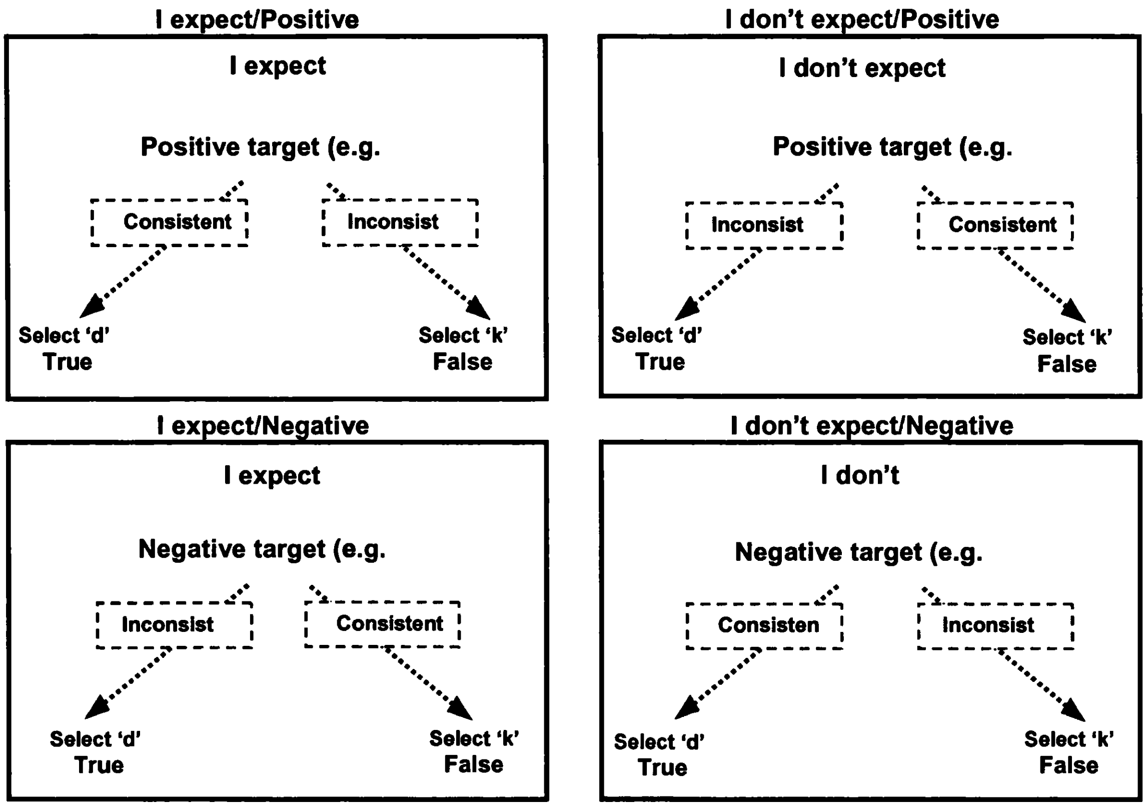
IF YOU MAKE AN ERROR YOU WILL SEE A RED 'X'

BELOW THE STIMULUS – WHEN THIS HAPPENS,

YOU HAVE TO MAKE THE CORRECT RESPONSE TO PROCEED

THIS IS PRACTICE – ERRORS ARE EXPECTED

23a) Sample 1 with Target 1 **23b)** Sample 2 with Target 1



23c) Sample 1 with Target 2 **23d)** Sample 2 with Target 2

Figure 23 a-d. The four FT-IRAP Trial-Types as presented to participants on screen to accompany verbal instructions in Experiment 6. The attribute (I expect, I don't expect), target word (love, illness, happiness, sadness etc.), and response options (True and False) appeared simultaneously on each trial. Arrows with superimposed text boxes indicate which responses were deemed consistent or inconsistent (the boxes and arrows did not appear on screen). Selecting the consistent response option during a consistent block, or the inconsistent option during an inconsistent block, cleared the screen for 400 ms before the next trial was presented; if the inconsistent option was chosen during a consistent block, or the consistent option during an inconsistent block, a red X appeared on screen until the participant emitted the alternative response.

During the consistent trials the participants were required to relate future expectancies with positive events (i.e. I expect positive – *true* etc), whereas for inconsistent trials participants were required to relate future self with negative events (e.g., I expect positive – *false* etc). In compliance with standard IRAP procedures participants in the Consistent-Relations-First condition commenced with a block of consistent trials and thereafter alternated between inconsistent and consistent blocks; participants in the Inconsistent-Relations-First condition were exposed to the blocks in the opposite sequence (i.e., Inconsistent followed by Consistent). Before the first trial commenced, a screen was presented that read:

> IF YOU MAKE AN ERROR YOU WILL SEE A RED 'X'
>
> BELOW THE STIMILUS – WHEN THIS HAPPENS,
>
> YOU HAVE TO MAKE THE CORRECT REPOSNSE TO PROCEED
>
> THIS IS A TEST – GO FAST, MAKING A FEW ERRORS IS OK

In each block the trials were presented in a quasi-random order with the constraint that each of the 2 sample stimuli appeared once with each of the 12 target stimuli (6 positive and 6 negative target words; see Table 38). On each trial, all stimuli appeared simultaneously on screen. Throughout the IRAP, feedback on incorrect responding was presented in the form of a red 'X' that appeared in the centre of the screen under the target word. Participants were prevented from continuing to the next trial until they provided a correct response and the 'X' remained on-screen until this occurred. Correct responding was not followed by feedback, but by a clear screen for 400ms before the next trial appeared. I.e. during consistent blocks, a consistent response cleared the screen for 400 ms and then the next trial was presented. If an inconsistent response was emitted, or any other key was pressed, a red X appeared immediately under the target stimulus. To remove the red X and continue to the 400 ms inter-trial interval, the participant was required to emit the consistent response. When the participant had completed all 24 IRAP responses within one set of trials the screen cleared and two types of feedback were presented for that block: the percent of correct responses, and the median response latency. When participants pressed the space bar to proceed, a screen was presented that read:

IMPORTANT: DURING THE NEXT PHASE THE PREVIOUSLY CORRECT AND WRONG ANSWERS ARE REVERSED. THIS IS PART OF THE EXPERIMENT. PLEASE TRY TO MAKE AS FEW ERRORS AS POSSIBLE – IN OTHER WORDS, AVOID THE RED X

At the end of each block of trials, participants were presented with a summary of their performances during the previous block in terms of accuracy percentage and mean response latency. Participants were permitted to pause between blocks and pressed the space bar when they were ready to proceed to the next block. Following completion of the last test block, participants were presented with the following instruction:

"Thank you. This is the end of the sorting task. Please report to the experimenter."

Following the IRAP participants were requested to complete the Verbal Fluency Control Task and the set of psychometric and well being questionnaires. Participants were thanked for their co-operation and time and appropriately debriefed about the research and invited to ask any questions. Although made available to them, no participants opted for short breaks at any point. All participants completed the study in a single experimental session that lasted between 20 and 30 minutes in total.

4.2.2 Results and Discussion

4.2.2.1. *Group Allocation*

As in previous experiments from Chapter 2 and 3, the current study opted to remove any participants with a BDI-II score of 0 (N= 4) or above 29 (N = 4, M = 30.75) in order to more accurately capture healthy participants and those at a sub-clinical level of depression. The cut off point for inclusion in the no depression group was a score of 1< 10, thus participants presenting scores of 1-9 (N = 17; M = 4.76) on the BDI-II were included in this group (Non-Depressed Group). For inclusion in the sub-clinical depression group BDI-II scores recorded where $10 < 30$ ($N = 13$; $M = 14.53$; Depressed Group).

Group differences were observed with respect to BDI-II grouping, with participants in the Non-Depressed group reporting significantly lower BDI-II scores than the corresponding Depressed group, $t(28) = -9.093$, $p < .001$. The two groups further diverged on their responses to measures of hopelessness (BHS; $t(28) =.-5.279$, $p<.001$), life optimism (LOT-R; $t(28) = 3.287$, $p=.003$), experiential avoidance (AAQ-II; $t(28) = 2.285$ $p=.030$) and anxiety (STAI; $t(28) = -2.732$, $p=.011$). No mood differences where found between the two groups (PA: $p=.125$; NA: $p=.348$). The psychometric means are presented with the participant demographics in Table 39. As can be observed from Table 39, the two groups did not differ with respect to age, $t(28) =.658$, $p=.516$, representation of gender, $\chi 2$ (2) $=.001$, $p=.977$, or verbal fluency, $t(28)=.468$, $p =.644$.

Table 39. BDI group split presentation of Demographics and Psychometric tests, presented as mean scores, with Standard deviations (SD), for the Depressed and Non-Depressed groups in Experiment 6.

Variable	**Non-Depressed *(SD)***	**Depressed *(SD)***
Gender: Females **(Males)**	13**(4)**	10**(3)**
Age	21.29 *(2.66)*	20.84 *(2.51)*
VFCT	11.27 *(2.92)*	10.76*(2.99)*
BDI	4.76 *(2.70)*	14.53 *(3.17)*
BHS	2.35 *(1.36)*	5.53*(1.94)*
STAI	32.41 *(8.13)*	39.46 *(5.12)*
LOT-R	17.82*(3.66)*	13.31 *(3.81)*
AAQ-II	50.71 *(9.26)*	43.61 *(7.14)*
PA	32.00 *(4.58)*	29.38 *(4.36)*
NA	14.64 *(4.89)*	16.31 *(4.47)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

4.2.2.2. *The Future Thinking Implicit Relational Assessment Procedure*

The response latency data from the FT-IRAP is presented as the time in milliseconds from the onset of a trial to the participant's first response for that trial. A group split based on high and low scores on the Beck Depression Inventory (as described above) were conducted in order to compare healthy and sub-clinically depressed participant responses. As can be seen from Figure 24 the overall mean response latencies, averaged across the three test-blocks, were shorter for the Non-Depressed group on the consistent (C) relative to the inconsistent (I) trials (C = 1837 ms, $\sigma = 293$, I = 2061 ms, $\sigma = 356$), opposing responses were found for the Depressed group relative to the Non-Depressed group, whom on average produced longer latencies for the consistent (C) proportionate to responses on the inconsistent (I) trials (C = 2055 ms, $\sigma = 253$, I = 1925 ms, $\sigma = 263$). Both groups produced patterns of accuracy concordant with the response latencies for the consistent and inconsistent test-blocks: that is, where latencies were shorter, accuracy scores tended to be higher (Non-Depressed, C = 94.9%, I = 89.9%; Depressed, C = 92.3%, I = 92.8%) indicating that the IRAP responses were consistent with previous learning history.

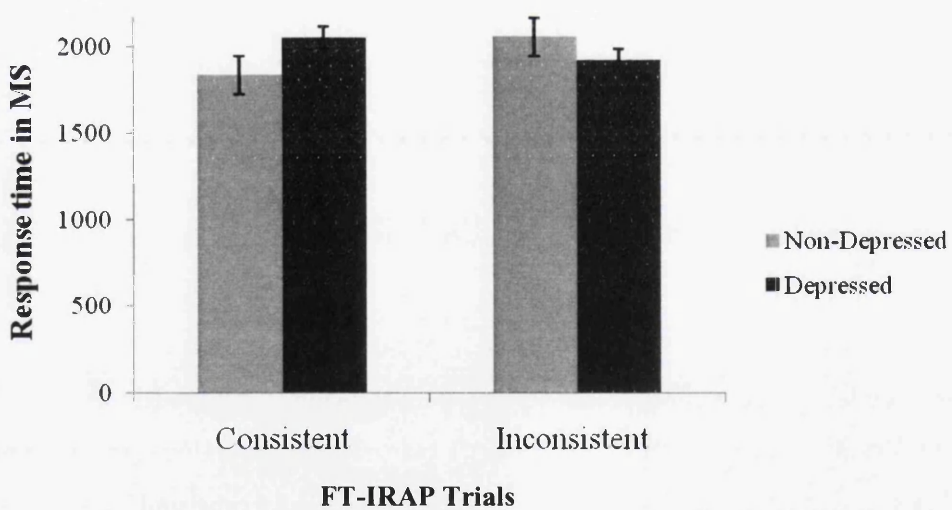


Figure 24. The FT-IRAP Mean Response Latencies across the Consistent and Inconsistent Trials, with Standard Error Bars (S.E), for the Depressed and Non-Depressed groups in Experiment 6.

4.2.2.3. D_{IRAP}-algorithm

The response latency data for each participant are typically transformed into D_{IRAP} scores using the $D_{IRAP\text{-algorithm}}$, derived from the $D_{algorithm}$ developed by Greenwald, Nosek, and Banaji (2003) for the IAT (Dawson et al., 2009; see also Back, Schmukle, Egloff, & Gutenberg, 2005; Cai, Sriram, Greenwald, & McFarland, 2004; Mierke & Klauer, 2003). The steps involved in calculating the D_{IRAP} scores are denoted by Barnes-Holmes et al. (2010, pp.10-11) as the following:

> (i) only response latency data from test blocks are used; (ii) latencies above 10,000 ms from the dataset are eliminated; (iii) all data for a participant are removed if he or she produces more than 10% of test block trials with latencies less than 300 ms; (iv) 12 standard deviations for the four trial-types are computed: four for the response latencies from test blocks 1 and 2, four from the latencies from test blocks 3 and 4, and a further four from test blocks 5 and 6; (v) 24 mean latencies for the four trial-types in each test block are calculated; (vi) difference scores are calculated for each of the four trial-types, for each pair of test blocks, by subtracting the mean latency of the consistent block from the mean latency of the corresponding inconsistent block; (vii) each difference score is divided by its corresponding standard deviation from step 4, yielding 12 D_{IRAP} scores; one score for each trial-type for each pair of test blocks; (viii) four overall trial-type D_{IRAP} scores, or IRAP effects, are calculated by averaging the scores for each trial-type across the three pairs of test blocks.

Thus the IRAP effects were derived for each trial-type from the raw response latencies using a technique based on the 'improved scoring algorithm' developed for use with the IAT by Greenwald, Nosek, and Banaji (2003; Table 4, p. 214). The D measure is an established way of addressing the general finding that participants with longer average latencies tend to show larger raw effects than those who respond more quickly. O'Toole and Barnes-Holmes (2009) found that their raw IRAP effect (the response latency differences between consistent and inconsistent trials) correlated significantly with various measures of intelligence; yet when the D-transformation was performed on the data (not reported in the article) no significant correlations with intelligence were observed. Because the D algorithm largely removes the influence of extraneous factors, Nosek, Greenwald, and Banaji (2007) recommended it for making group comparisons when latencies are variable between groups.

In a typical IAT design, *D* is computed for data cumulated across all trials including practice trials. In contrast, the IRAP's design allow for its D_{IRAP} effects to be calculated at the more detailed level, that is, the IRAP allows a D_{IRAP} score to be calculated for each trial-type (i.e., the four possible stimulus combinations of sample-with target-type; see Figure 23 a-d), on each of the three pairs of consistent and inconsistent test-blocks. In calculating the D-transformation with the IRAP's response latency data, only the response latency data from test-blocks were used (i.e., blocks 3-8 of the FT-IRAP), and trials with latencies greater than 10,000 milliseconds were dropped. The mean latencies calculated, of consistent (C) and inconsistent (I) trials for each trial-type, found the combined standard deviation (SD) among the C and I trials for each trial-type; and allowing for the calculation of the D_{IRAP} = (Mean.I - Mean.C)/SD for each trial-type (see Vahey, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009).

The larger the D_{IRAP} score the greater the difference in response latencies between the consistent and inconsistent trials. Positive D_{IRAP} scores denote responding in accordance with the pre-experimentally defined biases (i.e., within the current study, with expectancies for the future as concordant to positive relative to negative future experiences) and negative scores indicate the opposite (i.e., the future as concurring to negative relative to positive experiences). A zero score indicates that the participant was unable to discriminate between positive and negative future experiences (i.e. the responses showed no difference in relation to subjective expectations of either positive or negative experiences).

4.2.2.4. *Participant-type analyses*

Composite positive and negative D_{IRAP} scores were calculated for the four trial-types, with a positive marker including the two trial-types confirming positive future and denying negative future relations (i.e. consistent trials; $D_{IRAP\text{-}POS}$) and respectively, a negative marker combining the two trial-types analogous to the confirmation of negative future and denial of positive relations (i.e. inconsistent trials; $D_{IRAP\text{-}NEG}$). That is, in each case the magnitude of the resulting trial-typed D_{IRAP} indicates the degree to which the participant is inclined, based on their particular behavioural history, to provide the particular relational responses deemed consistent for that trial-type's specific sample/target-type combination. In the specific case of the current study, the trial-type D_{IRAP} scores computed for the FT-IRAP indicated the degree to which the participant is more fluent at providing the relational response "True" for the two trial-types "I expect – Positive Target Descriptors" and "I don't expect – Negative Target Descriptors," and the relational response "False" for the remaining two trial-types ("I expect – Negative Target Descriptors" and "I don't expect – Positive Target Descriptors). In other words, the sign of the FT-IRAP's D_{IRAP} score for each trial-type indicates whether the participant is biased towards the response relation associated with consistent trials (+; expect positive/don't expect negative; $D_{IRAP\text{-}POS}$) versus inconsistent trials (-; don't expect positive/expect negative; $D_{IRAP\text{-}NEG}$).

The mean $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ scores calculated for both groups of participants are presented in Figure 25. The data show the mean FT-IRAP effect for the Non-Depression group ($D_{IRAP\text{-}POS} = .52$, $\sigma = .34$; $D_{IRAP\text{-}NEG} = .24$, $\sigma = .27$) to differ on both means from the Depression group ($D_{IRAP\text{-}POS} = -.14$, $\sigma = .69$; $D_{IRAP\text{-}NEG} = -.23$, $\sigma = .61$). In other words, this further denotes that the Non-Depression group, relative to the Depression group, responded more rapidly on trials that required confirmation of future-positive and denial of future-negative relations (i.e. consistent trials) over tasks requiring confirmation of future-negative and denial of future-positive relations (i.e. inconsistent trials). In short, the IRAP data indicate that the Non-Depression group convey a greater level of positive future expectations compared with the Depression group. Thus it is evident from the preliminary data that an inverse pattern of responding to the FT-IRAP stimuli occurred for individuals in the Depression group proportionate to their Non-Depressed counterparts.

A mixed model ANOVA found a main effect for Valence ($F(1, 28) = 4.533$, p =.042, ηp^2 =.139) with participant responses discriminating between positive and negative future expectancies. No interaction effect was found for Valence and Group ($F(1, 28)$= 1.293 p =.265, ηp^2 =.044), though a main effect for Group was found ($F(1, 28)$= 12.535, p=.001, ηp^2 =.309) with the Non-Depressed group responding in line with the consistent FT-IRAP effect, that is, relating to positive future expectancies, whereas the Depression group did not show this effect (see Figure 25 for an illustration of the two groups $D_{IRAP-POS}$ and $D_{IRAP-NEG}$ scores).

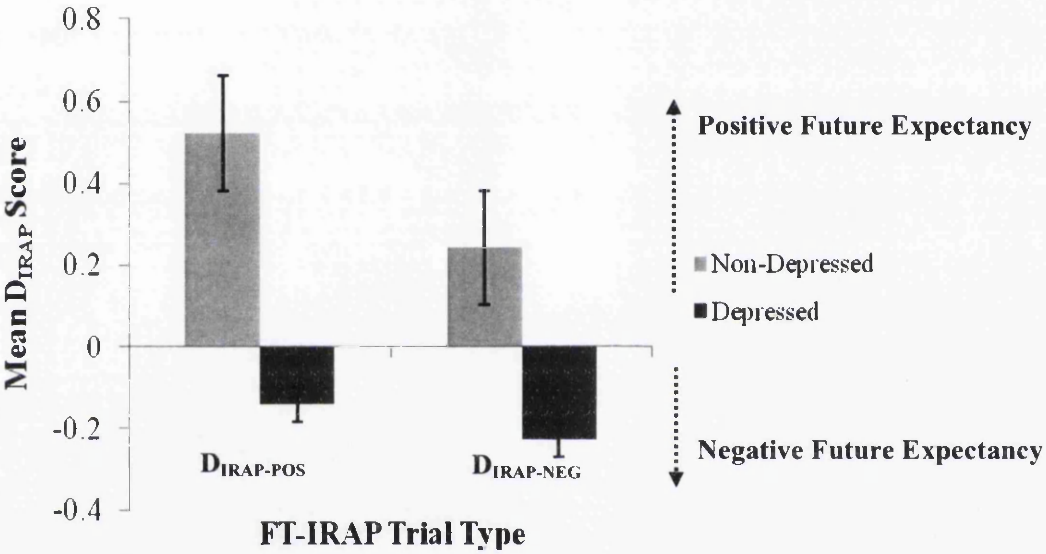


Figure 25. Mean Positive and Negative D_{IRAP} scores, with Standard Error Bars (S.E), for the Depressed and Non-Depressed groups in Experiment 6.

4.2.2.5 *FT-IRAP Trial-Type Analysis*

If, however, as is suggested by MacLeod et al., anticipation of future positive and *not* of negative experiences are indeed functionally different constructs then this would potentially be a confound of the combined $D_{IRAP-POS}$ and $D_{IRAP-NEG}$ type analysis. Due to the nature of the IRAP construct it allows for analysis of the individual trial types and as such it was sought to explore these separately. Thus, in order to explore the FT-IRAP data further, and gain an indication of the relational responses within the groups, we calculated D_{IRAP} scores for each of the four trial-types (I expect - Positive Targets (S1T1), I expect - Negative Targets (S1T2), I don't expect - Positive Targets (S2T1), I don't expect - Negative Targets (S2T2)) and performed planned One-Sample T-tests. This analysis was employed to determine if the mean D_{IRAP} scores for the four trial types would differ significantly from zero. Figure 26 shows the differences between Depressed and Non-Depressed participants in terms of their trial-typed D_{IRAP} effects. As can be seen Figure 26 indicates that there was a difference in the implicit responses by the two groups. The Non-Depressed participants were found to show an optimistic bias, and analysis of their responses was represented in the trial-type data by a positive value, in regards to the trial type that make up the consistent block (i.e. $D_{IRAP-POS)}$ both of which were significantly different from zero (S1T1, $t(16)= 6.180$, $p <.001$, and S2T2, $t(16)= 3.532$, $p=.003$). Denial of negative expectancies were also found to be significantly different from zero, i.e. the trial types that make up the inconsistent block (i.e. $D_{IRAP-NEG}$; S1T2, $t(16) = 2.836$, $p=.012$) and S2T1, $t(16) = 3.045$, $p=.008$).

An ambiguous pattern of responses was observed for the Depressed group, with no bias found pertaining to confirmation of positive expectancies, neither of which were significantly different from zero (S1T1, $t(12)= -.450$, $p =.661$ and S2T2, $t(12)= -1.108$, $p =.289$). Nor were the trials necessitating denial of negative expectancies found to be significantly different from zero (S1T2, $t(12) = -1.509$, $p =.157$ and S2T1, $t(12) = -.980$, $p =.346$). From these results it can be taken that the expectancy patterns were not valence specific nor does there appear to be a specific pattern of responding by the sub-clinical group in regards to type of relation *per se*. However, what is observed is that the directionality of responding pertains to a lack of optimistic future outlook relative to a strong directionality towards a positive future outlook as demonstrated by the healthy group. Figure 26 depicts the two groups' responses for each of the four trial types, and as can be seen here, a clear optimistic bias is observed for the Non-Depressed group with an analogous pessimistic pattern found for the Depressed group.

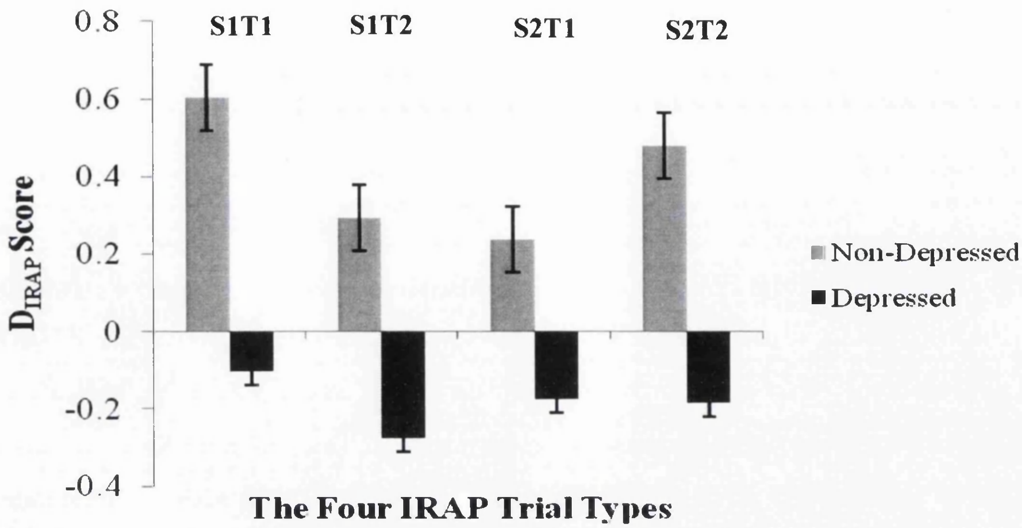


Figure 26. Mean D_{IRAP} scores (with S.E bars) for the Depressed and Non-Depressed groups across the Four FT-IRAP Trial-Types in Experiment 6. Trial Types are represented by sample and target distribution of positive (T1) and negative (T2) target words presented with the samples 'I expect' (S1) and 'I don't expect' (S2).

4.2.2.6 *Emotional Avoidance*

Of all the FT-IRAP components the AAQ-II was found to moderately correlate with the overall D_{IRAP} (r = .349, p = .059). Significant correlations were also seen for the trial type specific components, for the positive trials ($D_{IRAP\text{-}POS,}$ r = .904, p < .001) as well as the negative trials ($D_{IRAP\text{-}NEG,}$ r = .868, p < .001). That is, participants whom reported lower levels of emotional avoidance (as reflected in a higher score on the AAQ-2) were seen to be responding in line with the consistent FT-IRAP trials and as such demonstrating a greater positive future outlook.

4.2.3 Summary

The FT-IRAP data at split and combined levels of analysis all suggest that there is a distinct inverse pattern of responding between the sub-clinically Depressed and Non-Depressed groups. In relation to the first aim (1) the FT-IRAP was seen to be an adequate measure of future expectancy with clear group differences observed. By examining individual trial-type responses it was possible to discern relational patterns, such as greater expectancy of positive relative to reduced expectancy of negative future experiences, within the two groups. Depressed participants D_{IRAP} scores were close to zero, indicating that they made consistent ('I expect-positive' or 'I don't expect negative') and inconsistent (I don't expect positive' or 'I expect negative') responses with similar fluency on all four relational stimulus classes assessed by the FT-IRAP. Such ambivalence among the sub clinically depressed sample may be indicative of susceptibility to more increased levels of depression. That is, the IRAP effects are designed to measure the differential fluency of consistent versus inconsistent relational responding as a reflection of their relative frequencies in the participant's behavioural history; and so, when both consistent and inconsistent response classes are infrequent in that behavioural history, it implies that these opposing response classes will not differ in terms of their response fluency, and therefore not produce an IRAP effect. In other words, the REC model predicts that even if a depressed person is used to thinking about their personal future in an unfavourable way, so that they are biased toward "False" rather than "True" when asked whether "I expect happiness", they would nevertheless show no bias between "True" and "False" responses to the statement "I don't expect sadness", if they were not used to thinking in positive terms about their personal future (i.e. in terms of denying positive descriptors). Importantly, these findings demonstrate that the FT-IRAP is sensitive to whether a person is biased toward cognizing more about a particular sample stimulus in negative versus positive terms (e.g., "sadness" vs. "happiness"). In relation to the second aim of Experiment 6, (2) future expectancy and emotional avoidance were found to correlate, indicating that low emotional avoidance is related to increased positive future expectancies. Table 40 summarizes the main findings from Experiment 6.

Table 40. Summary of Main Aims and Findings from Experiment 6.

	Research Aim	Hypothesis	Main Findings
1	Examine implicit future thinking by use of the FT-IRAP in relation to sub-clinical depression.	*Implicit future thinking, as measured by the FT-IRAP, will differ between sub-clinically depressed individuals relative to non-depressed individuals as measured by the BDI-II.*	*The hypothesis is supported.* Group differences were found with the Non-Depressed group responses indicating greater expectancy of positive future events relative to the Depressed group (p=.001).
2	Examine implicit future expectancy (FT-IRAP) in relation to the role of emotional avoidance (AAQ-II) in future thinking.	*There will be a relationship between emotional avoidance and implicit future expectancy.*	*The hypothesis is supported.* A positive relationship between emotional avoidance and overall implicit future expectancy was found (p = .059). A positive relationship was further found for emotional avoidance and positive implicit future expectancy (p<.001) as well as negative future expectancy (p<.001).

Note. Low emotional avoidance is denoted by a high score on the AAQ-II.

4.3 Experiment 7

Experiment 6 demonstrated rather encouraging findings regarding the use of implicit methods (i.e. the FT-IRAP) in the measurement of future thinking. Although implicit measures are known to be more resistant to mood effects than explicit measures, the findings from Experiment 4 (Chapter 3) demonstrated that the Future Thinking Task at the sub clinical level is susceptible to current mood state. Given the fact that Experiment 6 also involved a sub clinical sample and an affective state (depression) it seems pertinent to test for any mood effects to ensure the measures stability. Systematically, testing the effect of current mood state will ensure that the group differences in Experiment 6 were a due to sub-clinical levels of depression and not a result of fluctuating mood. To date, no other study has looked at mood effects on the IRAP. To this end Experiment 7 has 1 main aim, (1) to examine if a positive or negative induced mood state will affect implicit cognitions as measured by the FT-IRAP effect. As it is expected that the FT-IRAP is a robust measure the predictions pertaining to the mood induction are relatively different to those in Experiment 4. That is, it is predicted that FT-IRAP responses will *not* differ between those who undertook the positive mood induction relative to those who undertook the negative mood induction

4.3.1 Method

4.3.1.1 Participants

Thirty-three adults volunteered to take part in the current experiment though following employment of the exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in section 4.3.2.1) data from three participants was removed thus only data from thirty participants was utilised in the following analysis. As such, the subsequent information pertains to the included sample of thirty young adults (19 female, 11 male) who took part in this study. The participants volunteered to take part in return of no monetary or course based credits. And the experiment took place in a small conference room in Century Wharf Apartments in Cardiff Bay. The participants age varied from 19 to 27 years with a mean of 22.33 years of age (σ = 2.20).

4.3.1.2 Apparatus and Materials

Participants were requested to complete a set of pre-experimental measures of psychological well being. These measures were the same as utilized in study 5, that is, the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Trait Anxiety Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983), the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004), the Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and the Verbal Fluency Control Task (Lezak, 1976).

Mood induction. The autobiographical recall task (Brewer, Doughtie, & Lubin, 1980) was used to induce happy or unhappy mood in the participants; the presentation and procedure utilized were the same as for Experiment 4 (see Section 3.3.1.2).

The Visual Analogue Scale (VAS; Wewers & Lowe, 1990) was presented and utilised in the same manner as described in Experiment 4 (see Section 3.3.1.2).

The Future Thinking IRAP was the same as the one presented in Experiment 4, the method and presentation remained the same for the current study, without exceptions (see Sections 4.2.1.4 and 4.2.1.5).

4.3.1.3 Experimental Overview

The current study used a 2 x 2 mixed design, with Group (Induced Mood: Positive, Negative) as the between participant variable and Valence (Implicit Future Cognitions: Positive/Negative) as the within participant variable. All participants completed all tasks and measures; the experimental sequence is depicted in Figure 27.

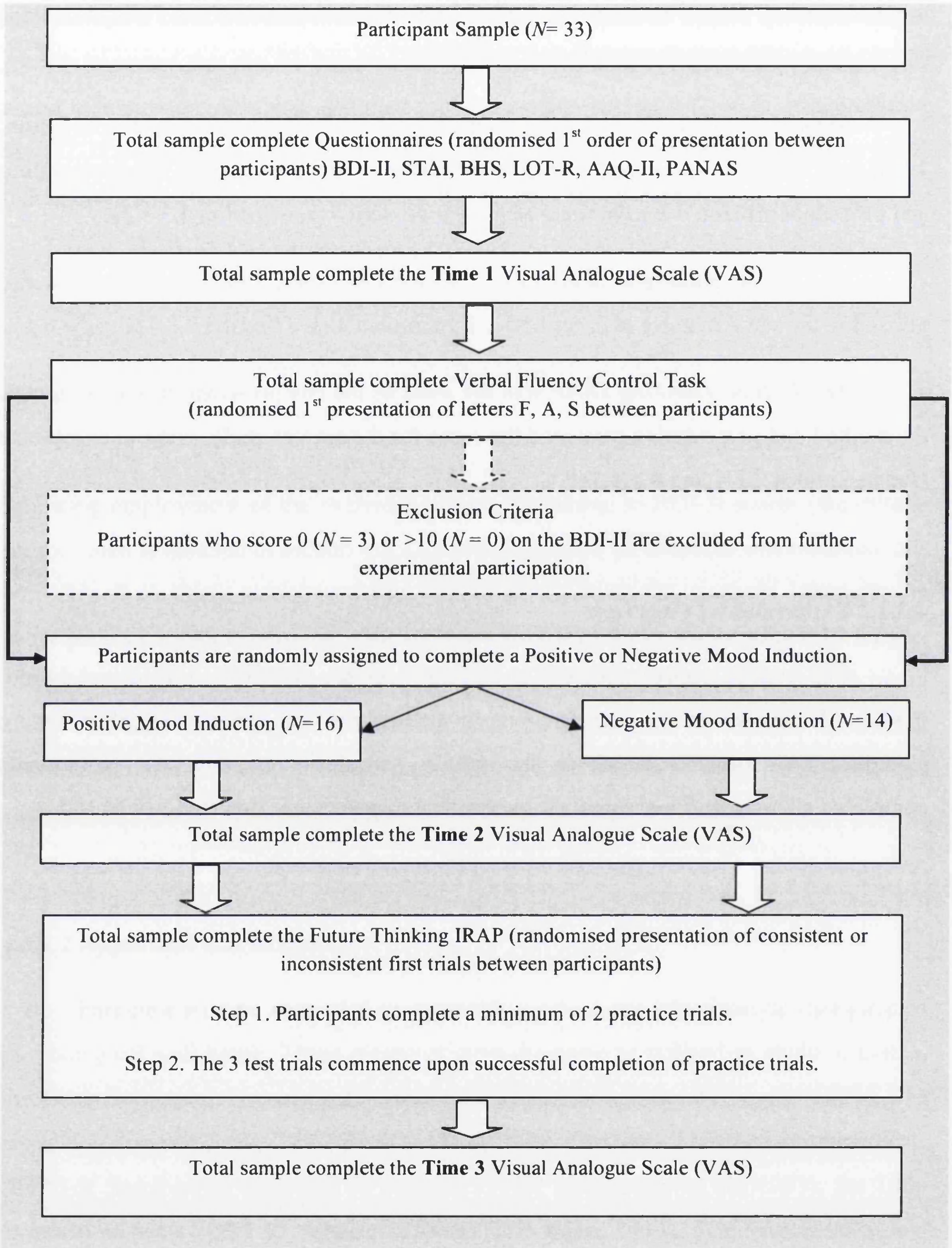


Figure 27. Overview of the Experimental Sequence for Experiment 7.

4.3.1.4 Ethical Issues

Experiment 7 was conduct according to all of the appropriate ethical guidelines as identified by the British Psychological Society (2006) and followed the measures and procedures outlined in Experiment 4 (see Section 3.3.1.4) with only minor adjustments necessary to facilitate the change in methodologies to tailor instructions to the current experiment. Emphasis was put in to assuring participants that the computer task was not a measure of how quick they were at responding but that the focus was on the responses made. This emphasis was made to deter distress related to feelings of inept computer skills. As in Experiment 4, participants were screened for depression by use of the Beck Depression Inventory (BDI-II) with the decision not to accept contribution to the experiment by anyone who reported depression levels of 10 or above as reported on the BDI-II. The experiment was approved by the Ethics Committee at Swansea University Psychology Department prior to commencement.

4.3.1.5 Procedure

Prior to commencement all participants were briefed as to the nature of the study, although omitting the expected mood influence induced by the memory task, and asked to complete a consent form. The study was identical in nature as Experiment 4, with the exception of the Future Thinking Task and the inclusion of the FT-IRAP as the main experimental task. The study commenced with participants completing the Visual Analogue Scale (VAS) to indicate how (un)happy they perceived themselves to be at the present moment. This was followed by completion of the psychometric tests and the Verbal Fluency Control Task. Following the VFCT participants BDI-II scores were examined and participants who were found to score above 10 on the BDI-II did not commence the mood induction task. As in Experiment 4, these participants were thanked for their participation and debriefed by stating that the second part of the experiment was no longer being conducted and that data from the first section was all that was required in this instance. The BDI-II scores were not revealed to, nor discussed with, the participants.

For the included participants a mood induction procedure followed the VFCT, with participants randomly assigned to a 'happy' or an 'unhappy' condition. The mood induction procedure was followed in point to that of Experiment 4 (see Section 3.3.1.3). As in Experiment 4 the participants were naïve as to the purpose of the mood induction and were informed that is was only one part of several tasks they needed to complete in this experiment. Immediately upon completion of the mood induction, participants were asked to respond to the second VAS, indicating how happy or unhappy they perceived themselves to be at that time. Participants then commenced the Future Thinking IRAP. The presentation and procedure of the FT-IRAP were equal to that of Experiment 6, without any amendments. Upon completion of the FT-IRAP participants were again asked to rate their mood on a VAS. At the end of the experiment participants were fully debriefed as to the nature of the mood induction and thanked for their participation.

4.3.2 Results and Discussion

4.3.2.1. *Exclusion Criteria and Descriptive Data*

A BDI-II cut off criteria was utilised in the current study as in Experiment 4, which was looking at mood effects on the Future Thinking Task. Therefore data from any participants with a BDI-II score of 0 ($N = 3$) or above 10 ($N = 0$) were removed prior to any statistical analysis in order to more accurately capture a sample of non-depressed participants. The included participants all reported BDI-II scores of 9 or less ($M = 5.03$).

No group differences were observed with respect to pre-induction psychometric scores. Overall, the reported findings from the psychometric measures were consistent with those of a presently healthy state of mind for each participant. The pre-experimental psychometric reports can be observed in Table 41. No mood differences where found between the two groups pre-experimentally (PA: $p=.320$; NA: $p=.489$). The two groups were not found to differ with respect to age, $t(28) = .382$, $p = .705$; nor was there a significant difference between the two groups in regards to representation of gender, $\chi 2$ $(2) = .010$, $p = .919$, or verbal fluency, $t(28) = -.536$, $p = .557$. Table 41 presents participant demographics and responses to the psychometric and well-being measures. As can be seen no significant differences were found between the two mood induction groups pertaining to any of these measures.

Table 41. Demographics and Psychometric tests, Mean scores and Standard deviations (SD) for the Positive and Negative Mood Induction groups in Experiment 7. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Positive Mood**	**Negative Mood**		
	Mean *(SD)*	Mean *(SD)*	***t*(28)**	***p***
Gender: Females **(Males)**	10**(6)**	9**(5)**		
Age	22.18 *(2.16)*	22.5 *(2.31)*	0.382	*0.705*
VFCT	14.38 *(4.89)*	14.16 *(4.36)*	-0.536	*0.557*
BDI	5.12 *(2.33)*	4.92*(2.49)*	-0.223	*0.825*
BHS	2.56 *(1.21)*	2.21*(1.05)*	-0.836	*0.410*
STAI	35.68 *(5.26)*	35.64*(6.03)*	-0.022	*0.983*
LOT-R	17.31 *(4.41)*	15.92 *(4.06)*	-0.889	*0.381*
AAQ-II	52.18 *(3.81)*	53.00 *(5.05)*	0.501	*0.620*
PA	36.62 *(6.28)*	38.64 *(4.28)*	1.012	*0.320*
NA	14.50 *(2.25)*	15.14 *(2.76)*	0.701	*0.489*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

4.3.2.2 *Mood Induction*

Mood ratings were reported on a Visual Analogue Scale at 3 separate time points, i.e. pre-experimentally (Time 1), immediately following the mood induction (Time 2) and post experimentally upon completion of the FT-IRAP (Time 3). One way Analysis of Variance (ANOVA), with mood induction as the between subjects variable and mood ratings as the dependent variable, found no group differences at Time 1, $F(1, 28)= .057$, $p=.812$. The mean mood reported at Time 1 by participants in the Positive Mood Induction group was 68.37 (σ = 12.73) (with a higher score reflecting a more positive mood) while the mean for participants in the Negative Mood Induction group was 67.07 (σ =16.99). Following the mood induction procedure a significant difference was found between groups at Time 2, $F(1, 28)=92.609$, $p<.001$, with the Negative Mood Induction group reporting low mood with a mean of 29.57 (σ =18.41) relative to increased mood scores, with a mean of 82.18 (σ =11.07), in the Positive Mood Induction group. At Time 3, this mood difference was still present ($F(1, 28) =32.773$, $p<.001$) though it was evident that the moods were reverting back to baseline levels with the positive mood group reporting a mean mood level of 70.25 (σ =9.44) and the negative mood group an increased mood level from time 2 with a mean of 53.21 (σ =6.27).

Split plot paired sample t-tests revealed within group differences for the three time periods, with significant differences in mood reported for Time 1 and 2 in both groups (Positive Mood induction, $t(15)=-7.417$, $p<.001$ Negative Mood induction, $t(13)=7.764$, $p<.001$). Significant mood differences were also found between times 2 and 3 for the group whom received a Positive Mood induction ($t(15) =4.920$, $p<.001$), as well as for the Negative Mood induction group, $t(13) =--5.828$, $p<.001$). However no mood differences were observed for Time 1 and 3 for the positive group, $t(15) =-.831$, $p=.419$); though a significant mood difference for times 1 and 3 was still present post experimentally for the negative mood induction group, $t(13) =-5.828$, $p<.001$). This implies that the mood induction procedure was successful in inducing a state mood which was apparent at the time of the experiment and approached baseline mood states post-experimentally. Specifically, the negative mood induction procedure resulted in significantly more negative ratings of mood compared with pre-mood induction ratings and the positive mood induction resulted in significantly more positive mood rating being made, the mood ratings are presented in figure below. Figure 28 depicts the effects of the positive and negative mood induction. T1 indicates mean pre-experimental mood rating. T2 indicates mean mood ratings made immediately following being exposed to the mood induction procedure. T3 indicates the mean mood ratings given at the end of the experiment.

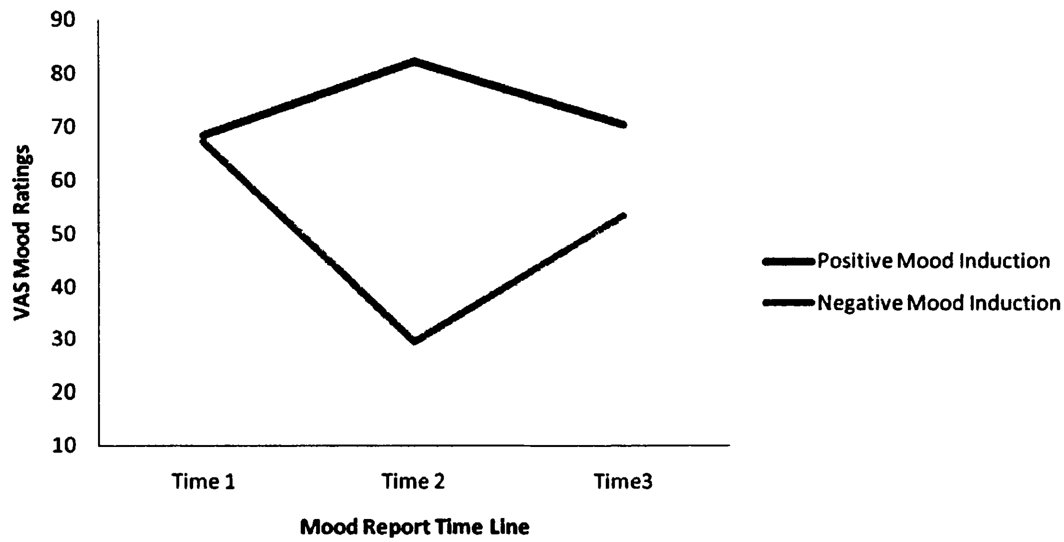


Figure 28. Mean Mood Ratings for participants completing the FT-IRAP in Experiment 7. T1 indicates Pre-Experimental Mood. T2 indicates Mood Rating Immediately Following the Mood Induction procedure. T3 indicates Post-Experimental Mood Ratings.

4.3.2.3 *IRAP D_{IRAP}-algorithm*

The response latency data from the IRAP is presented as the time in milliseconds from the onset of a trial to the participant's first response for that trial. The response latency data for each participant were transformed into D_{IRAP} scores as in Experiment 6, using the $D_{IRAP\text{-}algorithm}$, derived from the $D_{algorithm}$ developed by Greenwald, Nosek, and

Banaji (2003) for the IAT. The steps involved in calculating the D_{IRAP} scores were denoted in Experiment 6 (see Section 4.2.2.2) and were followed without exception in the current study. As before, the latency data from the IRAP was transformed into the D_{IRAP} measure (Dawson et al., 2008). The larger the D_{IRAP} score the greater difference in response latencies between the consistent and inconsistent trials. Positive D_{IRAP} scores denote responding in accordance with the pre-experimentally defined biases (i.e., within the current study, with the future expectancies as concordant to positive relative to negative future experiences and negative scores indicate the opposite (i.e., future expectancies as concurring to negative relative to positive experiences). A zero score indicates that the participant was unable to discriminate between positive and negative future events (i.e. the responses showed no difference in relation to subjective expectations of either positive or negative experiences).

4.3.2.4 D_{IRAP} *Analysis*

The D_{IRAP} scores for both mood induction groups were found to be concordant with expectancies of positive relative to negative future experiences and significantly different from zero in a positive direction (Positive mood, $t(15)= 5.168, p<.001$; Negative mood, $t(13)= 5.409, p<.001$).

Between group comparisons were made with a one-way ANOVA on the overall D_{IRAP} scores, revealing no significant difference between groups in their responses to the FT-IRAP trials following a mood induced state, $F(1,28)= 1.585, p=.125$. Though, as can be seen from Figure 29, there appeared to be some difference in the level of responding, with the Negative mood group showing somewhat stronger positive future relations.

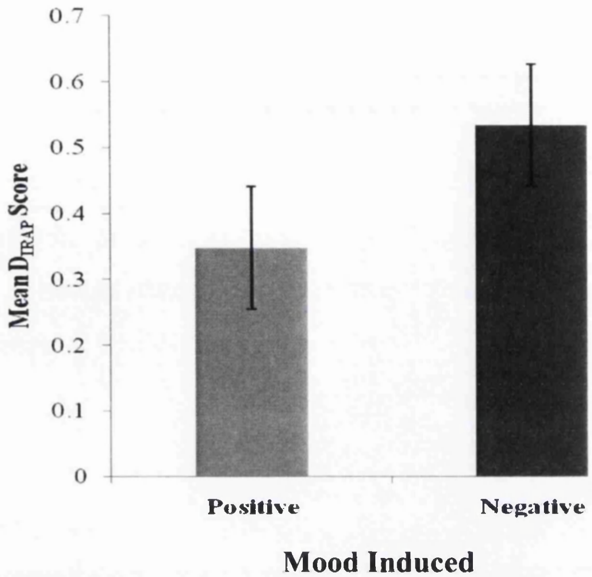


Figure 29. Mean D_{IRAP} scores with Standard Error Bars (S.E) for the Positive and the Negative Mood Induction groups in Experiment 7.

4.3.2.5 *Participant-type analyses*

Composite positive and negative D_{IRAP} scores were calculated for the four trial-types, with a positive marker indicative of the two trial-types confirming positive future and denying negative future relations (i.e. consistent trials; $D_{IRAP-POS}$) and respectively, a negative marker combining the two trial-types analogous to the confirmation of negative future and denial of positive relations (i.e. inconsistent trials; $D_{IRAP-NEG}$). The mean $D_{IRAP-POS}$ and $D_{IRAP-NEG}$ scores calculated for both groups of participants are presented in Figure 30. The data show the mean FT-IRAP effect for the positive mood induction group ($D_{IRAP-POS}$ = .409, σ =.301 $D_{IRAP-NEG}$ = .289, σ =.334) to be similar on both means relative to the negative mood induction group ($D_{IRAP-POS}$ = -.603, σ =.354; $D_{IRAP-NEG}$ = .471, σ =.428). In short, the descriptive FT-IRAP data indicate that the two groups convey similar levels of positive future expectations. A 2 (Mood Induced: Positive & Negative) x 2 (Valence: Positive & Negative) mixed model ANOVA found a significant main effect for Valence ($F(1, 28)=5.141$, $p=.031$, ηp^2 =.152) with overall participant responses relating to greater expectations of positive future experiences. No interaction effect was found for Valence and Group ($F(1, 28) = .013$, $p = .911$, $\eta p^2 < .0001$), nor a main effect for Group ($F(1, 28) = 2.536$, $p = .122$, $\eta p^2 = .083$). These results suggest that mood did not influence the FT-IRAP effect. That is, the responses by the two mood groups similarly represented expectancy of positive future experiences relative to negative experiences; this is in line with the predicted responses by a healthy sample of participants. However it is notable that the Negative Mood group demonstrated increased response latencies on all trials relative to the Positive Mood group.

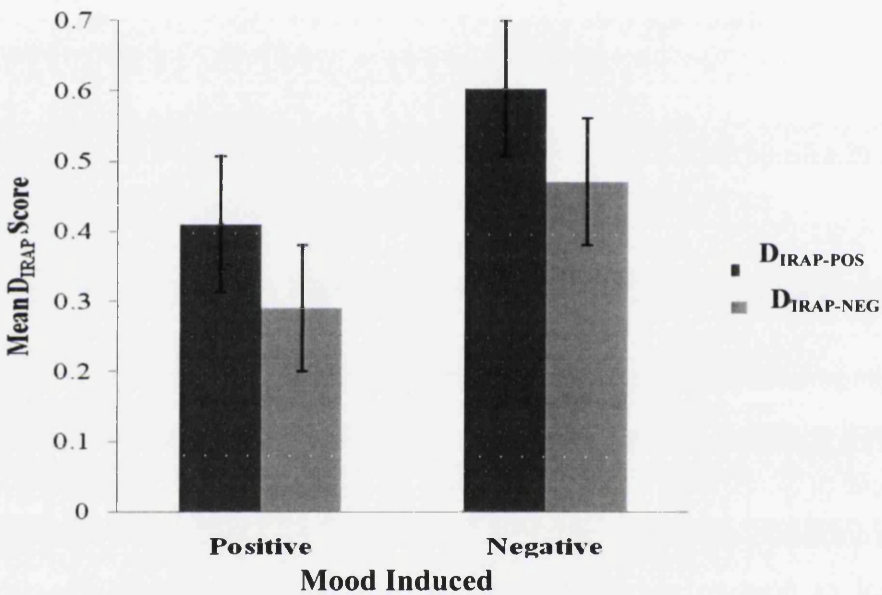


Figure 30. Mean Positive and Negative D_{IRAP} scores with Standard Error Bars (S.E) for the Positive and Negative Mood Induction groups in Experiment 7.

4.3.2.6 *Emotional Avoidance*

None of the FT-IRAP components were found to correlate with the AAQ-2 for either group.

4.3.3 Summary

In relation to the main aim of Experiment 7, (1) the analyses reveal that mood did not have a significant effect on the FT-IRAP performance as the FT-IRAP effect remained stable across the two groups. Regardless of mood condition, all participants completing the FT-IRAP confirmed expectancies of positive future experiences and denied negative future expectancies. Response latencies were significantly faster across trials that were consistent with participants' attitudes compared with trials that were inconsistent, demonstrating the expected FT-IRAP effect. Slightly inflated response times were found by the negative mood induction group and this may pertain to findings from the mood literature, where it has been noted that negative mood likely leads to an increased focus and promotes more realistic and weighed decisions (Schwarz, 1990). In light of the participant population being healthy individuals, with no known history of depression, it may be inferred that the negative mood induction lead to such a more analytical and focused strategy in attempting the task, thus these participant may have been paying more attention to instructions, stimuli and procedural information, with the increased response time as an outcome of such raised awareness. Thus unlike the FTT the FT-IRAP appears to be resistant to the influences of current mood states. The focus on measuring expectancies again appears more resistant to such fluctuating mood relative to assessments of fluency for future cognition. The main findings from Experiment 7 are depicted in Table 42. In order to further explore the FT-IRAP effect it would be advantageous to look at the specificity in its division by simulation of depressed mood as was seen in Experiment 5 with the FTT. Therefore Experiment 8 will look the FT-IRAP response pattern as presented by participants influenced by a Learned Helplessness paradigm.

Table 42. Summary of Main Aims and Findings from Experiment 7.

	Research Aim	Hypothesis	Main Findings
1	Examine mood influences of implicit future-oriented cognitions and sensitivity of the FT-IRAP.	*FT-IRAP responses will not differ between those who undertook the positive mood induction relative to those who undertook the negative mood induction.*	*The hypothesis is supported.* No significant difference was found between groups in their responses to the FT-IRAP trials following a mood induced state. *However, it is notable that the Negative Mood group demonstrated increased response latencies on all trials relative to the Positive Mood group.*

4.4 Experiment 8

In line with Experiment 5, in Chapter 3, the experimental method of inducing a depressed-like state of Learned Helplessness via an unsolvable task was employed in order to determine whether this induction of a depressed state (i.e., learned helplessness procedure) would impact on participants responding on the FT-IRAP. The Learned helplessness paradigm was seen to offer the induction of an analogous depressed state, relative to a mere mood state, in Experiment 5. To this end Experiment 8 has one main aim (1) to examine the effect of an induced analogue depressed mood, by use of a learned helplessness task (Solvable vs. Unsolvable Tasks), on implicit future oriented cognitions as measured by the FT-IRAP. It is predicted implicit future cognitions, as measured by the FT-IRAP responses, will differ for those who completed the Solvable Task relative to those who completed the Unsolvable Task due to the nature of the FT-IRAP's sensitivity in recognizing depressive response patterns.

4.4.1 Method

4.4.1.1 Participants

Forty-one adults volunteered to take part in the current experiment although following the exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in section 4.4.2.1) data from one participant was removed, thus data from forty participants was utilised in the following analysis. As such, the subsequent information pertains to the included sample of 26 females and 14 males who were all undergraduate students at Swansea University and who agreed to take part in return for course credits. The participant ages ranged from 18 to 26 years of age ($M = 20.92$, $\sigma = 1.99$). The study was approved by the Psychology Department Ethics Committee at Swansea University.

4.4.1.2 Apparatus and Materials

Participants were requested to complete a set of pre-experimental measures of psychological well being. These measures were the same as utilized in study 4, that is, the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Trait Anxiety Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983), the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004), The Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and the Verbal Fluency Control Task (Lezak, 1976). Participants further completed the learned helplessness and maze task as in Experiment 5. The main measure was the FT-IRAP.

The Learned Helplessness Task (Maldonado, Martos, & Ramirez, 1991) the task was presented as detailed in Experiment 5 (see Section 3.4.1.2).

The Maze Task was utilized in the same manner as detailed in Experiment 5 (see Section 3.4.1.2).

The FT-IRAP was identical in presentation and procedural manner as reported in Experiments 6 and 7 (see Sections 4.2.1.4 and 4.2.1.5 for complete details and instructions of the FT-IRAP).

4.4.1.3 Experimental Overview

The current study used a 2 x 2 mixed design, with Group (Solvable Task, Unsolvable Task) as the between participant variable and Valence (Implicit Future Cognitions: Positive/Negative) as the within participant variable. All participants completed all tasks and measures; the experimental sequence is depicted in Figure 31.

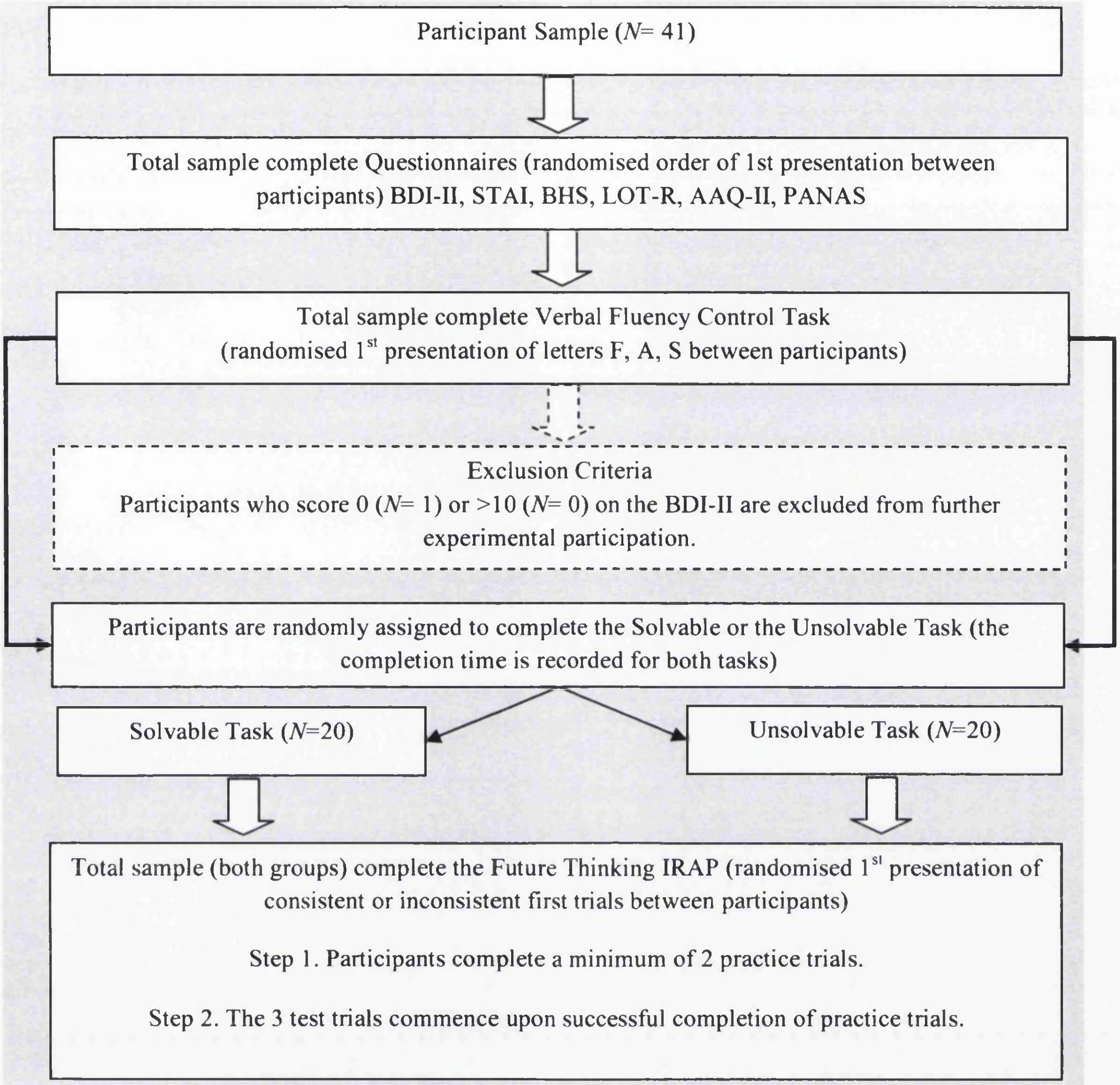


Figure 31. Overview of the Experimental Sequence for Experiment 8.

4.4.1.4 Ethical Issues

Experiment 8 was conduct according to all of the appropriate ethical guidelines as identified by the British Psychological Society (2006) and followed the measures and procedures outlined in Experiment 5 (see Section 3.4.1.4) with only minor adjustments necessary to facilitate the change in methodologies to tailor instructions to the current experiment. Emphasis was put in to assuring participants that the computer task was not a measure of how quick they were at responding but that the focus was on the responses made. This emphasis was made to deter distress related to feelings of inept computer skills. As in Experiment 5, participants were screened for depression by use of the Beck Depression Inventory (BDI-II) with the decision not to include anyone who reported depression levels of 10 or above as reported on the BDI-II. The experiment was approved by the Ethics Committee at Swansea University Psychology Department prior to commencement.

4.4.1.5 Procedure

Prior to commencement of the experiment participants were provided with information about the sequence and details of the tasks and presented the opportunity to discuss any questions that they may have. Upon completion of a consent form participants were asked to complete the set of psychometric measures and subsequently the Verbal Fluency Control Task. Following the VFCT participants BDI-II scores were examined and participants who were found to score above 10 on the BDI-II did not commence the mood induction task. These participants were thanked for their participation and debriefed by stating that the second part of the experiment was no longer being conducted and that data from the first section was all that was required in this instance. The BDI-II scores were not revealed to, nor discussed with the participants.

The included participants were subsequently randomly allocated to complete either the solvable or unsolvable version of the Maldonado computer based learned helplessness tasks, followed by completion of the maze task. The procedure and instruction for these tasks were as described in Experiment 5, without any adjustments made (see Section 3.4.1.3). Participants subsequently completed the FT-IRAP task; this commenced and proceeded as described in Experiment 6 (see Section 4.2.1.5 for full instructions on the IRAP procedure). Upon completion of all tasks participants were suitably debriefed as to the nature and intentions of the task. Particular care was taken in debriefing participants who were assigned to the unsolvable task, with reassurance that the task was in fact not a measure of intelligence rather the task had the concealed purpose of inducing a temporary mood state. All participants were thanked for partaking in the study.

4.4.2 Results and Discussion

4.4.2.1. *Group Allocation*

As in Experiment 7, when looking at mood effects, data from any participants with a BDI-II score of 0 (*N*= 1) or above 10 (*N*= 0) were removed in order to more accurately capture a sample of non-depressed participants (BDI-II: $M = 4.60$). No group differences were observed with respect to pre-induction psychometric scores. Overall reported findings from the psychometric measures were consistent with those of a presently healthy state of mind for each participant. The participant demographics and pre-experimental psychometric reports can be observed in Table 43 below. No mood differences where found between the two groups pre-experimentally (PA: $p=.129$; NA: $p=.138$). The two groups did not differ with respect to age, $t(38) = 1.033$, $p=.308$; nor was there a significant difference between the two groups in regards to representation of gender, $\chi 2\ (1) = .440$, $p=.507$.

Table 43. Demographics and Psychometric test Mean scores and Standard Deviations (SD) as reported by the Solvable and Unsolvable Task groups in Experiment 8. T-Test score and statistical value (*p)* from between group comparisons are presented.

Variable	**Solvable Task**	**Unsolvable Task**		
	Mean *(SD)*	Mean *(SD)*	***t*(38)**	***p***
Gender: Females **(Males)**	12**(8)**	14**(6)**		
Age	21.25 *(1.88)*	20.60 *(2.08)*	1.033	*0.308*
VFCT	13.28 *(4.19)*	12.16 *(4.26)*	-0.356	*0.577*
BDI	5.25 *(2.29)*	3.95*(2.81)*	1.601	*0.118*
BHS	2.50*(1.14)*	2.15*(1.04)*	1.011	*0.318*
STAI	28.45 *(10.05)*	24.55*(5.63)*	-1.514	*0.138*
LOT-R	15.30 *(3.35)*	15.20 *(4.12)*	0.084	*0.933*
AAQ-II	53.35 *(6.89)*	55.05 *(9.62)*	-0.642	*0.525*
PA	31.55 *(5.53)*	33.75 *(5.26)*	-1.552	*0.129*
NA	13.55 *(4.52)*	12.00 *(5.05)*	1.514	*0.138*

Note. BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

4.4.2.2 *Maze Task measure of Learned Helplessness Induction*

The amount of time taken to complete the maze task was recorded and is presented in Figure 32. As can be seen from Figure 32 the Solvable Task group took less time (M = 44.15 seconds) to complete the maze relative to those in the Unsolvable Task group (M = 48.65 seconds). This was further confirmed by statistical analysis by way of a One way ANOVA, F (1, 38) = 6.333, p = 0.016. These results can be taken to suggest that the differences displayed in maze completion were experienced due to successful induction of a learned helplessness state.

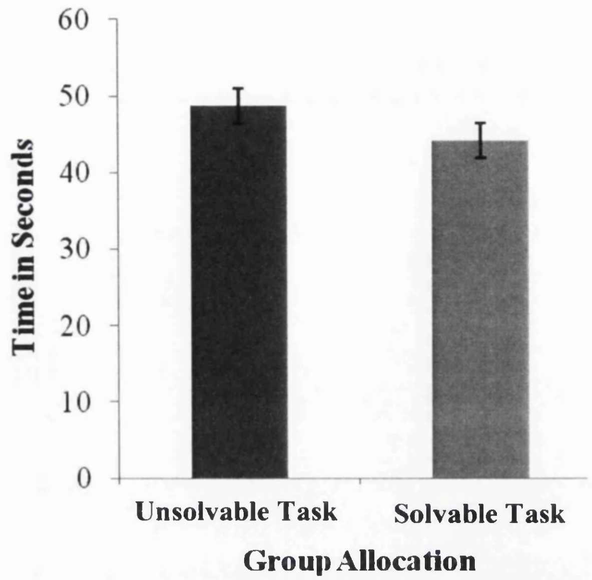


Figure 32. The time (in seconds) taken by each task group to complete the maze in Experiment 8. Error Bars show Mean Standard Error.

4.4.2.3. D_{IRAP}-*algorithm*

The response latency data for each participant were transformed into D_{IRAP} scores using the $D_{IRAP\text{-}Algorithm}$, derived from the $D_{Algorithm}$ developed by Greenwald, Nosek, and Banaji (2003). The steps involved in calculating the D_{IRAP} scores were those denoted by Barnes-Holmes et al. (2010), and as followed in Experiments 6 and 7 (see Section 4.2.2.2 for information on the D-score algorithm).

4.4.2.4 D_{IRAP} *Analysis*

One sample T-tests were used to determine if the D_{IRAP} scores were significantly different from zero in a positive direction (and concordant with expectancies of positive relative to negative future experiences). Both groups displayed responses relating to a positive future outlook (Solvable Task Group, $t(19) = 4.532$, $p<.001$; Unsolvable Task Group, $t(19) = 2.927$, $p = .009$). Between group comparisons were made by use of an

One-Way ANOVA with the D_{IRAP} data, revealing no significant difference between groups in their responses to the FT-IRAP following the Maldonado task completion, $F(1,38)=2.247$, $p=.142$. Though, as can be seen from Figure 33 there appeared to be a diverging trend pertaining to the level of responding between groups, with the Solvable Task group showing somewhat faster responses to positive future relations.

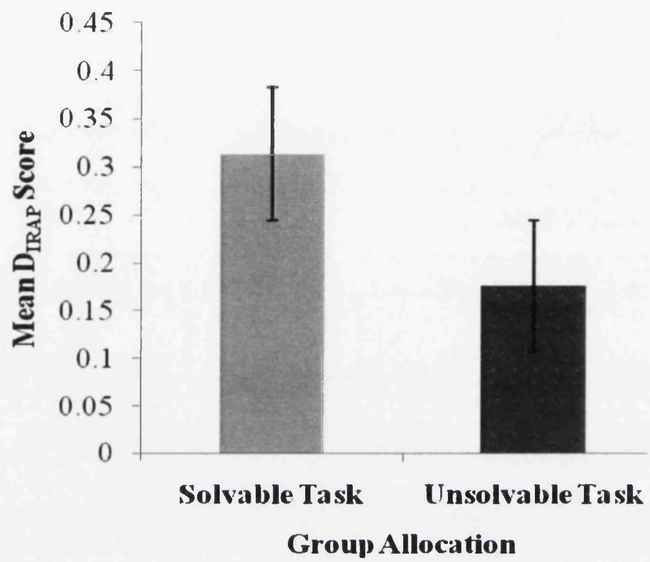


Figure 33. Mean D_{IRAP} scores with Standard Error Bars (S.E) for the for the Solvable and Unsolvable Task groups in Experiment 8.

4.4.2.5 *Participant-Type Analyses*

Composite positive and negative D_{IRAP} scores were calculated for the four trial-types. The $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ scores calculated for both groups of participants are presented in Figure 34. The FT-IRAP effect is apparent for the Solvable Task group ($D_{IRAP\text{-}POS} = .353$, $\sigma = .407$; $D_{IRAP\text{-}NEG} = .273$, $\sigma = .324$) and the effect can similarly be seen for the Unsolvable Task group in regards to the trials pertaining to an optimistic future outlook ($D_{IRAP\text{-}POS} = .293$, $\sigma_{DIRAP\text{-}POS} = .269$), however, the two groups were found to diverge in their responses to the inconsistent trial types ($D_{IRAP\text{-}NEG} = .061$, $\sigma = .355$); A paired samples t-test found this difference between the two groups to be moderately significant, $t(38)=1.967$, $p=.056$. No significant between group difference was observed for the consistent trial type responses ($D_{IRAP\text{-}POS}$, $t(38)=.576$, $p=.568$). One sample T-tests further found that the $D_{IRAP\text{-}NEG}$ score for the Unsolvable Task group was not significantly different from zero ($t(19)=.772$, $p=.450$), thus participants in this group displayed ambiguous responses in regards to future expectancy of negative events. That is their responses neither strongly deny nor confirm such expectancies. As such, this ambiguity, relative to the Unsolvable task group responses, is indicative of a learned helplessness induction effect.

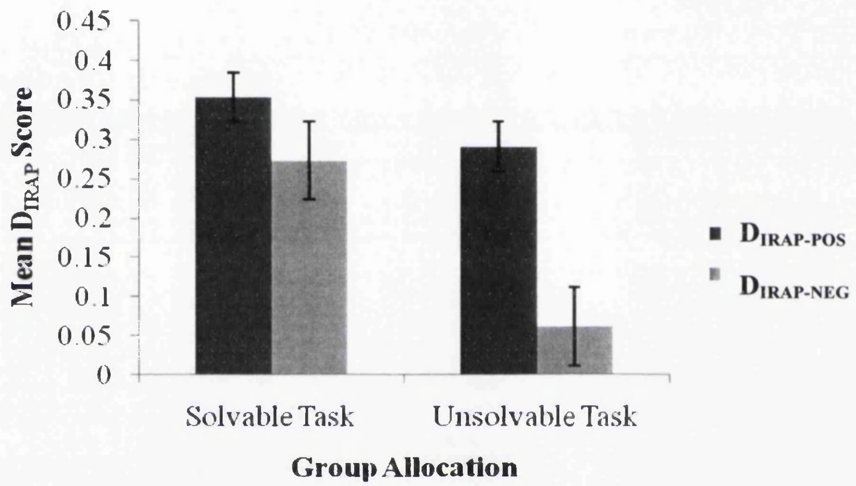


Figure 34. Mean Positive and Negative D_{IRAP} scores with Standard Error Bars (S.E) for the Solvable and Unsolvable Task groups in Experiment 8.

4.4.2.6 *Emotional Avoidance*

Similarly to Experiment 7, none of the FT-IRAP variables were found to correlate with the AAQ-2.

4.4.3 Summary

In relation to the main aim of Experiment 8 (1) the depressed mood induction was seen to affect the FT-IRAP performance. Within the Unsolvable Task group it was seen that response latencies were reduced across trials that were inconsistent with a positive future outlook. The main findings from Experiment 8 are noted in Table 44, and these findings are further discussed in conjunction with findings from Experiments 6 and 7 below.

Table 44. Summary of Main Aims and Findings from Experiment 8.

	Research Aim	Hypothesis	Main Findings
1	Examine the effect of induced analogue depressed mood, by use of a learned helplessness task (Solvable vs. Unsolvable Tasks), on implicit future oriented cognitions and sensitivity of the FT-IRAP.	*Implicit future cognitions, as measured by the FT-IRAP responses, will differ for those who completed the Solvable Task relative to those who completed the Unsolvable Task.*	*The hypothesis is not supported.* No significant difference was found between groups in their responses to the FT-IRAP following completion of the Solvable or Unsolvable Task.

4.5 General Discussion

Chapter 4 sought to address the limitations of self-report measures in future thinking by developing an implicit measure targeting positive and negative future expectancies. To this end, an implicit measure was designed and tested in order to determine whether it might be a useful procedure to implicitly measure future thinking and to provide further empirical support to the postulate that a lack of positive future expectancies is a characteristic of depression. Three separate experiments sought to validate the efficacy of the FT-IRAP as an implicit measure of future expectancy for use in a sub-clinical population; In Experiment 6 the main aim (1) was to examine the specificity of the FT-IRAP effect in a sub-clinical population. Experiment 7 aimed to (2) assess the reliability of the FT-IRAP in accounting for depressive ideation relative to mere fleeting mood states. And Experiment 8 employed a learned helplessness paradigm in order to (3) systematically examine the FT-IRAP effect.

To this end it was found that (1) the FT-IRAP, in Experiment 6, as an implicit measure, proved to be sensitive to sub-clinical depression. That is, the Non-Depressed group demonstrated strong expectancy of positive future experiences, by faster reaction times and greater accuracy on the consistent trials. Conversely, the Depressed group was found to generate faster response times and greater accuracy scores on the inconsistent trials, thus the positive directionality of expectancies was inversed, with stronger expectancies of negative future experiences. (2) Experiment 7 found the task to be resistant to fluctuating positive or negative mood states. Although (3) Experiment 8 found that an analogue of depressed mood influenced the FT-IRAP effect pertaining to an increased pessimistic future outlook yet not a deflated optimistic outlook. The results from Experiment 8 imply a characteristic response in relation to depressed mood as pertaining to an increased pessimistic, and thus hopeless, future ideation. This implication is in line with previous research with clinical samples on implicit hopelessness, for instance, Friedman et al. (2001) observed an implicit hopelessness bias in their sample of currently depressed individuals. Similarly, induced negative mood has previously been noted to raise levels of explicit hopelessness and implicit depression in healthy controls (e.g. Hepburn, Barnhofer & Williams, 2006). Although the findings overall are in line with both research from the future thinking literature and recent attempts to address hopelessness implicitly, importantly, the findings from Experiment 8 extend on previous research by Meites et al. (2008) who attempted to gain an implicit measure of hopelessness with their 'hopelessness IAT'. That is, Meites et al. similarly made use of a learned helplessness induction, however found an optimistic future outlook to be retained within the sample. However, in contrast to Meites et al., who were limited by their use of the IAT, it was seen here that, despite the retained optimistic outlook overall by the Unsolvable Task group, differences *were evident* when the individual trial types were examined, in regards to the FT-IRAP being able to discriminate the directionality of the pessimistic future outlook.

The learned helplessness effect observed may serve to demonstrate the activation and progression of negatively framed relations pertaining to the link between attitudes and behaviour, or in this instance, a lack of positive reinforcement for behaviour and subsequent hopeless beliefs. The learned helplessness effect did not reduce the optimistic outlook held by participants; rather the effect emerged in terms of increased pessimism. Thus, the responses were not similar to that of the sub-clinically depressed population from Experiment 6, who demonstrated reduced optimism about future events. Due to the nature of the task the FTT (Experiment 5) was not able to detect this discrete increase in pessimistic future outlook, and as such the FT-IRAP is able to offer further insight in to the relational networks inherent in depressive future cognition.

Although in the learned helplessness paradigm reduced optimism was not observed, the increased pessimistic future outlook implies a shift in cognitions which may be indicative of how a lack of positive reinforcement demonstrates the initiation of a depressive thought pattern, which as such may firstly manifest itself in negativity about future experiences, whereas prolonged instances of such feedback will affect and reduce optimistic future outlook. This is consistent with the suggestion that people are inherently optimistic (e.g. Sedikides & Gregg, 2008; Robinson & Ryff, 1999; Taylor & Brown, 1988), thus future optimism may be more resistant to change than pessimism. According to MacLeod and colleagues (e.g. MacLeod et al., 1996, 1997; O'Connor et al., 2008) reduced positive anticipation is a vital feature of hopelessness in depression and a characteristic of suicidal ideation. These researchers have suggested that it may be the co-morbidity of anxiety and depression that reflects this process of negative anticipation (i.e. an increased pessimistic future outlook) as a result of the accumulating lack of positive reinforcement necessary to maintain an optimistic future outlook.

The advantage of the FT-IRAP over the FTT extends beyond its implicit nature. That is, with the FT-IRAP it is possible to discriminate the directionality of the participants' future expectancies. in the FTT participants are requested to report expectancy of positive and negative events and as such obtain a measure of how strong the belief is in what an individual thinks may occur is. However, the FT-IRAP offers a measure of the strength of belief in events *not* occurring. That is, the FTT is firstly reliant on participants reporting subjective positive and negative events for evaluation, secondly it is inferred that the likelihood of these events occurring can be evaluated on an expectancy continuum. The FT-IRAP targets these relations more directly by participants responding to events as expected or not, thus the forced evaluation is more likely to target pre-established relations relative to more elaborative responses as seen on the FTT, which often results in a 'sitting-on-the-fence' evaluation equivalent to the response of 'neither expect nor don't expect' the event to occur. As such the FT-IRAP may be more precise as it targets the depressive *certainty* which has been denoted in the literature as an essential feature in developing hopeless ideation (e.g. Andersen, 1990; Andersen, Spielman, & Bargh, 1992). Although no mediating effect was observed for emotional avoidance and future thinking in relation to depression levels *per se,* it was found that low emotional avoidance was related to positive future expectancy.

The data obtained from the current study have a number of implications for those involved in the assessment, treatment and management of depression. While technologies such as the IRAP are relatively new, the data presented herein suggests that there may be potential in developing these methodologies for use in the clinical domain. If the IRAP provides a valid measure of implicit beliefs, future research may be conducted to determine whether a relationship exists between implicit beliefs and subsequent behaviour. This research would allow for the relationship between implicit future expectancies and depression to be explored, with the aim of developing more effective remediation programmes that attempt to target future expectancies directly.

In Chapter 3 it was demonstrated that on the FTT (self-report measure) participants were not openly reporting negative future events, they only generated fewer positive expectations, whereas in Chapter 4 on the implicit measure a similar sample reported a relation between the self and negative future events, as demonstrated by faster reaction times on tasks that involved pairing future expectancy with negative events. Specifically, in Chapter 3 participants in the Depression group chose *not to* report negative events they may have thought of while also finding it difficult to produce genuine positive events they looked forward to. Thus, the participants in Chapter 3 may have decided not to disclose all their thoughts of negative events as they may have been anticipating negative reactions. Subsequently, when they attempted to generate more positive expectancies they were unable to, due to the interference of the negative thoughts present. This interpretation of events is applicable when looking at results on the IRAP – where a similar group expressed a strong relation to negative future expectancies. This serves as a potential example of how participants avoid truthfully reporting beliefs and attitudes on explicit measures. One important route of future study is to compare the FT-IRAP and the FTT directly and at the level of prediction of category membership in order to determine the relative utility of each.

Chapter 5

Comparing Explicit and Implicit Measures of Future and Past Thinking

5.1 General Introduction

Chapters 2, 3 and 4 of the thesis tested both explicit and implicit measures of future and past thinking. In the current chapter the explicit future (i.e., the Future Thinking Task; FTT) and past (i.e., Autobiographical Memory Task; AMT) measures are directly compared with the implicit (FT-IRAP) measure across a sub clinical sample of depressed and healthy control undergraduate students. To this end, Experiments 9 and 10 aimed to compare within subjects the compatibility of the FT-IRAP with, the FTT and the AMT, respectively, in detection of levels of depression and hopelessness.

5.2 Experiment 9

Experiment 9 aims to compare the Future Thinking Task (FTT; MacLeod et al. 1998), with an IRAP task designed specifically to measure expectancies of future positive and negative experiences (FT-IRAP) across a sub clinical sample of depressed and healthy control undergraduate students. In line with previous research on the Future Thinking Task relating to clinically depressed participants, Experiment 9 will investigate if sub clinically depressed participants (i.e. high scorers on the Beck Depression Inventory; BDI-II) will similarly be found to indicate lower levels of future positive thinking on the FTT, as opposed to their healthy counterparts (i.e. low scorers on the BDI-II). Experiment 9 further aims to establish whether the sub-clinical groups' responses will be faster on the FT-IRAP trials that require a response pairing negative future events as expected and positive future events as not expected and if the implicit measure will be a better marker of depression/hopelessness in a sub clinically depressed population. To this end Experiment 9 has two specific aims (1) to investigate if the FT-IRAP and the FTT will be comparably sensitive and specific in the detection of sub clinical depression as measured by the BDI-II; and (2) if the FT-IRAP and the FTT will be equally sensitive and specific in the detection of hopelessness ideation as measured by the Beck Hopelessness Scale. It is predicted that implicit future cognitions, as measured by the FT-IRAP, will be more sensitive in detection of depression and hopelessness ideation, relative to future thinking as measured by the FTT. To our knowledge, and at the time of writing, no other studies have directly compares the FTT with an implicit future thinking measure.

5.2.1 Method

5.2.1.1 Participants

Eighty-four adults from Swansea University volunteered to take part in the current experiment, though after employing the exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in section 5.2.2.1) data from thirteen participants was removed, thus only data from seventy-one participants was utilised in the following analysis. As such, the subsequent information pertains to the included 18 males and 53 females ranging in age from 18 to 34 years old ($M = 21.14$, $\sigma = 3.36$).

5.2.1.2 Apparatus and Materials

Participants completed a series of self-report questionnaires assessing psychological health. This was the same set of assessments utilized throughout the previous chapters, (see Section 2.2.1.2 for details pertaining to each measure)i.e. the Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer & Brown, 1996); The Beck Hopelessness Scale (BHS; Beck & Steer, 1988); The State Anxiety Inventory (STAI-S; Spielberger, Gorsuch, & Lushene,1970; Spielberger et al., 1983); The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988); The Life Orientation Test – Revised (LOT-R; Scheier, Carver, & Bridges, 1994); The Acceptance and Action Questionnaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004) and the Verbal Fluency Control Task (Lezak, 1976).

The two main measures utilized were the FTT and the FT-IRAP. The measures have both been previously described and were utilized to the same format and method within the current study.

The Future Thinking Task (FTT; MacLeod et al. 1993; 1997) presentation and procedure was identical to that of Experiment 3 (see Section 3.2.1.2)

The Future Thinking-Implicit Relational Assessment Procedure presentation and procedural settings were identical to that of Experiment 6 (see Section 4.2.1.4).

5.2.1.3 Experimental Overview

The current study was of mixed-between-within participant design and each participant completed all experimental phases in the same order. Figure 35 depicts the experimental sequence for Experiment 9.

5.2.1.4 Ethical Issues

In order to conduct the study according to all of the appropriate ethical guidelines as identified by the British Psychological Society (2006), a number of specific measures were put in place. These were consistent with those outlined previously for Experiment 3 and Experiment 6 with measures and procedural details adopted from Experiment 1a specifically (see Section 2.2.1.4). Only minor adjustments were necessary to facilitate the change in methodologies to tailor instructions to the current experiment. As in Experiment 6, emphasis was put into assuring participants that the computer task was not a measure of how quick they were at responding but that the focus was on the responses made. This emphasis was made to deter distress related to feelings of inept computer skills. Due to the nature of the study with participants completing 2 subsequent tasks participants were encouraged to take a break between tasks. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the future events generated. The experiment was approved by the Psychology Department Ethics Committee at Swansea University prior to commencement of the study.

Participant Sample (N= 84)

Total sample complete the Future Thinking IRAP (randomised presentation of consistent or inconsistent first trials between participants)

Step 1. Participants complete a minimum of 2 practice trials.

Step 2. The 3 test trials commence upon successful completion of practice trials.

Total sample complete Verbal Fluency Control Task
(randomised 1st presentation of letters F, A, S between participants)

Total sample complete the Future Thinking Task (randomised 1st presentation of positive or negative future events between participants)

Step 1: Generation of Positive/Negative future events for next week/next year/next 5-10years

Step 2: Likelihood rating of Positive/Negative future event occurrence.

Step 3: Feeling rating of Positive/Negative future event upon occurrence.

Total sample complete Questionnaires (randomised order of 1st presentation between participants) BDI-II, STAI, BHS, LOT-R, AAQ-II, PANAS

Post-Experimental/Pre-Analysis BDI-II Group Split (see Section 5.2.2.1):

Low BDI-II score (1<10): N= 38 (BDI-II = 0, excluded from analysis, N = 10)

High BDI-II score (10<30): N= 33 (BDI-II score >29, excluded from analysis, N = 3)

Final sample for analysis: N = 71

Figure 35. Overview of the Experimental Sequence for Experiment 9.

5.2.1.5 Procedure

The experiment took place in a controlled environment, in the form of a standard research lab provided with a table, chair and portable computer. Prior to commencement the participants were informed about the tasks and invited to ask any questions before completing a consent form. The study commenced with the FT-IRAP directly followed by the Verbal Fluency Control Task and FTT, and lastly participants were requested to respond to the set of psychometric self-report measures. The procedures followed for these methods were as directed in previous chapters and adhered to the process described therein. The questionnaires were presented in a randomised order. Participants were offered breaks in between tasks although were found to generally opt out of this opportunity. Each task was explained prior to commencement, and questions were invited at any time. On completion of all tests, participants were thanked and verbally debriefed with reference to a written debriefing sheet provided for the participant to retain.

5.2.2 Results and Discussion

5.2.2.1 *Group Allocation*

The current experiment opted to remove any participants with a score of 0 (N = 10) or above 29 (N = 3, M = 31.75) in order to more accurately capture healthy participants and those at a sub-clinical level of depression. The cut off point for inclusion in the no depression group was a score of 1< 10, thus participants presenting scores of 1-9 (N= 38; M= 4.55) on the BDI-II were included in this group (Non-Depressed Group). For inclusion in the sub-clinical depression group BDI-II scores recorded where 10 < 30 (N = 33; M = 15.72; Depressed Group).

Group differences were observed with respect to BDI-II scores, with participants in the Non-Depressed group reporting significantly lower BDI-II scores than the corresponding Depressed group, $t(69)= -11.994$, $p<.001$. The two groups further diverged in their responses to measures of hopelessness (BHS; *t*(69) = -5.019, p<.001), life optimism (LOT-R; *t*(69) = 4.510, *p<.001*), experiential avoidance (AAQ-II; *t*(69) = 6.259, *p<.001*) and anxiety (STAI; *t*(69) = -2.559, *p=.011*). No mood differences where found between the two groups (PA: *p=.131*; NA: *p=.071*). The psychometric means are presented with the participant demographics in Table 45. As can be observed from Table 45, the two groups did not differ with respect to age, *t*(69) =-.377, *p*= .708, representation of gender, $\chi 2$ (2) =.558, *p=.455*, or verbal fluency, *t*(69) =.331, p=*.741*.

Table 45. BDI-II group split presentation of Demographics and Psychometric tests, presented as Mean scores with Standard Deviations (SD) for the Depressed and Non-Depressed groups in Experiment 9.

Variable	**Depressed *(SD)***	**Non-Depressed *(SD)***
Gender: Females **(Males)**	26 (7)	27(11)
Age	21.30 *(3.72)*	21.00 *(3.05)*
VFCT	10.03 *(2.86)*	10.27 *(3.23)*
BDI-II	15.72 *(5.04)*	4.55 *(2.58)*
BHS	5.96 *(3.12)*	2.87 *(2.04)*
STAI	38.67 *(8.11)*	33.84 *(7.52)*
LOT-R	12.84 *(4.44)*	17.12 *(3.50)*
AAQ-II	37.27 *(7.68)*	50.08 *(9.32)*
PA	28.48 *(7.19)*	30.89 *(6.08)*
NA	16.55 *(5.26)*	14.32 *(4.96)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

5.2.2.2 *The Future Thinking Task (FTT)*

Analysis of the Future Thinking Task scores were performed following the procedure set by MacLeod et al. (1998), and as discussed in previous chapters (for complete instructions of the FTT scoring algorithm see Section 3.2.2.2) with composite index scores calculated for each period in each condition, by multiplying the number of responses generated in a period by the mean likelihood ratings given for those responses and by the mean feelings ratings given for those responses.

5.2.2.3 *FTT Index Scores*

Analysis of the composite scores with a Group (Depression: Low BDI, High BDI) x Valence (Future expectancy: Positive/Negative) x Period (Week, Year, 5-10 years) mixed model ANOVA produced three significant effects. There was a significant main effect of Valence, with participants showing increased positive relative to negative future expectancy ($F(1,69) = 185.98$, $p < .001$, $\eta p^2 = .729$). A significant main effect of Period was found, reflecting more future events generated as pertaining to the next 5–10 years vs. the next year and the next week ($F(2,68) = 12.12$, $p < .001$, $\eta p^2 = .149$). There was also a significant interaction effect found for Period x Valence ($F(2, 68) = 9.45$, $p < .001$, $\eta p^2 = .120$), with more positive events expected in the more distant future of 5-10 years. The predicted effect of a Group x Valence interaction was not found to be significant ($F(1, 69) = 2.618$, $p = .110$, $\eta p^2 = .037$), nor was there a main effect for Group ($F(1, 69) = .076$, $p = .784$, $\eta p^2 = .001$).

Table 46. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task *Index* Scores, incorporating Fluency, Likelihood and Feeling values for each Time Period as reported by the Depressed and Non-Depressed groups in Experiment 9. T-Test score and statistical value *(p)* from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean (SD)	***Mean (SD)***	***t(69)***	***p***
Positive Responses				
Next Week	70.62 *(24.89)*	62.57 *(39.56)*	1.046	*0.299*
Next Year	71.98 *(27.48)*	70.52 *(34.28)*	0.199	*0.843*
Next 5-10 Years	90.68 *(36.63)*	83.67 *(33.17)*	0.841	*0.404*
Negative Responses				
Next Week	36.54 *(13.01)*	43.29 *(21.61)*	-1.614	*0.111*
Next Year	32.51 *(14.11)*	37.67 *(17.93)*	-1.357	*0.179*
Next 5-10 Years	40.53 *(19.75)*	38.30 *(21.95)*	0.452	*0.653*

The three-way interaction involving Group, Valence and Period did not approach significance ($F(2, 68) = .611$, $p=.544$, $\eta p^2 = .009$). Thus, the FTT index scores suggest that the Depressed and Non-Depressed individuals held similar expectations with regards to their subjective future experiences, with positive and negative expectancies consistently diverging across the three different time periods for both groups. Table 46 presents the collapsed FTT Index data.

5.2.2.4 *FTT Raw Scores*

The raw FTT scores were analysed for each of the three FTT components. Thus, raw scores for the number of events generated, likelihood values, and feeling ratings were calculated and are presented in Table 47. The same analysis was utilised with the raw data as for the FTT index scores.

Fluency for future events was firstly examined where a Group (Depression: Low BDI/High BDI) x Valence (Number of future thoughts: Positive/Negative) x Period (Week, Year, 5-10 years) mixed-model ANOVA found a significant main effect for Valence, $F(1, 69)=52.63$, $p<.001$, $\eta p^2 = .433$); that is, participants generated significantly more positive events ($M = 5.86$, $\sigma=1.73$) for the future relative to events that they were not looking forward to ($M = 4.77$, $\sigma=1.66$); the mean number of future thoughts by time period and valence for the Depressed and Non-Depressed groups are displayed in Table 47). A significant main effect was also found for Period ($F(2,68) = 5.24$, $p=.006$, $\eta p^2 = .071$) reflecting a lower number of events generated for the next year relative to the next week and the next 5-10 years. No main effect for Group was produced by the ANOVA ($F(1, 69) = .593$, $p=.444$, $\eta p^2 = .009$). An interaction effect was observed for Valence x Group ($F(2, 68) = 4.81$, $p= .032$, $\eta p^2 =. 065$), with the Non-Depressed group generating a greater number of positive future events relative to the Depressed group (Non-Depressed, $M= 6.16$, $\sigma= 1.77$; Depressed, $M= 5.52$, $\sigma=1.65$). No interaction effect was observed between Valence x Period ($F(2, 68) = 2.529$, $p=.083$, $\eta p^2 = .035$) nor was an effect found for the three way interaction for Group x Valence x Period ($F(2, 68) = 1.432$, $p=.242$, $\eta p^2 = .020$).

These results show that the predicted Group and Valence effect for fluency was observed in this experiment, with the depressed individuals demonstrating reduced positive future fluency. This finding is consistent with previous research in the future thinking area.

Table 47. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task *Raw Scores* for Fluency (number of events generated), Likelihood Ratings (summed for all events) and Feeling Ratings (summed for all events) for each Time Period for the Depressed and Non-Depressed groups in Experiment 9.

Variable	**Non-Depressed**	**Depressed**
	Mean *(SD)*	**Mean** *(SD)*
Positive Responses, *Next Week*		
Fluency (no. of events)	6.31 *(2.15)*	5.42 *(2.13)*
Likelihood	5.29 *(0.90)*	4.89 *(1.44)*
Feeling	2.20 *(0.43)*	2.33 *(0.54)*
Positive Responses, *Next Year*		
Fluency (no. of events)	5.63 *(1.79)*	5.30 *(1.67)*
Likelihood	5.20 *(0.91)*	5.02 *(1.06)*
Feeling	2.46 *(0.39)*	2.59 *(0.43)*
Positive Responses, *Next 5-10 years*		
Fluency (no. of events)	6.53 *(2.10)*	5.91 *(2.05)*
Likelihood	5.21 *(0.92)*	5.03 *(1.10)*
Feeling	2.67 *(0.31)*	2.93 *(0.76)*
Negative Responses, *Next Week*		
Fluency (no. of events)	4.61 *(1.95)*	4.78 *(1.71)*
Likelihood	4.06 *(1.43)*	3.99 *(1.46)*
Feeling	1.71 *(0.59)*	1.65 *(0.68)*
Negative Responses, *Next Year*		
Fluency (no. of events)	4.55 *(1.94)*	4.91 *(1.92)*
Likelihood	3.78 *(1.42)*	3.64 *(1.22)*
Feeling	2.18*(0.65)*	2.20 *(0.54)*
Negative Responses, *Next 5-10 years*		
Fluency (no. of events)	5.13 *(2.13)*	4.69 *(1.57)*
Likelihood	3.68 *(1.19)*	3.86 *(1.13)*
Feeling	2.29 *(0.56)*	2.17 *(0.86)*

5.2.2.5 *Future Thinking Task measures of Expectancy Likelihood*

The raw data pertaining to likelihood ratings of the future events generated was examined in the same manner as the fluency variable, that is, a Valence (Events likelihood: Positive/Negative) x Period (week, year, 5-10 years) x Group (Depression: Low BDI/Hi BDI) mixed-model ANOVA was utilised in the analysis. A significant main effect for Valence was found, $F(1, 69)=104.720$, $p<.001$, $\eta p^2 =.603$); that is, across all three time periods participants reported significantly more positive future events as likely to occur (M = 30.01, σ = 9.84) relative to the negative future events (M = 17.41, σ = 5.98). No significant main effects were found for Period ($F(1,69)=1.040$, $p= .356$, ηp^2 =.015), nor Group ($F(1,69)=.495$, $p= .484$, ηp^2 =.007), Further, no interaction effects were seen for Valence and Group ($F(2,68)=.963$, $p= .330$, ηp^2 =.014), for Period and Group ($F(2,68)=.605$, $p=.548$, ηp^2 =.009), nor for Valence and Period ($F(2,68)=1.293$, $p= .278$, ηp^2 =.018). The three way interaction of Valence x Period x Group ($F(2, 68)$ =.336, $p= .715$, ηp^2 =.005), further failed to produce any significant interaction effects.

These results show that the expectancy component of the FTT was unable to account for any of the variance observed between the two groups.

5.2.2.6 *Future Thinking Task measures of Event Affect*

The feeling values were explored in a similar fashion to the fluency and likelihood data, with an analysis of variance (ANOVA) completed with positive and negative future feeling raw scores. A Valence (Feeling: Positive/Negative) x Period (week, year, 5-10 years) x Group (Depression: Low BDI/Hi BDI) mixed-model ANOVA found a significant main effect for Valence, $F(1, 69)$ =85.699, $p<.001$, ηp^2 =. 554); that is, across all time periods participants foresaw feeling more positive of future events they were looking forward to (M = 14.64, σ = 4.32) relative to reports of negative anticipation relating to events that they were worried about (M = 9.68, σ = 4.20). A significant main effect was also found for Period ($F(1, 69)$ =39.935, $p<.001$, ηp^2 = .367) with participants reporting increased feeling ratings for the next year and next 5-10 years vs. the next week. However, no main effect was seen for Group ($F(1, 69)$ =.514, $p=.476$, ηp^2 =.007).

Interaction effects were seen to approach significance for Valence and Group ($F(2, 68) = 3.374$, $p=.067$, $\eta p^2 =.058$) with the Non-Depressed group reporting greater affect ratings relative to the Depressed group. The Valence and Period interaction also approached significance ($F(2, 68) =2.794$, $p= .065$, $\eta p^2 =.039$) with increased reports of positive affect across the three time periods relative to negative affect. The interaction between Period and Group also approached significance ($F(2, 68) = .068$, $p=.935$, $\eta p^2 = .001$), with the Non-Depressed participants reporting greater affect for more proximate future events relative to the Depressed group. No three way interaction was found for Valence x Period x Group ($F(2, 68) =.728$, $p=.485$, $\eta p^2 =.010$) as produced by the ANOVA.

These results show that the feeling variable on its own was unable to detect any differences in responding between the two groups, although it is noted that the expected interaction between Valence and Group did approach significance.

5.2.2.7 *Summary of FTT findings*

The FTT index score was unable to account for any future thinking divergence between the Depressed and Non-Depressed groups. However, the independent fluency variable did find an interaction effect for valence and group; consistent with previous literature this interaction effect demonstrates reduced fluency for positive future events within the Depressed group. The likelihood and feeling variables were unable to offer any further insight to the variance observed between groups pertaining to fluency.

5.2.2.8 *The Implicit Relational Assessment Procedure*

In line with the experiments from Chapter 4 latency data from the FT-IRAP was transformed into the D_{IRAP} measure (Dawson et al., 2009; Barnes-Holmes et al., 2010) (see Section 4.2.2.2. for further description of this transformation of data).

5.2.2.9 *Participant-type analyses*

Composite positive and negative D_{IRAP} scores were calculated for the four trial-types, with a positive marker including the two trial-types confirming positive future and denying negative future relations (+; i.e. consistent trials; $D_{IRAP\text{-}POS}$) and respectively, a negative marker combining the two trial-types analogous to the verification of negative future and refutation of positive relations (-; i.e. inconsistent trials; $D_{IRAP\text{-}NEG}$). The $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ scores calculated for both groups of participants are presented in 36. The data show the mean FT-IRAP effect for the Non-Depressed group ($D_{IRAP\text{-}POS} = .34$, $\sigma = .33$; $D_{IRAP\text{-}NEG} = .10$, $\sigma = .35$) to demonstrate an opposing pattern of responses relative to that of the Depression group ($D_{IRAP\text{-}POS} = -.05$, $\sigma = .64$; $D_{IRAP\text{-}NEG} = -.22$, $\sigma = .52$). That is, the Non-Depressed group, relative to the Depressed group, responded more rapidly on trials that required confirmation of future-positive and denial of future-negative relations (i.e. consistent trials) over tasks requiring confirmation of future-negative and denial of future-positive relations (i.e. inconsistent trials). In short, the descriptive FT-IRAP data indicate that the Non-Depressed group convey a greater level of expectations for positive future experiences as compared to the Depressed group. This is evident by the inverse pattern of responding observed to the FT-IRAP stimuli is by individuals in the Depressed group, proportionate to their Non-Depressed counterparts.

A mixed model ANOVA found a main effect for Valence ($F(1, 69) = 17.204$, $p < .001$, $\eta p^2 = .200$) with participant responses discriminating between positive and negative future expectancies. No interaction effect was found for Valence and Group ($F(1, 69) = .606$, $p = .439$, $\eta p^2 = .009$), though a main effect for group was found ($F(1, 69) = 12.747$, $p = .001$, $\eta p^2 = .156$) with the Non-Depressed group responding in line with the consistent FT-IRAP effect, that is, relating to expectancies of positive future events, whereas the Depressed group did not show this effect (see Figure 36 for an illustration of the two groups $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ scores).

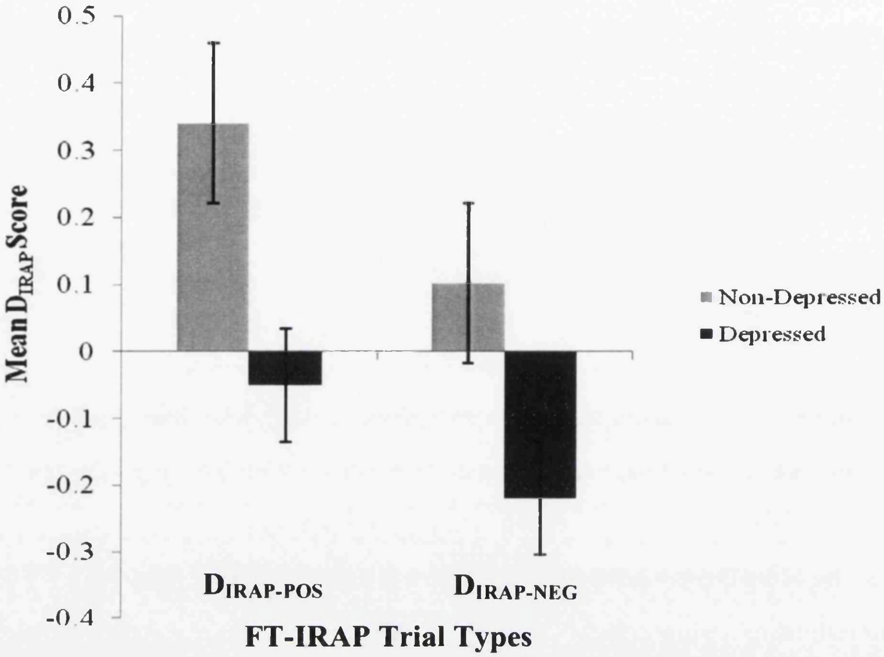


Figure 36. Mean Positive and Negative D_{IRAP} scores, with Standard Error Bars (S.E) for the Depressed and Non-Depressed groups in Experiment 9.

5.2.2.10 *FT-IRAP Trial-Type Analysis*

In order to explore the FT-IRAP data further and gain an indication of the relational responses within the groups, planned one sample T-tests were employed to determine if the mean D_{IRAP} scores for the four trial types differ significantly from zero.

As can be seen in Figure 37 there was a difference in the implicit responses by the two groups. The Non-Depressed participants were found to show an optimistic bias in analysis of their responses represented in the trial-type data by a positive value, specifically as confirmation of positive expectancies, i.e. 'I-expect-positive-*True*' (S1T1), to' I-don't-expect-negative-*True*'(S2T2) both of which were significantly different from zero ($t(37)=6.611$, $p<.001$ and $t(37)=3.120$, $p=.003$ respectively). However, the trials requiring denial of negative expectancies were not found to be significantly different from zero, i.e. 'I-expect-negative-*False*' (S1T2; $t(37) = 1.465$, $p = .151$) and 'I-don't-expect-positive-*False*' (S2T1; $t(37) = 1.829$, $p = .076$).

For the Depressed group the pattern of responses were again noted as relatively inverse to that of the Non-Depressed group, though with a significant bias only found in confirmation of negative expectancies on one of the trial types, i.e. 'I-expect-negative-*True*' (S1T2; $t(32) = -2.818$, $p = .008$). Participants in this group displayed no trend in their response towards confirmation of positive expectancies (S1T1; $t(32) = .010$, $p = .992$). Neither was there any significant findings in regards to denial of positive expectancies (S2T1; $t(32) = -1.176$, $p = .248$) nor for denial of negative expectancies (S2T2; $t(32) = -.962$, $p = .343$). Figure 37 depicts the two groups' responses on each of the four trial types, as can be seen here, a clear optimistic bias is observed for the non-depressed group with an analogous pessimistic pattern found for the depressed group.

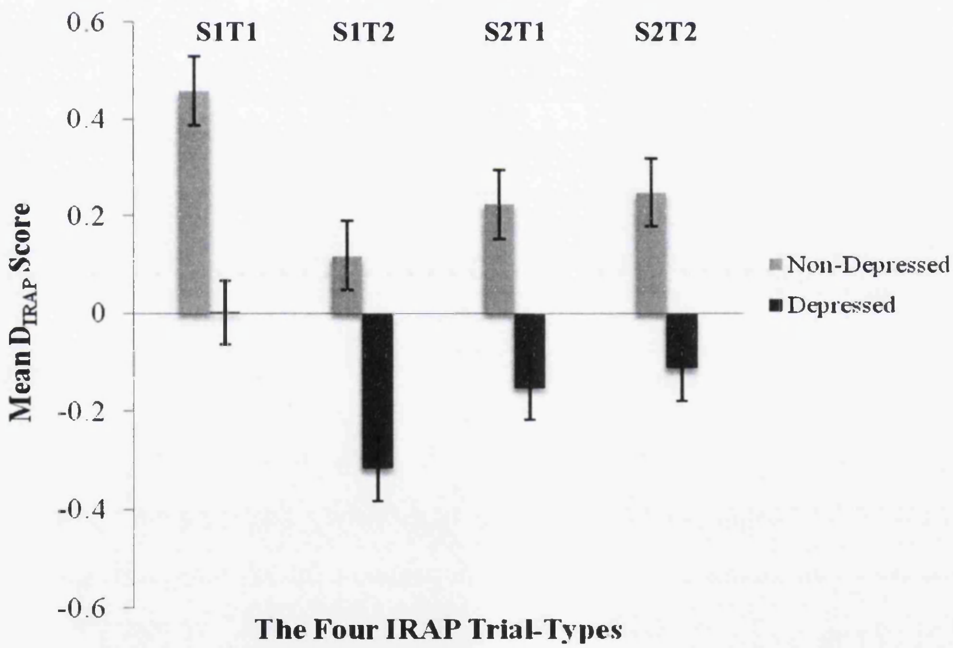


Figure 37. Mean D_{IRAP} scores (with S.E bars) for the two groups across the four FT-IRAP Trial-Types in Experiment 9. Trial types are represented by sample and target distribution of Positive (T1) and Negative (T2) Target Words presented with the Samples 'I expect' (S1) and 'I don't expect' (S2).

5.2.2.11 *Summary of the FT-IRAP findings*

The FT-IRAP data at split and combined levels of analysis all suggest that there is a distinct inverse pattern of responding for the two groups – with the trial-type analysis offering the additional information of discriminating which relational responses are of relevance in relating the data to particular patterns in cognising about the future.

5.2.2.12 Correlations and Hierarchical Regression Analyses

In order to form a comparison of sensitivity in future thinking as reported by the FTT and the FT-IRAP a series of correlations were conducted followed by two Hierarchical Regression Analyses pertaining to depression and hopelessness.

5.2.2.13 *Relationship between Implicit and Explicit Measures*

Zero-order correlations were conducted at group level for depression, hopelessness, explicit (FTT) and implicit future expectancies (FT-IRAP) (a summary of the Pearson's' correlations can be found in Table 48). Consistent with prior studies (e.g., Bosson et al., 2000; Gemar et al., 2001; Haeffel et al., 2007), no significant correlations emerged between implicit and explicit measures for either group. Though, it can be seen that within the FTT positive future thinking correlated with negative future thinking for both groups.

5.2.2.14 *Regression Analysis of Depression*

A Hierarchical Regression Analysis was employed to predict the probability of a participant being classified as depressed or non-depressed. The predictor variables were hopelessness scores (BHS), positive (PFT) and negative future thinking fluency (NFT) and implicit future expectancy (D_{IRAP}). Fluency was the only FTT component to display the expected group and valence interaction across the FTT analyses (as opposed to the index scores and raw likelihood and feeling scores) and as the FTT fluency variable is commonly utilised in the future thinking literature, along with its pronounced relevancy within the current findings, it was opted in as the best predictor of sub-clinical depression level in the set context. The single overall D_{IRAP} score (calculated across all four trial-types) was used herein, as suggested as the best variable employed in correlations and regression analyses with relevant explicit measures (Barnes-Holmes, Barnes-Holmes, Stewart & Boles, 2010). A test of the full model versus a model with intercept only was statistically significant, $\chi^2(4, N = 71) = 87.51, p < .001$. The model was able to correctly classify 78.9% of those who reported a low score on the BDI-II and 66.7% of those who scored high on the BDI-II, with an overall success rate of 73.2%.

Table 48. Zero order correlations for the Non-Depressed (ND) and Depressed (D) group for Depression, Hopelessness and the Explicit and Implicit Future Thinking Tasks in Experiment 9.

Group and Variable Denominator	**Variable**	**1**	**2**	**3**	**4**
ND 1	BDI				
D 1	BDI				
ND 2	BHS	0.235			
D 2	BHS	0.167			
ND 3	PFT	0.135	0.011		
D 3	PFT	0.152	-0.005		
ND 4	NFT	0.255	0.001	0.730***	
D 4	NFT	-0.051	0.218	0.739***	
ND 5	$D_{IRAP\text{-}TOTAL}$	-0.126	-0.218	0.006	0.065
D 5	$D_{IRAP\text{-}TOTAL}$	-0.022	-0.146	0.113	-0.026

Note. *** $p < .001$. BDI = Beck Depression Inventory, BHS = Beck Hopelessness Scale, PFT = Positive Future Thinking (fluency), NFT = Negative Future Thinking (fluency), $D_{IRAP\text{-}TOTAL}$ = composite D-score.

As is evident in Table 49, after controlling for hopelessness neither positive future thinking nor negative future thinking (pertaining to the FTT) were found to be significant predictors of depression at step 2, ($t(69)$=.304, p=.119 and $t(69)$=.147, p=.939 respectively). However, the FT-IRAP is seen as a significant predictor of depression scores at step 3, ($t(69)$ = 9.349, p<.001). Table 49 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. It is notable that, whereas the explicit future thinking measure fail to add significantly to the model, the FT-IRAP explains an additional 5% of the depression variance (Cohen's f^2 =.091) - a moderate effect size (Cohen, 1992).

Table 49. Hierarchical Logistic Regression Analysis Predicting Depression Scores in a Sub-Clinical Population (N= 71) in Experiment 9.

Step and Variable	B	SE	Wald Statistic	Odds Ratio (95% confidence interval)	χ2	R2
Dependent variable: Depression						
Step 1					$\chi2\ (1)= 22.521^{***}$	0.36
Beck Hopelessness Scale	0.487	0.125	15.215	$1.628\ (1.274\ -2.079)^{**}$		
Step 2					$\chi2\ (2)= 2.740^{NS}$	0.40
FTT						
Positive Fluency	-0.426	0.277	2.367	0.653(.380-1.124)		
Negative Fluency	0.291	0.283	1.062	1.338 (.769-2.329)		
Step 3					$\chi2\ (1)= 3.805^{*}$	0.45
Implicit Relational Assessment Procedure	-1.704	0.999	2.907	$0.163\ (.021-1.255)^{AS}$		

Note. $^{***}p$<.001, $^{**}p$<.01, $^{*}p$<.05, ^{NS} =Not Significant, ^{AS} = Approaching Significance: p=.06

In a separate analysis, the FT-IRAP scores were dichotomized to indicate whether individual D_{IRAP} scores represented a relation between depression and expectancies of positive future events (D_{IRAP} score > 0) versus expectancies of negative future events (D_{IRAP} score < 0), to test this as a theoretically and clinically meaningful cut point. Participants whose performance revealed greater expectancy of negative future events were significantly more likely to report higher scores on the BDI-II (32.4%) relative to those with a greater expectancy of positive future events (14.1%), χ^2 (1, N = 71) =11.752, p = *.001*. This cut point appears to produce adequate sensitivity and positive predictive value, as well as strong specificity and negative predictive value (see Table 50).

Table 50. Classification Statistics for the Future Thinking Implicit Relational Assessment Procedure in Prospectively Predicting Depression Levels ($N = 71$) in Experiment 9.

BDI Scores		**Sensitivity**	**Specificity**	**Positive Predictive Value**	**Negative Predictive Value**
Low	**High**				
D score > 0	D score >0				
$n = 27$	$n = 10$	.70 (23/33)	.71 (27/38)	.73 (27/37)	.68 (23/34)
D score < 0	D score < 0				
$n = 11$	$n = 23$				

Note. Scores on the Implicit Relational Assessment Procedure were dichotomized to indicate either a relation between future expectancies and negative events (D score > 0) or a relation between future expectancy and positive events (D score < 0). Sensitivity is the proportion of sub-clinically Depressed participants correctly identified by the FT-IRAP; Specificity is the proportion of Non-Depressed individuals correctly identified by the test. Positive Predictive Value is the proportion of individuals with a positive score who were correctly classified as Non-Depressed; Negative Predictive Value is the proportion of individuals with a negative test, correctly classified as a Depressed. Raw numbers for proportions are given in parentheses.

5.2.2.15 *Regression Analysis of Hopelessness*

The second hierarchical regression analysis focused on the same relationship with one difference, the outcome variable was hopelessness rather than depression. Given the lack of predictive ability for the explicit measures with relation to sub-clinical depression it was of interest to see if the FTT fluency variable was able to predict hopelessness ratings by participants. As deficiencies in positive future thinking has been termed in the literature as a marker of hopelessness and suicidal ideation it was of relevance to see if the predictive strength lie in these components specifically as opposed to depression more generally. The Hierarchical Regression Analysis was conducted with hopelessness as the dependent variable and positive and negative fluency, along with the D_{IRAP} as covariates. The hopelessness variable was dichotomized by use of a cutoff point of 5 on the Beck Hopelessness Scale, that is participants with a BHS score of <5 were considered healthy (N = 44, M = 2.36; Low BHS Group) whereas those with a score of ≥5 were considered to be showing signs of hopeless ideation (N = 27, M = 7.48; High BHS Group; this cut off was based on a mean split) the group difference was found to be significant, $t(69) = -12.392, p < .001$.

As is evident in Table 51 at step 1 the explicit future thinking reports were able to predict hopelessness ideation, though only positive future thinking (as represented by the fluency variable) predicted more hopeless ideation. At step 2 performances on the FT-IRAP predicted the reported occurrence of hopeless ideation above and beyond the influence of the explicit self-report variables, χ^2 (1, N = 71) = 15.39, p<.01, explaining an additional 28% of the variance in hopelessness (Cohen's f^2 =.444) – a large effect size (Cohen, 1992).

Table 51. Hierarchical Logistic Regression Analysis Predicting Hopelessness Ideation in a Sub-Clinical Population (N= 71) in Experiment 9.

Step and Variable	***B***	**SE**	**Wald Statistic**	**Odds Ratio (95% confidence interval)**	**χ2**	**R2**
Dependent variable: Hopelessness						
Step 1					$\chi2$ (2)= 4.758	0.09
FTT						
Positive Fluency	-0.504	0.255	3.917	0.604 (.367-.995)*		
Negative Fluency	0.417	0.247	2.852	1.517 (.935-2.460)		
Step 2					$\chi2$ (1)= 17.823***	0.37
Implicit Relational Assessment Procedure	-3.282	1.061	9.566	0.038 (.005-.301)**		

Note. ***p<.001, **p<.01, *p<.05

BHS scores where dichotomized to gain a measure of sensitivity, specificity and predictive value of the FT-IRAP positive and negative values in relation to hopeless ideation. As in the above analysis with the BDI-II, the FT-IRAP D-score values, representative of positive future expectancy (D_{IRAP} score > 0) versus negative future expectancy (D_{IRAP} score < 0), were assessed as ample indicators of pathological future beliefs. Participants whose performance revealed stronger relations between future expectancies and negative events were significantly more likely to report higher scores on the BHS (26.8%) than were those with a stronger relation with positive future expectancies (11.13%), χ^2 (1, N = 71) = 8.825, p = .003. Thus it appears that this cut point offers adequate negative predictive value (see Table 52).

Table 52. Classification Statistics for the Implicit Relational Assessment Procedure in Prospectively Predicting Hopelessness Scores (N = 71) in Experiment 9.

BHS Scores		**Sensitivity**	**Specificity**	**Positive Predictive Value**	**Negative Predictive Value**
Low	**High**				
D score > 0	D score >0				
n = 29	n = 8	.70 (19/27)	.66 (29/44)	.78 (29/37)	.56 (19/34)
D score < 0	D score < 0				
n = 15	n = 19				

Note: Scores on the Implicit Relational Assessment Procedure were dichotomized to indicate either a relation between future expectancies and negative events (D score > 0) or a relation between future expectancy and positive events (D score < 0). Sensitivity is the proportion of participants *with* hopeless ideation correctly identified by the FT-IRAP; Specificity is the proportion of participants correctly identified by the FT-IRAP as showing *no* hopeless ideation. Positive Predictive Value is the proportion of individuals with a positive test who were correctly classified as *not* pessimistic about their future; Negative Predictive Value is the proportion of individuals correctly classified as pessimistic with regards to their future outlook. Raw numbers for proportions are given in parentheses.

5.2.3 Summary

The Future Thinking Task indicated a group and valence interaction in line with the existing literature in regards to future thinking fluency, with the Non-Depressed group reporting increased levels of future positive events relative to the Depressed group, who in turn demonstrated a deflated fluency of positive future events, with no such differences emerging with regards to negative future anticipation. The FTT index score and the likelihood and feeling variables did not detect any differences between the two groups in regards to overall future expectations, or likelihood and affect in their pertaining to cognitions about future events.

In regards to the main aims of Experiment 9 it was found that (1) the FT- IRAP was sensitive and specific in the detection of sub clinical depression, whereas the FTT failed to significantly improve on the regression model; and (2) the FT-IRAP appeared to allow for greater sensitivity and specificity in the detection of hopelessness relative to the FTT. As such, the FT-IRAP demonstrated a group difference relative to future expectancies, enabling recognition of specific relational responses concurrent to depression and hopelessness. This was further emphasised by the FT-IRAP effectively adding to the regression models of depression and hopelessness, in contrast to the FTT components that did not significantly improve on these models. Table 53 summarises the main findings from Experiment 9.

Table 53. Summary of Main Aims and Findings from Experiment 9.

	Research Aim	**Hypothesis**	**Main Findings**
1	To investigate if the FT-IRAP and the FTT will be comparably sensitive and specific in the detection of sub clinical depression as measured by the BDI-II.	*Implicit future cognitions, as measured by the FT-IRAP will be more sensitive in detection of depression as measured by the BDI-II, relative to future thinking as measured by the FTT.*	*The hypothesis is supported.* No relationship was found for the FTT and FT-IRAP. At Step 2 neither positive nor negative future thinking (as measured by the FTT fluency variable) were found to be significant predictors of depression. At Step 3 the FT-IRAP is seen as a significant predictor of depression scores (p<.001).
2	Examine if the FT-IRAP and the FTT will be equally sensitive and specific in the detection of hopelessness ideation as measured by the Beck Hopelessness Scale.	*Implicit future cognitions, as measured by the FT-IRAP will be more sensitive in detection of hopelessness ideation as measured by the BHS, relative to future thinking as measured by the FTT.*	*The hypothesis is supported..* No relationship was found for the FTT, FT-IRAP or AMS. At Step 1 positive future thinking (as represented by the FTT fluency variable) predicted more hopeless ideation (p<.05). At Step 2 the FT-IRAP predicted hopeless ideation above and beyond the influence of the explicit self-report variables (p<.01).

5.3 Experiment 10

Within research looking at the relationship between past and future thinking (e.g. Berntsen & Bohn, 2010) the focus has been on how past and future thinking is similarly operationalised. With deficits in each regard seen linked to psychological disorders. That is, it has been noted that AMS and reduced future positive thinking are both relevant features in depression. However, seemingly no published research has distinguished which, of the past or future thinking deficits, is a stronger contributor in disorders such as depression. Or indeed, whether the relationship between these constructs may be seen to equally predict depression levels. The focus has also been on the progression of depressive symptoms relative to the onset of depression, with reference to the ongoing prognosis and not vulnerability *per se.* To date, there have been no known attempts to look at the relationship between AMT responses and implicit future thinking.

Experiment 10 aimed to compare the Autobiographical Memory Task (AMT; Williams & Broadbent, 1986), with an IRAP task designed specifically to measure positive and negative future expectancies (FT-IRAP) across a sub clinical sample of depressed and healthy control undergraduate students. Sumner, Griffith and Mineka (2010) in their recent meta-analysis of the predictive powers of Autobiographical Memory Specificity (AMS) in depression found that across studies the predictive power of AMS appears to be small although it has been found to be statistically significant, relative to depression symptoms. That is, lower levels of AMS (i.e., fewer specific memories and more categoric/overgeneral memories) in initial assessments of depression have been seen to relate to increased depression symptoms at subsequent follow up (Sumner at al., 2010). From the future thinking literature it has been seen that reduced positive future thinking is considered a central feature in depression (MacLeod & Salaminiou, 2001). O'Connor, Fraser, Whyte, Stirling and MacHale (2008) have reported the predictive powers of positive future thinking, with no independent effect of negative future thinking, for suicidal ideation, above that of measures of global hopelessness.

To this end Experiment 10 has two main aims to (1) investigate if the FT-IRAP and the AMT will be comparably sensitive and specific in the detection of sub clinical depression as measured by the BDI-II.; and to see (2) if the FT-IRAP and the AMT will equally be sensitive and specific in the detection of hopelessness ideation as measured by the Beck Hopelessness Scale. It is predicted that the implicit future cognitions, as measured by the FT-IRAP will be more sensitive in detection of depression and hopelessness relative to AMS as measured by the AMT.

5.3.1 Method

5.3.1.1 Participants

Forty-seven students from Swansea University volunteered to take part in the current experiment, after employing the exclusion criteria pertaining to BDI-II scores (the criteria for inclusion is detailed in section 4.7.1.1.) data from six participants was removed, thus only data from forty-one participants was utilised in the following analysis. Of the included sample of 41 undergraduate and postgraduate students 27 were female and 14 were males, between the ages of 21 and 34 (M= 24.97, σ = 2.97).

5.3.1.2 Apparatus and Materials

Participants completed a series of self-report questionnaires to assess psychological health. This was the same set of assessments utilized throughout the previous chapters (see Section 2.2.1.2 for details pertaining to each measure), i.e. the Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer & Brown, 1996); The Beck Hopelessness Scale (BHS; Beck & Steer, 1988); The State Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983); The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988); The Life Orientation Test – Revised (LOT-R; Scheier, Carver, & Bridges, 1994); The Acceptance and Action Questionnaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004) and the Verbal Fluency Control task. (Lezak, 1976).

The Autobiographical Memory Task (AMT; Williams & Broadbent, 1986) was identical in presentation and procedural followings as to Experiment 1a (see Section 2.2.1.2).

The Future Thinking-Implicit Relational Assessment Procedure was presented in the same form and the procedure was identical to that of Experiment 6 (see Section 4.2.1.4).

5.3.1.3 Experimental Overview

The current study was of mixed-between-within participant design and each participant completed all experimental phases in the same order. Figure 38 depicts the experimental sequence for Experiment 10.

5.3.1.4 Ethical Issues

As with the previous experiments reported herein the ethical guidelines identified by the British Psychological Society (2006) were adhered to in Experiment 10 by ensuring a number of specific measures were put in place. These measures were consistent with those outlined previously for Experiment 6 and Experiment 1a (see Section 2.2.1.4). Only minor adjustments were necessary to facilitate the change in methodologies to tailor instructions to the current experiment. As in Experiment 6, emphasis was put into assuring participants that the computer task was not a measure of how quick they were at responding but that the focus was on the responses made. This emphasis was made to deter distress related to feelings of inept computer skills. Due to the nature of the experiment, with participants completing 2 subsequent tasks, participants were encouraged to take a break between tasks. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the past events recalled. Experiment 10 was ethically approved by the Swansea University Psychology Department Ethics Committee prior to commencement.

Participant Sample (N= 47)

Total sample complete the Future Thinking IRAP (randomised presentation of consistent and inconsistent first trials between participants)

Step 1. Participants complete a minimum of 2 practice trials.

Step 2. The 3 test trials commence upon successful completion of practice trials.

Total sample complete Verbal Fluency Control Task (randomised 1st presentation of letters F, A, S between participants)

Total sample complete Autobiographical Memory Task (randomised 1st presentation of positive or negative cues between participants)

Total sample complete Questionnaires (randomised order of 1st presentation between participants) BDI-II, STAI, BHS, LOT-R, AAQ-II, PANAS

Post-Experimental/Pre-Analysis BDI-II Group Split (see Section 5.3.2.1):

Low BDI-II score (1<10): N= 22 (BDI-II = 0, excluded from analysis, N = 4)

High BDI-II score (10<30): N= 19 (BDI-II score >29, excluded from analysis, N = 2)

Final sample for analysis: N = 41

.Figure 38. Overview of the Experimental Sequence for Experiment 10.

5.3.1.5 Procedure

Experiment 10 took place in a controlled environment in the form of a standard research lab provided with a table, chair and portable computer. Prior to commencement participants were informed about the tasks and invited to ask questions before completing the consent form. The study commenced with the FT-IRAP (for details pertaining to the exact procedures of the FT-IRAP see Section 4.2.1.5), directly followed by the Verbal Fluency Control Task and the Autobiographical Memory Task (AMT) (for details pertaining to the exact procedures of the AMT see Section 2.2.1.3), and lastly followed by responses to the set of psychometric self-report measures. The procedures followed for these methods were as directed in previous studies and adhered to the process described therein. The questionnaires were given out in a randomised order. Participants were provided with the option to take short brakes between completions of the individual tasks; generally this offer was not made use of. On completion of all tests, participants were thanked and verbally debriefed with reference to a written debriefing sheet provided for the participant to retain.

An inter-rater reliability analysis using the Kappa statistic was performed to determine consistency among raters in regards to cue specificity on the AMT. A sample of 90% of the responses was rated by a second independent rater, and an inter-rater reliability of 93% ($k = .93$) was obtained.

5.3.2 Results and Discussion

5.3.2.1. *Group Allocation*

Group allocation was determined via discriminating scores on the Beck Depression Inventory (BDI-II). Participants with a score of 0 ($N = 4$) or above 29 ($N = 2$, $M = 32$) where excluded from the analysis. As before the BDI-II inclusion criteria for the no depression group was a score of $1 < 10$, thus participants presenting scores of 1-9 ($N = 22$; $M = 3.18$; Non-Depressed Group) whereas inclusion in the sub-clinical depression group required BDI-II scores of $10 < 30$ ($N = 19$; $M = 13.78$; Depressed Group).

5.3.2.2 *Demographics and Psychometrics*

The two groups were found to report significantly different depression levels on the BDI-II, with participants in the Non-Depressed group reporting significantly lower BDI-II scores than the corresponding Depressed group, $t(39)=-10.011$, $p<.001$. Similar divergence between the groups were found in relation to the other well-being measures with the Depressed group consistently reporting higher levels of anxiety (STAI, $t(39)=-4.171$, $p<.001$), increased hopelessness (BHS, $t(39)=-5.122$, $p<.001$), deflated life optimism (LOT-R, $t(39)=4.370$, $p<.001$) and reduced psychological flexibility (AAQ, $t(39)=2.771$, $p=.009$) relative to the Non-Depressed group. Mood was not found to be significantly different between the groups (PA: $p=.074$; NA: $p=.063$), though there is a clear trend indicating some level of mood variance. The psychometric means are presented with the participant demographics in Table 54. As depicted in Table 54, Depressed and Non-Depressed participants did not differ with respect to age, $t(39)=-1.216$, $p=.231$, representation of gender, $\chi 2$ (2) =. 997, $p=.318$ or verbal fluency, $t(39)=-1.311$, $p=.197$.

Table 54. BDI group split presentation of Demographics and Psychometric tests presented as Mean scores with Standard Deviations (SD) for the Depressed and Non-Depressed groups in Experiment 10.

Variable	**Depressed *(SD)***	**Non-Depressed *(SD)***
Gender: Females **(Males)**	16 **(6)**	11**(8)**
Age	25.78 *(3.79)*	24.45 *(1.96)*
VFCT	14.31 *(2.71)*	13.05 *(3.33)*
BDI	13.78 *(4.45)*	3.18 *(2.06)*
BHS	8.73 *(4.89)*	2.81 *(2.17)*
STAI	47.68 *(10.69)*	34.72 *(9.19)*
LOT-R	10.68 *(4.84)*	16.81 *(4.14)*
AAQ-II	47.26 *(10.43)*	55.22 *(7.93)*
PA	31.47 *(5.08)*	35.41 *(8.05)*
NA	22.10 *(9.01)*	18.13 *(3.42)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

5.3.2.3 *The Autobiographical Memory Test*

Following common practice in investigations of autobiographical memory specificity (AMS) (see Williams et al., 2006, 2007), the first response across the 12 trials, that is, memories that participants retrieved in response to the 12 AMT cue words that were specific, were used to index AMS (this variable is referred to here as memory specificity, with higher scores indicating increased specificity) (see Section 2.2.2.3 for further details on the AMT cue scoring).

High positive correlations were seen between the number of specific memories produced under each valence category with the total number of specific recall (Non-Depressed group positive cues, .91, and negative cues .88; Depressed group, positive cues .91 and negative cues .96). On average, retrieved memories for participants in the Non-Depressed group were specific 54.5% of the time across the 12 trials; whereas the Depressed participants showed somewhat diminished specificity in retrieval overall with merely 42.10% of the 12 trials noted as specific. Differences in specificity were predominantly noted for positive cues, with the Non-Depressed group retrieving a greater number of specific memories to positive cues, relative to the Depressed group ($M = 4.04$, $\sigma = 1.58$ and $M = 3.21$, $\sigma = .92$ respectively; $t(39) = 2.017$, $p = .05$). Specificity in recall for negatively cued events was poor within both groups (Non-Depressed group, $M = 2.50$, $\sigma = 1.43$; Depressed group, $M = 1.84$, $\sigma = 1.38$; $t(39) = 1.485$, $p = .146$). Table 55 presents the AMT performance for both groups and as can be seen omissions were rare. Verbal fluency scores did not correlate with the total number of cues for either group (Non-Depressed, $p = .224$; Depressed, $p = .136$).

Memory specificity was subjected to a 2 (Group: Depressed/Non-Depressed) x 2 (Cue valence: Positive/Negative) mixed analyses of variance (ANOVA). A main effect for Valence was found, with both groups being more specific in recall of positive memories ($F(1, 39) = 65.078$, $p < .001$ $\eta p^2 = .625$) relative to negative past events. The main effect for Group did approach significance, with the trend showing the Non-Depressed individuals as more specific in recall overall ($F(1, 39) = 3.686$, $p = .062$, ηp^2

=.086). No interaction effect was observed for Valence and Group ($F(1, 39)$ =.240, p=.627, ηp^2=.006).

Table 55. Autobiographical Memory Test Performance presented as Percentage of Specificity, Mean number, with Standard Deviations (SD), of Memory Specificity Responses across the six cue words in each valence category for the Depressed and Non-Depressed groups in Experiment 10. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	***t*(39)**	***p***
Total % of specific memories	54.50*(18.69)*	42.10 *(20.45)*		
Total % of omissions	2.14 *(3.56)*	2.90 *(4.62)*		
Total cues	6.54 *(2.72)*	5.05 *(2.17)*	1.603	*0.117*
Positive cues	4.04 *(1.58)*	3.21 *(0.92)*	2.017	*0.051**
Negative cues	2.50 *(1.43)*	1.84 *(1.38)*	1.485	*0.146*

Note. * p=.051. Positive/Negative Cues = number of specific first memories relative to the detailed valence category on the Autobiographical Memory Test.

5.3.2.4 *Summary of AMT findings*

The results show that the two groups differ in regards to levels of AMS, this diverge is in regards to recall of positive past events, with the Non-Depressed individuals demonstrating greater specificity in such recall relative to those from the Depression group. This finding is consistent with the results seen from Experiment 1a and 2a in Chapter 2.

5.3.2.5 *The Implicit Relational Assessment Procedure*

Latency data from the FT-IRAP was transformed into the D_{IRAP} measure (Dawson et al., 2008) consistent with calculations in previous chapters, i.e. an adapted version of the IAT D-algorithm noted by Greenwald, Nosek & Banaji, 2003) (for instructions on the algorithm transformation see Section 4.2.2.2.).

The two groups were found to differ significantly in relation to the overall D_{IRAP} score ($t(39)=2.609$, $p=.013$), with the Non-Depressed group producing scores significantly different from zero in a positive direction ($M= .21$, $\sigma= 0.17$; $t(21)=5.730$, $p<.001$), whereas the Depressed group presented a rather ambivalent response pattern, with no significant difference from zero ($M = 0.02$, $\sigma= 0.29$; $t(18)=.249$, $p=.806$). Figure 39 provides an illustration of this finding, and as can be seen the Non-Depressed group holds a strong positive bias towards the future whereas the Depressed individuals are showing a negative trend.

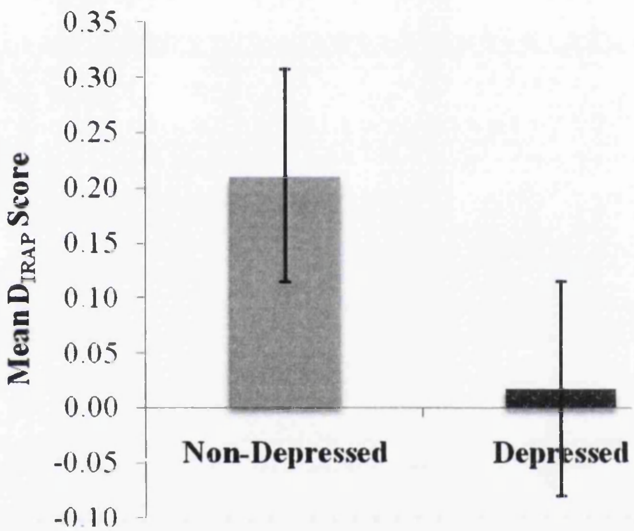


Figure 39. Mean D_{IRAP} scores for the Depressed and Non-Depressed groups in Experiment 10, with Standard Error Bars (S.E). A greater optimistic bias is indicated by larger positive scores, i.e. responding more quickly when confirming positive and denying negative future expectancy than when asked to confirm negative and deny positive expectancy on the relevant trials. A pessimistic bias incurs the inverse responding pattern.

5.2.3.6 ***Participant-type analyses.***

The mean $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ scores calculated for both groups are shown in Figure 40. For the positive future trial type, both groups exhibited an implicit optimistic bias, although for the Non-Depressed participants the D_{IRAP} effect was much stronger than that of the Depressed group. For the negative future trial type, the Non-Depressed group showed a non-pessimistic bias and the Depressed group showed a small effect pertaining to a pessimistic outlook. The D_{IRAP} scores for each participant were entered into a 2 × 2 mixed repeated measures ANOVA, with group (Non-Depressed vs. Depressed) as the between-participants variable and IRAP trial-type as the within-participants variable ($D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$).

The ANOVA revealed a significant main effect for Group, $F(1, 39) = 9.596$, $p=.004$, $\eta p^2 = .197$), and for IRAP trial-type, $F(1, 39) = 6.563$, $p=.014$, $\eta p^2 = .144$); though no interaction effect was found ($F(1, 39) = 3.322$, $p=.076$, $\eta p^2 = .076$).

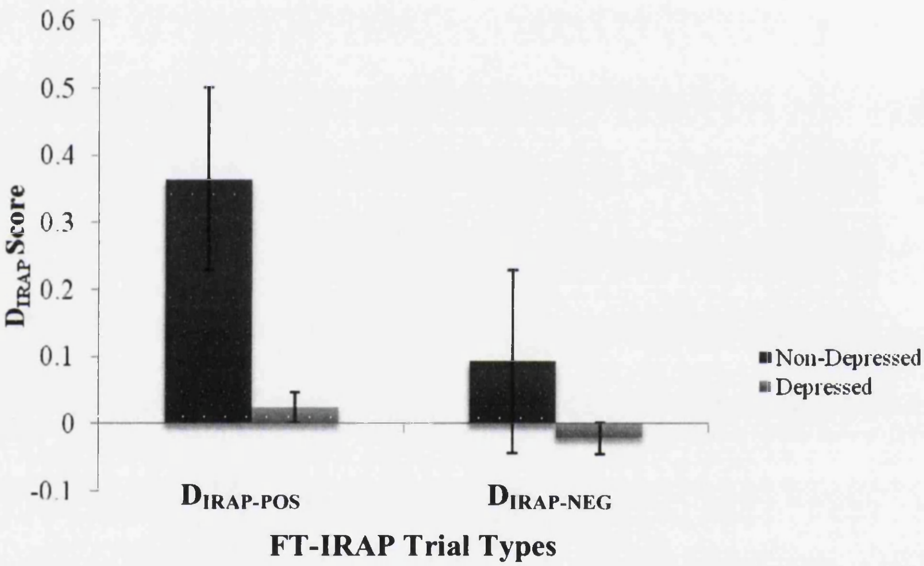


Figure 40. Mean Positive and Negative D_{IRAP} trial-type scores in Experiment 10, with Standard Error Bars (S.E), for the Non-Depressed and Depressed groups. The $D_{IRAP\text{-}POS}$ scores reflect an optimistic bias and the $D_{IRAP\text{-}NEG}$ scores reflect a pessimistic bias. The zero-point reflects no bias. An optimistic bias, pertaining to positive future expectancy, was produced if participants responded more quickly to "I expect–Positive–True" and "I don't expect-Positive–False" than to "I expect– Positive–False" and "I don't expect–Positive–True" (the opposite pattern indicated a pessimistic bias on positive expectancy trials). A pessimistic bias for future expectancy was produced if participants responded more quickly to "I expect–Negative–True" and "I don't expect–Negative– False" than to "I expect–Negative–False" and "I don't expect–Negative–True" (the opposite pattern indicated an optimistic bias on negative expectancy trials).

Two one-way between-participant ANOVAs yielded significant differences only for expectancy of positive future events, $F(1, 39) = 11.292$, $p = .002$, and not for expectancy of negative future event trial types $F(1, 39) = 1.589$, $p = .215$. Two one-sample t tests indicated that the optimistic D_{IRAP} effect for the Non-Depressed group differed significantly from zero: $D_{IRAP\text{-}POS}$, $t(21) = 8.328$, $p < .001$; whereas the pessimistic D_{IRAP} effect only approached significance, $D_{IRAP\text{-}NEG}$, $t(19) = 1.862$, $p = .077$. For the Depressed group, however, no significance was found with either effect ($D_{IRAP\text{-}POS}$, $t(22) = .171$, $p = .866$; $D_{IRAP\text{-}NEG}$, $t(19) = -.270$, $p = .790$). Overall, therefore, the IRAP indicated optimistic biases for the Non-Depressed group that differed significantly from the Depressed groups more pessimistic biases.

5.3.2.7 *Summary of FT-IRAP findings*

The data show that the two groups differed in their response pattern as recorded by the FT-IRAP. A clear optimistic bias was seen for the Non-Depressed group that differed significantly to the Depressed groups more pessimistic biases.

5.3.2.8 Correlations and Hierarchical Regression Analyses

In order to form a comparison between the AMT and the FT-IRAP sensitivity to depression and hopelessness a series of correlations were conducted followed by two Hierarchical Regression Analyses pertaining separately to depression and hopelessness.

5.3.2.9 *Relationship between Implicit Future Thinking and Explicit Memory*

Zero-order correlations were conducted at group level for depression, hopelessness, implicit future expectancies and autobiographical memory specificity (a summary of the Pearson's' correlations can be found in Table 56). As can be seen from Table 56 hopelessness and depression scores were found to positively correlate within the depressed sample. Hopelessness and positive cue specificity was seen to negatively correlate in the Non-Depressed sample, that is, those reporting high scores on the BHS were less specific in their recall of positive memories. Positive and negative cue specificity was found to positively correlate with the FT-IRAP within the Depressed group, thus indicating that those participants whom where more specific in their recall reported an optimistic bias pertaining to future expectancies of positive events.

Table 56. Zero order correlations for the Non-Depressed (ND) and Depressed (D) group for Depression, Hopelessness, Autobiographical Memory Specificity and Implicit Future Thinking in Experiment 10.

Group and Denominator	Variable Variable	1	2	3	4
ND 1	**BDI**				
D 1	**BDI**				
ND 2	**BHS**	-.109			
D 2	**BHS**	.539*			
ND 3	**PCS**	.084	-.452*		
D 3	**PCS**	-.409	-.370		
ND 4	**NCS**	-.016	-.152	.614**	
D 4	**NCS**	-.257	-.006	.770**	
ND 5	**$D_{IRAP-TOTAL}$**	.171	.088	-.304	.106
D 5	**$D_{IRAP-TOTAL}$**	-.121	-.322	.655*	.661**

Note. *p<.05, **p<.01; BDI = Beck Depression Inventory, BHS = Beck Hopelessness Scale, PCS = Positive Cue Specificity, NCS = Negative Cue Specificity, $D_{IRAP-TOTAL}$ = composite D-score.

5.3.2.10 *Regression Analysis of Depression*

A Hierarchical Regression Analysis was employed to test whether memory specificity and implicit future thinking contributed to the prediction of depression at a sub-clinical level. The predictor variables were hopelessness scores (BHS), positive (PCS) and negative cue specificity (NCS) and implicit future expectancy (D_{IRAP}). From the AMT analyses it was found that the valence categories indicated better predictive powers as individual variables than as a combined score thus accounting for the choice of inclusion of these as separate variables relative to a combined score within the regression analysis. The single overall D_{IRAP} score (calculated across all four trial-types) proved to be a successful predictor in Experiment 9 and was further employed herein. Hopelessness was entered as a predictor of group status (Depressed or Non-Depressed) in the first step. The BHS score proved to be a strong and significant predictor of group status, B = .61, p = .002, accounting for 58.7% of the variance. Autobiographical memory specificity was entered at the second step and this produced a weak increment, accounting for 61.9% of the variance (R^2 change = .032), and neither cue category were found to be significant (PCS, B = .27, p = .623, NCS, B = -.59, p = .241). At the third step the overall D_{IRAP} measure was entered, producing a significant increment, B = –6.726, p = .056, and significantly adding to the overall variance of 69.7% (R^2 change = .078). A test of the full model versus a model with intercept only was statistically significant, $\chi^2(4, N = 41) = 30.263, p < .001$. The model was able to correctly to classify 90.9% of those with low BDI-II scores, and 94.7% of those who scored high on the BDI-II, for an overall success rate of 92.7%.

Table 57 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. It is notable that, whereas the AMT fail to add significantly to the model, the FT-IRAP explains an additional 8% of the depression variance (Cohen's f^2 =.266) - a moderate effect size (Cohen, 1992). As is evident in Table 57, after controlling for hopelessness, positive cue specificity was a moderately significant predictor, though negative cue specificity was not found to be a significant predictor of depression at step 2, (p=.051 and p=.146 respectively). However, the FT-IRAP is seen as a significant predictor of depression scores at step 3, ($t(39)$ =9.349, p =.034).

Table 57. Hierarchical Logistic Regression Analysis Predicting Depression Scores in a sub-clinical population (N= 41) in Experiment 10.

Step and Variable	b	SE	Wald Statistic	Odds Ratio (95% confidence interval)	$\chi 2$	R2
Dependent variable: Depression						
Step 1					$\chi 2$ (1)= 23.715***	0.59
Beck Hopelessness Scale	0.616	0.202	9.284	1.852 (1.245 2.754)**		
Step 2					$\chi 2$ (2)=1.826^{NS}	0.62
AMT						
Positive Cue Specificity	0.27	0.55	0.241	1.310 (.446-3.855)		
Negative Cue Specificity	-0.593	0.506	1.372	.553 (.205-1.491)		
Step 3					$\chi 2$ (1)=4.721*	0.70
Implicit Relational Assessment Procedure	-6.726	3.522	3.646	0.001 (.000-1.195)*		

Note. $^{***}p$<.001; $^{**}p$<.01; $^{*}p$<.05; ^{NS} =Not significant

In a separate analysis, the FT-IRAP scores were again dichotomized to indicate whether individual D_{IRAP} scores represented a relation between future expectancies for positive events (D_{IRAP} score > 0) versus future expectancies for negative events (D_{IRAP} score < 0), to test this as a theoretically and clinically meaningful cut point. Participants whose performance revealed stronger relations between future expectancies and negative events were significantly more likely to report higher scores on the BDI (29.3%) than were those with stronger relations with positive future expectancies (17.1%), χ^2 (1, N = 41) = 5.331, p = *.021.* This cut point appears to produce adequate sensitivity and positive predictive value, as well as strong specificity and negative predictive value (see Table 46).

Table 58. Classification Statistics for the Future Thinking Implicit Relational Assessment Procedure in Prospectively Predicting Depression Levels ($N = 41$) in Experiment 10.

BDI Scores		**Sensitivity**	**Specificity**	**Positive Predictive Value**	**Negative Predictive Value**
Low	**High**				
D score > 0	D score > 0				
$n = 16$	$n = 7$	.63 (12/19)	.73 (16/22)	.70 (16/23)	.67 (12/18)
D score < 0	D score < 0				
$n = 6$	$n = 12$				

Note. Scores on the Implicit Relational Assessment Procedure were dichotomized to indicate either a relation between future expectancies and negative events (D score > 0) or a relation between future expectancy and positive events (D score < 0). Sensitivity is the proportion of sub-clinically Depressed participants correctly identified by the FT-IRAP; Specificity is the proportion of Non-Depresses individuals correctly identified by the test. Positive Predictive Value is the proportion of individuals with a positive score who were correctly classified as Non-Depressed; Negative Predictive Value is the proportion of individuals with a negative test, correctly classified as a Depressed. Raw numbers for proportions are given in parentheses.

5.3.2.11 *Regression Analysis of Hopelessness*

The second hierarchical regression analysis focused on the same relationship with one difference, the outcome variable was hopelessness rather than depression, in order to test whether memory specificity and implicit future thinking contributed to the prediction of hopelessness at a sub-clinical level. As deficiencies in autobiographical memory specificity has been termed in the literature as a marker of hopelessness and suicidal ideation it was of relevance to see if the predictive strength lie in these components specifically as opposed to depression more generally. The Hierarchical Regression Analysis was conducted with hopelessness as the dependent variable and positive and negative cue specificity, along with the $D_{IRAP,}$ as covariates. The hopelessness variable was dichotomized by use of a cutoff point of 5 on the Beck Hopelessness Scale, that is participants with a BHS score of <5 were considered healthy (N =21, M = 2.24; Low BHS group) whereas those with a score of ≥5 were considered to be showing signs of hopeless ideation (N = 20, M = 9.05; High BHS Group; this cut off was based on a mean split) the group difference was found to be significant, $t(39)$= -6.702, p<.001. Autobiographical memory specificity was not found to be a significant predictor of hopelessness levels, accounting for 5.5% of the variance and neither cue category were found to be significant (PCS, B =-.39, p = .227, NCS, B = .15, p = .608). At the second step the overall D_{IRAP} measure was entered, producing a significant increment, B = -5.335, p = .023, and accounting for 26.7% of the variance (R^2 change =.212). A test of the full model versus a model with intercept only was statistically significant, $\chi^2(3, N = 41) = 9.155, p < .05$.

As is evident in Table 59, at step 1 the AMT variables were not able to predict hopelessness ideation. At step 2 performances on the D_{IRAP} scores predicted the reported occurrence of hopeless ideation above and beyond the influence of AMS, χ^2 (2, N = 41) = 7.00, p=.030, explaining an additional 22% of the variance in hopelessness (Cohen's f^2 =.294) – a moderate to large effect size (Cohen, 1992).

Table 59. Hierarchical Logistic Regression Analysis Predicting Hopelessness Ideation in a Sub-Clinical Population (N= 41) in Experiment 10.

Step and Variable	B	SE	Wald Statistic	Odds Ratio (95% confidence interval)	χ^2	R^2
Dependent variable: Hopelessness						
Step 1					χ2 (2)=1.711	0.0[illegible]
AMT						
Positive Cue Specificity	-0.395	0.326	1.462	0.674 (.356-1.277)		
Negative Cue	0.157	0.306	0.263			
Specificity				1.170 (.642-2.135)		
Step 2					χ2 (1)= 7.444**	0.2[illegible]
Implicit Relational	-5.335	2.347	5.165			
Assessment Procedure				0.005(.000-.480)*		

Note. **p<.01; *p<.05

BHS scores where further dichotomized to gain a measure of sensitivity, specificity and predictive value of the FT-IRAP positive and negative values in relation to hopeless ideation. As in the above analysis with the BDI-II, the FT-IRAP D-score values representative of positive future expectancy (D_{IRAP} score > 0) versus negative future expectancy (D_{IRAP} score < 0) were assessed as ample indicators of pathological future beliefs. Participants whose performance revealed stronger relations between future expectancies and negative events were significantly more likely to report higher scores on the BHS (29.3%) than were those with a stronger relation with positive future expectancies (19.5%), χ^2 (1, N = 41) =4.108, p = .043. Thus it appears that this cut point offers adequate negative predictive value (see Table 60).

Table 60. Classification Statistics for the Future Thinking Implicit Relational Assessment Procedure in Prospectively Predicting Hopelessness Scores (N = 41) in Experiment 10.

BHS Scores		**Sensitivity**	**Specificity**	**Positive Predictive Value**	**Negative Predictive Value**
Low	**High**				
D score > 0	D score >0				
n = 15	n = 8	.60 (12/20)	.71 (15/21)	.65 (15/23)	.68 (12/18)
D score < 0	D score < 0				
n = 6	n = 12				

Note: Scores on the Implicit Relational Assessment Procedure were dichotomized to indicate either a relation between future expectancies and negative events (D score > 0) or a relation between future expectancy and positive events (D score < 0). Sensitivity is the proportion of participants *with* hopeless ideation correctly identified by the FT-IRAP; Specificity is the proportion of participants correctly identified by the test as showing *no* hopeless ideation. Positive predictive value is the proportion of individuals with a positive test who were correctly classified as *not* pessimistic about their future; Negative predictive value is the proportion of individuals correctly classified as pessimistic with regards to their future outlook. Raw numbers for proportions are given in parentheses.

5.3.3 Summary

Experiment 10 offered a direct comparison of the AMT and FT-IRAP. Within the Depressed group, the D_{IRAP} was found to correlate with specificity in recall for both positive and negative events. The regression model for depression further suggested a link between past and future thinking by providing an overall success rate of 92.7%. In regards to the main aims of Experiment 10 it was found that (1) the FT-IRAP was a stronger predictor overall in the depression model; with the FT-IRAP effect was further seen to be a strong indicator, in its own right, of depression levels as measured by the BDI-II, by generating strong levels of sensitivity and specificity.

Table 61. Summary of Main Aims and Findings from Experiment 10.

	Research Aim	Hypothesis	Main Findings
1	To investigate if the FT-IRAP and the AMT will be comparably sensitive and specific in the detection of sub clinical depression as measured by the BDI-II.	*Implicit future cognitions, as measured by the FT-IRAP will be more sensitive in detection of depression as measured by the BDI-II, relative AMS as measured by the AMT.*	*The hypothesis is supported.* Within the Depression group a positive relationship was found for implicit future cognitions and positive AMS (p<.05) and negative AMS (p<.01). The AMT failed to add significantly to the model. At Step 2 *positive* cue specificity was a moderately significant predictor, (p=.051). At Step 3 the FT-IRAP is seen as a significant predictor of depression scores (p<.05).
2	Examine if the FT-IRAP and the AMT will be equally sensitive and specific in the detection of hopelessness ideation as measured by the Beck Hopelessness Scale.	*Implicit future cognitions, as measured by the FT-IRAP will be more sensitive in detection of hopelessness ideation as measured by the BHS, relative to AMS as measured by the AMT.*	*The hypothesis is supported.* Within the Non-Depressed group a negative relationship was found positive AMS and hopelessness (p<.05). At Step 1 the AMT variables were not able to predict hopelessness ideation. At Step 2 the FT-IRAP is seen as a significant predictor of hopelessness ideation (p<.05).

In regards to the second aim (2) it was seen in the hopelessness regression that AMS did not add to the model, by either valence category, with the FT-IRAP demonstrating predictive ability beyond that of the AMS variables. Thus suggesting that specificity in autobiographical memory may not be a feature component of hopelessness ideation. The FT-IRAP individually offered a strong detection of hopelessness ideation with stable levels of sensitivity and specificity in recognition of such cognition. Although, the findings from Experiment 10, from the AMT, support the findings from

Chapter 2, implicit future thinking appears to represent a closer relationship to depression in general and hopelessness more specifically. Table 61 summarises the main findings from Experiment 10.

5.4 General Discussion

Chapter 5 aimed to determine whether the FT-IRAP could be employed as a useful procedure to implicitly measure future thinking in depression and how results on this measure compared with explicit measures of past (Autobiographical Memory Task: AMT) and future thinking (The Future Thinking Task: FTT). In addition to this, the empirical work herein aimed to provide further empirical support to the postulate that a lack of positive future expectancies is a characteristic of depression.

In Experiment 9 it was seen that, consistent with previous research, participants scoring high on the BDI-II were found to differ from those scoring low on the BDI-II in their generation of positive future events on the explicit Future Thinking Task (MacLeod, et al., 1997). Additionally, the general trend, for the generation of negative future events was also in line with previous studies, that is, no difference was seen in this regard for the Depressed on Non-Depressed individuals. The FT-IRAP proved more sensitive/predictive of depression levels in relation to the FTT, that is, the Non-Depressed group demonstrated a tendency towards positive future expectancies, by faster reaction times on the consistent trials. The Depression group appeared to identify with negative future expectancies, by generating faster response times on the inconsistent trials. This predictability was also seen in regards to hopelessness, with the FT-IRAP adding significantly to the model relative to the FTT fluency variables.

In Experiment 10 it was found that the AMT responses and levels of specificity demonstrated by the two groups were consistent with previous research, and the Experiments from Chapter 2, with improved levels of specificity in recall observed by the Non-Depressed individuals. A valence bias was found in parallel to the trend seen with Experiments 1a and 2a, with specificity in recall of positive past events being the main factor contributing to the groups diverging on the AMT. In Experiment 10 it was found that participants with low BDI-II scores demonstrated greater future optimism as measured by the FT-IRAP, with the high BDI-II scorers responding in line with a reduced level of optimism. The FT-IRAP demonstrated predictability of depression and hopelessness levels beyond that of the AMT, with significant contributions to the depression and regression models as opposed to the AMT which failed to add to these regression models at a significant level.

Overall the FT-IRAP and AMT regression model proved the strongest predictor of depression relative to the FT-IRAP and FTT model, with the FTT/IRAP model able to correctly classify 78.9% of those who reported a low score on the BDI-II and 66.7% of those who scored high on the BDI-II, with an overall success rate of 73.2%, whereas the AMT/IRAP model was able to predict group membership for 90.9% of those who scored low on the BDI-II and 94.7% of those who scored high on the BDI-II, for an overall success rate of 92.7%.

The FT-IRAP most significantly added to the hopelessness regression models, relative to the depression models, by accounting for 28 % of the variance in the FTT/IRAP hopelessness model and for 22% in the AMT/IRAP hopelessness model. As such the FT-IRAP measure of future expectancy may be particularly relevant in regards to research on hopeless ideation in future thinking, e.g. suicidal ideation. The current results indicate that the FT-IRAP may have value in predicting group membership regarding BDI-II scores; as overall, the FT-IRAP demonstrated a clear advantage over both the AMT and FTT in regards to its predictive power of group membership in sub-clinical depression samples. Specifically, it was found that across two separate experiments, and with different participants, the FT-IRAP consistently demonstrated good levels of sensitivity and specificity in detection of depressed and hopeless ideation.

The current results may be important in terms of aiding our understanding of the vulnerability factors pertaining to clinical disorders. These results add to the understanding of how thoughts about the past and the future can impact on our affect and vice versa. In the current chapter the implicit pairing of subjective expectancies with future experiences was predictive of sub clinical depression. Many researchers have argued for explanations of depression that rely on cognitive processes, such as Becks schema (e.g. Beck, 1967). From a behaviour-analytic perspective, however, such explanations are incomplete because they leave terms such as schema, which are also behaviours, unexplained (Barnes, 1989; Hayes & Brownstien, 1986). The IRAP is grounded in Relational Frame Theory (see Section 1.3.3 for a detailed account) a behavioural account of human language and cognition (e.g., Hayes, Barnes-Holmes & Roche, 2001; Sidman, 1994) and as such viewing future thinking as forms of derived relational responding (i.e., behaviours) may be useful at the level of intervention. Specifically, Acceptance and Commitment Therapy (ACT) is a therapeutic treatment package that has developed out of the Relational Frame Theory account of language and cognition that suggests useful ways for dealing with negative thoughts.

Chapter 6

Coping Strategies for Negative Past and Future Outlooks - Part I:

Mindfulness

6.1 General Introduction

In the foregoing chapters it has been noted that increased negative or reduced positive future anticipation are vulnerability factors for depressive disorders (e.g. Beck, 1967; Macleod et al., 1996). However, it has also been noted that reduced access to negative past experiences may inhibit regulatory functions of episodic memory, as individuals fail to benefit from the functional quality of 'learning from mistakes', or even to make use of the prior experience in anticipation of future problems. That is, research has shown that lack of specificity in recalling past (negative) events is related to avoidance, rumination and impaired problem solving (Williams et al., 2007). This lack of contact with personal past content has been shown as a risk factor for major depression (Teasdale et al., 2002). As was noted in Chapter 1 (see Section 1.3) common accounts of depression, i.e. cognitive theories, have focused on altering negative beliefs and the emotional engagement with such beliefs in an effort to reduce symptoms and progression of such disorders (for review, see Hollon, Thase, & Markowitz, 2002). And indeed support has been noted for such approaches in view of negatively biased reasoning and self-regard as risk factors for depression. However, limitations of such treatments have been noted with high recurrence rates following cognitive therapies. These shortcomings in treatment have led to the emergence of new approaches.

Mindfulness is one of several third wave behaviour and cognitive techniques receiving increasing attention in the clinical literature (Kabat-Zinn, 1990). This technique focuses on increasing an individual's willingness to experience distressing thoughts, feelings and bodily sensations without altering their content or frequency (Hayes, Strosahl & Wilson, 1999). Mindfulness has been described as *'the awareness that emerges through paying attention on purpose, in the present moment and non-judgementally to the unfolding of experience, moment to moment'* (Kabat-Zinn, 2003, p.145). It involves continuous, clear-sighted attention to ongoing subjective experience together with an attitude of acceptance towards that experience (Ortner, Kilner & Zelazo, 2007). Knowledge of mindfulness meditation has grown exponentially over the past thirty years, resulting in scientifically-backed support for mindfulness by researchers in diverse fields, including psychology, neuroscience, and philosophy, amongst others (Fletcher & Hayes, 2005). The recent development of therapies such as mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990) and mindfulness-based cognitive therapy (MBCT; Teasdale, Segal & Williams, 2000) has resulted in medical practitioners increasingly encouraging their patients to explore mindfulness meditation practices to alleviate a variety of physical and mental ailments.

Acceptance and Commitment Therapy (Hayes, Strosahl & Wilson, 1999) as one of the third wave behaviour therapies, employs mindfulness techniques. ACT further emphasizes the postulate that thoughts are transitory events and should be accepted as such rather than interpreted literally. This endorsement of accepting emotional content, even when perceived as negative, is similar to mindfulness as it promotes experiencing psychological events in a non-evaluative and non-judging way. ACT emphasizes the willingness to experience such events without trying to control, change or suppress them (Hayes, 2004). As argued in Chapter 1, attempts to control or suppress unwanted thoughts may be counterproductive and result in an increase of such negative thoughts (e.g. Wegner, 1994; Wenzlaff & Wegner, 2000). Lynch, Robins, Morse, and MorKrause (2001) have shown that avoidance of, or resistance to, emotional content is predictive of psychological distress in both clinical and non-clinical populations. Cognitive defusion (or defusion) is an ACT based coping strategy for dysfunctional or negative thoughts. Defusion involves encouraging people to view their thoughts as just thoughts rather than ontological truths. Mindfulness and defusion create cognitive flexibility by re-contextualising thoughts, that is, by altering the function of thoughts (i.e. the strength of belief in thoughts) (Blackledge, 2007).

In an attempt to construct a measure of mindfulness processes Bishop and colleagues (2004) focused on two components, that of the current experience, and curiosity to and acceptance of thoughts (defusion). Lau and colleagues (2006) later added the concept of 'intentional self regulation of attention'. Thus, Bishop and Lau and colleagues set the focus on awareness and acceptance in their evaluation of the mindfulness process. The Toronto Mindfulness Scale (TMS) (Lau et al., 2006) was specifically constructed to assess the processes proposed in this two-component model. Therefore, the TMS assesses (1) curiosity (i.e. wanting to learn more about the experience) and (2) decentering/defusion (i.e. distancing from thoughts and feelings with an increased awareness of current experiences, Lau et al., 2006).

The importance of such awareness and acceptance has been noted in research on Autobiographical Memory Specificity (AMS) where it has been found that by use of interventions to increase these components the risk of recurrence of depression is reduced (Teasdale et al., 2002). These findings have important clinical implications as they demonstrate the need for access to negative events, which is functional if the content can be experienced without the individual becoming overwhelmed or fused with the emotional connotations of such events. A study by Teasdale et al. (2002), focused on MBCT as an intervention aimed to increase AMS. This was one of the first studies to demonstrate that mindfulness can facilitate changes in decentering. However, this study was based on a prolonged treatment program which extended over several weeks. However, the effect of mindfulness processes have been demonstrated in experimental laboratory studies after inductions as short as ten minutes in length (Roemer & Orsillo, 2003; Williams, 2008). That is, laboratory studies with untrained meditators have compared brief mindful breathing exercises to rumination and distraction, suggesting that mindfulness may facilitate recovery from a depressed mood induction (Broderick, 2005). Arch and Craske (2006) similarly found participants to demonstrate an increased willingness to carry out a stressful task. However, this study did not explicitly examine whether mindfulness lead to decentering from private experiences.

The concept of decentering as an outcome of mindfulness based interventions has gained some focus in recent laboratory studies. Frewen, Evans, Maraj, Dozois, and Partridge (2008) investigated trait mindfulness by use of a random student sample in relation to the rate of, and response to, negative thoughts as separate concepts. Mindfulness was found to facilitate decreased frequency of negative automatic thoughts as well as higher perceived ability to "let-go" of negative thoughts. However, they did not include a control group, leaving the question regarding the specific effect of mindfulness meditation unanswered. In a related line of research, the TMS has been used to assess decentering directly following the practice of mindfulness meditation (Lau et al., 2006; Ortner, Kilner, & Zelazo, 2007; Thompson & Waltz, 2007). Although, many of the initial studies failed to include control groups, Erisman and Roemer (2010) recently included a neutral control condition in comparison with a brief mindfulness task, in which the control condition included the solving of a 'mental puzzle' or paying attention to recordings with educational content. The findings from this study suggested that mindfulness facilitated greater decentering as measured by the TMS. The recent upsurge in mindfulness based practice calls for an understanding of how increased awareness and acceptance operates. Appreciation of the underlying effect may be facilitated by examination of the presence of such an effect of improved cognitive functioning in healthy samples, prior to inferring and generalizing treatment effects at a more clinical level. Due to the exploratory nature of the current thesis, on the relation between past and future thinking in depression, it seemed pertinent to examine how this relation may be facilitated by the subjective level of awareness of private cognitions.

As has been noted, the subjective discrepancies between explicit and implicit cognitions may lead to difficulties in (psychological) functioning; with mood regulation strategies and emotional avoidance observed utilised by individuals in order to accommodate such conflicting explicit and implicit cognitions which do not adhere with ones current self-perspective. The understanding of the basic level of operation in relation to increased awareness via mindfulness is particularly relevant in attempts to facilitate explicit recognition of more automatic implicit cognitions in order to create greater coherence between such processing. Thus, mindfulness may act as a moderator of implicit and explicit attitudes in past and future thinking as related to depression. In this regard it would be expected that increased awareness of implicit cognitions would lead to stronger relations between implicit and explicit beliefs. That is, if automatic cognitions are not unconscious *per se,* the concordance between implicit and explicit cognitions would be related to the level of subjective awareness of such implicit cognitions. However, if automatic cognitions are exclusively unconscious, such increased awareness and introspection would not affect the relationship between explicit and implicitly held cognitions. This may have implications for clinical interventions and impact on the treatment packages currently offered.

In the previous chapters it has been consistently demonstrated that within healthy samples there exists a positivity bias in relation to both past and future cognitions, with increased levels of details and expectancy towards such positive experiences in relation to more negative events. However, it has also been noted that negative content has a functional role within daily living and psychological health. Mindfulness would facilitate healthy individuals to contact negative content if required to do so, by want or necessity. If mindfulness based approaches are to be applied in this context it is necessary to understand how these approaches would operate within healthy samples prior to use in clinical settings. That is, the moderating effects need to be established in order to understand the basic underlying processes. To this end Experiments 11, 12 and 13 aim to directly examine the contribution mindfulness based strategies may offer in relation to cognitions about the past and future.

6.2 Experiment 11

The rationale of AMS in depression has been demonstrated in several studies (for a review, see Van Vreeswijk & de Wilde, 2004; Williams et al., 2007) and is discussed in Chapter 1 (see Section 1.4.1.1.1) and Chapter 2 (see Sections 2.1 and 2.2). In short, reduced AMS is a contributing factor to depression (Gibbs & Rude, 2004; van Minnen, Wessel, Verhaak, & Smeenk, 2005). From an intervention perspective mindfulness-based cognitive therapy (MBCT) has been found to increase AMS (Williams, Teasdale, Segal, & Soulsby, 2000). MBCT specifically facilitates increased attention to present experiences, without judging or analytically processing it (Kabat-Zinn, 1982). MBCT consists of weekly training sessions with meditative exercises and group discussions pertaining to the individual experiences of these exercises. As part of MBCT individuals are encouraged to complete daily 45-min exercises.

Decentring following mindfulness inductions have been seen to increase awareness pertaining to the relative fluctuation of mood states. This increased awareness works to challenge depressed mood as everlasting and as a trait feature of the self. Watkins et al. (2000) found that participants in a decentring group, relative to a control group, recovered more easily from an induced negative mood, and reported shifts in perspective concerning mood states. In a reported pilot study Watkins (1999) investigated the effect of a decentring induction (Watkins *et al*., 2000) in regards to AMS and found increased AMS in memories recalled by dysphoric participants. However, Watkins' (1999) did not follow the standard procedure of the Autobiographical Memory Test (AMT; Brittlebank et al. 1993; Williams, 1995) as in the Watkins study participants were asked to ruminate on the recalled memory for 8 minutes in order to maximize any existing negative thoughts and feelings. The rumination procedure involved directing attention to the self, current symptoms, causes, consequences and importance of the current mood. As such it may be that the increased AMS resulted from an interaction between rumination and decentring rather than as a main effect of decentring *per se*.

Experiment 11 aims to determine whether a brief Focused Attention task (i.e. a mindfulness based technique; adapted from Arch & Craske, 2006) will facilitate decentering and influence AMS in a non-clinical population, relative to an Unfocused Attention condition. It is expected that the group who receive the Focused Attention induction will report greater levels of specificity on the AMS. Specifically, decentering in form of experiential awareness should allow for greater contact with negative content, relative to that of the Unfocused Attention group. To this end Experiment 11 has two main aims, (1) to determine if AMS is improved following a Focused Attention Task relative to an Unfocused Attention task, with particular reference to improved specificity in recall of negative past events; it is predicted that AMS of past events will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task. (2) To test if a Focused Attention task has a unique effect on experiential awareness as measured by the decentering component of the Toronto Mindfulness Scale; it is predicted that decentring scores as measured by the Toronto

Mindfulness Scale will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task.

6.2.1Method

6.2.1.1. Participants

Thirty-Six undergraduate students at Swansea University volunteered to take part in this experiment in return for course credits. Following the exclusion criteria pertaining to BDI-II scores (see Section 6.2.2.1) data from six participants were left out of the final statistical analysis. Of the included thirty participants there were 9 males and 21 females. Participant ages ranged from 19 to 25 years, with a mean of 21.03 ($\sigma = 1.62$) years. All participants were undergraduates at Swansea University, with English as their first language.

6.2.1.2 Apparatus and Materials

Autobiographical Memory Task (AMT; Williams & Broadbent, 1986; Williams et al., 1996). The AMT procedure and stimuli was equivalent to that employed in previous experiments (i.e., 1a, 2a and 10) (see Section 2.2.1.2 for details of presentation and Section 2.2.1.3 for AMT procedure). All cue responses were recorded on a Dictaphone and inter-rated for consistency in coding. An inter-rater reliability analysis using the Kappa statistic was performed to determine consistency among raters. A sample of 85% of the responses was rated by a second independent rater, and an inter-rater reliability of 98% (k = .98) was obtained.

The Toronto Mindfulness Scale (TMS; Lau, Bishop, Segal, Buis, Anderson, Carlson, Shapiro, & Carmody, 2006) is a 13-item, two-factor scale assessing the capacity to invoke a mindful state immediately following e.g. a meditation or focused breathing exercise for which participants must rate their awareness during this time. Items within the TMS reflect Bishop, Lau, Shapiro, Carlson, Anderson, Carmody, et al.'s (2004) two-component definition of mindfulness: (i) 'the intentional self-regulation of attention to facilitate greater awareness' and (ii) 'a quality of attention characterized by curiosity, acceptance, and openness to experience'. The items of Factor 1 (Curiosity) reflect awareness of the present and an attitude of wanting to learn more about the experience. The items of Factor 2 (Decentering) emphasize awareness of the experience rather than being 'carried away' by thoughts and feelings (Lau et al, 2006, p. 1425). Decentring scores thus reflect a change in awareness, by creating some distance to the thoughts and feelings the experience is one of a wider awareness. There are 6 questions measuring curiosity and 7 questions measuring decentring. Items are rated on a 5 point scale with 0 being "not at all" and 4 being "very much". All items are written in a positively keyed direction, so no reverse scoring of items is required, with a higher score reflecting higher level of mindfulness. There has been limited study of this measure, but preliminary evidence suggests that the TMS has adequate internal consistency reliability (Cronbach's alpha = .95) and criterion and incremental validity, and there is support for the two-factor structure (Lau et al., 2006).

Psychometric and psychological tests. The psychological measures employed in previous chapters were completed in the same manner and direction within the current study. These included the The Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer & Brown, 1996); The Beck Hopelessness Scale (BHS; Beck & Steer, 1988); The State Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983); The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988); The Life Orientation Test – Revised (LOT-R; Scheier, Carver, & Bridges, 1994); The Acceptance and Action Questionnaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004) and the Verbal Fluency Control Task (Lezak, 1976) (see Section 2.2.1.2 for details on each measure).

Experimental groups. Participants were randomly allocated to one of two experimental groups, Focused Attention and Unfocused Attention. The intervention tasks (Focused vs. Unfocused Attention) were based on similar interventions used by Arch and Craske (2006). The aim of the Focused Attention task was for participants to direct their attention and awareness to any sensations that they were experiencing in that present moment, with particular focus on their breathing. The Unfocused Attention Task served as a control task, which had no intended effect apart from a 'free flow of thoughts'. Both pre-experimental tasks included listening to and adhering to instructions presented on a recorded tape. The recorded instructions for each induction lasted 15 minutes. The length of instructions in each of the tasks was matched in the opening directions with *'Now we're going to do an exercise for 15 minutes. First, settle into a comfortable sitting position'*, and in provision of instructions on what to do if attention fades (e.g. *''bring your mind back''* to the focus of the exercise). A Dictaphone (Olympus VN-2100PC) was used in the recording and presentation of the two tasks. The following instructions were presented at the start of the recordings:

i) **Presented to both groups;** *Much of the emotional distress people experience is the result of thinking about upsetting things that have already happened or anticipating negative events that have yet to occur.*

ii) **Presented only to the Focused Attention group;** *Distressing emotions such as anger, anxiety, guilt and sadness are much easier to bear if you only focus on the present – on each moment one at a time. This is an exercise to increase your awareness of the present moment so that you can clear away any thoughts about past and future events.*

iii) **Presented only to the Unfocused Attention group***; Distressing emotions such as anger, anxiety, guilt and sadness are often brought to mind. With this exercise let your mind wander freely amongst thoughts about past and future events*

Focused Attention. The main recorded instructions for the Focused Attention induction were adapted from Arch and Craske (2006) who previously adapted their version from the sitting mindfulness meditation exercise used by Kabat-Zinn (1990) in his Mindfulness Based Stress Reduction program and subsequently by Segal et al. (2002) in Mindfulness Based Cognitive Therapy. The aim of the Focused Attention induction was for participants to direct their attention and awareness to whatever sensations they were experiencing in the present moment, with a particular focus on the experience of breathing. Participants were told *''Don't try to change anything about your breathing, just notice the air moving in and out of your body ......focus on the actual sensations of breath entering and leaving the body. There is no need to think about the breath - just experience the sensations of it....if you notice that your awareness is no longer on your breath.....gently bring your awareness back to the sensations of breathing......... Try to focus all your attention on your breathing...''*

Unfocused Attention. This induction advised participants *''Don't try to focus on your thoughts, just let them drift...without hesitation...simply think about whatever comes to mind...... Allow yourself to think freely....... Openly let your thoughts flow........Let your mind wander freely without trying to focus on anything in particular.''* Variants of these instructions were repeated every 30–60 seconds for the first 5 minutes, leaving longer intervals (i.e. every 1 to 2 minutes) between instructions in the last 10 minutes of the exercise, which lasted in total for 15 minutes.

Manipulation check. Following the mindfulness induction, individuals were asked to complete a Post Attention Test (PAT), that is, a post-experiment feedback report that inquired about their adherence to the recorded induction instructions. Participants responded to the question: *'I attempted to follow the induction instructions'* on a scale Likert scale (0–7), 1= very untrue, 4 = feel neutral about it, 7= very true, thus high scores reflected higher levels of task adherence.

6.2.1.3 Experimental Overview

The current study used a 2 x 2 mixed design, with Group (Focused Attention, Unfocused Attention) as the between participant variable and Valence (Positive Memory Specificity, Negative Memory Specificity) as the within participant variable. All participants completed the psychometric and wellbeing questionnaires along with the Verbal Fluency Control Task; this was followed by random assigned to one of two groups that were differentiated in terms of the instructions they received regarding completion of a focused or unfocused attention task. All participants subsequently completed the Post Attention Test, the Toronto Mindfulness Scale and the Autobiographical Memory Test. The experimental sequence is depicted in Figure 41.

6.2.1.4 Ethical Issues

Ethical considerations were adhered to in Experiment 11 by ensuring specific measures were put in place in line with the British Psychological Society (2009, 2006) guidelines. These were consistent with those outlined previously for Experiment 1a (see Section 2.2.1.4). Minor adjustments were made to facilitate the change in methodologies to tailor instructions to the current experiment, with emphasis put on the focused and unfocused tasks. No participants reported recalling a traumatic past event during the Autobiographical Memory Task. No participants reported a deflated mood or a negative emotional response upon departure. At no point during the experiment did any participant withdraw from the experiment or express dissatisfaction or distress of any kind. Prior to commencement the experiment was approved by the Department of Psychology, Swansea University Ethics Committee.

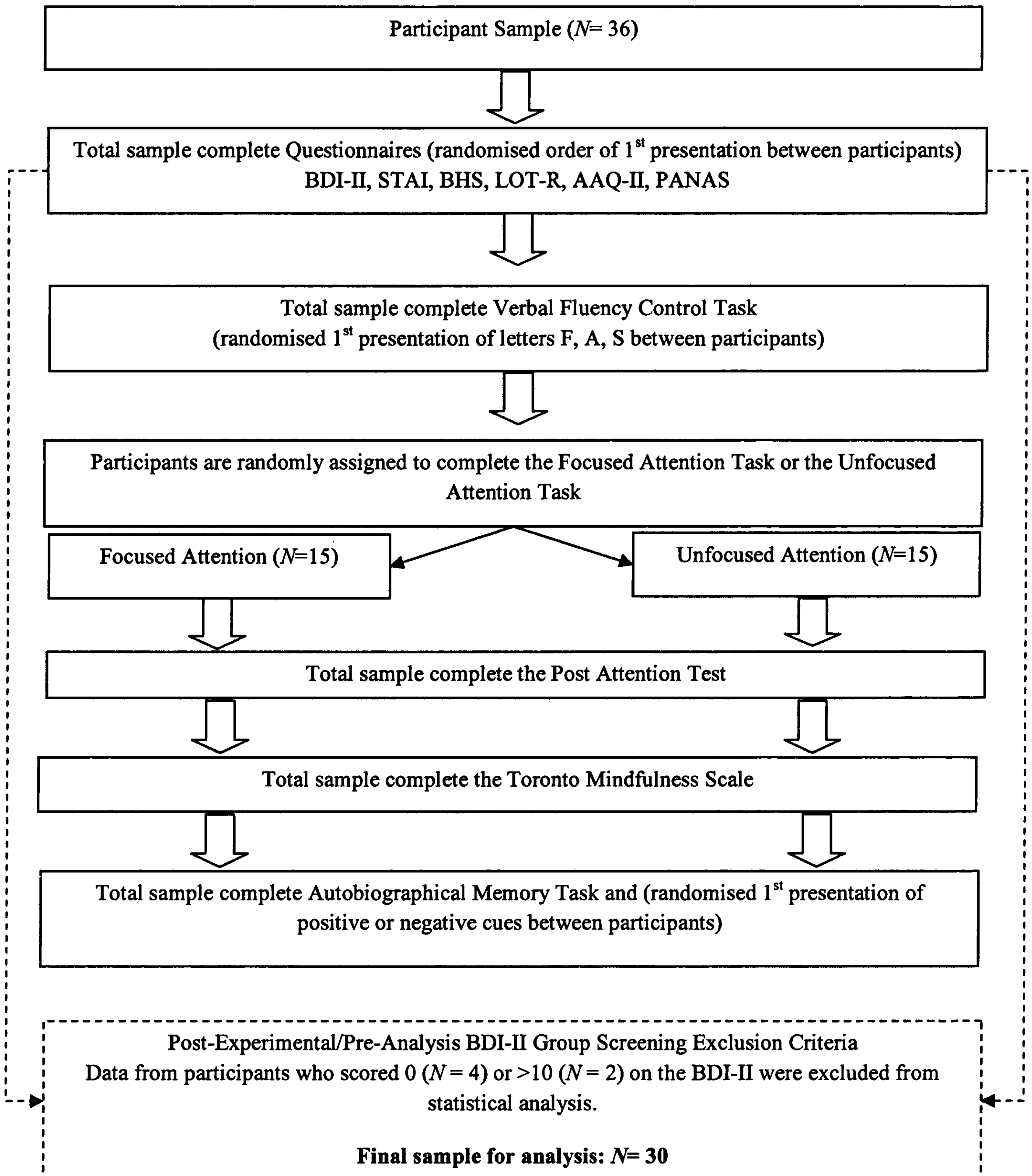


Figure 41. Overview of the Experimental Sequence for Experiment 11.

6.2.1.5 Procedure

The experiment took place in a quiet room free from distraction which contained only a desk and a chair. All participants completed the psychological measures and the Verbal Fluency Control Task prior to commencement of the experimental induction task. Participants were randomly allocated to either the Focused or Unfocused Attention task. Instructions were provided verbally by the experimenter prior to the induction and participants were encouraged to follow and adhere with the instructions presented on the tape to their best ability. Care was made to ensure the participants were comfortably seated and participants were encouraged to undertake the exercise with their eyes closed, so as to free up any distraction. Following the induction participants completed the post attention test followed by the Toronto Mindfulness Scale. The Autobiographical Memory Task (AMT) subsequently followed and took form as an experimenter led task; with participants allocated 60 seconds of recall for each of the 12 cue words (see Section 2.2.1.3 for further details on the AMT procedure), with positive and negatively emotive cue words interchangeably presented. At the end of the experiment, participants were thanked for participating, and suitably debriefed.

6.2.2 Results and Discussion

As in all previous studies the current study opted to remove any participants with a score of 0 ($N = 4$). Due to the nature of the study, additionally it was also sought here to remove any participant data from those displaying depression levels of 10 or above as reported on the BDI-II ($N = 2$, $M = 13.5$) in order to more accurately capture a sample of non-depressed participants. All the included participants reported a score of 9 or less ($M = 5.10$) on the BDI-II.

Table 62. Demographics and Psychometric tests results for the Focused and Unfocused groups, presented as Mean scores with Standard Deviations (SD) for each group in Experiment 11.

Variable	**Focused Attention *(SD)***	**Unfocused Attention *(SD)***
Gender: Females **(Males)**	11 **(4)**	10 **(5)**
Age	21.00 *(1.73)*	21.06 *(1.57)*
VFCT	10.47 *(4.53)*	10.73 *(2.88)*
BDI-II	5.20 *(2.51)*	5.00 *(2.92)*
BHS	5.13 *(4.47)*	2.93 *(2.21)*
STAI	30.73 *(10.25)*	33.06 *(6.95)*
LOT-R	17.13*(2.99)*	16.67 *(2.31)*
AAQ-II	49.40 *(7.50)*	51.46 *(5.26)*
PA	27.93 *(8.37)*	30.86 *(7.42)*
NA	12.80 *(4.72)*	14.20 *(3.91)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

6.2.2.1 *Group Allocation*

Preliminary analyses found no difference between groups pertaining to age $t(28) = -.110, p = .913$, verbal fluency $t(28) = -.184, p = .856$, nor gender, $\chi 2\ (1) = .159, p = .690$. Data analyses further indicated no difference between the Focused and Unfocused Attention groups on the psychometric measures of STAI, $t(28) = -.730, p = .472$, BDI-II, $t(28) = .201, p = .842$, BHS, $t(28) = 1.707, p = .099$ and LOT-R t(28) = .477, p =.637. Nor were there any differences pertaining to Mood (PA, $t(28) = -1.015, p = .319$, NA, $t(28) = -.884$, p =.384) or emotional avoidance (AAQ-2; $t(28) = -.874, p = .390$). The groups were thus well matched and the group characteristics can be seen displayed in Table 62.

6.2.2.2 *Induction adherence.*

The post-experiment attention measure (PAT) found no significant differences between groups in response to the statement: *'I attempted to follow the induction instructions'*. Although participants in the Focused Attention group reported somewhat higher levels of adherence (*M*= 5.73, σ =.88) relative to the Unfocused Attention group (*M*= 5.06, σ =1.27) although these were not statistically significant ($t(28)$ =1.66, p=.108). The overall mean across groups of indicated that participants viewed this statement as a 'somewhat true' (*M* = 5.40, σ = 1.13).

6.2.2.3 *Post Induction Mindfulness.*

In analysis of the factors pertaining to the TMS a significant difference was found between groups with regards to the Decentering component, with the Focused Attention group reporting higher levels of awareness (*M* = 14.13, σ =2.97) relative to the Unfocused Attention group (*M* = 11.67, σ = 3.53; t(28)=2.067, p=.048). However no difference was observed between groups for the Curiosity component, in fact the Unfocused Attention group were seen to report somewhat higher scores in this direction relative to the Focused Attention group (*M* = 13.06, σ = 5.25 and *M* = 11.33, σ = 4.83 respectively; p=.355).

6.2.2.4 *Autobiographical Memory Test.*

The first response across the 12 trials, i.e. memories that participants retrieved in response to the 12 AMT cue words that were specific, was used to index AMS with higher scores indicating increased specificity (see Section 2.2.2.3 for further details on the transformation of AMT data; cf. Williams et al., 2006, 2007),.

High positive correlations were seen between the number of specific memories produced under each valence category with the total number of specific recall (Focused Attention group positive cues, .91, and negative cues .91; Unfocused Attention group, positive cues .93 and negative cues .89). On average, retrieved memories for participants in the Focused Attention group were specific 78.88% of the time across the 12 trials; whereas the Unfocused Attention group showed reduced specificity in retrieval overall with 53.88% of the 12 trials noted as specific. Differences in specificity between groups were seen for both valence categories with the Focused group retrieving a greater number of specific memories relative to the Unfocused group on overall specificity ($M = 9.46$, $\sigma = 1.92$ and $M = 6.46$, $\sigma = 2.55$ respectively).

Table 63 presents the AMT performance for both groups and as can be seen both groups recalled more positive than negative events, and omissions were rare.

Memory specificity was subjected to a 2 (Group: Focused vs. Unfocused) x 2 (Cue valence: Positive & Negative) mixed model Analysis of Variance (ANOVA). A main effect for Valence specificity was found, $F(1, 28) = 10.892$, $p = .003$, $\eta p^2 = .280$, with participants being more specific in recall to positive cues overall relative to negative cues. A main effect for group was also found, $F(1, 28) = 13.174$, $p = .001$, $\eta p^2 = .320$, with the Focused Attention group being more specific in recall of past events relative to the Unfocused Attention group. The Group and Valence interaction was seen to approach significance ($F(1,28) = 3.651$, $p = .066$, $\eta p^2 = .115$), with the Focused group more specific in recall of negative past experiences relative to the Unfocused group.

Table 63. Autobiographical Memory Test Performance responses presented as Percentage of Specificity, Mean number, with Standard Deviations (SD), of Memory Specificity across the six cue words in each valence category within the Focused and Unfocused Attention groups in Experiment 11. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	Focused Attention	Unfocused Attention		
	Mean *(SD)*	**Mean *(SD)***	***t*(28)**	***p***
Total % of specific memories	78.88*(16.01)*	53.88 *(21.32)*		
Total % of omissions	1.14 *(2.26)*	2.30 *(3.63)*		
Total cues	9.46 *(1.92)*	6.46 *(2.55)*	3.630	*0.001****
Positive cues	4.86 *(1.06)*	3.73 *(1.27)*	2.641	*0.013**
Negative cues	4.60 *(1.05)*	2.73 *(1.53)*	3.630	*0.001****

Note. *$p < .05$; ***$p = .001$. Positive/Negative Cues = number of *specific* first memories relative to the detailed valence category on the Autobiographical Memory Test.

6.2.2.5 *TMS correlations*

No correlations were found for AMS and either of the TMS components. However, the decentering factor from the TMS was found to positively correlate with the pre-experimental AAQ-2 scores (r =.430, p =.018), with low emotional avoidance related to increased decentering reports. The two groups did not differ in regards to their pre-induction AAQ-2 scores, perhaps suggesting that the brief Focused Attention task facilitated cognitive defusion which facilitated greater specificity in the recall of past events.

6.2.3 Summary

Regarding the main aims of Experiment 11 it was found that (1) AMS varied following the Focused Attention Task relative to the Unfocused Attention task overall, with enhanced specificity in recall of negative past events particularly notable. In regards to the second aim it was seen that (2) a brief Focused Attention Task had a distinctive effect on experiential awareness as measured by the decentering component of the TMS. The current data reveal that implementation of even very brief mindfulness based techniques facilitates specificity in retrieval of autobiographical memories, and thus may be relevant in relation to overcoming OGM deficiencies. As such, Experiment 11 replicates findings by Williams et al. (2000) and extends on Heeren, Van Broeck and Philippot (2009) with a non-clinical sample, as the data suggest that a short focused attention (mindfulness based technique) increases specific and decreases general (i.e., extended and categorical) autobiographical memory retrieval. Support is also provided to previous suggestions by Roemer and Orsillo (2003) who proposed that focused attention may facilitate a change in pre-established relations, by a shift to flexible and intentional responding relative to more rehearsed and automatic relations. As such it may be this awareness which facilitates a move from automatic to conscious processing and creates the space to make the choice of distancing oneself from the content. Roemer and Orsillo (2003) sees the complete focus on present-moment experience as the main facilitator of flexible responding, which is supported by Hayes, Strosahl and Willson (1999) who have argued that a certain level of awareness is required in order to shift environmental contingencies, such as rigid rule following. Thus, it is likely that such present moment awareness was induced by the Focused Attention task, which likely evoked an active choice of approaching the past experiences with an 'open mind', a process noted as 'relating openly with experience' (Bishop et al., 2004). Acceptance and mindfulness based approaches aim to vary the *impact* of, and *response* to, thoughts and feelings relative to the content of these. As such these approaches appear particularly effective for use in relation to psychological disorders characterized by increased negative affect, as intolerance to negative content is related to experiential avoidance. The main findings from Experiment 11 are summarised in Table 64.

Table 64. Summary of Main Aims and Findings from Experiment 11.

	Research Aim	Hypothesis	Main Findings
1	Determine if AMS is improved following a Focused Attention Task relative to an Unfocused Attention task, with particular reference to improved specificity in recall of negative past events.	*AMS of past events will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task.*	*The hypothesis is supported.* A group difference was found, with the Focused Attention group seen to be more specific in recall of past events relative to the Unfocused Attention group (p=.001). A Valence x Group interaction was found to approach significance, with the Focused Attention group being more specific in recall of negative past experiences relative to the Unfocused Attention group (p=.066).
2	To test if a Focused Attention Task increases experiental awareness, as measured by the decentering component of the Toronto Mindfulness Scale.	*Decentring scores as measured by the Toronto Mindfulness Scale will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task.*	*The hypothesis is supported.* The Focused Attention group was found to report higher levels of awareness relative to the Unfocused Attention group (p<.05).

6.3 Experiment 12

Experiment 12 aimed to extend on the findings from Experiment 11 by application of the focused attention task in a future thinking paradigm. There is currently no literature pertaining to mindfulness practice in facilitation of future directed cognition *per se*. However, mindfulness based approaches have been employed in the depression literature in relation to reduction of depression related characteristics, one of which is a negative future outlook. Experiment 12 has two main aims, (1) to examine if future cognitions, as measured by the FTT, with particular reference to increased generation of negative future events, will vary following a Focused Attention Task relative to an Unfocused Attention Task. It is predicted that future cognitions, as measured by the FTT, will differ between those who undertaking the Focused Attention Task and those undertaking the Unfocused Attention Task. The second aim is to (2) test if a Focused Attention task has a unique effect on experiential awareness as measured by the decentering component of the Toronto Mindfulness Scale; it is predicted that decentring scores as measured by the Toronto Mindfulness Scale will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task.

6.3.1 Method

6.3.1.1. Participants

Thirty-four adults volunteered to take part in this experiment. Following the exclusion criteria pertaining to BDI-II scores (see Section 6.3.2.1) data from four participants were excluded from the final analysis. Of the included thirty participants 12 were male and 18 female. Participant ages ranged from 19 to 27 years, with a mean of 21.76 ($\sigma = 2.04$) years.

6.3.1.2 Apparatus and Materials

All materials and procedures were the same as in Experiment 11 with the exception of the AMT and the inclusion of the Future Thinking Task.

The Future Thinking Task (MacLeod et al. 1993; 1997). The FTT procedure and stimuli were without exception equivalent to that employed in previous experiments (see Section 3.2.1.2 and 3.2.1.3 for details as to the presentation and procedure).

Psychometric and Psychological Tests. The psychological measures employed in previous chapters were completed in the same manner and direction within the current study. These included the Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer & Brown, 1996); The Beck Hopelessness Scale (BHS; Beck & Steer, 1988); The State Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983); The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988); The Life Orientation Test – Revised (LOT-R; Scheier, Carver, & Bridges, 1994); The Acceptance and Action Questionnaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004) and the Verbal Fluency Control task (Lezak, 1976) (see Section 2.2.1.2 for details on each of these measures) and The Toronto Mindfulness Scale (see Section 6.2.1.2 for details on this measure).

Experimental Groups. Participants were randomly allocated to one of two experimental groups. The groups were exposed to the same induction as described in Experiment 11, a Focused Attention Task and an Unfocused Attention Task, based on interventions used by Arch and Craske (2006). The aim of the Focused Task was for participants to direct their attention and awareness to any sensations that they were experiencing in that present moment, with particular focus on their breathing. A Dictaphone was used as before in the recording and presentation of the two tasks.

Manipulation check. Following the mindfulness induction, individuals were asked to complete a Post Attention Test (PAT), by responding to the question: *'I attempted to follow the induction instructions'* by ratings on a scale Likert scale (0–7), where 1= very untrue, 4 = feel neutral about it, 7= very true, thus high scores reflected higher levels of task adherence.

6.3.1.3 Experimental Overview

The current study used a 2 x 2 mixed design, with Group (Focused Attention, Unfocused Attention) as the between participant variable and Valence (Positive Future Cognitions, Negative Future Cognitions) as the within participant variable. All participants completed the psychometric and wellbeing questionnaires along with the Verbal Fluency Control Task; this was followed by random assigned to one of two groups that were differentiated in terms of the instructions they received regarding completion of the Focused or Unfocused Attention Task. All participants subsequently completed the Post Attention Test, the Toronto Mindfulness Scale and the Future Thinking Task. The experimental sequence is depicted in Figure 42.

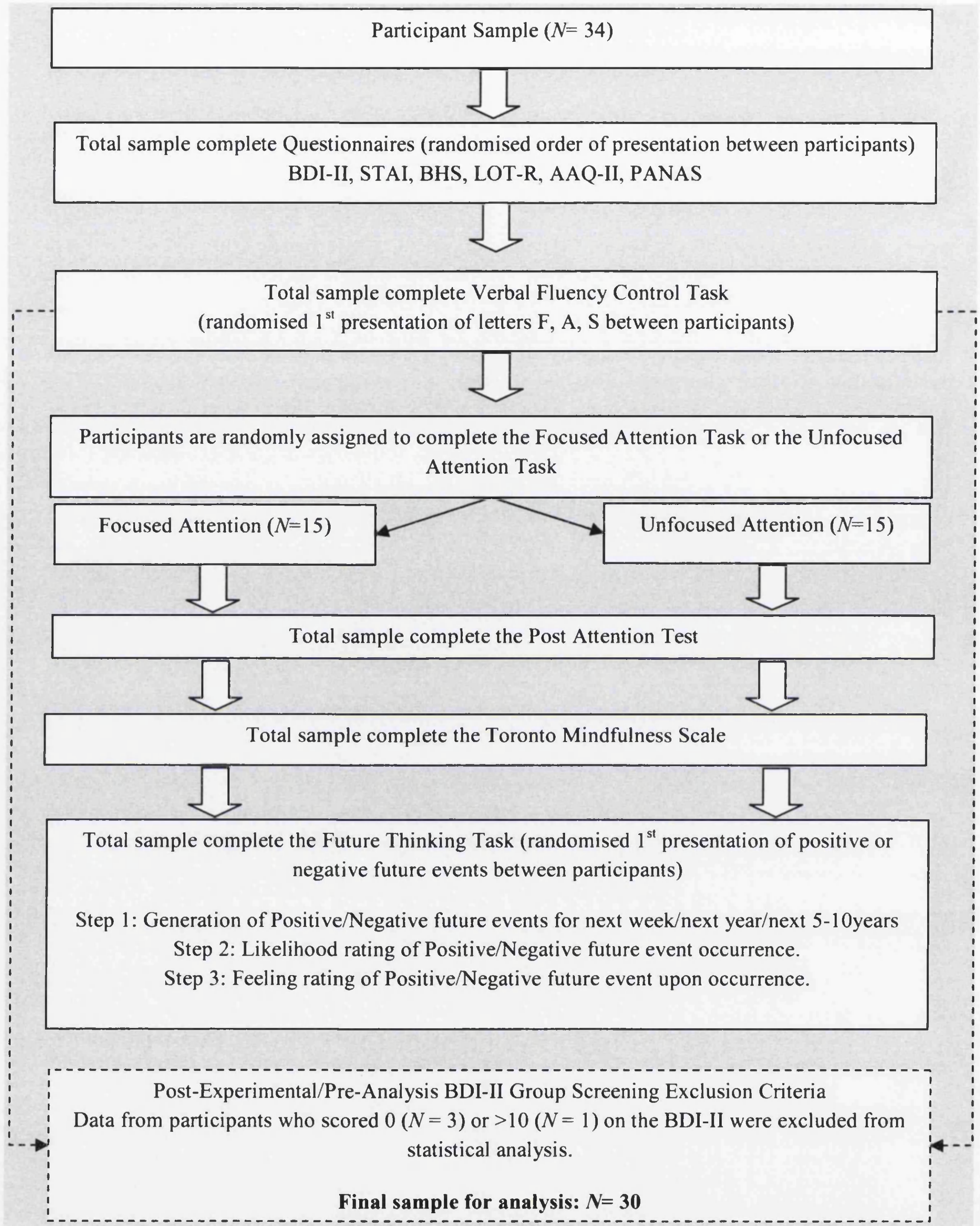


Figure 42. Overview of the Experimental Sequence for Experiment 12.

6.3.1.4 Ethical Issues

In order to conduct the experiment according to the appropriate ethical guidelines as identified by the British Psychological Society (2009, 2006), precautionary measures were explicitly employed in Experiment 12. The steps taken were consistent with those employed in previous experiments (i.e., Experiment 3, and as outlined in Experiment 1a (see Section 2.2.1.4). The only differences relate to the specific experiment information, i.e. the nature of the study and procedural details of Experiment 12 as detailed in the written and verbal experimental briefs. A 'cooling off' period of a minimum 24 hours was implemented between receiving information about the experiment and participation commencement as in the previous experiments. Emphasis was again given in the brief and debrief to any psychological distress that may arise following the experimental procedures. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the future events generated. The experiment was approved by the Psychology Department Ethics Committee at Swansea University.

6.3.1.5 Procedure

The experiment was conducted in a quiet room free from distraction which contained only a desk, and a chair. All participants completed the psychological measures and the Verbal Fluency Control Task prior to the experimental induction task. The induction took form as directed in Experiment 11 (see Section 6.2.1.3). Following the induction participants immediately completed the post attention test along with the Toronto Mindfulness Scale. The Future Thinking Task (FTT) was subsequently presented and took form as an experimenter led interview, the FTT procedure is described in detail in Experiment 3 (see Section 3.2.1.2) and the present experiment did not deviate from these proceedings. Participants were thanked and suitably debriefed on completion of all tasks.

6.3.2. Results and Discussion

6.3.2.1 *Group Allocation*

As in all previous studies the current study opted to remove any participants with a score of 0 ($N = 3$). Due to the nature of the study, and in conjunction with Experiment 11, additionally it was also sought to remove any participant data by those displaying depression levels of 10 or above as reported on the BDI-II ($N = 1$, $M = 15$) in order to more accurately capture a sample of non-depressed participants. All the included participants reported a score of 9 or less (M= 5.31) on the BDI-II.

Table 65. Demographics and Psychometric tests results for the Focused ad Unfocused groups mean scores, with Standard Deviations (SD), for each group in Experiment 12.

Variable	**Focused Attention** ***(SD)***	**Unfocused Attention** ***(SD)***
Gender: Females **(Males)**	8 **(7)**	10 **(5)**
Age	21.87 *(2.41)*	21.66 *(1.67)*
VFCT	11.51 *(3.31)*	10.66*(2.83)*
BDI-II	5.20 *(2.27)*	4.73 *(3.12)*
BHS	3.93 *(1.98)*	2.93 *(2.01)*
STAI	34.20 *(9.95)*	29.60 *(6.78)*
LOT-R	15.20*(4.72)*	17.33 *(3.13)*
AAQ-II	48.66 *(6.82)*	52.13 *(5.19)*
PA	27.73 *(7.17)*	31.06 *(8.51)*
NA	15.20 *(4.72)*	17.33 *(3.13)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

Preliminary analyses found no difference between groups pertaining to age $t(28)$ =-.263, p =.794, verbal fluency $t(28)$ = .751, p =.459, nor gender $\chi 2$ (1) =. 556, p=.456. Further analysis indicated no difference between the Focused and Unfocused Attention groups on the psychometric measures of anxiety (STAI, $t(28)$ =-1.480, p =.150), depression (BDI-II, $t(28)$ = .467, p = .644), hopelessness (BHS, $t(28)$ =1.370, p =.182) and optimism (LOT-R $t(28)$ =1.458, p =.156). Nor were there any differences pertaining to mood (PA $t(28)$ =1.159, p =.256, NA $t(28)$ =-1.141, p =.264) or Emotional Avoidance (AAQ-2; $t(28)$ =1.566, p =.129). Both groups' characteristics are displayed in Table 65 and as can be seen the groups were well matched.

6.3.2.2 *Induction Adherence.*

The post-experiment attention measure found no significant differences between the two groups in response to adherence to task instructions for the Focused and Unfocused inductions, with the majority reporting high agreement with the statement: *''I attempted to follow the induction instructions''*. Participants in the Focused Attention group reported somewhat higher levels of adherence (M= 5.733, σ =.88) relative to the Unfocused Attention group (M= 5.133, σ =1.06) although this was not found to be statistically significant ($t(28)$ =1.684, p=.103). The overall mean of 5.43(σ =1.01) indicated that participants viewed this statement as *''somewhat true.''*

6.3.2.3 *The Future Thinking Task*

Analysis of the Future thinking scores were performed following the standards set by MacLeod et al. (1998). Table 66 presents the future thinking index scores and results from independent T-tests. As can be seen the only significant finding was obtained between groups in relation to negative expectancies for the next year, where interestingly the Focused Attention group are reporting greater expectancy of such events occurring relative to the Unfocused group. Similarly the two groups diverge in regards to expectancies for the next 5-10 years, is apparent from the mean scores, though this did not result as statistically significant.

6.3.2.4 *FTT Index Scores*

Analysis of the composite index scores, with a Group (Depression: Low BDI vs. High BDI) x Valence (Future expectancy: Positive/Negative) x Period (Week, Year, 5-10 years) mixed model ANOVA, produced three significant effects. There was a significant main effect of Valence, with participants showing higher levels of positive relative to negative future expectancy ($F(1,28) = 63.189$, $p < .001$, $\eta p^2 = .693$), as well as a significant main effect of Period, reflecting higher scores for the next 5–10 years vs. the next week or the next year ($F(2,28) = 13.229$, $p < .001$, $\eta p^2 = .321$). There was also a significant interaction effect found for Period x Valence ($F(2, 28) = 3.196$, $p = .048$, $\eta p^2 = .102$), with more positive and more negative events anticipated for the more distant future of 5-10 years time. The interaction effect for Group x Valence was not found to be significant ($F(1, 29) = .970$, $p = .333$, $\eta p^2 = .033$), nor was there a main effect for Group ($F(1, 29) = 2.487$, $p = .126$, $\eta p^2 = .082$). The three-way interaction involving Group, Valence and Period did not approach significance ($F(2, 28) = .285$, $p = .753$, $\eta p^2 = .010$).

Thus, the FTT index scores suggest that the Focused and Unfocused groups reported similar personal future expectancies, with positive and negative expectancies consistently diverging across the three different periods for both groups.

Table 66. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task *Index* Scores, incorporating Fluency, Likelihood and Feeling Values for each Time Period within the Focused and Unfocused Attention groups in Experiment 11. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Focused Attention**	**Unfocused Attention**		
	Mean (SD)	***Mean (SD)***	***t(28)***	***p***
Positive Responses				
Next Week	66.60*(28.02)*	60.30 *(31.75)*	0.576	*0.569*
Next Year	84.39 *(53.70)*	57.97 *(21.13)*	1.773	*0.087*
Next 5-10 Years	96.63 *(44.40)*	81.88 *(33.09)*	1.032	*0.311*
Negative Responses				
Next Week	27.39 *(11.06)*	29.39 *(13.64)*	-0.443	*0.661*
Next Year	39.05 *(15.19)*	28.89 *(12.04)*	2.030	*0.052**
Next 5-10 Years	42.07 *(22.06)*	33.42 *(12.16)*	1.330	*0.194*

Note. *p=.052.

6.3.2.5 *FTT Raw Scores*

Raw scores for the FTT variables pertaining to number of events generated, likelihood values, and feeling ratings were calculated and analysed separately to the compiled index score. The individual means for each variable are presented in Table 67.

Fluency was firstly analysed in a Group (Depression: Low BDI/High BDI) x Valence (Number of future thoughts (fluency): Positive/Negative) x Period (Week, Year, 5-10 years) mixed-model ANOVA. A significant main effect was found for Valence, $F(1, 28) = 19.749$, $p < .001$, $\eta p^2 = .414$). A main effect was also found for Period ($F(2, 27) = 5.722$, $p = .005$, $\eta p^2 = .170$). Though no main effect for Group was found ($F(1, 28) = 2.125$, $p = .156$, $\eta p^2 = .071$). Nor was any interaction effects observed for Valence x Group ($F(1,28) = .088$, $p = .769$, $\eta p^2 = .003$), Valence x Period ($F(2,28) = 1.903$, $p = .159$, $\eta p^2 = .064$), or Group x Valence x Period ($F(2,28) = .145$, $p = .866$, $\eta p^2 = .005$).

In regards to the other FTT variables of likelihood and feeling, the statistical analyses found no significant results for either variable.

6.3.2.6 *Post Induction Mindfulness.*

In analysis of the TMS factors a significant difference was found between groups with regards to the Decentering component, with the Focused Attention group reporting higher levels of awareness ($M = 14.93$, $\sigma = 3.28$) relative to the Unfocused Attention group ($M = 12.26$, $\sigma = 3.41$; $t(28) = 2.181$, $p = .038$). However no difference was observed between the experimental groups for the Curiosity component, $t(28) = .038$, $p = .970$.

Decentering scores were further found to positively correlate with the pre-experimental AAQ-2 scores ($r = .394$, $p = .031$). The two groups did not differ in regards to their pre-induction AAQ-2 scores, thus it may be inferred that the brief Focused Attention task facilitated cognitive defusion which lead to more experiential contact with personally relevant content in the construction of personal future events. None of the FTT components were found to correlate with neither Decentering nor Curiosity.

Table 67. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task Raw Scores for Fluency, Likelihood and Feeling Ratings for each Time Period within the Focused and Unfocused Attention groups in Experiment 12.

FTT Variable	**Focused Attention**	**Unfocused Attention**
	Mean *(SD)*	**Mean** *(SD)*
Positive Responses, ***Next Week***		
Fluency (no. of events)	5.46 *(2.13)*	4.733 *(1.75)*
Likelihood	4.95 *(1.29)*	5.14 *(1.31)*
Feeling	2.59*(0.36)*	2.46 *(0.45)*
Positive Responses, ***Next Year***		
Fluency (no. of events)	6.60 *(2.97)*	5.20 *(2.04)*
Likelihood	5.27 *(1.08)*	5.08 *(1.05)*
Feeling	2.37 *(0.54)*	2.28 *(0.44)*
Positive Responses, ***Next 5-10 years***		
Fluency (no. of events)	6.53 *(2.09)*	5.80 *(1.78)*
Likelihood	5.27 *(1.08)*	5.08 *(1.05)*
Feeling	2.77 *(0.19)*	2.74 *(0.24)*
Negative Responses, ***Next Week***		
Fluency (no. of events)	4.93 *(1.71)*	4.26 *(1.38)*
Likelihood	3.97 *(1.30)*	4.20 *(0.16)*
Feeling	1.57 *(0.65)*	1.77 *(0.74)*
Negative Responses, ***Next Year***		
Fluency (no. of events)	5.20 *(2.07)*	4.20 *(2.08)*
Likelihood	3.58 *(0.84)*	4.11 *(1.28)*
Feeling	2.21*(0.40)*	1.94 *(0.73)*
Negative Responses, ***Next 5-10 years***		
Fluency (no. of events)	5.27 *(2.15)*	4.46 *(1.59)*
Likelihood	3.58 *(0.84)*	4.11 *(1.27)*
Feeling	2.29 *(0.65)*	2.04 *(0.71)*

6.3.3 Summary

In regards to the main aims set out for Experiment 12 it was found that (1) overall there were no significant group difference between the Focused and Unfocused Attention induction on the FTT. However, inspection of the FTT index and raw data revealed that the Focused Attention group generated more negative events for the future, greater expectancy of negative future events occurring and increased levels of negative affect in the likelihood of these negative events occurring relative to the Unfocused Attention group. However, only one of these differences was found to be statistically significant, that is, the combined index score revealed that expectancy of negative events occurring in the next year diverged between the two groups. In regards to the second aim (2) it was seen that a brief Focused Attention Task was able to facilitate a decentering effect as measured by the TMS. Table 68 summarises the main findings from Experiment 12.

Table 68. Summary of Main Aims and Findings from Experiment 12.

	Research Aim	Hypothesis	Main Findings
1	Examine if future cognitions, as measured by the FTT, with particular reference to increased generation of negative future events, will vary following a Focused Attention Task relative to an Unfocused Attention Task.	*Future expectancy, as measured by the FTT, will differ between those who undertaking the Focused Attention Task and those undertaking the Unfocused Attention Task.*	*The hypothesis is not supported.* No significant group differences were found.
2	To test if a Focused Attention Task increases experiental awareness, as measured by the decentering component of the Toronto Mindfulness Scale.	*Decentring scores as measured by the Toronto Mindfulness Scale will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task.*	*The hypothesis is supported.* A significant difference was found between groups with the Focused Attention group reporting higher levels of awareness relative to the Unfocused Attention group (p<.05).

6.4 Experiment 13

Meditation and mindfulness exercises have previously been found to be related to improvements in automatic cognitive flexibility (e.g., lower Stroop interference scores) in comparison to relaxation and no-treatment conditions (Alexander, Langer, Neman, Chandler & Davies, 1989). As such, mindfulness based techniques, for instance a focused attention task, may improve awareness of and attention to stimuli. Experiment 13 sought to examine the implementation of such a mindfulness based techniques, in form of a focused attention task, in relation to implicit future thinking as measured using the FT-IRAP. To this end Experiment 13 has two main aims (1) to examine if implicit future thinking, as measured by the FT-IRAP effect, will vary following a Focused Attention Task relative to an Unfocused Attention task. It is predicted that implicit future thinking, as measured by the FT-IRAP, will differ for those who undertook the Focused Attention Task relative to those who undertook the Unfocused Attention Task. A further aim of Experiment 13 is to (2) test if a Focused Attention task has a unique effect on experiential awareness as measured by the decentering component of the Toronto Mindfulness Scale; it is predicted that decentring scores as measured by the Toronto Mindfulness Scale will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task.

6.4.1Method

6.4.1.1. Participants

Thirty-five undergraduate students at Swansea University volunteered to take part in this experiment in return for course credits. Following the exclusion criteria pertaining to BDI-II scores (see Section 6.4.2.1) seven participants were left out of the final data analysis. Of the included twenty-eight participants there were 8 males and 20 females. Participant ages ranged from 18 to 29 years, with a mean of 21.14 ($\sigma = 2.55$) years.

6.4.1.2 Apparatus and Materials

Materials and procedures were the same as in experiment 11 and 12 except with the FT-IRAP as the main measure.

Future Thinking-IRAP. The FT-IRAP stimuli and procedure was the same as in previous chapters (see Section 4.2.1.4 for details pertaining to stimuli presentation, and Section 4.2.1.5 for procedure). Positive and negative future expectations were presented on a computer screen requiring immediate and accurate responding by the participants. With participants responses recorded as time in milliseconds.

Psychometric and psychological tests. The psychological measures employed in previous chapters were completed in the same manner and direction within the current study. These included the Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer & Brown, 1996); The Beck Hopelessness Scale (BHS; Beck & Steer, 1988); The State Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983); The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988); The Life Orientation Test – Revised (LOT-R; Scheier, Carver, & Bridges, 1994); The Acceptance and Action Questionnaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004), the Verbal Fluency Control Task (Lezak, 1976) (see Section 2.2.1.2 for details on each measure) and The Toronto Mindfulness Scale (see Section 6.2.1.2 for details).

Experimental groups. Participants were randomly allocated to one of two experimental groups, either a Focused Attention Task or an Unfocused Attention Task (see Section 6.2.1.2). These inductions were based on interventions used by Arch and Craske (2006). The aim of the Focused task was for participants to direct their attention and awareness to any sensations that they were experiencing in that present moment, with particular focus on their breathing. A Dictaphone was used in the recording and presentation of the two tasks.

Manipulation check. Following the mindfulness induction, individuals were asked to complete a Post Attention Test (PAT), by responding to the question: *'I attempted to follow the induction instructions'* by ratings on a scale Likert scale (0–7), where 1= very untrue, 4 = feel neutral about it, 7= very true, thus high scores reflected higher levels of task adherence.

6.4.1.3 Experimental Overview

The current study used a 2 x 2 mixed design, with Group (Focused Attention, Unfocused Attention) as the between participant variable and Valence (Implicit Positive Future Cognitions, Implicit Negative Future Cognitions) as the within participant variable. All participants completed the psychometric and wellbeing questionnaires along with the Verbal Fluency Control Task; this was followed by random assigned to one of two groups that were differentiated in terms of the instructions they received regarding completion of the Focused or Unfocused Attention Task. All participants subsequently completed the Post Attention Test, the Toronto Mindfulness Scale and the Implicit Future Thinking Task (FT-IRAP). The experimental sequence is depicted in Figure 43.

6.4.1.4 Ethical Issues

In order to conduct the study according to the appropriate ethical guidelines, as identified by the British Psychological Society (2009), a number of specific measures were put in place. These measures were consistent with those adopted for Experiment 6, and as outlined previously for Experiment 1a (see Section 2.2.1.4). Only minor adjustments were necessary in order to facilitate the change in methodologies to tailor instructions to the current experiment. Emphasis was put on assuring participants that the computer task was not a measure of how quick they were at responding but that the focus was on the responses made. This emphasis was made to deter distress related to feelings of inept computer skills. At no point during the experiment did any participants withdraw from the experiment or express dissatisfaction or distress of any kind. The experiment was approved by the Department of Psychology Ethics Committee at Swansea University prior to commencement.

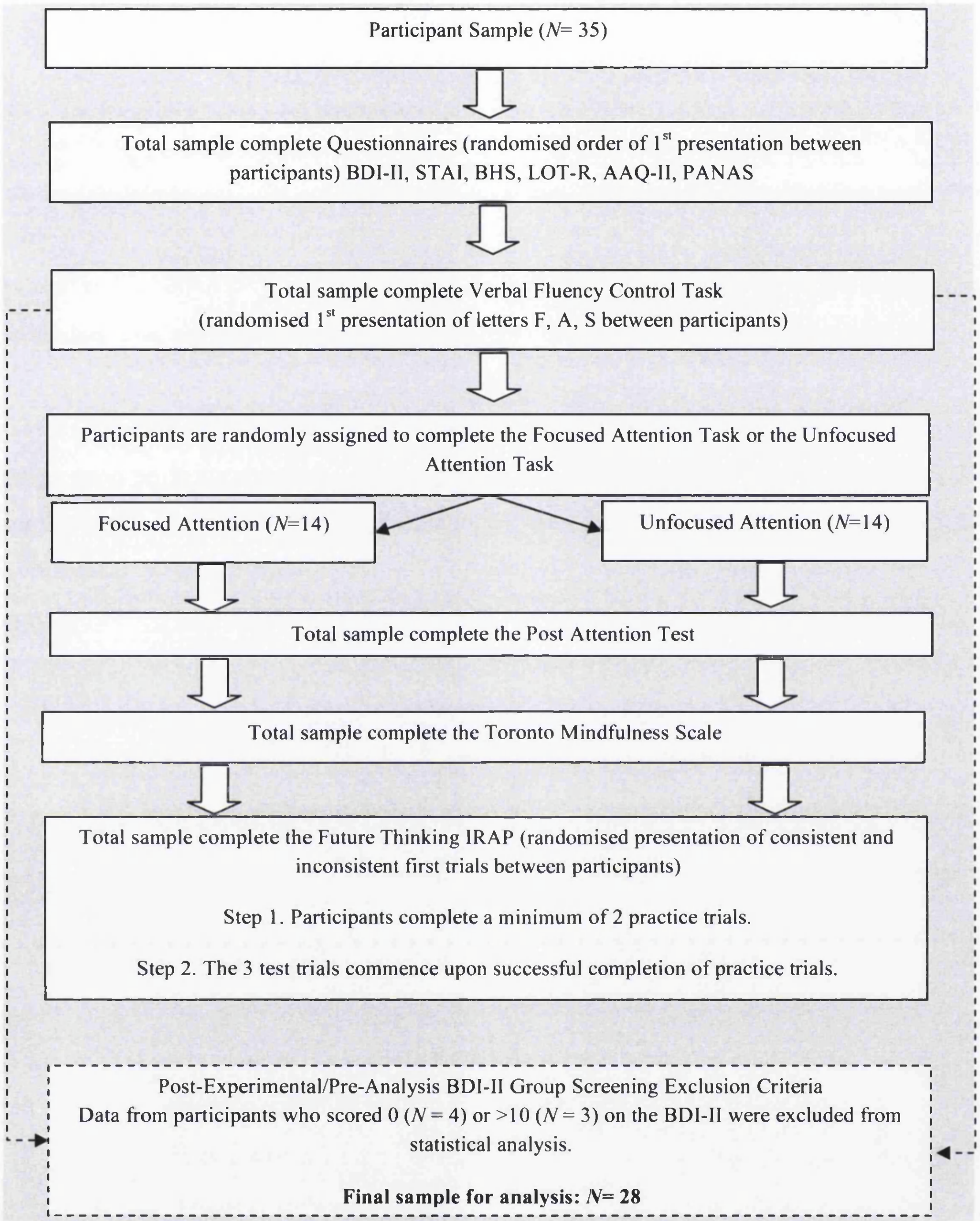


Figure 43. Overview of the Experimental Sequence for Experiment 13.

6.4.1.5 Procedure

The experiment was conducted in a quiet room free from distraction which contained only a desk, a chair and a personal computer. All participants completed the psychological measures and the Verbal Fluency Control Task prior to the experimental induction tasks. Participants were presented with verbal instructions regarding the induction tasks and were requested to adhere with the instructions presented to the best of their abilities (see Section 6.2.1.3 for procedural details). Following the induction participants immediately completed the post attention test along with the Toronto Mindfulness Scale. Detailed verbal and visual instructions were presented to participants prior to the FT-IRAP – and a minimum of two practice trials were completed prior to the testing commencement. Feedback was provided throughout the FT-IRAP trials, presented as on screen instructions (see Section 4.2.1.5 for the FT-IRAP procedure). Participants had access to the experimenter for any questions that arose. On completion of all tasks participants were thanked and suitably debriefed.

6.4.2 Results and Discussion

6.4.2.1 *Group Allocation*

As in all previous studies the current study opted to remove any participants with a score of 0 ($N = 4$). Due to the nature of the study, and in conjunction with Experiments 11 and 12, additionally it was also sought to remove any participant data by those displaying depression levels of 10 or above as reported on the BDI-II ($N = 3$, $M = 16.67$) in order to more accurately capture a sample of non-depressed participants. All the included participants reported a score of 9 or less ($M = 6.85$) on the BDI-II.

Preliminary analyses found no difference between groups pertaining to age $t(26) = .146$, $p = .885$, verbal fluency $t(26) = .788$, $p = .438$ nor gender $\chi 2$ (1) =. 700, $p = .403$. The analyses further indicated no difference between the Focused Attention and Unfocused Attention groups on the psychometric measures of anxiety (STAI, $t(26) = .739$, $p = .106$), depression (BDI-II, $t(26)$ =.384, p = .704), hopelessness (BHS, $t(26)$ =.658, p=.516) and optimism (LOT-R $t(26)$ =-1.031, p=.312). Nor were there any differences pertaining to mood (PA $t(26)$ =.460, p=.649, NA $t(26)$ =1.324, p=.197) or Emotional Avoidance (AAQ-2; $t(26)$ =.525, p =.604). The groups' characteristics are displayed in Table 69 and as can be seen the two groups were well matched on all the variables.

Table 69. Demographics and Psychometric test results presented as Means, with Standard Deviations (SD) for the Focused and Unfocused Attention groups in Experiment 13.

Variable	**Focused Attention**	**Unfocused Attention**
Gender: Females **(Males)**	11 **(3)**	9**(5)**
Age	21.21 *(2.86)*	21.07 *(2.30)*
VFCT	11.78 (3.15)	10.90 (2.75)
BDI-II	7.35 *(6.93)*	6.36 *(6.85)*
BHS	5.21 *(3.16)*	4.57*(1.83)*
STAI	39.92 *(8.41)*	34.36 *(9.20)*
LOT-R	13.14 *(3.89)*	14.50 *(3.01)*
AAQ-II	50.71 *(5.96)*	49.71 *(3.89)*
PA	28.64 *(8.36)*	27.42 *(5.24)*
NA	14.85 *(4.62)*	12.71 *(3.91)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

6.4.2.2 *Induction adherence.*

The post-experiment measure found no significant differences between groups in their responses to the statement: *'I attempted to follow the induction instructions'*. The overall mean of 5.28 (σ =.81) indicates that participants generally viewed this statement as *''somewhat true.''*

6.4.2.3 *The FT-IRAP*

Statistical analyses first involved transforming the individual response latencies for each participant using the D_{IRAP} algorithm. Latency data from the IRAP was transformed into the D_{IRAP} measure (Dawson et al., 2009) consistent with calculations in previous chapters (i.e. an adapted version of Greenwald, Nosek and Banaji's (2003) IAT D-algorithm) (see Section 4.2.2.2 for details on the transformation of the D_{IRAP} scores).

No significant difference was found between the two groups in relation to the overall D_{IRAP} score ($t(26)$ =.288, p=*.776*), with both groups producing scores significantly different from zero in a positive direction (Focused Attention, M = .21, σ = 0.27; $t(13)$ =2.963, p=*.012*; Unfocused Attention, M= .18, σ = 0.23; $t(13)$ = 3.059, p =*.009*). Figure 44 provides an illustration of this finding, and as expected in a healthy population both groups are depicted as holding a strong positive bias towards the future.

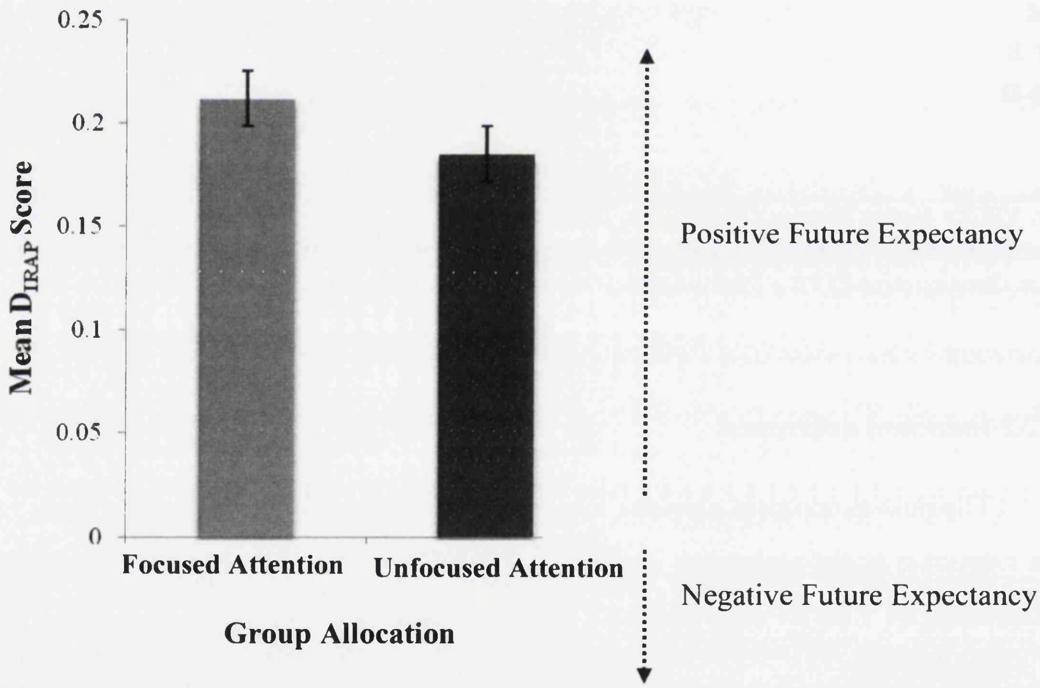


Figure 44. Mean D_{IRAP} scores for the Focused and Unfocused Attention groups in Experiment 13, with Standard Error Bars (S.E). A greater optimistic bias is indicated by larger positive scores, i.e. responding more quickly when affirming positive and refuting negative expectancy than when asked to affirm negative

and refute positive expectancy on the relevant trials. A pessimistic bias incurs the inverse responding pattern.

6.4.2.4 *Participant-type analyses.*

In order to explore the effect of the mindful exercise in relation to negative future expectancies the FT-IRAP trial types were looked at individually. In responses to the consistent FT-IRAP trial types, both groups exhibited an implicit optimistic bias, although for the Focused Attention group the $D_{IRAP\text{-}POS}$ effect was stronger than that of the Unfocused Attention group, both were significantly different from zero (p=.004 and p=.011 respectively). For the inconsistent FT-IRAP trial types, again both groups showed a non-pessimistic bias, though the Unfocused Attention group showed a stronger $D_{IRAP\text{-}NEG}$ effect which was significantly different from zero (p=.028). The Focused Attention group did not produce a significant $D_{IRAP\text{-}NEG}$ effect (p=.155).

The D_{IRAP} trial type scores for each participant were entered into a 2 × 2 mixed repeated measures ANOVA, with group (Focused vs. Unfocused Attention) as the between-participants variable and IRAP effect-type as the within-participants variable ($D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$).

The ANOVA revealed a moderately significant effect for trial type, $F(1, 26) =3.819$, $p=.061$, $\eta p^2 =.128$), with a non-significant interaction ($F(1, 26) =1.039$, $p=.317$, $\eta p^2 =.038$). No main effect for group observed, $F(1, 26) =.083$, $p=.776$, $\eta p^2 =.003$).

A split plot analysis looked at the within group effects pertaining to the consistent and inconsistent trials; the observed difference in responses these trials, as measured by the $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ means, were not found to be significant for the Focused ($t(13)= 1.788$, $p =.097$) or the Unfocused Attention groups($t(13)= .841$, $p =.415$). Notably a trend is emerging within the Focused Attention group, demonstrating greater differences in responses to the varying trial types. Overall the FT-IRAP indicated optimistic biases for both groups with regards to future expectancies. The mean $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ scores calculated for both groups are shown in Figure 45.

6.4.2.5 *Post induction mindfulness – Toronto Mindfulness Scale.*

In analysis of the TMS variables a significant between group difference was observed with regards to the Decentering component within the TMS; with the Focused Attention group reporting higher levels of awareness (M= 16.28, σ =2.36) relative to the Unfocused Attention group (M = 13.64, σ = 4.16; $t(26)$= 2.065, p=.049). However no difference was observed between the experimental groups for the Curiosity component, $t(28)$ = 1.121, p=.273.

Decentering scores were further found to approach significance in correlation with the pre-experimental AAQ-2 scores (r=.344, p=.074). Decentering scores were also found to positively correlate with the D_{IRAP} score, r =.411, p =.030. More specifically the decentering component correlated positively with the $D_{IRAP\text{-}NEG}$ scores (r=.386, p=.042), whereas $D_{IRAP\text{-}POS}$ did not show significance (r=.319, p=.098). There was also a positive correlation between curiosity scores and induction adherence, r=.417, p=.027.

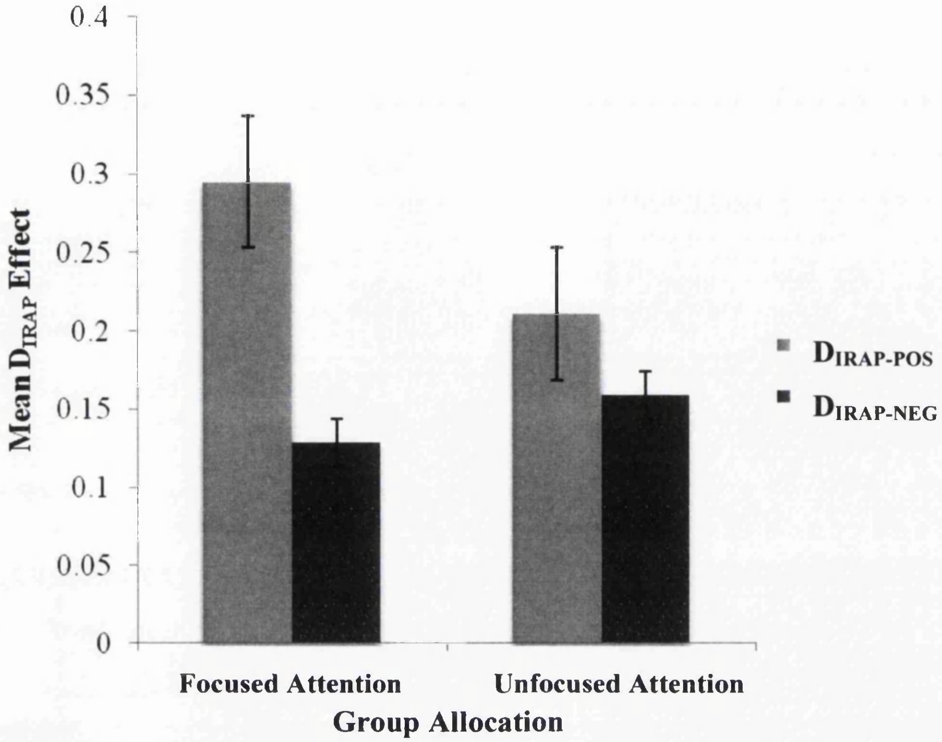


Figure 45. Mean Positive and Negative D_{IRAP} Trial-Type scores, with Standard Error Bars (S.E) for the Focused and Unfocused Attention groups in Experiment 13. Positive D_{IRAP} scores reflect an optimistic bias and negative D_{IRAP} scores reflect a pessimistic bias. The zero-point reflects no bias. An optimistic bias for positive future expectancy was produced if participants responded more quickly to "I expect–Positive–True" and "I don't expect-Positive–False" than to "I expect– Positive–False" and "I don't expect–Positive–True" (the opposite pattern indicated a pessimistic bias on positive expectancy trials). A pessimistic bias for future expectancy was produced if participants responded more quickly to "I expect–Negative–True" and "I don't expect–Negative– False" than to "I expect–Negative–False" and "I don't expect–Negative–True" (the opposite pattern indicated an optimistic bias on negative expectancy trials).

6.4.3 Summary

In relation to the main aims of Experiment 13 (1) the FT-IRAP effect was found to be consistent across participants with responses pertaining to an overall optimistic future outlook. Although this effect was robust the Focused Attention group revealed greater flexibility in responding, with a stronger effect in response to inconsistent FT-IRAP trials, although this effect was not statistically significant. (2) It was further seen that the brief Focused Attention Task lead to increased awareness as measured by the decentering component of the TMS. Table 70 summarises the main findings from Experiment 13.

Table 70. Summary of Main Aims and Findings from Experiment 13.

	Research Aim	Hypothesis	Main Findings
1	Examine if implicit future thinking is altered following a Focused Attention Task relative to an Unfocused Attention Task.	*Implicit future cognition as measured by the FT-IRAP will differ between those who undertook the Focused Attention Task and those who undertook the Unfocused Attention Task.*	*The hypothesis is not supported.* No significant differences were found.
2	To test if a Focused Attention Task increases experiental awareness, as measured by the decentering component of the Toronto Mindfulness Scale.	*Decentring as measured by the Toronto Mindfulness Scale will differ between those who completed the Focused Attention Task and those who completed the Unfocused Attention Task.*	*The hypothesis is supported.* A significant between group difference was observed with the Focused Attention group reporting higher levels of awareness relative to the Unfocused Attention group (p<.05).

6.5 General Discussion

Chapter 6 aimed to examine (1) the contribution of mindfulness based strategies in relation to past and future thinking and to (2) determine if implicit future cognitions could be targeted in this approach. It was found that (1) increased awareness was related to improved specificity in recall of past events, with increased AMS in relation to past negative experiences particularly notable. However, no significant difference was observed in regards to explicit future thinking as measured by the FTT. (2) Implicit future thinking responses were found to vary between those who completed the Focused Attention Task relative to who completed the Unfocused Attention Task, with participants in the former group found to be more accepting of negative future experiences. It was found that (3) a Focused Attention Task had a unique effect on awareness, as consistently across the three Experiments (11-13) it was found that following the brief Focused Attention Task participants reported increased levels of awareness (as measured by the decentering component within the TMS), relative to the Unfocused Attention group. The pre-experimental levels of emotional avoidance were similar between groups; as such following the induction task participants may have experienced defusion from negative connotations. This finding is in line with previous research which found that exposure to a brief mindfulness intervention by inexperienced participants lead to an increased decentering score relative to participants in an inactive control group (Erisman & Roemer, 2010).

In Experiment 11 it was seen that autobiographical memory specificity was increased for the Focused Attention group relative to the Unconfused Attention group. Recall of negative past events were particularly raised in relation to the previous experiments with the AMT (e.g. Experiment 1a, 2a and 10) in which specificity was seen predominantly for positive event recall. Findings with the FTT in Experiment 12 found no group differences emerging in regard to future outlook, neither at a combined nor split variable level of analysis. The pattern of responses by both groups on the FTT is consistent with those of healthy participants and as such in line with the previous literature and findings from the control samples (non-depressed groups) utilised in Experiments 3 and 9. However, as predicted the Focused Attention group did demonstrate an increased level of endorsement for negative future content. Although there was only one significant between group differences regarding increased negative future events, that it, appears to be linked to defusion provided by the mindfulness task. That is, if the Focused group reported high levels of defusion, access to negative content was also evident. In Experiment 13 a similar pattern emerged for the FT-IRAP as to that observed with the FTT. Specifically, there were no group differences *per se*, but with the Focused Attention group notably responded more flexibly to the negative content. The most notable finding from this series of experiments was the increased level of contact with negative past and future content, due to defusion from verbal content and engagement with the process of the tasks. This has implications for the understanding of how negative future cognition is construed and as such how we can reform less functional approaches to thinking about the past and future, for instance as a useful alternative approach to emotional avoidance.

The current series of experiments found that in relation to past experiences, explicit acceptance of negative future events as likely to occur showed some resistance. Interestingly, the implicit future thinking task was able to account for such an approaching shift more clearly than the explicit future thinking task. This discrepancy may be accounted for by two separate arguments. First, due to the nature of the tasks being explicit versus implicit, the responses on the FTT may be influenced by the elaborative process with participants expressing the socially endorsed positive future events rather than openly confirming expectancy of more negative events. Second, the FT-IRAP may be more sensitive in detecting the shift towards acceptance of negative future events due to the relation between past and future thinking. That is, in Chapter 5 the AMT and FT-IRAP was found to correlate, and with the finding from Experiment 11 supporting a mindful shift towards contact with negative past content, it maybe that it is this relation which facilitated greater exposure of the effect on the FT-IRAP. As noted in Chapter 3, there is recent evidence to suggest that memory may implicitly inform future thinking, relative to more explicit activation when individuals consciously attempt to recall past information. Implications from this would pertain to the focus on the functional role of past experience in informing future thinking and as such for the recognition of the influence past content holds on present and future behaviour, implicit or otherwise. In this regard acceptance and mindfulness based approaches appear particularly relevant.

Overly focusing on negative events as well as avoiding any thoughts about negative events is linked with psychological ill health. Similarly, it has been reported that suppressing negative thoughts is related to increased levels of pathology (Wenzlaff & Bates, 1998). Thus thinking too much about an event is equally as damaging as not thinking about an event at all. The experimental series reported herein suggests that defusion from negative content can be achieved, with increased present awareness of such past and future events. This is of particular interest as recent research suggests that defusion plays a functional role in adjusting and directing future behaviour, with favorable effects of specific cognitive defusion techniques found in several recent empirical studies (e.g. Masuda, Hayes, Sackett, & Twohig, 2004; Melia, Roche, & Blackledge, 2006; Healy, Barnes-Holmes, Barnes-Holmes, Wilson, Luciano, & Keogh, 2006; Keogh & Barnes-Holmes, 2006).

Chapter 7

Coping Strategies for Negative Past and Future Outlooks - Part II:

Values Clarification

7.1 General Introduction

ACT conceptualisations, similarly to the early behavioural conceptualisations, view depression in light of the reduced ability to contact positive reinforcers, that is, either through a reduction the effectiveness of the reinforcer(s) or as a result of withdrawal from activities where positive reinforcement occurs (Zettle & Hayes, 2002; Kanter, Busch, Weeks, & Landes, 2008). As such it is considered that in order for behaviour to be maintained over time, regular positive reinforcement is needed. Thus, values clarification is seen as a crucial process in order to model committed action in valued directions. Values clarification can be facilitated through undermining pliance and increasing tracking and helps to reveal the specific function of values. Hayes, Barnes-Holmes & Roche (2001) describe pliance as an individual's rule following behaviour that is reinforced for the sake of rule following. From an RFT perspective, pliance and experiential avoidance function somewhat differently. Avoidant reasoning pertains to following values that might be under aversive control in the form of experiential avoidance, e.g. where individuals follow certain values to avoid certain feelings relating to cognitions of guilt or anxiety (Plumb & Hayes, 2008). Pliant 'valuing' has the potential to lead to positive reinforcement for rule-following, whereas experientially avoidant 'valuing' behaviour will typically lead to negative reinforcement (or the removal of an unpleasant stimulus such as guilt or anxiety). Depressed individuals as such are noted as experiencing a lack of reinforcement when engaged in life activities; this can bring about the assumption that they do not value those domains. When thoughts of personal values arise in depressed individuals they may at times be under aversive control. For instance, when ruled by avoidance strategies in an attempt to cope with such cognitions. On the contrary, 'appetitive' reasons are positively reinforcing reasons for values following. That is, individuals follow chosen values based on personal and positively reinforcing experiences, such as 'fun and enjoyment', and increased positive perceptions of a vital life. Importantly appetitive reasoning shuns influence from external factors, and is self-fulfilling. As such values following which is appetitive are targeted and fostered by ACT processes (Plumb & Hayes, 2008; Hayes et al., 1999).

In the context of depressive cognitions there are a variety of behaviours which may facilitate avoidant engagement of valued activities. Fusion (the opposite of defusion, see Section 1.8.1.1) refers to individuals considering thoughts as literal truths, that is, when the thought or emotion experienced is considered the reality of the here and now. As such fusion plays a significant role in feared outcomes that are believed as likely to result from engagement in value-directed behaviour. For example, a depressed individual may not complete course assignments because they are fused with the thought of being unable to achieve important goals when they are feeling sad, or avoid social gatherings for fear of being seen as uninteresting (Plumb & Hayes, 2008; Hayes et al., 1999). Thus, behaviour consistent with valued living is reduced, or when present, becomes less reinforcing due to fusion with thoughts about the self, worries about the future, ruminations about the past, or *a lack of awareness* of present moment reinforcers.

Hayes et al. (1999) define values as "verbally desired global life consequences", adding that they can be thought of as "verbally constructed contingencies useful when the consequences of actions are remote, subtle, or probabilistic" (p. 206). More recently, Wilson has defined values as 'Freely chosen, verbally constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominant reinforcers for that activity that are intrinsic in engagement in the valued behavioural pattern itself' (Wilson & Dufrene, 2009, p.66; cf. Wilson & Sandoz, 2008). Within Acceptance and Commitment Therapy (ACT) values serve as an organisational rubric for groups of activities that the client perceives as reinforcing and as enhancing his/her quality of life. While values are assumed to be shaped by the learning history of the client, the client narrates his/her most important values during the course of treatment, subdivided into domains such as intimate and social relationships, spiritual beliefs, and career path. Values never refer to specific actions, but rather to overarching, guiding aspirations in the client's life. Accordingly, a value for the intimate relationship domain could be something like "having an honest, open, trusting relationship with my partner." More specific actions like "sharing details of my day regularly with my partner" could be subsumed under such a value, but would not comprise values in and of themselves. In fact (and not surprisingly, given ACT's behavioural roots), ACT clients must clearly delineate specific goals within each value, as well as specific behaviours or sets of behaviours likely to achieve those goals. The focus on value-driven behaviour is implemented to bring the client's behaviour increasingly under the control of long-term contingencies likely to provide a higher reinforcement ratio for the client. According to Hayes, an extensive behavioural literature shows that, "in the absence of verbal behaviour, consequences are effective over only a very short time frame: minutes to hours at most" (Hayes et al., 1999, p. 206). Essentially, the verbal rules known as values put human beings more under the control of desirable long-term consequences.

Previous research has demonstrated that not living in accordance with values (i.e. valued living) is associated with increased levels of psychological distress (Wilson et al., 2008) and depression (Plumb & Hayes, 2008). Michelson, Lee, Orsillo and Roemer (2008) found differences in reports of active values between individuals diagnosed with general anxiety disorder relative to individuals not diagnosed with any anxiety disorders, with the anxious participants reporting less stability in living their values. In a recent paper, Hayes, Orsillo and Roemer (2010) targeted values, along with mindfulness, when examining the use of ACT for generalized anxiety disorder. Hayes et al. found that change in both acceptance and engagement in meaningful activities predicted positive outcome of post-treatment status beyond that of change in worry. Support for the benefits of engagement with personal values also comes from the chronic pain literature, where, for instance, McCracken and Yang (2006) found that reports of pain-related disability and anxiety correlated with accounts of success in living personal values. In fact, values clarification and engagement has received a lot of support in the area of behavioural medicine, with a large amount of the existing research pertaining to chronic pain (e.g. Vowles & McCracken, 2008).

In the original ACT text, Hayes et al. (1999) suggested that it may be functional for individuals to describe and record valued directions and values-consistent goals. Since this original suggestion several values assessment and treatment tools have been developed to aid values clarification and the direction of goals related to the values process. One measure that is increasingly popular in this regard is the Personal Values Questionnaire (Blackledge & Ciarrochi, 2006). The Personal Values Questionnaire (PVQ) aims to facilitate contact with values and to evaluate aversive versus appetitive control. The PVQ considers valued living across nine values domains: family relationships, friendship/social relationships, romantic relationships, work/career, educations, recreation, spirituality, community and physical well-being. The PVQ facilitates the categorisation of the function behind reported values into three categories: social compliance, appetitive control or avoidance.

Hildebrandt et al. (2008) found that specific components of the PVQ, that is, pliant and avoidant values reasoning, demonstrated strong predictive power in terms of psychological health, specifically poorer psychological health at baseline in a sample of teachers and substance abuse counsellors. Plumb and Hayes (2008) similarly reported that these same components, pliant and avoidant reasoning, correlated with pre-treatment levels of depression. Thus, values clarification and thinking about the past and future on face value appear to be intrinsically linked. Therefore, it is surprising that no research to date has attempted to demonstrate an empirical link between the two. Chapter 7 aims to examine the link between valued living and past and future thinking. Chapter 7 comprises of three experiments where valued living, as reported on the Personal Values Questionnaire (PVQ), is compared to responses on the AMT (Experiment 14), the FTT (Experiment 15) and the FT-IRAP (Experiment 16), respectively.

7.2 Experiment 14

Although AMS has not been seen to be directly associated to personal values *per se,* theories pertaining to autobiographical memory have referred to its functional quality in informing future directed behaviour (e.g. Williams, 1996). It is likely that reduced AMS, in a similar fashion to its link with future thinking, would also be related to personal values and behavioural direction on this path, with values direction supported by the role of past experiences in personal goals and self-identity. This relationship has been emphasised in the self-memory system model (see Sections 1.4.1.1 and 1.4.1.2) proposed by Conway and Pleydell-Pearce (2000). The self-memory model argues that access to autobiographical memories may be disrupted if the memories sought are unpleasant (i.e. aversive) or in conflict with the person's ideal self-image. Conway and Pleydell-Pearce (2000) propose that reduced AMS may be an adaptive behaviour aimed at retaining (i.e. avoiding a loss of) confidence in personal goals and identity. Recurring avoidance of such aversive memories, have been argued by Williams et al. (2007) as consequently leading to a more instinctive and universal (i.e. overgeneral) retrieval style.

Experiment 14 will explore the relationship between Autobiographical Memory Specificity (AMS), as measured by the Autobiographical Memory Test, and personal values, as measured by the Personal Values Questionnaire (PVQ). Experiment 14 has four aims; To examine the role of AMS, in relation to (1) values reasoning (i.e. pliant, appetitive and avoidant reasoning), (2) perceived values importance (3) and values success. It is predicted that Autobiographical Memory Specificity, will be related to values reasoning, values success and values importance. (4) Experiment 14 further aim to explore the role of emotional avoidance, as measured by the Acceptance and Action Questionnaire (AAQ-II), in relation to values reasoning as measured by the PVQ. It is predicted that emotional avoidance will be related to values reasoning.

7.2.1 Method

7.2.1.1 Participants

Thirty-Six undergraduate students at Swansea University volunteered to take part in this experiment in return for course credits. Following the exclusion criteria pertaining to BDI-II scores (see Section 7.2.2.1) seven participants were left out of the final data analysis. Of the included twenty-nine participants there were 17 females and 12 males, whose ages ranged from 19 to 24 years, with a mean of 20.24 ($\sigma = 1.43$).

7.2.1.2 Materials and Apparatus

Psychometric Measures. The psychometric and psychological well-being measures used were identical to those used in Chapter 2, 3, 4 5 and 6, that is the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Anxiety Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983), the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004), The Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and a Verbal Fluency Control Task (Lezak, 1976) (for details pertaining to each of these measures see Section 2.2.1.2).

The Autobiographical Memory Task. The AMT was identical in stimuli and procedure to that used in previous chapters (cf. chapter 2, Section 2.2.1.2 for details on its presentation and Section 2.2.1.3 for the AMT procedure).

The Personal Values Questionnaire (PVQ; Blackledge & Ciarrochi, 2006). The PVQ was developed by Blackledge and Ciarrochi (2006) and is consistent with the core theories of Acceptance and Commitment Therapy (ACT) as it was adapted for use in an ACT context. The PVQ was modified from work by Sheldon and colleagues (e.g. Sheldon & Kasser, 1995; Sheldon Ryan, Deci & Kasser, 2004) pertaining to the assessment of goal content and motives (i.e. the function of goals) and the revised version of Sheldon's goal attainment procedures is as such considered a variation of these measures.

The PVQ is a multifaceted measure and as such provides assessment of personal values across nine different values areas, i.e. family (1); friendships/social relationships (2); couples/romantic relationships (3); work/career (4); education/schooling/personal growth/development (5); recreation/leisure (6); spirituality/religion (7); community/citizenship (8); health/physical well-being (9). Within each of the nine domains the PVQ aims to capture a brief description of the chosen value; that is, each values domain requests consideration of the features of the chosen value and respondents are asked to note down: i) what is vital in the chosen value; ii) the reason for choosing the value; iii) if they have been successful in living consistent with the chosen value, iv) how committed they are to that value, v) the importance of that value, and vi) how much they would like to improve on living consistent with that value.

Following this, ratings are made on a five-point Likert scales, with the respondents indicating how much they agree with statements regarding their reasons for endorsing particular values, with 1 being *'not at all for this reason'* and 5 being *'entirely for this reason'*. The considerations of, and belief in, a particular value may be assessed in regards to appetitive, avoidant, and pliant reasons.

Appetitive reasons for valuing. Appetitive, or positively reinforcing, reasons for valuing is reported in reply to three questions for each domain. These items include, (i) *'doing these things makes my life more vital'*, (ii) *'I view this value as important, whether or not others agree; this value may have been taught to me by others, now it is my own heartfelt value'* and (iii) *'I experience fun and enjoyment when engaged in this value'*.

Avoidant reasoning is targeted by replies to the statement, *'I would feel ashamed, guilty or anxious if I didn't value this'*. This question aims to get at the respondents reasons for valuing that might be under aversive control in the form of experiential avoidance.

In an effort to obtain levels of *Pliant reasoning* respondents are asked to rate their level of agreement to the statement, *"I value this because somebody else thinks I ought to or because someone else will like it if I do. I probably wouldn't say I value this if I didn't get some kind of praise or approval for it"*. This question aims to get at reasons for valuing that might be under the control of a particular form of rule-governed behaviour, such as pliance. That is, the extent to which someone is behaving under aversive control, by following a rule in light of it being reinforced by someone in the respondent's environment, rather than the probability of valuing for personally reinforcing reasons.

Next, participants rate how successful they have been at living each value in the past month on a 5-point Likert scale, with 1 indicating 0 – 20% success and 5 indicating 80-100% success. Respondents subsequently indicate how important the value is to them, how committed they are in following this value, and how much they would like to improve on the value commitment; with 1 being *very low* importance, commitment or desired improvement and 5 being *very high* importance, commitment or desired improvement. Preliminary examinations have shown good internal consistency among the items on the PVQ with encouraging parallel validity (Blackledge, Ciarrochi, Bilich, & Heaven, 2007). The PVQ is particularly relevant for use in research, were assessment occurs outside of the therapeutic context, as the main purpose of the PVQ is to facilitate ACT-consistent contact with values and to assess for aversive versus appetitive control (Ciarrochi, Bilich, & Godsell, 2010).

7.2.1.3 Experimental Overview

Experiment 14 used a 2 x 2 mixed participants design, with Beck Depression Inventory Scores (Sub-clinically Depressed and Non-Depressed) as the between participant variable, and Autobiographical Memory Specificity (Overgeneral, Specific) as the as within-participant variable. A correlational design was further employed for examination of relationships between the AMT, PVQ and AAQ-II measures. All participants received the same instructions and all completed the AMT and the PVQ. All participants completed all other measures and questionnaires, i.e., the AAQ-II, the BDI-II, the BHS, the LOT-R, the PANAS and the STAI. Participant data was categorised and analysed based on their Beck Depression Inventory responses (see Section 7.2.2.1 for group allocations to the Depressed and Non-Depressed groups). Figure 46 summarises the experimental sequence utilised for Experiment 14.

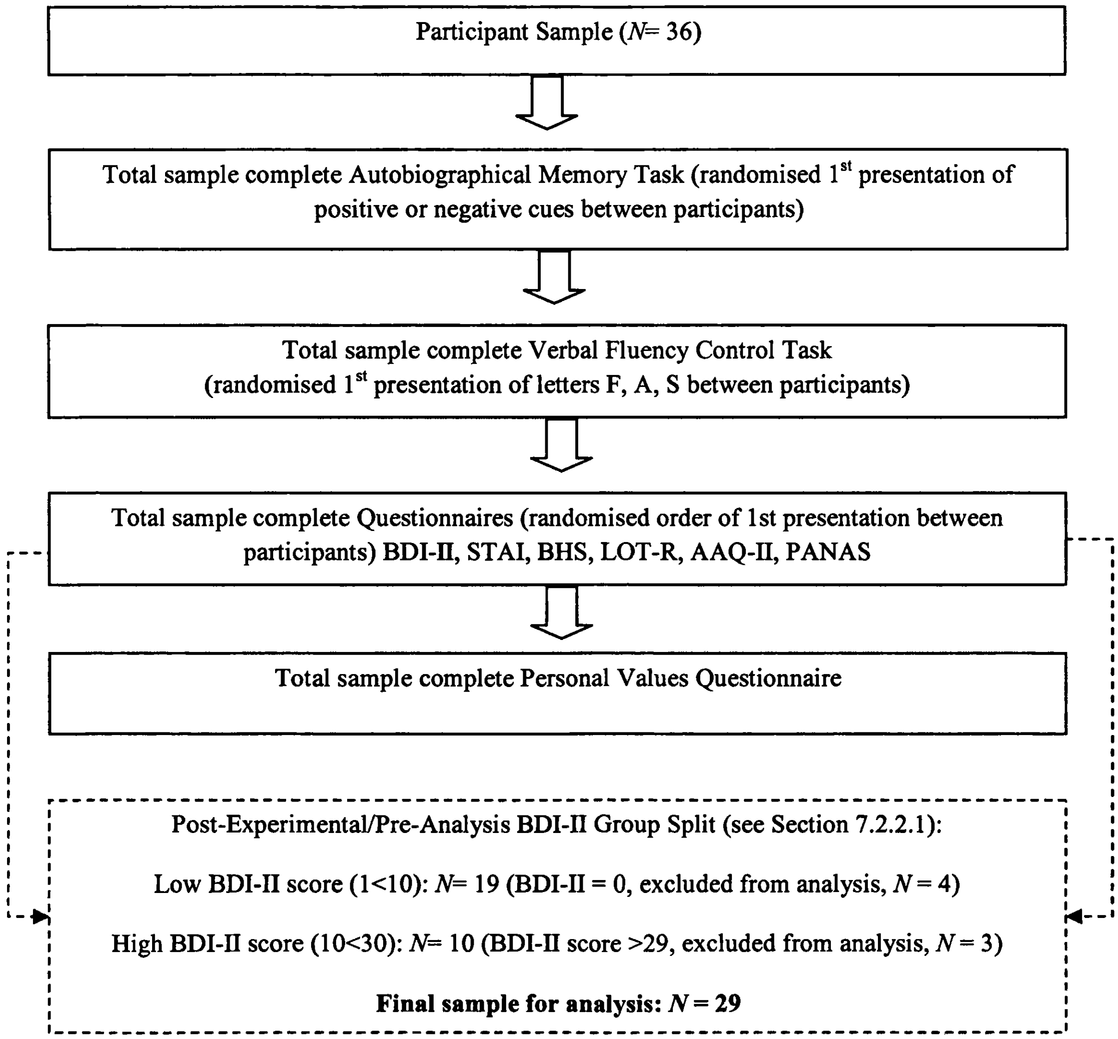


Figure 46. Overview of the Experimental Sequence for Experiment 14.

7.2.1.4 Ethical Issues

Given that recall of negative past events may invoke past traumatic events, induce a negative mood or an emotional response the current experiment raised a number of ethical considerations. Precautionary measures were taken with all participants in order to conduct the experiment within the appropriate ethical guidelines (The British Psychological Society, 2009). Thus Experiment 14 followed the same carefully considered procedural process as laid out in Experiment 1a (see Section 2.2.1.4). No participants reported recalling a traumatic past event during the Autobiographical Memory Task, nor did any participants report a deflated mood or a negative emotional response upon departure. At no point during the experiment did any participant withdraw from the experiment or express dissatisfaction or distress of any kind. Prior to commencement the experiment was approved by the Department of Psychology, Swansea University Ethics Committee.

7.2.1.5 Procedure

The experiment took place in a psychology laboratory consisting of a table and chair. Prior to the experimental tasks participants received further information about the study and completed a consent form. Participants first completed the Autobiographical Memory Task (AMT), which was identical in regards to stimuli and procedure to the AMT employed in previous experiments and described in Chapter 2 (see Section 2.2.1.2). After completing the AMT participants were presented with a set of psychometric tests along with the Verbal Fluency Control Task and the AAQ-II. These were presented in the exact same manner as described in previous chapters (see Section 2.2.1.2). Participants were lastly presented with the Personal Values Questionnaire (PVQ). Participants were asked to read the instruction sheet accompanying the PVQ, which detailed the Values Domains as *'areas of your life you may find important'* (cf. Blackledge & Ciarrochi, 2006). Unlimited time was offered to participants for reading through these instructions. The experimenter remained present during this time and participants were encouraged to ask questions pertaining to the completion of the PVQ. Once participants indicated confidence in completing the task at hand the experimenter left the room. No time limits were enforced in completion of the PVQ and participants were told to take as long as they needed. In an effort to increase truthful values reporting participants were reminded that the questionnaire responses were confidential, and that all replies would be anonymous in the experimental analysis and write up. It was emphasised that participants should write down *their own values* where indicated, described as *'ways of living and doing things related to that Values Domain that are very important to you'*. Upon completion the participants were thanked and suitably debriefed as to the nature of the study.

7.2.2 Results and Discussion

7.2.2.1 *Group Allocation*

Participants were split based on their depression scores as reported on the BDI-II in order to form two experimental groups. The study adhered with the practise utilised in the foregoing experiments by excluding data for any participants with a BDI-II score of 0 ($N = 4$) or above 29 ($N = 3$; $M = 30.67$) in order to more accurately capture samples from healthy and sub-clinically depressed participants. The inclusion criteria for the Non-Depressed group was a score of 1< 10 as reported on the Beck Depression Inventory, thus participants presenting scores of 1-9 ($N = 19$; $M = 4.11$) were allocated to this group, whereas inclusion in the sub-clinical Depression group required BDI-II scores of 10 < 30 ($N = 10$; $M = 16.90$; Depressed Group).

7.2.2.2 *Demographics and Psychometrics*

The Non-Depressed and the Depressed group were found to present diverging responses on all of the psychometric measures. The groups reported significantly different levels of depression (BDI-II, $t(27) = -7.571, p < .001$), optimism (LOT-R, $t(27) = 6.131, p < .001$), anxiety (STAI, $t(27) =- 4.439, p<.001$), and hopelessness (BHS, $t(27) = -3.560, p = .001$). The groups were also significantly different with respect to levels of emotional avoidance (AAQ-2, $t(27) = 4.520, p <.001$). No group differences were seen with respect to Verbal fluency ($t(27) = -.034, p =.455$), age ($t\ (27) = -.700, p=.490$) or gender ($X^2(1) =.012, p=.913$), nor for positive (PA, $p=.069$) or negative mood (NA, $p=.071$). The psychometric means are presented with the participant demographics in Table 71 depicting the mean differences for each of these variables.

Table 71. Participant Demographics and Psychological well-being reports presented as Means, with Standard Deviations (SD) as reported by the Depressed and Non-Depressed groups in Experiment 14.

Variable	**Depressed *(SD)***	**Non-Depressed *(SD)***
Gender: Females **(Males)**	6 **(4)**	11**(8)**
Age	20.50 *(1.26)*	21.15 *(5.65)*
VFCT	12.43 *(3.49)*	13.12 *(4.02)*
BDI-II	16.90 *(6.75)*	4.11 *(2.28)*
BHS	7.30 *(3.30)*	4.21 *(1.39)*
STAI	45.50 *(11.61)*	30.52 *(6.66)*
LOT-R	9.90 *(1.59)*	17.68 *(3.81)*
AAQ-II	42.50 *(6.20)*	51.73 *(4.66)*
PA	28.10 *(3.66)*	31.10 *(4.24)*
NA	16.70 *(6.23)*	13.47 *(3.09)*

Note. VFCT = Verbal Fluency Control Task; BDI-II= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

7.2.2.3 *Personal Values Questionnaire*

Values Importance. Values importance was examined across all of the nine value domains for both the Depressed and the Non-Depressed group. The typical response to the question *"How Important is this value to you?"* was *'quite important'*, though some variance was observed between values. For values pertaining to Family Relationships, Friendships/Social Relationships, Couples/Romantic Relationships, Education/Personal Development (PVQ values domains 1, 2, 3 and 5 respectively), responses were consistently high, that is, either noted as *'quite important'* or *'extremely important'* for both groups. Examination of importance for Family Relationships, Friendships/Social Relationships, Recreation/Leisure/Sport , Community/Citizenship and Health/Physical Well-Being (value domains 1, 2, 6, 8 and 9 respectively) saw the widest range of responses, with respondents rating these as *'not at all important'* to *'extremely important'*. Examining the level of importance by group showed that the percentage of *"quite important"* and *"extremely important"* responses across domains did not differ much between the Non-Depressed (78.31%) and the Depressed group (70%).

7.2.2.4 *Values Success and Values Reasoning Variables*

Values success and values reasoning (i.e. pliant, avoidant, or appetitive reasons for valuing) were examined for group differences. The appetitive reasoning composite variable was created by combining PVQ items 3, 4, and 5 (see Section 7.2.1.2). There were differences between the Depressed and Non-Depressed groups in relation to appetitive ($t(27) = 2.058$, $p = .049$), avoidant reasoning ($t(27) = -2.327$, $p = .028$) and success at living all values ($t(27) = 2.850$, $p = .008$), with the Depressed group presenting less appetitive and more avoidant reasoning for values, along with reporting less success at living values. No group differences were found for pliant reasoning ($t(27) = .777$, $p = .444$) and levels of importance ($t(27) = .357$, $p = .724$). Table 72 presents the mean scores for both the Depressed and Non-Depressed groups responses to the PVQ variables analysed.

7.2.2.5 *Correlations between Values, Reasoning, Psychological Variables and the AMT*

The relationships between psychological symptom variables and values were examined by use of Pearsons' correlations. Avoidant reasoning was seen to correlate positively with depression (BDI-II; $r = .351$, $p = .062$), hopelessness (BHS, $r = .370$, $p = .048$) and anxiety (STAI, $r = .459$, $p = .012$) and negatively with optimism (LOT-R, $r = -.362$, $p = .054$). Values success correlated negatively with depression (BDI-II, $r = -.404$, $p = .030$) and anxiety (STAI, $r = -.484$, $p = .008$) and positively with optimism (LOT-R; $r = .445$, $p = .016$). The less successful respondents were at living their values the more likely they were to report higher levels of depression and anxiety. No correlations were found with appetitive or pliant reasoning, nor values importance and psychological variables. Emotional avoidance, as measured with the AAQ-2, was not found to correlate with either of the PVQ variables.

Table 72. Means and Standard Deviations (SD) for each of the PVQ variables Values Success, Values Importance, Pliant-, Avoidant- and Appetitive Reasoning as reported by the Depressed and Non-Depressed groups in Experiment 14.

Values Component	**Group**	**N**	**Mean**	***SD***
Success	*Non-Depressed*	19	3.12	*0.52*
	Depressed	10	2.42	*0.81*
Importance	*Non-Depressed*	19	4.07	*0.43*
	Depressed	10	4.01	*0.39*
Pliant Reasons	*Non-Depressed*	19	1.62	*0.47*
	Depressed	10	1.48	*0.40*
Avoidant Reasons	*Non-Depressed*	19	2.01	*0.58*
	Depressed	10	2.62	*0.79*
Appetitive Reasons	*Non-Depressed*	19	4.03	*0.08*
	Depressed	10	3.74	*0.09*

7.2.2.6 *Lack of Success in Living Important Values: Assessing Values Discrepancy*

An examination of the discrepancy between values importance and values success was conducted. Theoretically of interest was the psychological impact of being less successful at living values ranked as especially important, therefore only the positive discrepancies were examined. First, success scores were subtracted from importance scores. Negative scores on the discrepancy variable were re-coded into zeros, as this indicated higher success scores than importance scores (meaning the respondents reported being more successful at living less important values). Finally, a total score of values discrepancy was calculated across values domains by summing discrepancy in each domain.

Significant group differences for the samples were found for the variable “Total Values Discrepancy” demonstrating that Depressed participants were more likely to report reduced success in living important values (t (27)=-2.720, p =.011) relative to the Non-Depressed sample.

7.2.2.7 *Autobiographical Memory Test*

The AMT data was collated and assessed following common practice in investigations of autobiographical memory specificity (AMS) (see Williams et al., 2006, 2007), where the first response across the 12 trials, that is, memories that participants retrieved in response to the 12 AMT cue words that were specific, was used to index AMS (referred to here as memory specificity) with higher scores indicating increased specificity (see Section 2.2.2.3 for further discussion on the AMT data transformation).

Moderate to high positive correlations were seen between the number of specific memories produced under each valence category with the total number of specific recall (Non-Depressed group positive cues, .63, and negative cues .91; Depressed group, positive cues .82 and negative cues .86). On average, retrieved memories for participants in the Non-Depressed group were specific 83.82% of the time across the 12 trials; whereas the Depressed participants showed somewhat reduced specificity in retrieval overall with 78% of the 12 trials noted as specific. Differences in specificity were predominantly noted for positive cues, with the Non-Depressed group retrieving a greater number of specific memories relative to the Depressed group (M = 5.52, σ= .69 and M= 4.70, σ= 1.05 respectively; t(27) =5.232, p=*.017*). Both groups generally recalled less specific details in recall which was prompted by negative cues, and no significant group difference was observed in this domain (t(27)=1.769, p=*.088*). Table 73 presents the AMT performance for both groups and as can be seen omissions were rare.

Table 73. Autobiographical Memory Test Performance presented as Percentage of Autobiographical Memory Specificity, with Mean number and Standard Deviation (SD) of Memory Specificity responses across the six cue words in each valence category as reported by the Depressed and Non-Depressed groups in Experiment 14. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean *(SD)*	**Mean *(SD)***	***t*(28)**	***p***
Total % of specific memories	82.82*(13.75)*	78.00 *(15.24)*		
Total % of omissions	1.16 *(2.16)*	2.25 *(2.30)*		
Total cues	10.00 *(1.63)*	8.30 *(1.88)*	2.526	*0.018**
Positive cues	5.52 *(0.69)*	4.70 *(1.05)*	2.532	*0.017**
Negative cues	4.47 *(1.30)*	3.60 *(1.17)*	1.769	*0.088*

Note: *$p<.05$. Positive/Negative Cues = Number of *specific* first memories relative to the detailed valence category on the Autobiographical Memory Test.

Memory specificity was subjected to a 2 (Group: Non-Depressed vs. Depressed) x 2 (Cue valence: Positive vs. Negative) mixed model Analysis of Variance (ANOVA). A main effect for Valence specificity was found ($F(1, 2) = 18.695$, $p<.001$, $\eta p^2 = .409$) with participants in general being more specific in recall to positive cues. A main effect for Group was also found, ($F(1, 27) = 6.382$, $p=.018$, $\eta p^2 = .191$), with the Non-Depressed group found to be more specific in recall of events overall, relative to the Depressed group. No significant interaction was found, $F(1, 27) = .009$, $p=.925$, $\eta p^2 < .001$.

7.2.2.8 *Correlations between AMT specificity and Values*

The relationship between autobiographical memory specificity (AMS) and values was examined across groups. No significant relationship was found for AMS with either of the values components neither between nor within groups.

7.2.2.9 *Autobiographical Memory Specificity and Values predictability*

In a final analysis the AMS scores were dichotomized to indicate whether each person's response was specific (AMS score > 75%) or not specific in cued recall (AMS score < 75%), to test this as a theoretically meaningful cut point relating to values discrepancy. Participants who were specific in cued recall where marginally more likely to report *success* at living their values (34.5%) than were those whom where less specific in recall (20.7%), though this difference was not found to be significant (χ^2 (1, N = 29) =.697, p=.404).

Table 74. Summary of Main Aims and Findings from Experiment 14.

	Research Aim	**Hypothesis**	**Main Findings**
1	Examine the role of AMS, as measured by the AMT, in relation to values reasoning (i.e. pliant, appetitive and avoidant reasoning) as measured by the PVQ.	*There is a relationship between AMS and use of avoidant reasoning as measured by the PVQ.* *There is a relationship between AMS and use of pliant reasoning as measured by the PVQ.* *There is a relationship between AMS and use of appetitive reasoning as measured by the PVQ.*	*The hypotheses are not supported.* No significant relationship was found for AMS with either of avoidant, pliant or appetitive reasoning neither between nor within groups.
2	Examine the role of AMS, as measured by the AMT, in relation to perceived values importance as measured by the PVQ.	*There is a relationship between AMS and values importance.*	*The Hypothesis is not supported.* No relationship was found for AMS and values importance.
3	Examine the role of AMS in relation to and values success as measured by the PVQ.	*There is a relationship between AMS and values success.*	*The Hypothesis is not supported.* No relationship was found for AMS and values success.
4	Examine the relationship between emotional avoidance and pliant, appetitive and avoidant reasoning as measured by the PVQ.	*There is a relationship between emotional avoidance and pliant reasoning.* *There is a relationship between emotional avoidance and appetitive reasoning.* *There is a relationship between emotional avoidance and avoidant reasoning.*	*The hypotheses are not supported.* No relationship was found for emotional avoidance and either pliant, avoidant or appetitive reasoning.

7.2.3 Summary

The AMS group difference noted in previous experiments (i.e. 1a, 2a and 10) was again confirmed within the current sample. That is, the Non-Depressed individuals were seen to be more specific in recall of past events relative to the Depressed group. In relation to the aims of Experiment 14 no relationship was found between AMS and (1) values reasoning (i.e. pliant, appetitive and avoidant reasoning), nor (2) perceived values importance. In relation to values success it was found that (3) when the AMS scores were dichotomised to represent high and low specificity groups, independent of depression levels, a trend was seen with the low specificity group reporting less success in valued living, although this was not supported by statistical analysis as significant. No relationship was found between (4) emotional avoidance with either of the PVQ variables. Table 74 summarise the main findings from Experiment 14.

7.3 Experiment 15

Experiment 15 aims to extend on Experiment 14 by examining the relationship between future thinking, valued living and sub clinical depression. A withdrawal from important areas of life functioning often co-exists with negative future expectations (e.g. Plumb & Hayes, 2008; Young, Beck & Weinberger, 1993; Beck, Rush, Shaw, & Emery, 1979). When someone is experiencing depressive thoughts (e.g., 'I don't expect to succeed in life') and takes those thoughts literally (e.g., 'it is true that I'm a failure'), it follows that this person will be less successful at actively engaging in valued living. For example, a depressed individual may avoid asking for a promotion at work based in the belief that they are not worthy of such an endorsement, or they may leave their degree course as they are fused with thoughts telling them that they cannot accomplish anything significant when they are feeling sad.

It is important in this context to distinguish between having goals and not engaging with goals. Melges and Bowlby (1969) described future hopelessness as a state of having goals, but feeling that these goals are unattainable. It was seen by Melges and

Bowlby, that even when a goal was perceived as inaccessible, individuals were unable to 'let go' of these goals, with the spiraling effect of subsequent goals not being pursued. Hadley and MacLeod (2010) recently offered support to Melges and Bowlby's account, as they found that individuals high in hopelessness did hold personal goals for the future, but displayed a lack of belief in the likelihood of such events occurring. It was argued that this lack of belief is underpinned by a reduction in positive future thinking (Vincent et al., 2004). MacLeod and Conway (2007) describe this inability to plan or clarify future goals, not as disengagement, rather, these individuals seem to be 'painfully engaged' with the future.

Experiment 15 aims to examine the relationship between responses on the Future Thinking Task (FTT; Macleod et al., 1993; 1996) and personal values, as measured by the PVQ, in relation to sub-clinical depression. Experiment 15 has four main aims; i.e. to examine the role of positive future thinking, as measured by the FTT, in relation to (1) values reasoning (i.e. pliant, appetitive and avoidant reasoning), (2) perceived values importance (3) and values success as measured by the PVQ. With precedence in the future thinking literature it is predicted there will be a relationship between positive future expectancies, depression and success in living values. A further aim is to (4) explore the role of emotional avoidance, as measured by the AAQ-II, in relation to values reasoning, as measured by the PVQ. It is predicted that there will be a relationship between emotional avoidance and values reasoning.

7.3.1 Method

7.3.1.1 Participants

Thirty-five undergraduate students at Swansea University volunteered to take part in this experiment in return for course credits. Following the exclusion criteria pertaining to BDI-II scores (see Section 7.3.2.1) the data from four participants were left out of the final data analysis. Of the included thirty-one participants there were 20 females and 11 males, whose ages ranged from 19 to 24 years, with a mean of 20.29 ($\sigma = 1.13$).

7.3.1.2 Materials and Apparatus

Psychometric Measures. Participants completed a set of psychometric and psychological well-being measures; The psychometric and psychological well-being measures used were identical to those used in Chapter 2, 3, 4 5 and 6, that is the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Anxiety Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983) , the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004), The Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and a Verbal Fluency Control Task (Lezak, 1976) (for details pertaining to each of these measures see Section 2.2.1.2).

The Future Thinking Task (FTT) was identical in stimuli and procedure to that used in previous chapters (cf. chapter 3, Section 3.2.1.2 for details on its presentation and Section 3.2.1.3 for procedure).

The Personal Values Questionnaire (PVQ; Blackledge & Ciarrochi, 2006) was again used in the values assessment and the presentation and procedure was exactly the same as that of Experiment 14 (see Sections 7.2.1.2 and 7.2.1.3).

7.3.1.3 Experimental Overview

Experiment 15 used a 2 x 2 mixed participants design, with Beck Depression Inventory Scores (Sub-clinically Depressed and Non-Depressed) as the between participant variable, and Future Thinking (Positive, Negative) as the as within-participant variable. A correlational design was further employed for examination of relationships between the FTT, PVQ and AAQ-II measures. All participants received the same instructions and all completed the FTT and the PVQ. All participants completed all other measures and questionnaires, i.e. the Verbal Fluency Control Task, the AAQ-II, the BDI-

II, the BHS, the LOT-R, the PANAS and the STAI. Participant data was categorised and analysed based on their Beck Depression Inventory responses (see Section 7.3.2.1 for group allocations to the Depressed and Non-Depressed groups). Figure 47 summarises the experimental sequence of Experiment 15.

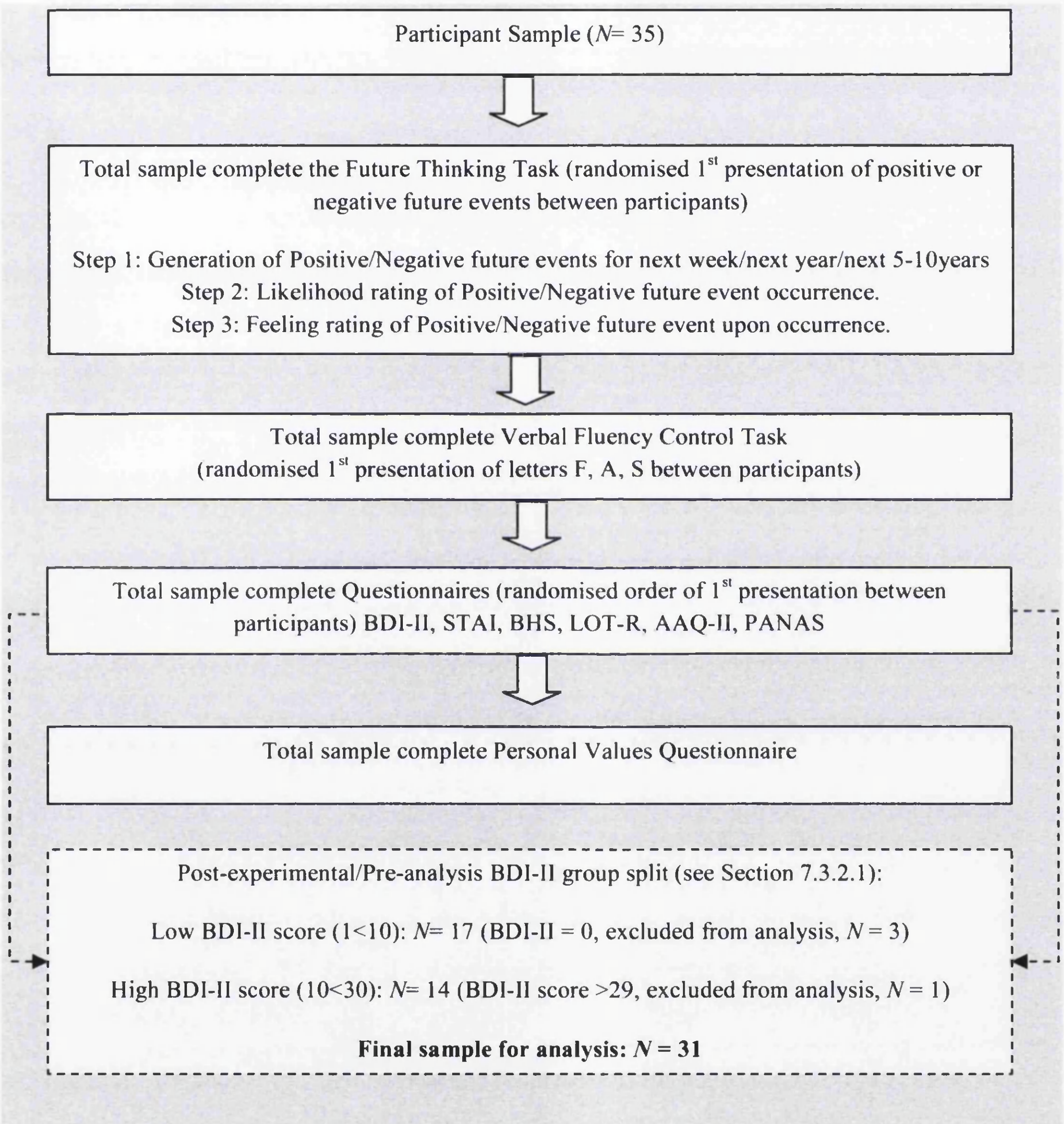


Figure 47. Overview of the Experimental Sequence for Experiment 15.

7.3.1.4 Ethical Issues

In order to conduct the experiment according to the appropriate ethical guidelines as identified by the British Psychological Society (2009), precautionary measures were explicitly employed in Experiment 15. The steps taken were consistent with those employed in previous experiments (i.e., Experiment 3) and as outlined in Experiment 1a (see Section 2.2.1.4 for full details). The only differences relate to the specific experiment information, i.e. the nature and procedural details of Experiment 15 as detailed in the written and verbal experimental briefs. A 'cooling off' period of a minimum 24 hours was implemented between receiving information about the experiment and participation commencement as in the previous experiments. Emphasis was again given in the brief and debrief to any psychological distress that may arise following the experimental procedures. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the future events generated or following completion of the PVQ. The experiment was approved by the Psychology Department Ethics Committee at Swansea University.

7.3.1.5 Procedure

The experiment took place in a specifically allocated psychology lab, which comprised of a small room with a table and chair. Participants received further information about the experiment and completed a consent form prior to the experiment commencing. Participants firstly completed the Future Thinking Task (FTT), which was identical in regards to presentation and procedure as to the FTT tasks employed in previous experiments and as described in Chapter 3 (see Section 3.2.1.3). Upon completion of the FTT participants were presented with the set of self-report psychometric tests along with the Verbal Fluency Control Task and the AAQ-2. The completion of self-report questionnaires took form of that reported in previous experiments (see Section 2.2.1.3). Participants were lastly presented with the Personal

Values Questionnaire (PVQ). As in Experiment 14, participants were asked to read the instruction sheet accompanying the PVQ (cf. Blackledge & Ciarrochi, 2006) prior to commencement of the task. Participants were not confined to any time limitations in this task and the experimenter remained present during this time for which participants were encouraged to ask any questions they may have pertaining to the completion of the PVQ. Once participants indicated confidence in completing the task at hand the experimenter left the room. Truthful values reporting was encouraged by ensuring participants that the questionnaire responses were confidential, and that all replies would be anonymous in the experimental analysis and write up. Emphasis was put on presentation of '*their own values*', described as *'ways of living and doing things related to that Values Domain that are very important to you'*. Upon completion of all tasks the participants were thanked and suitably debriefed as to the nature of the study.

7.3.2 Results and Discussion

7.3.2.1 *Group Allocation*

As in Experiment 14 participants were split based on their depression scores (BDI-II) in order to form two experimental groups. The study adhered with the practise utilised in the foregoing experiments by excluding data for any participants with a BDI-II score of 0 (N = 3) or above 29 (N = 1; M = 30) in order to more accurately capture samples from healthy and sub-clinically depressed participants. The inclusion criteria for the Non-Depressed group was a score of 1< 10 as reported on the Beck Depression Inventory-II, thus participants presenting scores of 1-9 (N = 17; M = 4.17) were allocated to this group, whereas inclusion in the sub-clinical Depression group required BDI-II scores of 10 < 30 (N = 14; M = 16; Depressed Group

7.3.2.2 *Demographics and Psychometrics*

The Non-Depressed and the Depressed samples were seen to differ significantly on all the psychometric measures. I.e. the groups differed on depression scores (BDI-II,

$t(29) = -6.834$, $p < .001$), optimism (LOT-R, $t\ (29) = 4.501$, $p < .001$), anxiety (STAI, $t(29) =- 4.589$, $p<.001$), and hopelessness (BHS, $t\ (29) = -3.641$, $p = .001$). The two groups also reported differing levels of emotional avoidance (AAQ-2, $t\ (29) = 6.352$, $p <.001$). No group differences were seen with respect to age ($t\ (29) = -1.067$, $p=.295$), gender ($X^2(1) =.2.203$, $p=.138$), or verbal fluency ($t\ (29) = .024$, $p = .981$). Nor was any group differences seen for positive (PA, $p=.150$) or negative mood (NA, $p=.156$). The psychometric means are presented with the participant demographics in Table 75 depicting the mean differences for each of these variables.

Table 75. Means and Standard Deviations (SD) of Demographics and Psychometric measures as reported by the Depressed and Non-Depressed groups in Experiment 15.

Variable	**Depressed *(SD)***	**Non-Depressed *(SD)***
Gender: Females (Males)	11 (3)	9 (8)
Age	21.85 *(6.44)*	20.17 *(0.88)*
VFCT	10.83 (3.17)	10.86 (3.79)
BDI-II	16.00 *(6.64)*	4.17 *(2.40)*
BHS	6.64 *(3.12)*	3.41 *(1.73)*
STAI	42.50 *(8.08)*	31.64 *(4.97)*
LOT-R	11.57 *(3.54)*	17.23 *(3.43)*
AAQ-II	40.64 *(7.34)*	55.17 *(5.38)*
PA	26.78 *(7.45)*	30.47 *(6.42)*
NA	13.78 *(2.45)*	12.58 *(2.12)*

Note. VFCT= Verbal Fluency Control Task; BDI= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

7.3.2.3 *The Future Thinking Task*

Analysis of the Future Thinking Task scores were performed following the standards set by MacLeod et al. (1998), with composite index scores calculated for each period within in each valence condition, by multiplying the number of responses generated in a period by the mean likelihood ratings given for those responses and by the mean feelings ratings given for those responses. The composite scores from both groups of the overall positive and negative conditions are shown in Table 76.

Table 76. Means and Standard Deviations for Positive and Negative Future Thinking Task *Index* Scores, incorporating Fluency, Likelihood and Feeling ratings for each Time Period as reported by the Depressed and Non-Depressed groups in Experiment 15. T-Test score and statistical value (*p*) from between group comparisons are presented.

Variable	**Non-Depressed**	**Depressed**		
	Mean (SD)	***Mean (SD)***	***t(29)***	***p***
Positive Responses				
Next Week	71.24 *(20.66)*	59.86 *(32.06)*	1.195	*0.242*
Next Year	78.28 *(23.88)*	77.31 *(42.61)*	0.080	*0.937*
Next 5-10 Years	53.70 *(28.01)*	55.12 *(42.11)*	-0.112	*0.912*
Negative Responses				
Next Week	27.95 *(12.39)*	27.83 *(9.98)*	0.031	*0.976*
Next Year	31.12 *(13.45)*	37.57 *(17.74)*	-1.152	*0.259*
Next 5-10 Years	41.40 *(21.04)*	40.85 *(20.15)*	0.073	*0.942*

7.3.2.4 *FTT Index Scores*

Analysis of the composite scores with a Group (Depression: Low BDI vs. High BDI) x Valence (Future expectancy: Positive/Negative) x Period (Week, Year, 5-10 years) mixed model ANOVA produced three significant effects. There was a significant main effect of Valence, with participants showing higher levels of future positive relative to negative expectancy ($F(1,29) = 57.154$, $p < .001$, $\eta p^2 = .663$), as well as a moderate main effect of Period, reflecting higher scores for the next year vs. the next week the next 5–10 years ($F(2,28) = 3.018$, $p = .057$, $\eta p^2 = .094$). There was also a significant interaction effect found for Period x Valence ($F(2,28) = 12.519$, $p < .001$, $\eta p^2 = .302$), with more positive events expected in the next year relative to more negative events anticipated for the more distant future of 5-10 years time. The predicted effect of a Group x Valence interaction was not found to be significant ($F(1, 29) = .448$, $p = .508$, $\eta p^2 = .015$), nor was there a main effect for group ($F(1, 29) = .025$, $p = .875$, $\eta p^2 = .001$).

The three-way interaction involving Group, Valence and Period did not approach significance ($F(2, 28) =.564, p=.572, \eta p^2 =.019$). Thus, the FTT index scores suggest that the Depressed and Non-Depressed individuals held similar expectations with regards to their subjective future expectancies, with positive and negative expectancies consistently diverging across the three different periods for both groups.

7.3.2.5 *FTT Raw Scores*

Raw scores of number of events generated, likelihood values, and feeling ratings were calculated and are presented in Table 77. The same analysis was employed with the raw data as for the FTT index scores.

The fluency data was firstly analysed in a Group (Depression: Low BDI-II/High BDI-II scores) x Valence (Number of future events (fluency): Positive/Negative) x Period (Week, Year, 5-10 years) mixed-model ANOVA found a significant main effect for Valence, $F(1, 29)=43.598, p<.001, \eta p^2 =.601$); that is, participants generated significantly more positive thoughts for the future relative to events that they were worried about. No main effect was found for Period ($F(2, 28) = 1.467, p=.239, \eta p^2 =.048$) nor for Group ($F(1, 29) =.109, p=.744, \eta p^2 = .004$). No significant interaction effect was observed for Valence x Group ($F(2, 28) = 2.072, p= .161, \eta p^2 =.067$). No interaction effect was observed between Valence x Period ($F(2, 28) =.582, p=.562, \eta p^2 =.020$) nor was there a three way interaction for Group x Valence x Period ($F(2, 68) =1.019, p=.367, \eta p^2 =.034$).

The results indicate that the two groups did not diverge in regards to the number of future events generated for either valence category.

7.3.2.6 *Future Thinking Task measures of Expectancy Likelihood*

As with the fluency data, an analysis of variance (ANOVA) was conducted for the likelihood ratings as an individual variable. A Valence (Events likelihood: Positive/Negative) x Period (week, year, 5-10 years) x Group (Depression: Low BDI-II/High BDI-II scores) mixed-model ANOVA found a significant main effect for

Valence, $F(1, 29) = 44.554$, $p < .001$, $\eta p^2 = .606$); that is, across all time periods participants generated significantly more positive expectations for the future relative to the events that they were worried about. A significant interaction was seen for Period and Group ($F(2, 28) = 3.148$, $p = .050$, $\eta p^2 = .098$). No main effect was found for Period ($F(1,29) = .919$, $p = .404$, $\eta p^2 = .031$), nor for Group ($F(1,29) = .1.985$, $p = .169$, $\eta p^2 = .064$), Further, no interaction effects were seen for Valence and Group ($F(1,28) = .650$ $p = .427$, $\eta p^2 = .022$), or Valence and Period ($F(2,28) = 2.051$, $p = .138$, $\eta p^2 = .066$). The three way interaction of Valence x Period x Group further failed to produce any significant interaction effects ($F(2, 28) = .106$, $p = .900$, $\eta p^2 = .004$). The results show that expectancy as an individual component of the FTT was not able to detect any future expectancy differences between the two groups.

7.3.2.7 *Future Thinking Task measures of Event Affect*

The feeling values were explored in a similar fashion to the fluency and likelihood data, with an analysis of variance (ANOVA) completed with positive and negative future feeling raw scores. A Valence (Feeling: Positive/Negative) x Period (week, year, 5-10 years) x Group (Depression: Low BDI-II/High BDI-II scores) mixed-model ANOVA found a significant main effect for Valence, $F(1, 29) = 64.327$, $p < .001$, $\eta p^2 = .689$); that is, across all time periods participants foresaw feeling more positive of future events relative to increased negative anticipation relating to events that they were not looking forward to. A significant main effect was also found for Period ($F(1, 29) = 11.159$, $p < .001$, $\eta p^2 = .278$) with participants reporting increased levels of affect at the time of events occurring in the next 5-10 years vs. the next week and the next year. However, no main effect was seen for Group ($F(1, 29) = .255$, $p = .617$, $\eta p^2 = .009$). None of the interaction effects were significant, Valence and Group ($F(2, 28) = .185$, $p = .670$, $\eta p^2 = .006$), Valence and Period ($F(2,28) = 1.056$, $p = .354$, $\eta p^2 = .035$) , nor Period and Group ($F(2, 28) = .667$, $p = .517$, $\eta p^2 = .022$), nor was there a three way interaction for Valence x Period x Group ($F(2, 28) = 1.674$, $p = .197$, $\eta p^2 = .055$).

The raw feeling data as an individual component of the FTT was not able to detect any differences between the two groups in relation to anticipated affect.

Table 77. Means and Standard Deviations (SD) for Positive and Negative Future Thinking Task Raw Scores for Fluency (number of events generated), Likelihood and Feeling Ratings for each Time Period as reported by the Depressed and Non-Depressed groups in Experiment 15.

Variable	**Non-Depressed**	**Depressed**
	Mean *(SD)*	**Mean** *(SD)*
Positive Responses, *Next Week*		
Fluency (no. of events)	6.12 *(2.02)*	6.35 *(2.79)*
Likelihood	5.27 *(1.11)*	4.61 *(1.27)*
Feeling	2.15*(0.42)*	2.37 *(0.59)*
Positive Responses, *Next Year*		
Fluency (no. of events)	6.11 *(1.69)*	5.71 *(1.77)*
Likelihood	5.21 *(0.87)*	5.24 *(1.23)*
Feeling	2.51 *(0.35)*	2.48 *(0.38)*
Positive Responses, *Next 5-10 years*		
Fluency (no. of events)	6.64 *(2.23)*	6.50 *(1.82)*
Likelihood	4.94 *(0.69)*	4.81 *(0.86)*
Feeling	1.69 *(0.61)*	1.70 *(0.79)*
Negative Responses, *Next Week*		
Fluency (no. of events)	4.35 *(2.14)*	5.14 *(1.79)*
Likelihood	4.61 *(1.61)*	3.53 *(1.17)*
Feeling	1.68 *(0.63)*	1.65 *(0.62)*
Negative Responses, *Next Year*		
Fluency (no. of events)	4.35 *(1.96)*	5.21 *(2.32)*
Likelihood	3.81 *(1.52)*	3.50 *(1.32)*
Feeling	2.21*(0.62)*	2.21 *(0.50)*
Negative Responses, *Next 5-10 years*		
Fluency (no. of events)	5.05 *(2.35)*	4.92 *(1.94)*
Likelihood	3.83 *(1.39)*	3.58 *(0.89)*
Feeling	2.36 *(0.61)*	2.38 *(0.58)*

7.3.2.8 *Summary*

Overall the FTT data, at split and combined levels of analysis suggests that the two groups did not differ in regards to cognitions about future events, with no reported difference in the number of events occurring, the likelihood of the events taking place, nor feelings pertaining to the anticipated experience of such events occurring.

7.3.2.9 *Personal Values Questionnaire*

Values Importance. The values domains spirituality/religion and community/citizenship (PVQ domains 7 and 8 respectively) were consistently found to be rated as not important across the sample. Most participants (75%) did not respond to the questions related to these values or incomplete responses were made (25%). Thus these values were omitted from further examination and are not included in statistical calculations here.

Values importance was examined across the remaining value domains for both the Depressed and the Non-Depressed groups. The typical response to the question *"How Important is this value to you?"* was *'quite important'*, though some variance was observed between values. For values pertaining to Family Relationships, Friendships/Social Relationships, Couples/Romantic Relationships and Work/Career (PVQ values 1, 2, 3 and 4 respectively), responses were consistently high, that is, either noted as *'quite important'* or *'extremely important'* for the Non-Depressed group. The Depressed group were seen to follow the same pattern of responses as the Non-Depressed group, with the exception of Work/Career which saw a slightly wider range of responses from *'moderately important'* to *'extremely important'*. The Depressed group also rated Health/Well-Being (values domain 9) as *'quite important'* or *'extremely important'*. Overall the most common responses were *"quite important"* across all the inclusive domains, with none of the inclusive value domains considered as *'not at all important'*.

7.3.2.10 *Values Success and Values Reasoning Variables*

In subsequent analyses group differences in responses to Values Success and Values Reasoning (pliant, avoidant, or appetitive reasons for valuing) were examined. The Appetitive Reasoning composite variable was created by combining PVQ items 3, 4, and 5 (as described in Section 7.2.1.2). Differences were observed between the Depressed and Non-Depressed groups in relation to Appetitive reasoning ($t(29) = 2.120$, $p = .043$). No group differences were found for Avoidant ($t(29) = -.583$, $p = .565$) or Pliant reasoning ($t\ (29) = -.913$, $p = .369$), levels of importance ($t\ (29) = .674$, $p = .506$) or success at living all values ($t\ (29) = .232$, $p = .819$). Mean differences pertaining to values reasoning, importance and success are presented in Table 78.

Table 78. Means and Standard Deviations (SD) of the participant responses to the PVQ variables of Values Success, Values Importance, Pliant-, Avoidant- and Appetitive Reasoning for the Depressed and Non-Depressed groups in Experiment 15.

Values Component	Group	N	Mean	*SD*
Success	*Non-Depressed*	17	3.46	*0.88*
	Depressed	14	3.39	*0.59*
Importance	*Non-Depressed*	17	4.40	*0.44*
	Depressed	14	4.28	*0.52*
Pliant Reasons	*Non-Depressed*	17	1.82	*1.11*
	Depressed	14	2.21	*1.27*
Avoidant Reasons	*Non-Depressed*	17	2.29	*0.90*
	Depressed	14	2.51	*1.15*
Appetitive Reasons	*Non-Depressed*	17	4.27	*0.33*
	Depressed	14	3.96	*0.48*

7.3.2.11 *Correlations between PVQ components and Psychological Variables*

The relationships between psychological symptom variables and the PVQ components were examined and found that Avoidance correlated moderately with depression and hopelessness (BDI-II, r = .337, p =.060, BHS, r = .506, p =.004 respectively), thus reports of increased Avoidant reasoning related to higher levels of depression and hopelessness. A positive relationship was seen between Pliant reasoning and depression (r = .373, p =.039), hopelessness (r = .563, p =.001), and anxiety (r = .416, p =.020). Whilst a negative correlation was found for Pliant reasoning and optimism (LOT-R, r = -.380, p =.035). Appetitive reasoning correlated positively with emotional avoidance (with higher AAQ-2 scores reflecting lower levels of emotional avoidance) (AAQ-2, r = .540, p =.002) and negatively with anxiety (STAI, r = -.387, p =.031). Values Importance and Success did not correlate with any of the psychological variables.

7.3.2.12 *Lack of Success in Living Important Values: Assessing the Values Discrepancy*

It was of interest to examine the psychological impact of being less successful at living values ranked as important. In this regard an examination of the discrepancy between values importance and values success was conducted. First, success scores were subtracted from importance scores. Negative scores on the discrepancy variable were re-coded into zeros, as this indicated higher success scores than importance scores (meaning respondents were more successful at living less important values). Finally, a total score of values discrepancy was calculated across values domains by summing discrepancy in each domain. No significant group differences for the sample were found for the variable "Total Values Discrepancy" indicating that Depressed and Non-Depressed participants reported similar experiences in success at living important values (t (29)= -1.630, p =.114).

7.3.2.13 *Correlations between FTT index scores and Values.*

In examination of the FTT index score relationship with the values components it was seen that Pliant reasoning correlated negatively with both positive (r = -.489, p =.005) and negative future thinking index scores (r = -.383, p =.033). Appetitive reasoning correlated positively with the positive index scores (r = .448, p =.012). Avoidant reasoning, values importance and values success was not seen to correlate with either of the index scores.

Within group correlations found that pliant reasoning was inversely related to positive future thinking within the Non-Depressed group (r = -.579, p =.015) and with negative future thinking within the Depressed group (r = -.611, p =.020). That is higher levels of pliant reasoning were related to less optimistic outlook within the Non-Depressed sample, whereas the Depressed sample reported higher levels of pliant reasoning with lower levels of negative future expectancies. Appetitive reasoning was also found to correlate with positive future thinking within the Non-Depressed sample (r = .480, p =.051). No correlations for appetitive reasoning were seen within the Depressed sample. Avoidant reasoning, values importance and values success were not seen to correlate with either of the FTT index scores at the split level of analysis.

These results show that future expectancies were related to Pliant reasoning, with within group analysis revealing this relationship to be related to reduced negative future outlook in the Depressed group and a reduced positive future outlook in the Non-Depressed group. Appetitive reasoning was seen to relate to positive future thinking, with within group analysis demonstrating that this relationship was only found in the Non-Depressed sample, where increased Appetitive reasoning was related to improved positive future outlook.

7.3.2.14 *Correlations between FTT individual variables and Values*

The relationship between raw data from the Future Thinking Task and values was examined across groups. Pliant reasoning was seen to correlate positively with both positive and negative likelihood ratings from the FTT (Likelihood of Positive Future Events, r = .493, p =.005 and Likelihood of Negative Future Events r = .428, p =.016 respectively). Negative correlations were seen for Pliant reasoning and positive feeling ratings (r = -.411, p =.022) along with positive fluency (r = -.525, p =.002) and negative fluency (r = -.556, p =.001). Appetitive reasoning marginally correlated with positive fluency (r = .325, p =.075). Values importance correlated negatively with negative likelihood ratings (r = -.368, p =.042) and positively with positive feeling ratings (r = .520, p =.003). Values success, similarly to importance, correlated negatively with negative likelihood ratings (r = -.342, p =.060) and positively with positive feelings (r = .471, p =.007). Avoidant reasoning was not found to correlate with any of the FTT components.

Looking at the raw data it can be seen that increased expectancy of future events occurring (as measured by likelihood scores and independent of valence category) was related to Pliant reasoning. Increased Pliant reasoning was related to decreased fluency in number of positive and negative events generated. With increased Pliant reasoning also seen to relate to a decreased level of affect associated with positive future events. Increased likelihood of negative events occurring was seen to be related to ratings of decreased Values Importance and decreased Success, with increased reports of positive affect pertaining to positive future events seen to relate to increased Values Importance and similarly increased Success.

7.3.2.15 *Future Thinking and Values Predictability*

In a final analysis the FTT index scores were dichotomized, by using a median (32.47) cut off point for discrepancy of the index scores in regards to generation of Positive and Negative future expectancy. That is the negative future index score was subtracted from the positive future index score with the discrepancy variable indicating the variance between positive and negative future expectancy. Thus a higher discrepancy score reflected a greater overall positive future outlook; In this regard it was possible to indicate whether each person's response was generally of a more (FTT discrepancy score

> 32.47) or less positive future outlook (FTT discrepancy score $\leq$ 32.47), and to test this as a cut point relating to values discrepancy. Participants who were generally noted by higher positive scores were marginally more likely to report *success* at living their values (47.1%) than were those with lower discrepancy sores (42.9%), though this difference was not found to be significant (χ^2 (1, N = 31) =.055, p=.815).

7.3.3 Summary

The FTT data did not detect any differences between the two experimental groups pertaining to their reported future outlook. Between group differences were noted in relation to appetitive reasoning. In relation to the main aims of Experiment 15 it was seen that (1) within the Non-Depressed sample Appetitive reasoning was related to an overall optimistic future outlook as seen in correlations between Appetitive reasoning and the positive future index score and fluency of positive future events. Values importance (2) and success (3) were linked to both positive affect and decreased anticipation of negative events occurring. Both groups reported similar levels of successfully living their values. (4) Appetitive reasoning was the only PVQ variable which correlated with emotional avoidance and found that low emotional avoidance was related to increased reports of appetitive reasoning. Table 79 summarises the main findings from Experiment 15.

Table 79. Summary of Main Aims and Findings from Experiment 15.

Research Aim	Hypothesis	Main Findings
1 Examine the role of positive future thinking, as measured by the FTT, in relation to values reasoning (i.e. pliant, appetitive and avoidant reasoning) as measured by the PVQ.	*There is a relationship between positive future thinking and use of pliant reasoning as measured by the PVQ.*	*The hypothesis is supported.* A negative relationship was observed for pliant reasoning and positive FTT index scores (p<.01); positive FTT fluency (p<.01); and positive FTT feeling (p<.05). A positive relationship was found for positive FTT likelihood and pliant reasoning (p<.01).
	There is a relationship between positive future thinking and use of avoidant reasoning as measured by the PVQ.	*The hypothesis is not supported.* No relationship was found for future expectancy and avoidant reasoning.
	There is a relationship between positive future thinking and use of appetitive reasoning as measured by the PVQ.	*The hypothesis is supported.* A positive relationship was found for positive FTT index scores and appetitive reasoning (p<.05).
2 Examine the role of positive future cognitions, as measured by the FTT, in relation to perceived values importance as measured by the PVQ.	*There is a relationship between positive future cognitions and values importance.*	*The hypothesis is not supported.* No relationship was found between positive future expectancy and values importance. A positive relationship was found between values importance positive feeling ratings (p<.01).
3 Examine the role of positive future thinking, as measured by the FTT, in relation to and values success, as measured by the PVQ.	*There is a relationship between positive future cognitions and success in living values.*	*The hypothesis is partially supported.* A positive relationship was found for values success and positive feelings (p<.01).
4 Examine the relationship between emotional avoidance and pliant, appetitive and avoidant reasoning as measured by the PVQ.	*There is a relationship between emotional avoidance and pliant reasoning.*	*The hypothesis is not supported.* No relationship was found.
	There is a relationship between emotional avoidance and appetitive reasoning.	*The hypothesis is supported.* A positive relationship was found for appetitive reasoning and emotional avoidance (p<.01).
	There is a relationship between emotional avoidance and avoidant reasoning.	*The hypothesis is not supported.* No relationship was found.

7.4 Experiment 16

In Experiment 16 the relationship between the PVQ components is examined in regards to implicit future expectancy. Experiment 16 has four main aims, (1) examine the role of implicit future thinking, as measured by the FT-IRAP, in relation to values reasoning (i.e. pliant, appetitive and avoidant reasoning) as measured by the PVQ; (2) perceived values importance (3) and values success. It is predicted that those who respond in concurrence to reduced future optimism, as measured by the FT-IRAP effect, will report lower levels of values success. A further aim is to (4) examine emotional avoidance, as measured by the AAQ-II, in relation to values reasoning.

7.4.1 Method

7.4.1.1 Participants

Thirty-one adults volunteered to participate in Experiment 16, however, following the exclusion criteria pertaining to BDI-II scores (see Section 7.4.2.1) the data from three participants were left out of the final data analysis. Of the included twenty-nine participants 11 were male and 17 female. Participant ages ranged from 19 to 24 years, with a mean of 20.57 (σ = 1.28) years. All participants were undergraduates at Swansea University, with English as their first language. Participants were recruited by advertisements in the Psychology Department.

7.4.1.2 Materials and Apparatus

The study was conducted in a quiet room free from distraction which contained only a desk, a chair, and a Personal Computer, with a 550 MHz processor, a 14-inch colour monitor, and a standard computer mouse. All FT-IRAP trial presentations, and response recordings, were controlled by a program written in Visual Basic 6.0.

The Future Thinking-IRAP. The implicit future thinking task was identical in stimuli and procedure to that used in previous experiments (cf. Chapter 4, Section 4.2.1.4 for details on stimuli and instructions).

The Personal Values Questionnaire (PVQ; Blackledge & Ciarrochi, 2006) was utilised and presented in the same manner as for Experiments 11 and 12 (see Section 7.2.1.2 for details on presentation and procedure).

Psychometric Measures. The set of self-report psychological measures used were the same as utilised throughout all the experiments in Chapter 2, 3, 4 5 and 6, that is the Beck Depression Inventory 2nd version (BDI-II; Beck, Steer & Brown, 1996), The Beck Hopelessness Scale (BHS; Beck & Steer, 1988), The State Anxiety Inventory, (STAI-S; Spielberger, Gorsuch, & Lushene ,1970; Spielberger et al., 1983) , the Life-Orientation Scale (LOT-R; Scheier, Carver, & Bridges, 1994), The Acceptance and Action Questionaire-2 (AAQ-2; Bond et al., (Submitted); Hayes, Strosahl, et al., 2004), The Positive and Negative Affective Scale (PANAS; Watson, Clark, & Tellegen, 1988) and a Verbal Fluency Control Task (Lezak, 1976) (see Section 2.2.1.2 for details pertaining to each of these measures).

7.4.1.3Experimental Overview

Experiment 16 used a 2 x 2 mixed participants design, with Beck Depression Inventory Scores (Sub-clinically Depressed and Non-Depressed) as the between participant variable, and Implicit Future Thinking (Positive, Negative) as the as within-participant variable. A correlational design was further employed for examination of relationships between the FT-IRAP, PVQ and AAQ-II measures. All participants received the same instructions and all completed the FT-IRAP and the PVQ. All participants completed all other measures and questionnaires, i.e. the Verbal Fluency Control Task, the AAQ-II, the BDI-II, the BHS, the LOT-R, the PANAS and the STAI. Participant data was categorised and analysed based on their Beck Depression Inventory responses (see Section 7.4.2.1 for group allocations to the Depressed and Non-Depressed groups). Figure 48 summarises the experimental sequence utilised for Experiment 16.

7.4.1.4 Ethical Issues

In order to conduct the study according to the appropriate ethical guidelines, as identified by the British Psychological Society (2009), a number of specific measures were put in place. These were consistent with those outlined previously for Experiment 6 and as outlined in Experiment 1a (see Section 2.2.1.4), with only minor adjustments necessary to facilitate the change in methodologies to tailor instructions to the current experiment. Emphasis was put on assuring participants that the computer task was not a measure of how quick they were at responding but that the focus was on the responses made. This emphasis was made to deter distress related to feelings of inept computer skills. Focus was again given in the brief and debrief to any psychological distress that may arise following the experimental procedures. At no point during the experiment did any participant withdraw from the study or express dissatisfaction or distress of any kind. No participants reported emotional upset in relation to the FT-IRAP task or following completion of the PVQ. The experiment was approved by the Psychology Department Ethics Committee at Swansea University prior to commencement.

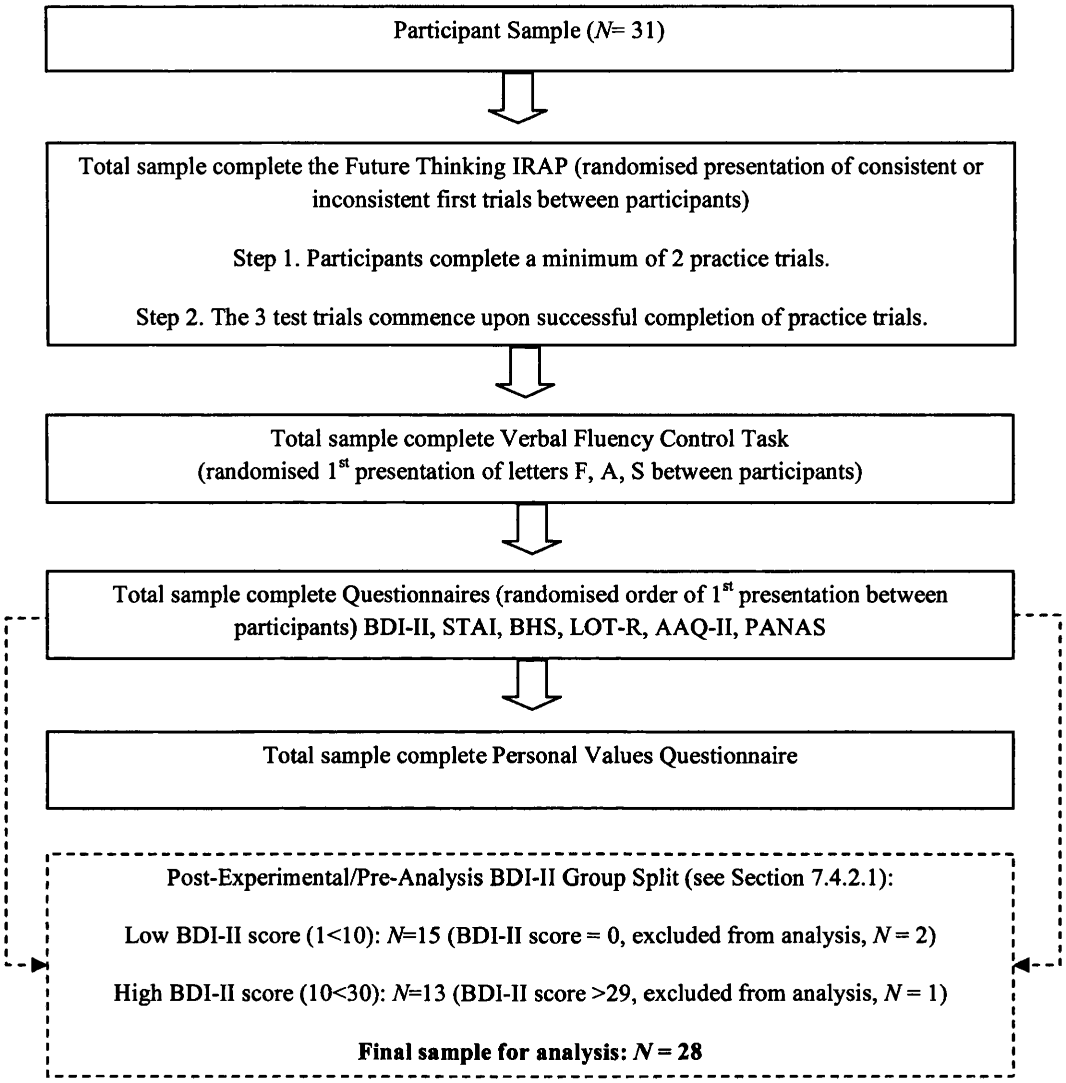


Figure 48. Overview of the Experimental Sequence for Experiment 16.

7.4.1.5 Procedure

Participation took place in a designated psychology laboratory, which comprised of a table, chair and portable personal computer. The participants received further information about the study, were offered the opportunity to ask questions and completed a consent form prior to commencement of the experimental tasks. Participants firstly completed the FT-IRAP, which was identical in regards to stimuli and procedure to the FT-IRAP employed in previous chapters (cf. Section 4.2.1.5). After completion of the FT-IRAP, the Verbal Fluency Control Task followed (see Section 2.2.1.3 for details on the Verbal Fluency Control Task) after which participants were subsequently presented with the set of self-report psychometric tests along with the AAQ-2. The self-report measures were presented in the exact same manner as described in previous chapters (see Section 2.2.1.3). Participants were lastly presented with the Personal Values Questionnaire (PVQ). As in the foregoing experiments participants were asked to read the instruction sheet accompanying the PVQ (cf. Blackledge & Ciarrochi, 2006). Unlimited time was offered to participants for reading through these instructions and the experimenter remained present during this time and encouraged participants to ask questions pertaining to the completion of the PVQ. Once participants indicated confidence in completion of the task at hand the experimenter left the room. Participants were given unrestricted time to complete the questionnaire and were told to take as long as they needed. In an effort to increase truthful values reporting participants were reminded that the questionnaire responses were confidential, and that all replies would be anonymous in the experimental analysis and write up. It was emphasised that participants should write down '*their own value's* where indicated; this was described in the PVQ instructions as *'ways of living and doing things related to that Values Domain that are very important to you'*. Upon completion of all tasks participants were thanked and suitably debriefed as to the nature of the study.

7.4.2 Results and Discussion

7.4.2.1 *Group Allocation*

Participants were categorised based on their depression scores as measured by the BDI-II in order to form two experimental groups. In line with the previous experiments participants with a BDI-II score of 0 (N= 2) or above 29 (N= 1, M = 31) where excluded from the analysis. The inclusion criteria for the No-Depression group was a score of 1<

10 as reported on the Beck Depression Inventory, thus participants presenting scores of 1-9 ($N = 15$; $M = 4.86$) were allocated to this group, whereas inclusion in the sub-clinical depression group required BDI-II scores of $\geq 10 < 30$ ($N = 13$; $M = 14$; Depressed Group) (cf. Chapter 2, Section 2.2.2.1 for details on the inclusion criteria).

7.4.2.2 *Demographics and Psychometrics*

The groups were found to differ in their responses on depression scores (BDI-II, t (26) = -7.48, $p < .001$), optimism (LOT-R, t (26) = 6.24, $p < .001$), anxiety (STAI, t(26) =- -2.316, p=.*028*), and hopelessness (BHS, t (26) = -3.04, p = .005). The groups also reported significantly different levels of emotional avoidance (AAQ, t (26) = 3.92, p <.001). No group differences were seen with respect to age (t (26) = .124, p=.903) or gender ($X^2(1)$ =2.673, p=.102), nor for positive (PA, p=.132) or negative mood (NA, p=.598). The psychometric means are presented with the participant demographics in Table 80 depicting the mean differences for each of these variables.

Table 80. Means and Standard Deviations (SD) of Demographics and Psychometric reports for the Depressed and Non-Depressed groups in Experiment 16.

Variable	**Depressed *(SD)***	**Non-Depressed *(SD)***
Gender: Females **(Males)**	10 **(3)**	7**(8)**
Age	20.54 *(1.33)*	20.60 *(1.29)*
VFCT	11.13 *(3.28)*	12.38 *(3.28)*
BDI-II	14.00 *(4.00)*	4.86 *(2.35)*
BHS	5.46 *(2.36)*	3.06 *(1.79)*
STAI	39.76 *(8.49)*	32.26 *(8.58)*
LOT-R	11.53 *(2.84)*	17.67 *(2.35)*
AAQ-II	43.23 *(8.30)*	53.20 *(4.94)*
PA	28.00 *(7.32)*	32.20 *(6.98)*
NA	15.31 *(6.54)*	14.13 *(5.08)*

Note. VFCT= Verbal Fluency Control Task; BDI-II= Beck Depression Inventory; BHS= Beck Hopelessness Scale; STAI = State Anxiety Inventory; LOT-R= Life Optimism Test-Revised; AAQ-II= Acceptance and Action Questionnaire-II; PA = Positive Affective Scale; NA= Negative Affective Scale.

7.4.2.3 *The Future Thinking Implicit Relational Assessment Procedure*

Statistical analyses first involved transforming the individual response latencies for each participant using the D_{IRAP} algorithm consistent with calculations in previous chapters (i.e. an adapted version of Greenwald, Nosek & Banaji's (2003) IAT D-algorithm) (see Section 4.2.1.4 for details on the transformation of D_{IRAP} scores).

The two groups were found to differ significantly in relation to the overall D_{IRAP} score ($t(26)=2.566$, $p=.016$), with the Non-Depressed group producing scores significantly different from zero in a positive direction ($M= .24$, $\sigma= 0.25$; $t(14)=3.633$, $p=.003$), whereas the Depressed group presented a rather ambivalent response pattern, with no significant difference from zero, though a leaning towards a negative bias was apparent ($M= -.01$, $\sigma = 0.26$; $t(12)=-.194$, $p=.849$). Figure 49 provides an illustration of the D_{IRAP} scores for each group, and as can be seen the Non-Depressed group holds a strong positive bias towards the future whereas the Depressed individuals are showing a trend towards a negative bias.

7.4.2.4 *Participant-type analyses.*

The D_{IRAP} scores for each participant were entered into a 2 × 2 mixed repeated measures ANOVA, with group (Non-Depressed vs. Depressed) as the between-participants variable and FT-IRAP effect-type as the within-participants variable ($D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$).

The ANOVA revealed a significant main effect for group, $F(1, 26) = 4.249$, $p=.049$, $\eta p^2 =.140$), and a moderately significant effect for the IRAP trial type, $F(1, 26) = 3.592$, $p=.069$, $\eta p2 =.121$), with a non-significant interaction ($F(1, 26) =.013$, $p=.908$, $\eta p^2 = .001$).

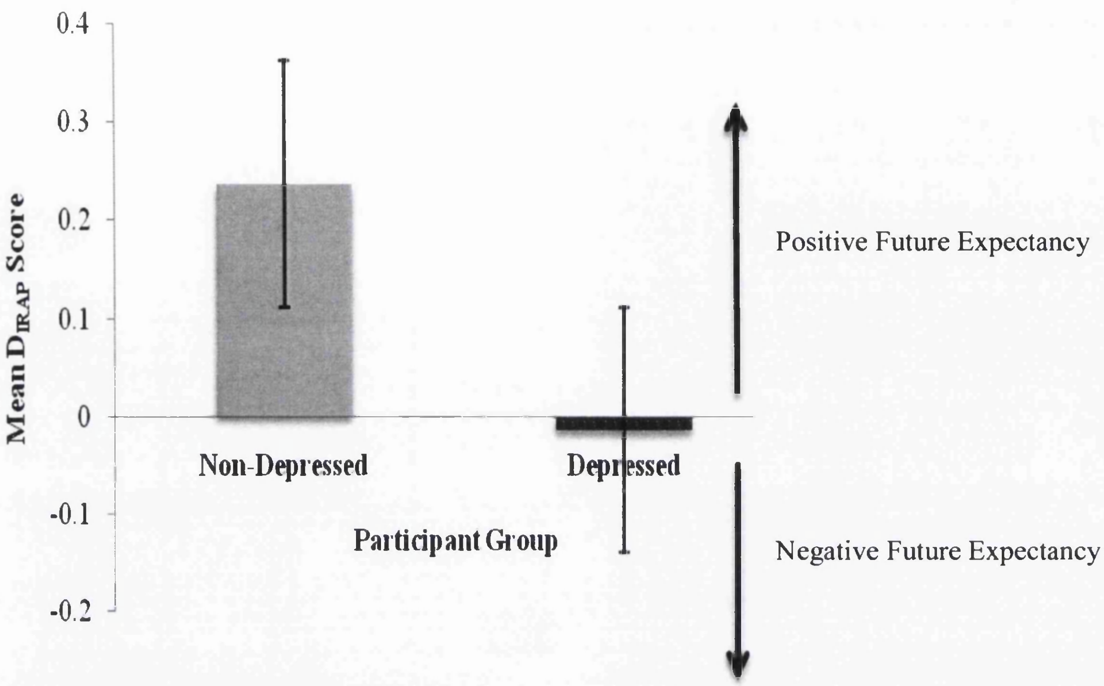


Figure 49. Mean D_{IRAP} scores for the Depressed and Non-Depressed groups in Experiment 16, with Standard Error Bars (S.E). Greater positive future expectancy is indicated by larger positive scores, i.e. responding more quickly when accepting positive and denying negative experiences than when asked to accept negative and deny positive expectancy on the relevant trials. Greater negative future expectancy incurs the inverse responding pattern.

Two one-sample *t* tests indicated that the optimistic D_{IRAP} effect for the Non-Depressed group differed significantly from zero: $D_{IRAP\text{-}POS}$, $t(14) = 3.795$, $p = .002$; whereas the pessimistic D_{IRAP} effect only approached significance, $D_{IRAP\text{-}NEG,}$ $t(14) = 1.938$, $p = .073$. For the Depressed group, however, no significance was found with either effect ($D_{IRAP\text{-}POS,}$ $t(12) = .933$, $p = .369$; $D_{IRAP\text{-}NEG}$, $t(12) = -.456$, $p = .657$). Overall the FT-IRAP indicated a positive future outlook for the Non-Depressed group that differed significantly from the Depressed groups more negative future outlook.

The mean $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ scores calculated for both groups are shown in Figure 50. For the positive future trial type, both groups exhibited an implicit positive bias, although for the Non-Depressed participants the D_{IRAP} effect was much stronger than that of the Depressed group. For the negative future trial type, the Non-Depressed group showed a no negative bias and the Depressed group showed a small negative outlook effect.

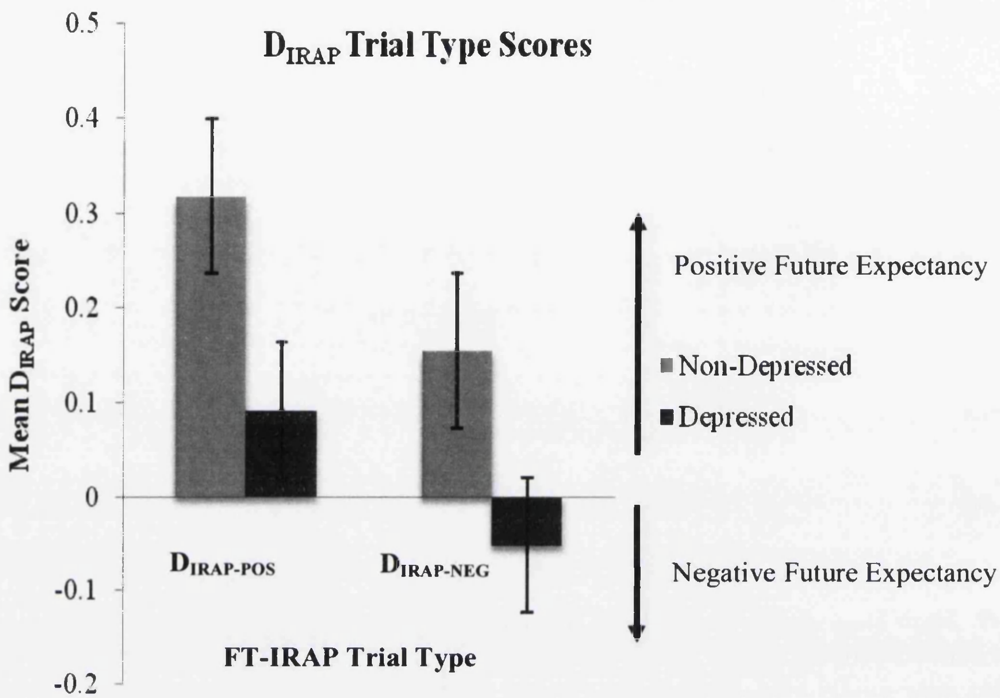


Figure 50. Mean Positive and Negative D_{IRAP} Trial-Type scores, with Standard Error Bars (S.E), for the Non-Depressed and Depressed groups in Experiment 16. Positive D_{IRAP} scores reflect an optimistic bias and negative D_{IRAP} scores reflect a pessimistic bias. The zero-point reflects no bias. An optimistic bias for positive future expectancy was produced if participants responded more quickly to "I expect–Positive–True" and "I don't expect-Positive–False" than to "I expect– Positive–False" and "I don't expect–Positive–True" (the opposite pattern indicated a pessimistic bias on positive expectancy trials). A pessimistic bias for future expectancy was produced if participants responded more quickly to "I expect–Negative–True" and "I don't expect–Negative– False" than to "I expect–Negative–False" and "I don't expect–Negative–True" (the opposite pattern indicated an optimistic bias on negative expectancy trials).

7.4.2.5 *Personal Values Questionnaire*

Values Importance. The values domains spirituality/religion and community /citizenship (PVQ domains 7 and 8 respectively) were consistently found to be rated as not important across the sample. Most participants (88%) did not respond to the questions related to these values or incomplete responses were made (12%). Thus these values were omitted from further examination and are not included in statistical calculations here.

Values importance was examined across the remaining value domains for both the Depressed and the Non-Depressed groups. The typical response to the question *"How Important is this value to you?"* was *'quite important'*, though some variance was observed between values. For values pertaining to Family Relationships, Friendships/Social Relationships, Couples/Romantic Relationships and Health/Physical Well-Being (PVQ values 1, 2, 3 and 9 respectively), responses were consistently high, that is, either noted as *'quite important'* or *'extremely important'* for the Non-Depressed group. A slightly wider range of responses to the same values domains were observed for the Depressed group, with responses in the range of *'moderately important'* to *'extremely important'*. Examination of importance for Work/Career and Education-Schooling/Personal Growth and Development (value domains 4 and 5 respectively) saw the widest range, with respondents rating these *'not at all important'* to *'extremely important'*. Though overall the most common responses were *"quite important"* across all the inclusive domains.

7.4.2.6 *Values Success and Values Reasoning Variables*

Values success and values reasoning (pliant, avoidant, or appetitive reasons for valuing) were examined for group differences. The Appetitive Reasoning composite variable was created by combining PVQ items 3, 4, and 5 (as described in Section 7.2.1.2). Differences were observed between the Depressed and Non-Depressed groups in relation to Appetitive (t (26) = 1.940, p = .063) and Avoidant reasoning (t (26) = 2.041, p = .052). No group differences were found for Pliant reasoning (t (26) = -1.065, p = .297), levels of Importance (t (26) = .978, p = .337) or Success at living values (t (26) = 1.011, p =.322). Table 81 presents both the group mean responses to the PVQ items.

Table 81. Means and Standard Deviations (SD) of the separate PVQ variables for Values Success, Values Importance, Pliant-, Avoidant- and Appetitive reasoning for the Depressed and Non-Depressed groups in Experiment 16.

Values Component	Group	N	Mean	*SD*
Success	*Non-Depressed*	15	3.47	*0.66*
	Depressed	13	3.26	*0.39*
Importance	*Non-Depressed*	15	4.45	*0.43*
	Depressed	13	4.27	*0.53*
Pliant Reasons	*Non-Depressed*	15	1.30	*0.33*
	Depressed	13	1.45	*0.45*
Avoidant Reasons	*Non-Depressed*	15	2.06	*0.61*
	Depressed	13	1.63	*0.49*
Appetitive Reasons	*Non-Depressed*	15	4.21	*0.41*
	Depressed	13	3.87	*0.51*

7.4.2.7 *Correlations between PVQ components and Psychological Variables*

The relationship between psychological symptom variables and the PVQ components was examined. Results indicated that Success at living consistently with one's values and values Importance significantly correlated with anxiety (STAI; r = -.392, p =.058 and r = -.447, p =.029 respectively). The less successful respondents were at living their values and the less important values were rated across domains the more likely they were to display increased levels of anxiety. Depression was seen to correlate with Appetitive reasoning (BDI-II, r = -.408 p =.048), that is, those who scored low on depression were more likely to report appetitive reasoning in view of values. No other correlations were found pertaining to psychometrics and values components. Emotional avoidance was not found to relate to either of the PVQ components.

7.4.2.8 *Lack of Success in Living Important Values: Assessing the Values Discrepancy*

An examination of the discrepancy between values importance and values success was conducted. The "Total Values Discrepancy" variable was constructed by first, subtracting success scores from importance scores. Negative scores on the discrepancy variable were re-coded into zero, as this indicated higher success scores than importance scores (meaning respondents were more successful at living less important values). Finally, discrepancy in each domain was summed. Marginally significant group differences were found for "Total Values Discrepancy" indicating that Depressed participants were more likely to report lack of success at living important values (t (26)=1.88, p =.07).

7.4.2.9 *Correlations between FT-IRAP and Values*

The relationship between implicit future thinking (D_{IRAP}) and values was examined across groups. Results saw the D_{IRAP} correlating negatively with Avoidant reasoning (r (28) = -.410, p=.047) and positively with values Success (r(28) = .353, p =.065). Total Values Discrepancy approached significance (r(28) = -.332, p =.084). No significant relationship was found with the FT-IRAP responses and values Importance (r (28) = -.033, p =.868), Pliant reasoning (r(28) = -.116, p =.590) nor Appetitive reasoning (r(28) = .104, p =.597) across groups.

7.4.2.10 *FT-IRAP and Values predictability*

In a final analysis the D_{IRAP} scores were dichotomized to indicate whether each person's score represented a relation between positive future expectancies (D_{IRAP} score > 0) versus negative future expectancies (D_{IRAP} score < 0), to test this as a theoretically meaningful cut point relating to values discrepancy. Participants whose performance revealed stronger relations with negative future expectancies were significantly more likely to report lower success at living their values (28.6%) than were those with a stronger relation with positive future expectancies (10.7%), χ^2 (1, N = 28) = 3.743,

p=.053. This cut point appears to produce sensitivity and positive predictive significance, as well as strong specificity and negative predictive significance (see Table 82).

Table 82. Classification Statistics for the Future Thinking Implicit Relational Assessment Procedure in Prospectively Predicting Successful Values Living ($N = 28$) in Experiment 16.

Total Values Discrepancy		**Sensitivity**	**Specificity**	**Positive Predictive Value**	**Negative Predictive Value**
Successful	**Less Successful**				
D_{IRAP} score > 0	D_{IRAP} score >0				
$n = 8$	$n = 6$	.64 (11/17)	.72 (8/11)	.57 (8/14)	.78 (11/14)
D_{IRAP} score < 0	D_{IRAP} score < 0				
$n = 3$	$n = 11$				

Note. Scores on the Implicit Relational Assessment Procedure were dichotomized to indicate either a relation with negative future expectancies (D_{IRAP} score > 0) or a relation with positive future expectancy (D_{IRAP} score < 0). Sensitivity is the proportion of participants who are not successful in living their values correctly identified by the FT-IRAP; Specificity is the proportion of individuals successfully living their values correctly identified by the test. Positive Predictive Value is the proportion of individuals with a positive score who were correctly classified as living their values; Negative Predictive Value is the proportion of individuals with a negative D_{IRAP} score, correctly classified as a not living their values. Raw numbers for proportions are given in parentheses.

Table 83. Summary of Main Aims and Findings from Experiment 16.

	Research Aim	Hypothesis	Main Findings
1	Examine the role of implicit future thinking, as measured by the FT-IRAP, in relation to values reasoning (i.e. pliant, appetitive and avoidant reasoning) as measured by the PVQ.	*There is a relationship between implicit future thinking and use of pliant reasoning as measured by the PVQ.*	*The hypothesis is not supported.* No relationship was found.
		There is a relationship between implicit future thinking and use of avoidant reasoning as measured by the PVQ.	*The hypothesis is supported.* A negative relationship was found for implicit future thinking and avoidant reasoning (p<.05).
		There is a relationship between implicit future thinking and use of appetitive reasoning as measured by the PVQ.	*The hypothesis is not supported.* No relationship was found.
2	Examine the role of implicit future thinking, as measured by the FT-IRAP, in relation to perceived values importance as measured by the PVQ.	*There is a relationship between implicit future thinking and values importance as measured by the PVQ.*	*The hypothesis is not supported.* No relationship was found.
3	Examine the role of implicit future thinking, as measured by the FT-IRAP, in relation to and values success, as measured by the PVQ.	*There is a relationship between implicit future thinking and success in living values as measured by the PVQ.*	*The hypothesis is partially supported.* A positive relationship approached significance for the implicit future thinking and values success (p=.065).
4	Examine the relationship between emotional avoidance and pliant, appetitive and avoidant reasoning as measured by the PVQ.	*There is a relationship between emotional avoidance and pliant reasoning.* *There is a relationship between emotional avoidance and appetitive reasoning.* *There is a relationship between emotional avoidance and avoidant reasoning.*	*The hypotheses are not supported.* Emotional avoidance was not found to relate to either of the PVQ components.

7.4.3 Summary

The FT-IRAP was able to detect group differences in relation to future expectancies, with the Non-Depressed groups' response pattern indicating an increased level of positive future expectancies, relative to the Depressed group. Group differences were observed for PVQ responses with the Depressed group reporting more avoidant and less appetitive reasoning for endorsing values, relative to the Non-Depressed group. Depressed participants were also seen to report being less successful at living their values relative to their Non-Depressed counterparts. In relation to the main aims of Experiment 16 a relationship was found between the PVQ components and the FT-IRAP. That is, within the sub clinically depressed group *reduced* positive future outlook was found to relate to (1) reduced reports of reinforcement by appetitive reasoning, (2) values rated as low in importance and (3) less successful values following. Within the healthy sample, *increased* positive future outlook was related to (1) reduced avoidant reasoning, increased appetitive reasoning and (3) successful values following. (2) Values importance was not found to relate to the FT-IRAP within the healthy sample. Reduced success in living their values was related to a reduced positive future outlook. (4) Emotional avoidance was not found to relate to either of the PVQ components. Table 82 gives a summary of the main findings from Experiment 16.

7.5 General Discussion

Across Experiments 14, 15 and 16 group differences were consistently found in relation to values reasoning and reports of success at living one's values. With the Depressed samples reporting greater use of avoidant reasoning, though not a reduced level of importance of values. However, a decreased level of values success was reported. In Experiment 14 it was seen that AMS was not found to correspond with either of the PVQ variables, thus indicating that autobiographical memory specificity may not directly influence the values process. However, AMS was seen to vary between the two groups, thus indirectly, AMS may be significant in the construction, relative to the ongoing process, of values. Experiment 15 found appetitive reasoning to be related to optimistic future outlook as measured by the FTT. Specifically, a distinction was observed between the two groups in that the Non-Depressed group reported an increased level of appetitive reasoning which was found to relate to optimistic future outlook. Values importance and success was further seen to relate to both positive affect and decreased anticipation of negative events occurring. Experiment 16 further expanded on the findings pertaining to future relations and values processing by revealing that implicit optimistic future biases corresponded with increased values success and reports of appetitive reasoning.

Deficiencies in past and future cognitions throughout Chapter 7 were related to the values process as well as depression levels. The recurrent use of avoidant coping strategies in construction and following of values by the depressed samples strengthen the postulate that emotional avoidance functionally mediates past and future cognition (Hayes et al., 1999). The data indicate that, at a sub-clinical level, individuals who report higher levels of depression, and other forms of psychological distress, are likely to be living a life that is not consistent with their stated values, whereas non-depressed individuals are more likely to be living consistently with their values. This is in line with findings from research with a clinically depressed sample, which noted that depression symptoms often include a withdrawal from important areas of life functioning (Plumb & Hayes, 2008).

Overall, it was seen that family, social relationships, romantic relationships and education were the values highest ranked across the three studies, which may be expected in an undergraduate student population. The AMT study was the only one to find an explicit difference between groups in terms of values success, with the depressed group reporting lower levels of success in this domain relative to non-depressed participants. Though there are marginal differences between the groups within these three experiments, the AMT Experiment (14) was the one with depressives scoring the highest for levels of depression on the BDI-II, which may be indicative of why such a diverge amongst groups occurred in this experiment relatively speaking. Interestingly, also within the AMT experiment it was found that the depressed sample reported values as pertaining to pliant reasoning. This was not found for the non-depressed sample or in the other two studies.

The most consistent values finding across the three experiments was that within all samples a difference relating to appetitive reasoning emerged, that is, across the three experiments it was found that participants in the depressed groups reported lower levels of appetitive reasoning. This is further supported by differences between groups, in Experiments 14 and 16 pertaining also to avoidant reasoning, with depressed participants reporting greater use of such strategies. Avoidant reasoning was also seen to correlate with depression and hopelessness levels within these studies. Regarding future expectancies in relation to hopeless thoughts such as "I'll always be a failure", taking these thoughts literally, e.g., "It is true that I'm a failure", corresponds to not living consistently with many important values domains. Also consistent across the studies was the lack of group difference found for levels of importance of values. Although across two experiments (i.e. 14 and 16) significance was found between groups for the 'Total Values Discrepancy' variable, indicative of depressed participants being more likely to report less success at living important values relative to the non-depressed individuals. Values success was also seen to correlate with anxiety across studies, that is, those who reported less success in living their values were found to report higher levels of anxiety.

Only Experiment 15 found any correlations for emotional avoidance with either of the values components, in the FTT Experiment (15), however, appetitive reasoning was seen to correlate with the AAQ-2, that is, lower levels of emotional avoidance were associated with reports of appetitive reasoning in values following. No significant relationship was found for AMS with any of the values components, neither across nor within the experimental groups. However, the future thinking measures showed more fruitful findings with regards to the values components. Pliant reasoning was seen to correlate positively with both positive and negative future expectancy in regards to event outcome as measured by likelihood ratings on the FTT.

Furthermore, within this sample, it was seen that values importance correlated negatively with outcome expectancy for negative future events and positively with positive feeling rating. Values success, similarly to importance, was seen to be negatively associated with reduced likelihood ratings and positively with optimistic feelings. That is, the participants reported that their expectancy for future outcomes were based on negative reinforcement, i.e. as sanctioned by 'others'; where values importance and success in attainment of values were related to strength in subjective belief of negative future events occurring, along with the strength of emotion they anticipated in relation to this event. At the split level of analysis it was seen that higher levels of pliant reasoning were related to less optimistic future outlook, as measured by the FTT index score, within the non-depressed sample. The depressed sample reported higher levels of pliant reasoning with overall lower levels of negative future expectancies. This is interesting in terms of the function of pliant reasoning is playing here. It appears that the depressed participants are considering 'if I do what I am told is reasonable (or what others expect me to do) nothing can go wrong'.

This pattern of responding has been reported previously in the attribution theory literature and is known as the 'Just world hypothesis', where people believe they 'get what they deserve and deserve what they get' (Lerner & Miller, 1978). That is, failure in attaining goals and following values is attributed to dispositional causes which are unchangeable and uncontrollable, rather than situational causes. People are as such motivated to see a 'just world' as this reduces the perceived threats, and provides a sense of security. This may further help people find meaning in difficult and unsettling circumstances, particularly when bad things happen to *other* people. However, such belief holds a strong negative connotation in the case of a personally relevant 'turn of events', that is people who hold beliefs such as 'if I follow the rules I will be ok and nothing bad will happen', and as such follow the 'rules', suffer worse when things actually do go wrong, as they struggle with thoughts relating to evaluations of 'but I did everything right – it must be something wrong with me, or I did something wrong, if this happened to me' and so on. When the depressed sample reported more appetitive reasoning this was seen to be related to higher levels of positive future thinking. In line with previous research by Sheldon and colleagues, whether value-based goals are under appetitive or aversive control is thus quite important. The D_{IRAP} measure further adds to these interpretations, as it correlated negatively with avoidant reasoning and positively with values success. That is, reports of avoidant reasoning were measured as reduced positive future outlook, whereas reports of successfully living ones values were seen to be reflected in a positive future outlook as measured by the FT-IRAP.

In regards to values predictability, the AMS was unable to specify consistency in values success, whereas the two future thinking measures were more successful. The use of median split cut off points for the compiled FTT index score and zero as a cut off marker for the D_{IRAP} score were both seen to offer a level of specificity in determining success at living values as reported by participants in these studies. Thus it can be inferred that values attainment is a relevant and important indicator within future hopeless thinking. Given the FT-IRAP's strong ability to detect depression and hopelessness levels, as demonstrated in Chapter 4, it is perhaps not surprising that it is also able to detect such hopeless cognising evident within the reflection on values construction. It appears within the current findings that values attainment is related to psychological distress, and may be important for future thinking, and indeed the phenomena of mental time travel. The findings of these studies are also consistent with the theoretical postulate that someone suffering from depression and subsequently losing contact with reinforcers would potentially rate values as less important than non-depressed individuals. Although these results are informative it cannot, from these analyses alone, be determined whether a lack of values success causes depressive thoughts, or more extensively - psychological distress, or if psychological distress causes lack of values success, or if the relationship is bidirectional. However, the results reported herein begin to answer some of the questions regarding the importance of values in preventing the escalation of a depressive course.

Chapter 8

General Discussion

8.1 Overview

The current thesis had three main aims. The first aim was to investigate the relationship between past and future thinking in sub clinically depressed versus non-depressed individuals. There is a burgeoning literature suggesting that depressed individuals are particularly susceptible to such deficits in past recall, and arguably - by association, future thinking (e.g. MacLeod et al., 1996; Williams et al., 1996, 2007; O'Connor et al., 2008). The autobiographical memory literature reports suppression of *negative past* events in relation to depression, whereas in the future thinking literature reduced generation of *positive future* experiences is linked with depression. Thus a valance effect has been noted across past and future thinking which has been accounted for in terms of emotional avoidance. However, there is limited evidence from previous research specifically looking at emotional avoidance in relation to such autobiographical memory deficits and no studies have made the comparison between future thinking and emotional avoidance *per se.* Although much evidence has been gathered for past and future thinking deficits in depressed individuals, discrepancies currently exist within this literature, particularly in regards to levels of such deficits in a sub-clinical population. Chapter 2 and 3 of the current thesis aimed to examine the role of valence and emotional avoidance in past and future events in a sub-clinical sample.

A current debate in the literature surrounds how to best conceptualize and measure cognitive vulnerability to depression, as some researchers focus on targeting explicit cognitions (e.g., cognitive products) whereas others argue for the importance of targeting implicit cognitions (e.g., cognitive processes/information-processing). Notably, previous research has made extensive use of explicit measures which are susceptible to demand characteristics and mood effects. The second aim of the current thesis was to offer an alternative to the use of self report measures in the mental time travel literature. Recent research, stemming from behaviour analysis, has proposed a model which aims to address the empirical and conceptual diverges noted between implicit and explicit measures of cognition; The REC model, grounded in RFT, suggest that explicit and implicit procedures reflect the same behavioural repertoire, i.e. arbitrarily applicable relational responding. A new methodology that directly targets this repertoire is the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes, Barnes-Holmes, Hayden, et al., 2006); Chapter 4 described the adoption of the IRAP methodology in the development of a robust and accurate implicit measure of positive future expectations in depression. Chapter 5 further sought to compare the sensitivity and specificity of this new implicit measure with the currently utilised methodologies of explicit past and future thinking. Lastly, the thesis aimed to provide analogue evidence of techniques that may be useful in the remediation of reduced positive future thinking, which is characteristic of hopelessness in depression. In Chapter 6 a brief mindfulness induction was explored in regards to the facilitation of increased contact with negative past and future content. The empirical work reported in Chapter 7 further examined the link between personal values and past and future cognitions in depression.

Taken together the empirical work reported in Chapters 2 - 7 aimed to review the existing, and predominantly cognitive, research in the mental time travel domain pertaining to depression and to add to this work, by drawing on new behavioural theories and related methodology, in designing more effective methods of assessment and potentially useful remediation strategies for those with deficits in these areas. The discussion will commence with a section providing a summary of findings for the empirical Chapters 2 to 7, followed by a separate section which will address the theoretical issues relating to these findings.

8.2 Summary of Findings

Chapter 2 sought to explore if deficits in autobiographical past and future cognitions were present in a sample of sub-clinically depressed individuals relative to non-depressed individuals. The proposed function of such deficits was explored in regards to assessment of the subjective experience related to autobiographical recall and the use of avoidant coping strategies. Two experiments (1a and 2a) explored the relation between specificity in recall of past experiences and depression whereas two parallel experiments (1b and 2b) investigated the representation of such specificity deficits in generation of future events. Experiments 1a and 1b had three main aims: (1) to investigate the specificity of assessment for the autobiographical memory test and the future cuing test in a sub-clinical sample; (2) to examine reported levels of emotional avoidance in relation to reported phenomenological characteristics of positive and negative past and future event specificity; and (3) examine emotional avoidance in relation to positive and negative past and future event specificity.

The results of Experiment 1a indicated that (1) that the sub-clinically depressed sample demonstrated reduced specificity in recall of past events relative to the non-depressed individuals, thus supporting previous research from the clinical literature (e.g. Williams et al. 1996) and the use of the AMT with a sub-clinical population. The sub clinically depressed group also presented subjective reports of the past event experience as seen from a more objective point of view, with reports of less clarity, frequency of consideration and greater proximal distance of positive events recalled relative to the non-depressed sample. (2) Lower levels of emotional avoidance was seen in those who recalled positive events from the more recent past and negative events from the more distant past. A lower level of emotional avoidance was also found to correlate with recall of positive past events from the first person perspective. (3) Lower levels of emotional avoidance were found to correlate with increased specificity of past positive events and lower levels of depression; this was the first known empirical evidence of such an effect and extends on the work by Hermans et al. (2005).

The results from Experiment 1b indicated that (1) the sub-clinically depressed individuals were less specific in generation of positive future events, relative to specificity overall, a finding that contrasts previous research (e.g. Williams et al. 1996) where participants in a clinical sample were found to be less specific *overall* relative to non-clinical controls. As such the valence effect observed here was unexpected in relation to past research with the FCT. The results can be related to affect regulation models proposed within the literature (e.g. Williams et al., 2007) as well as the extended literature from future thinking research, where reduced contact with positive future content has been noted as linked to hopelessness in depression (e.g. MacLeod et al., 1997). The subjective reports by the depressed sample, relating to the future experiences, indicated that these events were observed more objectively with information pertaining to reduced levels of having previously considered such future events, relative to the non-depressed group who reported having frequently considered such future positive events. The depressed group further reported the expected positive events to be occurring in a more distant future relative to the non-depressed group who expected these events to be more likely to occur, as well as to be occurring in the near future. (2) A lower level of emotional avoidance was related to clarity of positive events and frequency of negative future event generation. Within the Non-Depressed group lower levels of emotional avoidance were related to improved clarity of future events. Within the Depressed group a high level of avoidant coping strategies was found to relate to a decreased expectancy of negative future events occurring. (3) Emotional avoidance was found to correlate with depression scores, with the depressed sample more likely to report use of avoidant strategies relative to the non-depressed group. Although no relationship was found with regards to the degree of specificity in future events. This was the first known empirical investigation of such an effect in relation to specificity in episodic future thinking. With the depressed group notably objectifying the subjective experience of the past and future events in both Experiments 1a and 1b, two subsequent experiments (i.e. 2a and 2b) sought to account for imagery as a conflicting variable in reports of specificity. The main aim of Experiment 2a and 2b was to (2) explore independently measured imagery abilities in relation to phenomenological characteristics of past and future event specificity.

The results from Experiment 2a replicated the AMS findings from Experiment 1a. Although (2) no effects were found for imagery abilities in relation to group or specificity of recall. Though, imagery abilities and reported clarity in recall of positive past events were related. The results from Experiment 2b replicated the FES findings from Experiment 1b. (2) Decreased specificity of negative future events was seen to correspond with increased imagery abilities independent of depression levels. Overall, the findings from Chapter 2 support the proposal that past and future cognitions are related (e.g. Atance & O'Neill, 2001; Suddendorf & Corballis, 1997). The most informative relations between past and future cognition, emotional avoidance and depression emerged from the reports pertaining to the subjective experiences of past and future events relative to the episodic incidence *per se*; with belief in future event occurrence specifically relevant to the diverge between the sub clinically depressed and healthy individuals. As the FCT make use of experimenter cued future events which may have lead to weak links with emotional avoidance, a future thinking task which allowed for personally primed future events and the obtainment of a measure of future *expectancy* in depression was subsequently adopted.

Chapter 3 sought to evaluate the Future Thinking Task (FTT) (MacLeod et al., 1993; 1997) as a more adequate measure of future directed cognitions and expectancies. Three experiments validated the efficacy of the FTT for use in a sub-clinical population. Experiment 3 sought to explore the effectiveness of the FTT in accounting for depression among a sub-clinical population. Experiment 4 examined the reliability of the FTT in accounting for a depressive state relative to current mood state. Experiment 5 employed a learned helplessness paradigm in order to systematically examine the expectancy component of the FTT relative to more general future thinking and fluency for future events. Experiment 3 had four main aims, (1) to examine whether the FTT was efficient in its employment with a sub-clinical population, (2) to examine whether the valence and group interaction found in previous clinical samples would is present in a sub-clinical population, (3) whether future expectancy as a separate variable would offer further insight to the role of cognitions about the future in relation to depression, and (4) to examine the relationship between emotional avoidance and future cognitions. Results from Experiment 3 indicated that (1) there was no clear between group differences found for any of the FTT variables; this finding is inconsistent with previous research in the clinical future thinking literature (e.g. MacLeod et al., 1997). (2) The valence and group interaction for fluency, pertaining to number of future events generated, approached significance. Subsequent tests revealed that the sub clinically depressed sample was less able to produce personally primed positive future events relative to healthy individuals, with no group differences observed in relation to negative future events. This finding is in line with previous research and supports the suggestion that depressed mood is related to the reduced ability to consider positive future experiences (cf., MacLeod et al., 1997). (3) Future expectancy, as measured by a separate variable pertaining to the likelihood of future events occurring, was not found to differ between groups, nor was the predicted interaction observed in regards to valence specific future expectations. This finding is not in line with past research *per se*, in regards to between group differences of future cognitions, however previous studies utilising the FTT have notably failed to include the likelihood measure in their reported findings, thus the current result is ambiguous in terms of the literature on expectancy of future events occurring. (4) Emotional avoidance was found to differ significantly between groups, with the sub clinically depressed individuals reporting greater use of avoidant strategies. High levels of avoidance were found to relate to increased expectancy of negative events occurring. This finding is relevant to previous studies with the FTT where increased generation of negative events were related to worry about the future (i.e. anxiety) (MacLeod et al., 1997). Thus, the current results extend on previous research which has suggested that expectancy is a sub component of future thinking. After considering the inconsistency of results herein in relation to past studies it was suggested that mood effects may interact with the generation of future events, and as such account for the variance in fluency, relative to depression levels *per se*. In this regard such potentially latent mood effects were sought to be explored.

Experiment 4 sought to examine if induced positive or negative mood would affect the generation of cognitions about the future as measured by the FTT. Experiment 4 had three main aims; (1) to examine whether positive and negative mood would generate group differences on the FTT overall and (2) to determine whether future expectancy would be more resilient to the induced mood effect relative to fluency of future events; and (3) to examine the relationship between induced mood, emotional avoidance and future cognitions.The results from Experiment 4 show that, (1) the mood induction affected fluency responses, with the induction of a positive mood generating an increase in positive, relative to negative future events produced. In comparison, induction of a negative mood lead to participants generating significantly more negative relative to positive events. This finding is in line with previous studies that looked at mood effects on the FTT (e.g. Hepburn, Barnhofer & Williams, 2006; 2008; 2009; Jong-Meyer et al., 2007). (2) No significant effects of the mood induced were found for the perceived likelihood of positive and negative future events occurring. The previous studies that looked at mood effects on the FTT failed to report any effects of the mood induced in regards to the expectancy component of the FTT. (3) Following the negative mood induction it was found that those who reported high levels of emotional avoidance at baseline reported increased expectancy of positive future events. The results from Experiment 4 overall indicate that the strength of belief in positive/negative outcomes is a more stable characteristic to measure in relation to frequency of positive/negative events generated. To this end, future expectancy may serve as a more reliant measure in relation to future thinking as a feature of depression. In response to the consideration of expectancy as a relevant feature of depression the associated role of hopelessness about the future was considered to be of interest in further examining this construct. The literature on learned helplessness has suggested that subjective perceptions relating to the lack of control of external events are related to depression symptoms. Experiment 5 was designed to follow on from the initial findings of Experiment 3 and 4, by employing a learned helplessness paradigm in order to systematically examine the expectancy component relative to more general future thinking and fluency for future events. Experiment 5 had four main aims (1) to examine if the analogue depressed mood induction would lead to an overall group diverge in responses on the FTT, (2) to determine whether the valence and group interaction found in previous clinical samples could be replicated following a depressed mood induction, (3) to explore whether future expectancy would be affected by the depressed mood induction, and (4) examine group differences in relation to emotional avoidance and future expectancy. Results from Experiment 5 indicated that (1) that the induction of a depressed mood by completion of an unsolvable task lead to an overall decreased ability to generate events for the future, relative to participants who completed a solvable task; (2) no group and valence specific interactions were found, thus the main group effect found did not extend to the expected interaction which has been noted in clinically depressed samples (e.g. Macleod et al., 1997). (3) The depressed mood induction did not affect the expectancy ratings of the likely occurrence of the future events generated. (4) Those high in emotional avoidance reported increased expectancy of positive future experiences following completion of the Unsolvable Task, whereas no such biases were found for those high in emotional avoidance that completed the Solvable Task. Thus, overall the results from Experiment 5 found that the learned helplessness effect was not evident when looking at expectancy ratings relative to fluency for future events.

Overall, Chapter 3 found that the FTT is unstable in its detection of sub clinical levels of depression (Experiment 3), is susceptible to current mood effects (Experiment 4) and a short analogue depression induction produced false positives (Experiment 5). One potential weakness of the experimental series of future thinking pertains to the fact that the FCT and FTT are both explicit self report measures. Recently, Szpunar (2010) has suggested that future thinking may be more automatic in its construction, with recent arguments for the potential importance of looking at implicit cognition in the analysis and treatment of psychopathology (e.g. Wiers, Teachman, & De Houwer, 2007). Thus, an implicit measure of future thinking in depression would be advantageous as the self report nature of the FTT and the FCT may not facilitate access to more implicit cognitions, furthermore, self-report renders it easy for participants to 'conceal' information from assessors, thus limiting their value in clinical research.

Chapter 4 sought to address the limitations of self-report measures in future thinking by developing an implicit measure targeting positive and negative future expectancies. Three experiments sought to validate the efficacy of the adopted procedural design of the Implicit Relations Assessment Procedure (IRAP) (Barnes-Holmes et al., 2006), which allows for relations between and among chosen stimuli to be considered for use in a sub-clinical population. Experiment 6 aimed to construct and trial the IRAP methodology in targeting future expectancy, i.e. the FT-IRAP, in a sub-clinical population. Experiment 7 examined the reliability of the FT-IRAP in accounting for a depressive state relative to mere fleeting mood. Experiment 8 employed a learned helplessness paradigm in order to systematically examine the FT-IRAP effect. To this end, Experiment 6 had two main aims, (1) to examine if the FT-IRAP was efficient in its employment with a sub-clinical population, (2) to determine if implicit future expectancy would offer some insight on the role of emotional avoidance in future thinking. The results from Experiment 6 found (1) the FT-IRAP to be an adequate measure of future expectancy with clear group differences observed, i.e. the sub clinically depressed sample demonstrated a reduced level of positive future expectancy relative to increased positive future expectancy responses by the healthy participants. This was the first empirical evidence of such an effect. (2) Clear links between future expectancy and emotional avoidance were observed with strong correlations between low emotional avoidance and increased positive future expectancies. This was the first empirical evidence of such an effect. Overall, Experiment 6 demonstrated rather encouraging findings regarding the use of implicit methods (i.e. the FT-IRAP) in the measurement of future thinking. Although implicit measures are known to be more resistant to mood effects than explicit measures, the findings of Experiment 4, Chapter 3, demonstrated that the Future Thinking Task at the sub clinical level is susceptible to current mood state. Given the fact that Experiment 6 also involved a sub clinical sample and an affective state (depression) it was considered important to test for any mood effects to ensure the implicit measures stability.

Experiment 7 sought to test the effect of induced positive or negative (i.e. current) mood state on the FT-IRAP in order to ensure that the group differences in Experiment 6 were due to sub-clinical levels of depression and not a result of fluctuating mood. Experiment 7 aimed to (1) to examine if a positive or negative induced mood state would influence the FT-IRAP effect. The results from Experiment 7 found that (1) neither an induced positive nor negative mood state significantly impacted the participants' performance as the FT-IRAP effect remained stable across the two groups. This was the first empirical trial of mood effects on the IRAP. Unlike the FTT the FT-IRAP was found to be resistant to the influences of current mood states. As such it was inferred that the FT-IRAP, as a measure of expectancy appears more resistant to fluctuating mood relative to assessments of fluency for future cognition. Experiment 8 sought to examine the FT-IRAP response pattern for participants post a Learned Helplessness paradigm. To this end Experiment 8 had one main aim, (1) to assess if the FT-IRAP effect would be affected by the induction of a depressed mood state. An effect of the depressed mood induction on the FT-IRAP performance was observed; (1) within the depressed mood group, pertaining to the participants who attempted to complete an unsolvable task within the learned helplessness paradigm, it was seen that response latencies were reduced across trials that were inconsistent with a positive future outlook. That is, the depressed mood group responses reflected those confirming the expectancy of negative events. It was inferred that the pattern of responses demonstrated after the induced depressed mood (i.e. Unsolvable Task group) was analogous with a depressed mood state. The results from Experiment 8 support findings by Hepburn, Barnhofer and Williams (2006) who, after inducing negative mood found raised levels of explicit hopelessness and implicit depression in healthy controls. Similarly, the results are in line with Friedman et al. (2001) who observed an implicit hopelessness bias in their sample of currently depressed individuals. Overall, Chapter 4 found that the FT-IRAP is stable in its detection of sub clinical levels of depression (Experiment 6), is *not* susceptible to current mood effects (Experiment 7) and is sensitive to a hopelessness effect as induced in a learned helplessness paradigm (Experiment 8). Thus, the findings from Chapter 4 provide evidence for the utility of an implicit measure, i.e. the FT-IRAP, as a functional procedure to implicitly measure future thinking, and provide further empirical support to the postulate that a lack of positive future expectancies is a characteristic of depression.

Chapters 2, 3 and 4 of the thesis tested both explicit and implicit measures of future and past thinking. Chapter 5 aimed to directly compare and contrast the novel implicit measure with the more widely used explicit measures, that is, the explicit future (i.e., Future Thinking Task: FTT) and past (i.e., Autobiographical Memory Task) with the implicit measure (FT-IRAP) across a sub clinical sample. To this end, Chapter 5 consisted of two experiments, Experiments 9 and 10, which each aimed to assess the compatibility of the FT-IRAP with, the FTT and the AMT, respectively, in detection of levels of depression and hopelessness. Experiment 9 had two main aims, (1) to investigate whether the FT-IRAP and the FTT would be comparably sensitive and specific in the detection of sub clinical depression; and (2) to determine whether the FT-IRAP and the FTT would be comparably sensitive and specific in the detection of hopelessness. The results from Experiment 9 showed that the depressed participants were found to demonstrate a reduced generation of positive future events on the explicit FTT; however this finding did not extend to expectancy ratings. The depressed participants' did however demonstrate reduced future expectancy as measured by the FT-IRAP. (1) In a regression analysis the FT-IRAP proved more sensitive and specific in the detection of depression levels. This improved predictability over the FTT was also seen in regards to (2) hopelessness, with the FT-IRAP adding significantly to the regression model relative to the FTT variables. It may be inferred that the improved specificity of the FT-IRAP is likely due to its implicit construct, relative to the measure of future expectancy, as it was seen here that two groups did not differ in regards to their responses as measured by the FTT expectancy variable. However, due to the inherent nature of such explicit tasks being subjective to demand characteristics it is difficult to make any causal judgments pertaining to this discrepancy of findings between the two tasks. As future expectancy is strongly related to hopelessness (e.g. O'Connor et al., 2008) it may be inferred here that reduced positive future expectancy, relative to reduced positive future thinking deficits *per se* in depression (e.g. MacLeod et al., 1997) is indicative of increased hopelessness. This finding is in contrast to previous research which has focused on fluency in regards to the number of positive events generated as indicative of such future hopelessness (e.g. O'Connor et al., 2008; MacLeod et al., 200x). This improved specificity may be further explained by the nature of the FT-IRAP as a relational construct in measuring the strength of belief in relations held for future occurrences, i.e. the *quality* of such beliefs; relative to the mere number of such associated future events generated, i.e. the *quantity* of future associations, as measured by the FTT fluency variable.

Experiment 10 sought to investigate the FT-IRAP effect in relation to AMS as measured by the AMT. Experiment 10 had two main aims (1) to investigate whether the FT-IRAP and the AMT would be comparably sensitive and specific in the detection of sub clinical depression; and (2) to determine whether the FT-IRAP and the AMT would be comparably sensitive and specific in the detection of hopelessness. Results from Experiment 10 found that the AMT responses by the depressed sample reflected an overall reduced specificity in recall. The FT-IRAP found the depressed sample to respond in line with a reduced level of future expectancy. (1)The regression results found the FT-IRAP to demonstrate predictability of depression levels beyond that of the AMT, with significant contributions to the regression model relative to the AMT, which failed to add to the regression model at a significant level. The regression analysis relating to hopelessness (2), suggested that the FT-IRAP was more specific and sensitive in detection of hopelessness relative to AMS. These findings suggest that there may be a link between past and future thinking as the same sample demonstrated deficits in past event specificity and future expectancy. However, autobiographical memory specificity was a less accurate indicator of depression than the FT-IRAP. It may be inferred from these results that as the FT-IRAP is a measure of pre-established relations, i.e. based on individual learning histories, it may not be the content of past events *per se* (as measured by the AMT) which informs depression and ultimately hopeless ideation, rather, it may be belief in the content and the relational network incurred. As such it may be that the AMT, with its inherent focus on the level of detail, attributes the number of details recalled to specificity rather than the clarity or vividness related to re-living the past experience. Furthermore, it maybe that the method of questioning by the AMT in itself is confusing the retrieval process; that is, participants are requested to verbally report a past experience related to the emotional cues presented, something which would likely lead to a number of prior experiences being brought to mind. Thus, the task becomes one of selecting the more appropriate or representative experience for the task rather than re-experiencing the event *per se.* In this regard the lab-based retrieval on an explicit measure may not be able to target the cognitions experienced in private, whereas implicit targeting of relations omits the elaborative selection process and as such is able to gain insight into such cognitions.

Given the finding that the belief in the content of their past memories and future expectations was predictive of sub clinical levels of depression a worthwhile endeavour for the mental time travel literature might be to consider how these cognitions can most effectively be addressed and modified. And with implicit cognitions being a stronger predictor of depression, relative to the explicitly expressed past and future cognitions, it would be relevant to consider how awareness of such implicitly held beliefs may be raised. To this end, Chapters 6 and 7 sought to examine potential techniques that may facilitate the reduction in believability of such thoughts. In order to raise awareness of the automaticity of beliefs and the construction of such cognitions mindfulness appears like a potentially useful technique. Mindfulness techniques aim to increase awareness of and willingness to experience distressing cognitions without altering their content or frequency (Hayes, Strosahl, & Wilson, 1999) (see Section 1.8.1.1.2). Chapter 6 focused on the reporting of such cognitions following a brief mindfulness induction; to this end the chapter comprised of three experiments looking at the effects of a Focused Attention Task relative to an Unfocused Attention Task, with subsequent responses measured on the AMT (Experiment 11), the FTT (Experiment 12) and the FT-IRAP (Experiment 13). It was also sought to test the prediction that mindfulness, by way of a focused attention task, has a unique effect on decentering (that is, a reduction in believability). Experiment 11 had two main aims (1) to determine whether AMS was improved following the Focused Attention Task relative to the Unfocused Attention task, with particular reference to improved specificity in recall of negative past events. (2) To test if a Focused Attention task has a unique effect on decentering as measured by the Toronto Mindfulness Scale. The results from Experiment 11 suggested that (1) autobiographical memory specificity increased for the Focused Attention group relative to the Unfocused Attention group. Increased specificity in recall of negative past events was particularly notable in Experiment 11, in relation to the previous experiments with the AMT (e.g. Experiment 1a, 2a and 10) in which increased specificity by the healthy groups were predominantly seen in positive event recall. (2) Furthermore, a brief Focused Attention task facilitated defusion via increased experiential awareness as measured by the TMS and as seen in the increased specificity in recall of past negative experiences.

Experiment 12 had two main aims (1) to examine if future cognitions, as measured by the FTT, with particular reference to increased generation of negative future events, would vary following a Focused Attention Task relative to an Unfocused Attention Task; (2) to test if a Focused Attention task has a unique effect on decentering. The Results from Experiment 12 did not show any group differences emerging in regard to future thinking. However, (1) inspection of the FTT index and raw data revealed that the Focused group reported more negative events for the future, greater expectancy of negative future events occurring and increased levels of negative affect in the likelihood of these negative events occurring. Although only one of these differences was statistically significant, a trend was clearly emerging with participants demonstrating increased acceptance of negative future cognitions relative to the Unfocused Attention group. (2) The Focused Attention task was found to facilitate decentering in form of increased experiential awareness, as measured by the TMS and as seen in the increased reporting of negative future experiences. The mindfulness induction was subsequently examined in relation to improved contact with implicit cognitions and Experiment 13 sought (1) to examine if implicit future thinking is altered following a Focused Attention Task relative to an Unfocused Attention Task, with particular reference to expectancy of negative future events. And to (2) test whether a Focused Attention Task has a unique effect on decentering. The results from Experiment 13 reflected a similar pattern emerging for the FT-IRAP to that observed with the FTT in Experiment 12; i.e. the FT-IRAP effect was not influenced *per se*, though the Focused Attention group notably responding more flexibly to the negative content (1) (2). Thus, overall the most notable finding from Chapter 6 was the increased level of contact with negative past and future content, likely due to defusion from verbal content and increased task engagement. These results have implications for the understanding of how negative future cognition is construed and as such how we can reform dysfunctional strategies in thinking about the past and future. That is, in relation to the potential role of emotional avoidance in future thinking.

Chapter 7 sought to explore values processing as a means for understanding the function of past and future related cognitions. Values have been described as a personally relevant and chosen behaviour towards preferred consequences (Hayes et al., 1999; Wilson, 2009) (see Section 7.1). Chapter 7 comprised of three experiments where the construct of values, as reported on the Personal Values Questionnaire (PVQ), were examined in relation to responses on the AMT (Experiment 14), the FTT (Experiment 15) and the FT-IRAP (Experiment 16). Experiment 14 had four aims, to assess (1) AMS in relation to values reasoning (i.e. pliant, appetitive and avoidant reasoning), (2) perceived values importance (3) and values success. Furthermore it was sought (4) to explore if general emotional avoidance serves a function in endorsement of personal values. The results from Experiment 14 demonstrated that (1) AMS was not found to relate to pliant, appetitive or avoidant reasoning, (2) perceived values importance, (3) nor success at living one's values, thus indicating that memory specificity may not directly influence the values process. However, AMS was seen to vary between sub clinically depressed and non-depressed individuals, who again were found to differ in their responses to the PVQ components, thus indirectly, AMS may be significant in the construction, relative to the ongoing process of values. No relationship was found between (4) emotional avoidance with either of the PVQ variables. Personal values in relation to future thinking were subsequently examined and Experiment 15 had four main aims, (1) to assess future thinking in relation to values reasoning (i.e. pliant, appetitive and avoidant reasoning), (2) perceived values importance (3) and values success. Furthermore it was sought (4) to examine emotional avoidance in relation to values reasoning. The results from Experiment 15 found (1) positive future outlook, as measured by the FTT, to relate to appetitive reasoning. Specifically, the healthy participants, relative to the sub clinically depressed sample, reported an increased level of appetitive reasoning seen to correlate with a positive future outlook. (2)Values importance and (3) success was further seen to relate to both intensity of positive affect and decreased anticipation of negative events occurring. (4) Appetitive reasoning was the only PVQ variable found to correlate with emotional avoidance, with low emotional avoidance related to increased reports of appetitive reasoning.

Experiment 16 examined values in relation to implicit future cognitions and had three main aims, (1) to assess the FT-IRAP effect in relation to values reasoning (i.e. pliant, appetitive & avoidant reasoning), (2) and perceived values importance (3) and values success. (4) Examine the relationship between emotional avoidance and values reasoning. The results from Experiment 16 indicated that there was a relationship between the PVQ components and the FT-IRAP. That is, within the sub clinically depressed group *reduced* positive future outlook was found to relate to (1) reduced reports of reinforcement by appetitive reasoning, (2) values rated as low in importance and (3) less successful values following. Within the healthy sample, *increased* positive future outlook was related to (1) reduced avoidant reasoning, increased appetitive reasoning and (3) successful values following. No relation was found, within this group to, with (2) values importance. Thus, in line with the predictions those with reduced positive future outlook also reported reduced success in living their values. (4) Emotional avoidance was not found to relate to either of the PVQ components. Overall, Chapter 7 further expanded on the findings pertaining to future relations and values processing by revealing that implicit positive future biases corresponded with increased values success and reports of appetitive reasoning. Given the finding that implicit positive future thinking was linked with lower depression levels, increased awareness of such implicit cognitions emerge as a meaningful target in therapeutic approaches. The results clearly indicate that sub-clinically depressed individuals are able to think of personal values, but are likely to be living a life that is not consistent with their stated values. These results reflect the importance of having a theoretically consistent explanation of values as a process, and calls for additional work on targeting these experiences in regards to future thinking and expectancies therein, with a focus on raising the awareness of implicit cognitions.

8.3 Theoretical Issues

The first aim of the thesis was to examine the relationship between past and future thinking in sub clinically depressed versus non-depressed individuals. The theoretical issues that arose in the experimental series (i.e. Experiments 1a, 2a, 10, (11) and 14) that aimed to examine memory deficits in depression will initially be detailed. Subsequently, a discussion on theoretical issues related to the experiments which aimed to examine future thinking deficits (Experiments 1b and 2b) and future expectancy in depression (FTT: Experiments 3,(4, 5) 9, (12) and 15; FT-IRAP: 6, (7, 8) 9, 10, (13) and 16) will follow.

8.3.1. *Autobiographical Memory Specificity in Depression*

In Chapter 2, consistent differences in AMS within a sub clinical population emerged across several Experiments (i.e. 1a, 2a,) (along with Chapter 5, Experiment 9; Chapter 7, Experiment 14). These results reflect previous results with clinical samples (e.g. Williams et al., 1996; cf. Williams et al., 2007 for a review). Additionally, a trend toward valence specificity on the AMT emerged. That is, it was noted that sub clinically depressed individuals differed from their healthy counterparts in relation to recall of positive past events, rather than negative past events. In previous research with the AMT valence specific findings were not regularly reported although a more recent focus has been given to such valence effects, with increased recognition of reduced positive recall as the stronger predictor of depression (Williams & Scott, 2009). This postulate is supported by evidence from the parallel research domain of future directed behaviour, which has emphasized reduced contact with positive experiences serving as a vulnerability factor for depression and the progressive development of depressive symptoms. That is, in regards to reduced recall of positive relative to increased recall of negative experiences (MacLeod, Tata, Kentish, & Jacobsen, 1997). The relation between such reduced exposure to positive events and depression has further been recognized in behavioural theories of depression (e.g., Lewinsohn & Gotlib, 1995). For instance, behavioural activation intended to boost exposure to behaviour that augments cognitions related to mastery and pleasure are central to both Beck's cognitive therapy (Beck, Rush, Shaw, & Emery, 1979) and Lewinsohn's behavioural therapy for depression (Lewinsohn, Antonuccio, Brekenridge, & Teri, 1984). The current findings are thus in line with existing research within the Autobiographical Memory field, and support behavioural theories of depression.

The subjective phenomenological characteristics related to the past events, as recorded by the MCQ strongly supported the AMT results. That is, the past event accounts by sub clinically depressed individuals, portrayed reduced contact with past positive experience by a lack of previous retrievals, as well as reduced clarity and an objective vantage adopted in reliving the experience, relative to the healthy sample. Several authors have emphasized that the ability to *re-live* the original experience is the core feature of autobiographical memory (e.g. Baddeley, 1992; Greenberg & Rubin, 2003; Rubin, 1998). The retrieval of an episodic event has been seen to involve the *present* awareness of a *former* conscious experience, a state of mind which Tulving referred to as autonoetic *consciousness* (Tulving, 1983, 1985; Wheeler, Stuss, & Tulving, 1997). The accounts by the healthy sample supported this notion as the subjective memory characteristics very much reflected a re-lived experience. However, this was in stark contrast to that of the sub clinically depressed sample. One component noted to hold a significant relation to re-living past experiences is visual imagery, a (cf. Brewer, 1996; Larsen, 1998; Rubin, 1998; Rubin, Burt, & Fifield 2003; Rubin & Greenberg, 2003); as it has been argued that one function of the process of recollection is to separate imagining (or dreaming) from autobiographical memory. Experiment 2a showed that, within the given sample, imagery was not seen to account for AMS variance, thus supporting the ability of the AMT to adequately report memory deficits relative to imagery deficits within a sub-clinical sample.

Belief is another central feature in autobiographical memory (e.g. Brewer, 1996), and is a variable that can better be related to the proposed role of AMS deficits as a form of functional avoidance. That is, if an individual is fused with the content of their past experience, i.e. has a strong belief in the content, avoidant coping strategies are more likely to be implemented. In this regard it was found that emotional avoidance was related to specificity of past positive events *and* levels of depression. With imagery ruled out as a factor it may be inferred that the subjective differences observed were due to sub clinically depressed participants experiencing fusion with the content of past events, and as such emotional avoidance may impact the belief in the experiences, i.e. avoidance of past events which do not 'fit' with current self-perceptions or future expectations. Previous research has documented that belief in memories are predicted by depression levels (i.e. the Beck Depression Inventory) and dissociation (i.e. the Dissociative Experience Scale) (e.g. Rubin, Schrauf & Grenneberg, 2003). Rubin et al. (2003) found that improved contact with past experiences, as subjectively reported (e.g. pertaining to clarity, frequency and detail), was related to individual differences in autobiographical memory *per se*, though visual imagery was not found to be related to *belief* in memory, nor did they find any relations with regards to subjective differences in belief in these memories. The authors were not able to explain these findings and referred to shortcoming in the cognitive measures used in an effort to clarify their results. However, these findings are relevant to the current thesis, as it is argued herein that the strength of *belief* in cognitions, past or future, is a relevant indicator of depression progression. Specifically, the AMT as a measure was unable to offer further insight to the relationship between strength of belief and depression in relation to emotional avoidance. Such directionality and belief in past experiences may be a relevant feature which warrants further attention. Indeed, Andersen et al. (1992; Andersen, 1990; Andersen & Lyon, 1987) has argued that hopelessness develops once a degree of *certainty* is established regarding private cognitions.

Autobiographical memories are multifaceted in their construction, typically evoked due to personal relevance and involving vision, hearing, smell, taste, touch etc (e.g., Willander & Larsson, 2006; Rusted, Marsh, Bledski, & Sheppard, 1997; Johnson, 1988; Larsen, 1998). As such some limitations have been noted pertaining to evoking autobiographical past events in an experimental setting (i.e. Experiments 1a, 2a, 10, 11 and 14). By cued recall in an experimental setting many of the natural sensory facilitators are not produced and as such may limit the understanding of how the past events are experienced. Furthermore, the multifaceted construct of autobiographical memory means that the self is not a 'single entity' (Conway & Pleydell-Pearce, 2000), rather the perception of the self is spread across diffuse subjective organizations of events. The stability of an individual's self image resolves from the relations formed between these organizations and contextual cues; as such, in many cases, much of what is 'remembered' as part of a personal 'life story' is likely common cultural knowledge about the life course. This common knowledge can often be endorsed by social and cultural expectations, rather than personal autobiographical memory (Berntsen & Rubin, 2004). The brief content analysis of the past experiences reported relates well to this suggestion, and as such the AMT may have been subjected to such self-reports of more socially expected experiences. However, the group difference in specificity of positive past events still marks an important relation to depression. First, a reduced rate of past positive experiences would be a central risk factor in depression. And second, the perceived belief that there was a reduction in such past positive experiences, as facilitated by emotional avoidance of contacting such past events, would likely influence cognitions about present and future circumstances thus also serving as a vulnerability factor.

8.3.2 *Future Thinking in Depression*

A clear valence bias was observed, across the two FCT Experiments (1b and 2b) in Chapter 2; this finding is consistent with the current proposal that reduced contact with positive future cognitions are indicative of depression. The sub clinically depressed individuals were notably seen to differ from the healthy individuals in regards to positive event specificity relative to specificity of negative future events. In the early literature pertaining to FES, much as in the AMS literature, valence differences were not notably recognised *per se,* with overall specificity in recall and future projection more generally reported. Thus the procedural shift towards examining valence specific effects is supported by the present experiments. The relevance of accounting for valence specific effects have more commonly been noted in research with the Future Thinking Task, pertaining to reduced positive future expectancy, relative to increased negative future expectancy as associated with future hopelessness (e.g. MacLeod, Pankhania, Lee, & Mitchell, 1997). As such the valences of cognition have been strongly linked with depression and hopelessness, in particular reduced positive cognitions. The clear valence discrepancy observed across the two separate experiments (1b and 2b) warrants attention, as it is inferred that the FCT may not be sensitive or specific in its relation to depression without considering such valence specific effects. The accounts of the subjective experience of the future events generated in Experiment 1b and 2b supports this, as the phenomenological characteristics (as measured by the FCQ) specifically points to a more objectified perception of positive future events as experienced by the sub clinically depressed samples. No previous research has reported on differences in phenomenological characteristics in future thinking between depressed and non-depressed individuals, nor on between subject experiences in clinical and healthy samples *per see,* as the focus has been on differences of the within participant experience of past relative to future events (c.f. D'Argembeau & Van der Linden, 2004). As such, the between group results of phenomenological characteristics in Experiment 1b and 2b are novel, and significantly contributes to understanding of the valance findings with the FCT. Notably, the sub clinically depressed individuals overall responses to the FCQ indicated deficiencies in perception of positive future events. Taking into account that future oriented thinking (valence was not reported), as accounted for by healthy student samples, come to mind around 59 times per day (i.e. equivalent to once every 16 minutes within a cycle of 16 waking hours) (D'Argembeau et al., 2009), it may be inferred that the reduced consideration of positive events by the sub clinically depressed sample, in the present series of experiments, support previous notions of reduced positive future thought as implying vulnerability to depression. Subsequently, the depressed sample reported positive future events as less likely to occur in the proximate future, relative to their healthy counterparts (e.g. MacLeod et al., 1996). If episodic future thoughts direct behaviour, constructing detailed accounts of events that are perceived as unlikely to occur for some time is not efficient (Spreng & Levine, 2006). As such the lack of detail presented by the depressed individuals may be due to a lack of belief that such future events are likely to occur in the near future. As such, generation of more proximate future events would likely be more detailed due to the influence of the current context relative to distant future events (Szpunar & McDermott, 2008), thus the reduced level of generating more proximate events, as well as a lack of detail in positive future events, may indicate a (perceived) lack of recent past positive events within the sub clinically depressed sample.

Similarly to its proposed function in reliving past experiences, visual imagery has been linked to individual differences in the construction of hypothetical future episodes (D'Argembeau & Vander Linden, 2006). Experiment 2b examined visual imagery as a potential confounding variable in accounting for the FES discrepancy noted in Experiment 1b, and found that, independent of depression levels, those who demonstrated high imagery abilities were less specific in generation of negative future events. This is not surprising given the fact that the vivid construction of painful future events is generally difficult. However, judgments about the future may have been facilitated by automatic relations with personal schemas as a brief content analysis revealed that the constructed future events were schema-consistent relative to more elaborative personal accounts of future events. It is inferred that automatic execution of schema based descriptions would reduce the specificity of future events as these are not being sufficiently *pre-experienced* in their construction. An alternative explanation for the reduced specificity by those high in imagery may be that more deliberate mood regulation strategies were implemented, i.e. in an effort to avoid the negative connotations related to the emerging image so as to restore a positive bias in regards to future expectations (Taylor & Brown, 1988). Thus two independent arguments arise from these findings relating to inferences of implicit (automatic) and explicit (reflective and deliberate) processing in relation to depression vulnerability. Although visual imagery has been noted as 'interesting' in relation to episodic future thought (e.g., Norem & Illingworth, 1993; Quoidbach, Hansenne, & Mottet, 2008; Quoidbach, Hansenne, & Mikolajczak, 2010; Zimbardo & Boyd, 1999) it has been granted little focus in the clinical literature, thus the lack of previous research in this area renders it difficult to sufficiently interpret the results from Experiment 2b and further research is need in this regard.

8.3.3 *Future Expectancy*

In an attempt to target personal future expectancy with the Future Thinking Task (e.g. MacLeod et al., 1993; 1996) no group differences emerged between the sub-clinically depressed and non-depressed individuals. The FTT literature specifically looks for an interaction effect between valence and group, predicting that depressed individuals will present with reduced positive future anticipation relative to non-depressed individuals. In the current set of experiments (Experiments 3, 9 and 15) no such interaction emerged for the FTT index score, nor was it observed for the expectancy or feeling values. However, the fluency value did approach significance for the valence and group interaction. Given that there have been some inconsistencies in findings with non-clinical samples on the FTT, with some studies reporting the same interaction effect as obtained in clinical samples (MacLeod & Salaminiou, 2001; MacLeod, Pankhania, Lee, & Mitchell, 1997; MacLeod, Tata, Kentish, & Jacobsen, 1997), whereas others are unable to replicate such effects (e.g., depressed patients: Butler & Mathews, 1983; MacLeod et al., 1997; dysphoric students: Andersen, Spielman, & Bargh, 1992; Pietromonaco & Markus, 1985), the present series of experiments may be able to shed some light on this inconsistency. That is, it was found that the most commonly analysed and reported variable in previous FTT experiments, i.e. fluency in the number of future events generated, consistently contrasted the other FTT variables within the given samples (i.e. future expectancy and future event affect). Furthermore, high levels of avoidance were found to be related to increased expectancy of negative events occurring, with emotional avoidance seen to differ significantly between groups, with the sub clinically depressed individuals reporting greater use of avoidant strategies; thus it may be inferred that the FTT expectancy value may be more sensitive in detection of sub-clinical levels of depression relative to fluency, although notably this was not reflected in analysis of the raw data, as the expectancy variable did not discriminate between groups in relation to depression levels *per se*. Furthermore, a review by Taylor (1991) support the consistency of the expectancy variable as opposed to fluency, as it was found that negative events (e.g. cognitive, behavioural, and emotional) obtain faster and more robust responses relative to positive events. It has been reported that anticipated negative events might also produce such an effect (MacLeod, Tata, Tyler, Schmidt, Davidson, & Thompson, 2005). As such it has been proposed that the number of events generated *per se* may be less relevant in regards to negative expectancies as the emotional influence is elicited more rapidly; that is, negative affect is less fluctuating and more enduring which means the image of a few negative future events has a strong effect on the individuals anticipation of the future. Whereas the more gradual approach for positive events means the emotional influence is reached less rapidly and as such is more accumulative (MacLeod et al., 2005). Thus the relationship between emotional avoidance and negative expectancy may be due to the use of such mood regulation coping strategies to monitor the impact of the anticipated negative events generated. In fact, such mood regulation strategies would likely see an initial increase in the generation of positive future events due to the suppression of negative content. However, as previously noted, such strategies, functional as they may be in the short term, are related to increased psychological distress in the long-term. Longitudinal and follow up studies would be able to discriminate this effect and offer further insight on the progressive role of emotional avoidance as a coping strategy in depression over time.

It is important to further examine the processes underlying expectancy in future thinking, particularly in relation to findings where perceived expectancy of negative outcomes has been noted as strong predictors of avoidance behaviour in anxious patients (Warren, Zgourides, & Jones, 1989), whereas low expectancy of positive outcomes is a strong predictor of hopelessness (MacLeod et al., 2005). Given the focus on varying valence effects it is surprising that mood influences have previously been left unaccounted for in many experiments. Experiment 4 found that induced positive and negative mood did affect the number of events generated, with the negative mood induction demonstrating an increased number of negative events generated by participants within this group. Whereas the participants exposed to the positive mood induction produced more positive events within this group and in relation to the negative mood induction group. The FTT fluency responses were seen to differ following the induced mood (Positive mood group: Positive Fluency, *M*= 7.27; Negative Fluency, *M*= 3.66; Negative Mood group: Positive Fluency, *M*= 4.39; Negative Fluency, *M*= 4.90), in relation to that of healthy participants who received no intervention in Experiments 3, 9 and 15 (collated mean across the three groups: Positive Fluency, *M*= 5.97; Negative Fluency, *M*= 4.39), with the positive mood group demonstrating an inflated number of positive future events and a reduced number of negative future events relative to the no intervention groups. The negative mood group demonstrated an inverse pattern to the positive mood group, where in relation to the no-intervention groups an increased number of negative events were generated and a reduced number of positive events. However, mood was not found to affect the expectancy values reported. These findings are consistent with previous research looking at mood effects on the FTT, although these studies only considered mood effects on fluency (Hepburn, Barnhofer & Williams, 2006; de Jong-Meyer et al., 2007). An interesting finding emerged with the feeling ratings, where it was found that the negative mood induction led to ratings of perceived mood for future events being raised for positive and negative events. That is, relative to the positive mood induction group, the negative mood group reportedly expected to feel more positive in anticipated future events. Some researchers have suggested that negative mood may lead to a more analytical and logical approach to 'problem solving' and other cognitive tasks (e.g. Forgas, 1998; Schwarz, 1990). In this regard the current finding may be interpreted as the negative mood group approaching the future events from a more analytical point of view, where the current mood facilitated more 'logical' assessment of potential future events. However, there are implications for this finding in regards to the fluency reports, as this even more clearly demonstrates how the fluency measure is inconsistent with findings from the separate FTT variables, and may indeed be causing false reports of findings. That is, it is demonstrated in Experiment 4 that the feeling and expectancy values report variances which are inconsistent to those of a depressed individual, thus detecting a fluctuating mood, whereas the fluency report indicates that the variances are in line with those of a depressed person. In this regard by looking at fluency alone it may be inferred that the pattern of responses are indicative of depression, however, when the variables are viewed together a more coherent picture emerges. To this end, Experiment 4 raises a relevant question pertaining to within participant differences noted on the FTT, as was seen, the two groups did differ in their responses and as a between group measure the FTT falsely determined the negative mood group as depressed relative to the positive mood group. However, looking at the within participant scores it is evident that, in all variables bar event fluency, the negative mood group demonstrated the valence difference noted as 'healthy', that is, the negative mood group still rated positive relative to negative future events as more likely to occur. In this regard the question of what constitutes a normative cut off point for the FTT in terms of looking at individual data sets arises. Especially, as to whether there needs to be a significant difference between valence categories to warrant a healthy/positive future outlook. As a proposed measure indicative of hopelessness there is no cut off point to suggest when an individual is demonstrating hopeless ideation *per se.* That is, a reduced positive future outlook is relative to individual differences, and as some individuals may produce two positive future events to one negative, it is unclear if this signifies a healthy or unhealthy future outlook. If the numbers become inversed, with more negative than positive events generated, it is proposed that this no longer reflects depression or hopelessness but is more indicative of anxiety. As such there may be some scope for clarification as to the degree of positive expectancy required in order to represent a healthy level of future optimism. Most measures operate on a continuum and are usually scored as 'high' or 'low' with some indication of levels becoming of a more clinical range (e.g. the BDI, BHS).

In Experiment 5 a learned helplessness paradigm was employed in order to systematically examine the expectancy component relative to more general future thinking and fluency for future events. The induction demonstrated group differences pertaining to the overall ability to generate events for the future, with the unsolvable task group generating less positive and negative future events relative to those who completed a solvable task. However, the valence effect was still present, with both groups reporting more positive relative to negative future events. As such, as discussed in relation to the mood induction in Experiment 4, on an individual level, participants in the unsolvable task group did not demonstrate a learned helplessness effect. The depressed mood induction did not affect the expectancy ratings of the likely occurrence of the future events generated. Thus, overall the results from Experiment 5 suggested that the learned helplessness effect was not evident at a group or an interaction level when looking at expectancy ratings relative to fluency for future events. One notable limitation arose from the mood and learned helplessness inductions pertaining to baseline measures. As the FTT was only completed following the inducted positive, negative and depressed mood comparisons cannot be made with a pre-induction response pattern on this measure. However, in the mood induction experiment both groups displayed similar mood levels prior to the tasks and reported good levels of psychological health with no notable group differences. In comparison to Experiment 3, where the healthy individuals provided evidence of healthy responses, the induced mood groups in Experiment 4 and 5 show differing response patterns on the FTT, yet are of a similar population in regards to demographic and psychological measures. Thus it is inferred that in the two experiments it was in fact the mood induction that influenced the pattern of responses. Overall, the findings from the FTT were inconsistent with previous research which has obtained a more specific interaction effect for group and valence, pertaining to depressed individuals demonstrating reduced positive future expectancies. Specifically, the FTT was found to be influenced by mood and susceptible to false positive reports of induced depression levels.

8.3.4 *The Relationship between Explicit Past and Future Thinking in Depression*

Taken as a whole, participants were seen to generate similar responses pertaining to specificity in past and future episodic thinking (as reported on the AMT and FCT, Experiments 1a, 1b, 2a and 2b), with the sub clinically depressed samples displaying deficits on both measures relative to the healthy samples. Although, in relation to future thinking group differences were seen more clearly in relation to valence of events, i.e. positive future events, relative to past events. Emotional avoidance was seen to relate to recall of positive past events and it is likely that the relation between past and future thinking deficits stems from a lack of availability of such past positive events in construction of future positive events. These findings support the suggestion that vulnerability to depressive episodes may be marked by deficits pertaining to past and future relations. This was further supported by findings with the FTT in relation to the mood induction task (Experiment 4), where it was seen that recent recall of a positively valenced memory facilitated greater generation of such positive future events. Thus, suppression of positive experiences and rumination over past negative experiences likely impact on the ability to attend to cues which may facilitate positive future projection. These findings support the suggestion that emotional avoidance underlies the deficits observed in future thinking. However, the current experiments do not imply that this is related to episodic memory *per se*. In this regard it is likely that whether it is episodic or semantic information that is drawn upon in the construction of future events is affected by the accessibility of the relevant information, that is, the information which is first brought to mind is more likely to influence the content of future cognitions (Tversky & Kahneman, 1973; Kahneman & Tversky, 1982). It has been proposed that more abstract representations related to the context of the future event would be more accessible than episodic representations of similar information (Szpunar 2010). Indeed this proposal will be discussed further below in regards to the use of implicit measures where the individual response is based on personal past learning history combined with current contextual variables.

8.4 Implicit Future Thinking

The second aim of the thesis was to examine an implicit measure as an alternative to the current use of self report measures in the mental time travel literature. Notably previous research conducted in these domains has made extensive use of explicit measures, however as noted in Experiments 3 and 4, such methods are susceptible to demand characteristics and mood effects, and recent debates question the accessibility of more automatic cognitions via such measurements. Chapter 4 described the development of a robust and accurate implicit measure of positive future expectations in depression (i.e. the FT-IRAP). Chapter 5 further sought to compare the sensitivity and specificity of this new implicit measure with the currently used explicit past and future thinking measures.

8.4.1 *Implicitness*

One implication in the comparison of the tasks within this thesis refers to the nature of 'implicitness'. De Houwer and colleagues (De Houwer & Moors, 2007; De Houwer, Tiege-Mocigemba, Spruyt, & Moors, 2009) have noted that implicit measures can be implicit in different ways, and separate automaticity elements may not be presented within a given measure (De Houwer et al., 2009). A recent meta-analysis included measures that were considered to have at least one automatic attribute (Moors et al., 2010), as indicated by empirical evidence or deduction (Phillips, Hine, & Thorsteinsson, 2010). The FTT was included in this meta-analysis as it was considered to be implicit in the sense of 'efficient and fast'; i.e. De Houwer and Moors (2007) have noted that responses under time pressure are reasonably linked with other implicitness features such as being uncontrolled. However, it was found that the FTT may 'tolerate too much conscious awareness' and as such generate an overlap with measures of explicit processing (Phillips, Hine, & Thorsteinsson, 2010). This is consistent with findings within the thesis, with the FTT seen as unable to demonstrate the same level of efficiency as the FT-IRAP in detection of implicit cognitions, as well as in regards to the demonstrable mood influence found for the FTT. Overall the meta-analysis by Phillips, Hine and, & Thorsteinsson (2010) found insufficient empirical evidence to confidently categorize measures as implicit or not. However, it would be important to further clarify and catalog implicit features of measures, as this would assist further research in regards to the methodologies chosen as well as the interpretation of data of implicit depressive cognitions.

8.4.2 *Future Thinking Implicit Relational Assessment Procedure*

The FT-IRAP demonstrated good utility in relation to depressive and hopeless ideation, as an adequate level of sensitivity and specificity was found in regards to categorization of group membership at a sub-clinical level (Experiments 6, 9, 10 and 16). The FT-IRAP was further found to be resistant to mood effects (Experiment 7) and sufficiently responsive in an experiment of analogue depressed mood (Experiment 8). Overall, it was seen that the FT-IRAP effect suitably reported responses indicative of established behavioural characteristics in relation to future expectancy. These results are encouraging and address many of the shortcomings seen in more explicit self-report measures. For example, explicit measures have been reported as affected by mood states (as was the FTT in Chapter 3). The finding that the FT-IRAP is resistant to mood effects further supports the suggestion that implicit measures more readily target latent cognitions indicative of subjective behavioural characteristics. Furthermore, inconsistencies within research utilizing the FTT have lead to an ambiguous picture of the role of reduced positive future thinking in sub-clinical samples, and indeed question the efficacy of more direct measures of future thinking (i.e. the FTT) as a suitable method within such populations. The two future thinking measures (FTT vs. FT-IRAP) were directly compared in Experiment 9, where it was seen that the FT-IRAP was a stronger predictor of group membership for depressed and healthy individuals relative to the FTT. This finding has implications for research utilizing the FTT in samples of vulnerable individuals such as paracuicidals, where overt verbal reports of hopeless and suicidal intentions are restricted, and as such the FT-IRAP may be suitable in meeting the need for more implicit recognition of such cognitions without enforcing self-report. This is particularly relevant in recognition of such cognitions being 'hidden' from the vulnerable individual, as explicit recognition (i.e. conscious awareness) of such cognitions may not have occurred. The results from Experiment 9 support suggestions of explicit and implicit procedures reflecting the same behavioural functions, and rather that the divergence between findings from implicit and explicit measures pertain to explicit measures allowing for conscious deliberation and 'denial' of automatic evaluations which do not cohere with the more elaborate and extended relational responding (cf. Hughes et al., 2010 for a discussion). In this regard, a task such as the FT-IRAP may facilitate the early therapeutic intervention stages by reflection on individual behavioural response patterns related to depression and suicidality not verbally reported.

The FT-IRAP results further support the current literature pertaining to reduced positive future outlook as a significant feature in depression and hopelessness ideation. It was clearly demonstrated that, at a sub-clinical level, participants demonstrating reduced implicit expectations of positive future experiences were also likely to display increased levels of depression. Furthermore, the relation between emotional avoidance and reduced positive future expectancy can be linked to the relationship between autobiographical memory and implicit future expectancy. That is, greater emotional avoidance independently, and in the context of personal past content, was seen to relate to reduced responding in accordance to an optimistic future outlook on the FT-IRAP. This relation was further strengthened by increased negative AMS and decreased positive implicit future thinking both resulting from increased awareness (i.e. focused attention) (Chapter 6, Experiments 11 and 13), where the AMT and FT-IRAP measures reflected an increased willingness to experience negative past and future content respectively. Overall individuals who were specific in their recall of past events also reported stronger implicit relations with positive future experiences. Thus, the functional role of reduced specificity in recall to avoid affective content, and autobiographical experiences in future thinking, was supported. The implication of negative or reduced positive future expectancies has been noted in a range of psychological disturbances, with a common approach in therapy being to try to alter such expectancies. It has been proposed that future expectancies constitute a prearranged knowledge construction that can become automatized (e.g. Andersen, Spielman, & Bargh, 1992), with more global expectancies operating as schemas that may facilitate or inhibit healthy psychological functioning with assessments of these targeted in several instruments (e.g. Scheier & Carver, 1985). The FT-IRAP provides a measure of future expectancies that does not seem to strongly rely on introspection or on conscious access to a restricted account of representation of past experience. In this regard the FT-IRAP shows resistance to methodical measurement issues found with subjective recall or external influence in accounts of past behaviours. Additionally, the D_{IRAP} measure may provide a guide of established relations about the future that may automatically direct behaviours. Approaches in cognitive psychology have emphasized the centrality of such automatic cognitions in both etiology and treatment of psychopathology. The FT-IRAP has a clear, theoretically interpretable structure and good test-retest reliability. Its nomological network follows logically from its conceptualization as a measure of general positive and negative expectancies. It also has good discriminant validity with the FT-IRAP able to detect depression and hopelessness in a sample of sub-clinically depressed individuals.

In addition, the fact that FT-IRAP 'optimism' and FT-IRAP 'pessimism' (as discriminated by the $D_{IRAP\text{-}POS}$ and $D_{IRAP\text{-}NEG}$ variables) differentially predicted individual differences indicates that the directionality of relations offered by investigating separate constructs of the FT-IRAP may offer greater links to theoretical underpinnings. At the time of their first approach to treatment, individuals are often experiencing difficult life events as well as emotionally laden feelings such as worries pertaining to their situation and confusion related to the experience of psychological distress. In such scenarios it may be difficult to gain the 'objective' perspective required to help them in identifying and defusing from such maladaptive cognitions and expectancies. And as such this is likely a target in therapy. An implicit assessment tool, such as the FT-IRAP, may in this regard offer a way to assess the strength and direction of such automatic schemas in order to increase awareness of these cognitions. As such it is felt that the FT-IRAP is well suited as a measure of relatively automatic future expectancies and its exploration for continued and expanded use is recommended with further investigation and application in clinical samples. One suggestion may also be to include the use of personally relevant target stimuli to investigate if different responses may be obtained in this context. For example, personal values as measured by the Personal Values Questionnaire (Blackledge & Ciarrochi, 2006) may be particularly relevant targets. Chapter 4 raised some potential clinical implications whereof results from Experiments 6, 7 and 8 suggest that positive expectancies may be a specific behavioural target in treatment approaches. One advantage of the FT-IRAP is that the responses provide concrete suggestions that could be incorporated into clinical interventions such as the recognition of personal goals and values. As such, the present results emphasize positive future expectancy as central in depression and hopeless ideation in a sub-clinical population – which may go some way towards supporting Williams (2001, 2005)'Cry of Pain' model, detailing how in the absence of rescue factors, perceived entrapment may lead to hopeless ideation. Thus, further adding to the self-regulation model (Carver & Scheier, 1998) which proposes that the ability to relate to (as well as pursue and attain) future goals is essential in facilitating flexibility in self-directed behaviour.

8.4.3 *The Relationship between Implicit Future Expectancy and Explicit Measures of Past and Future Thinking*

One aim within this line of research was to examine the relationship between implicit and explicit measures of future thinking. Previous research pertaining to such implicit – explicit comparisons have found that when adequate resources are available to facilitate subjective behavioural observation, self report measures may be useful in the prediction of such behaviours, although when such introspection is inhibited, as is often the case in regards to determining psychological distress, more implicit measures have been seen to predict behaviour over and above self report (e.g. impulsive vs. self regulatory behavior; Freise, Hofmann, & Wanke, 2008). Some researchers have worked from the point of view that implicit and explicit measures target unrelated and independently formed evaluations; with automatic evaluations believed to be more 'trait' like and stemming from early learning experiences (e.g. De Hart, Pelham, & Tennen, 2006; Rudman, 2004); with contextual relations considered as mere noise factors interfering with a person's 'true' beliefs. However, as has been observed in the foregoing Experiments (11-13) brief mindfulness tasks were able to shift the direction of response patterns for the AMT, the FTT and the FT-IRAP. As such both the explicit and implicit tasks were susceptible to contextual changes, which render future expectancy unlikely to be a stable trait. These findings are in line with previous research with AMS and future thinking, which have been found to be modifiable. The results lend further support to the postulate that implicit and explicit attitudes are structurally similar, but may be independently acquired through targeting separate processing levels (e.g. Fazio & Towles-Schwen, 1999; Olson & Fazio, 2009). As reported (see Sections 1.3.4 and 1.7.2) the Relational Elaboration and Coherence (REC) Model (Barnes-Holmes et al., 2010) offers some light on the relationship between implicit and explicit attitudes, by proposing that when formed under time-pressure, implicit responding, such as the FT-IRAP effect, is motivated largely by instant and comparatively brief relational responses, while responses on explicit measures reflect contact with more extended and contextually consistent relational networks (Hughes, Barnes-Holmes, & De Houwer, 2010). The REC model proposes relational coherence as a likely variable accounting for the diverge sometimes observed between explicit and implicit measures:

> 'A relational network is said to cohere when all of the individual elements relate to each other in a manner that is consistent with the reinforcement history typically provided by the verbal community for such relational responding. According to RFT, the verbal community constantly reinforces coherence (and punishes incoherence) within relational networks, to the extent that relational coherence itself becomes a type of conditioned reinforcer for most language users' (Hughes, Barnes-Holmes, & De Houwer, 2010, p.32)

As such it has been suggested that the observed relations between implicit and explicit measures rely on contextual factors, such as the incentive and availability to intentionally elaborate on the responses required (Dovidio & Fazio, 1992). In this regard weak correlations have notably been found in studies of socially-sensitive attitudes (e.g. prejudice, Ziegert & Hanges, 2005). As such, the nature of the reports requested is relevant in research designs, pertaining to an individual's true awareness of the underlying features, as self reports rely on responses being consciously accessible, as well as 'socially acceptable'. One advantage of the IRAP methodology is that it has been shown that individuals are unable to consciously influence the level or direction of the IRAP effect, this was seen to hold true even after participants were provided with directions to do so (McKenna, Barnes-Holmes, Barnes-Holmes, & Stewart, 2007). Consequently, it is not surprising that discrepancies between the FTT and the FT-IRAP were observed.

Structural similarity has also been shown to be a variable that effects correlations between measures. For instance, Ajzen and Fishbein (1977) reported that structural similarity increased the strength of correlations between different explicit measures. The

FT-IRAP stimuli stems from the FTT, and as such there exist similarities between the two future thinking measures herein; however, it may be that the implicit nature of the FT-IRAP, combined with more specifically targeting expectations about the future, i.e. the strength of belief in such events occurring, is what renders the FT-IRAP more precise in detection of depression relative to the FTT. For instance, it has been found that responses in associative learning paradigms depend on the strength of belief in proposed events relative to the targeted events *per se* (De Houwer, 2002). It is relevant to note here that propositions are referred to in RFT research as 'stimulus relations' (Hughes, Barnes-Holmes, & De Houwer, 2010) and by De Houwer in the associative learning paradigm as 'statements about a state of affairs, [that] refer not only to the presence of a relation between events but also to the manner in which events are related' (2009, p.3), and as such are distinguished from associations as 'unqualified links between representations' (De Houwer, 2009, p.3). The IRAP methodology capitalizes on the focus of predictive ability, and as such this may be what separates the two future thinking measures herein, i.e. the lack of correlation between the FTT and the FT-IRAP. However, the FT-IRAP and the AMT were found to correlate, suggesting that future cognitions extend on relations generated on the basis of prior knowledge. For instance, when looking towards the likely occurrence of a future event, individuals may consider similar past experiences as a construct for how likely the event is to re-occur, with relevant structural details of what is likely to occur. The fact that experience may inform associative learning, is not challenged though awareness is raised in relation to associative learning effects as obtained through subjective beliefs about events, that is, the extent to which propositions about the events are believed to be true (De Houwer, 2009. Thus the focus on episodic events in their own regard may not be of as much relevance as previously thought. As such, previous experiences seem to influence future thinking only by their impact on the truth evaluation of propositions, something which is facilitated via the IRAP methodology. This postulate holds implications for the literature pertaining to episodic memory as an underlying informant of episodic future thinking. As it may not be specific past experiences *per se* that forms the expectancies, rather the relations drawn on a basis of the belief that such past experiences were 'true'. That is, the current framework pertaining to constructive episodic simulation (Schacter & Addis, 2007), propose sampling of past experiences as likely in the generation of potential future experiences. However, recent data by Szpunar (2010) implies that implicit memory may be implicated in this process. Implicit memory, relative to episodic memory, is related to how information from past experiences is utilized rather than to content specificity *per se* (Szpunar, 2010). Implications of such findings pertain not to priming effects *per se,* e.g. in regards to tasks such as 'name ten capital cities'. However, the relevance lies in the postulate that cognitions about the future have been seen as a source of information that subsequently guides behaviour (Suddendorf & Corballis, 1997, 2007; Taylor, Pham, Rivkin, & Armor, 1998; Taylor & Schneider, 1989). Szpunar (2010) thus propose recent experiences as likely to implicitly influence the generation of future experiences in light of how this past experience was perceived, i.e. as positive or negative, subsequently guiding behavioural approach or avoidance. As was seen in the mood induction paradigm in Experiment 4 recalling a positive or negative past event did affect the subsequent generation of future events, with the future events generated congruent to the valence of the past event recalled. However, this effect was not found with the FT-IRAP, thus looking at future expectancy relative to specific events may be relevant. Although recent experiences may implicitly bias future thinking content, as has been seen the use of even brief mindfulness exercises may counterbalance this effect. Future research that incorporates follow-up studies may be able to observe whether increased awareness of the potential influences of recent experiences (i.e. implicit memory) in relation to future thoughts will impact future behaviour. Importantly, this may warrant some further consideration of the proposed construction of episodic future events. That is, past experience appears to impact on the construction of future events, however, this influence may not be limited to specificity of episodic memories. More accurately mixtures of contextual, episodic and semantic details, as well as vicarious observations, are likely to form expectations of future events. Anticipation of future outcomes is understood to equally signify direct learning *and* vicarious observation of past events (Goldman, 1999). Chapter 5 found that in direct comparison with the AMT, the FT-IRAP was a better predictor of depression and hopelessness. As such the FT-IRAP, with its grounding in RFT, is able to account for such derived relations from vicarious experiences, whereas measures such as the AMT would miss out any relations which have not been directly experienced due to the inherent nature of the task requesting information from personal past experiences. Thus there may be some limitations seen in the use of measures that ignores contextual sources as influencing behaviour, relative to reliance of privately held feelings and emotions as the main sources of information drawn on by individuals. Overall, it seems likely that the results presented in Chapters 2, 3, 4 and 5 reflect a single processing system of which implicit and explicit measures reflect different patterns of responding (e.g. Hughes et al., 2010) and as such it is likely that the results are due to procedural differences of the methods utilised. Although a clear pattern of similarity for the implicit and explicit future thinking tasks were observed the lack of a significant correlation is consistent with previous findings within the literature where for instance a comprehensive study into self-esteem found reduced correlations between implicit and explicit measures (e.g. Bosson et al., 2000).

8.5 Coping Strategies for Negative Past Experiences and altering Future Outlooks

The final aim of the current thesis sought to examine techniques that may increase awareness of implicit cognitions and alter cognitive vulnerability to depression. The effects of a brief mindfulness induction were explored in Chapter 6, whereas Chapter 7 sought to examine past and future cognitions in relation to personal values following and depression. From the results in Chapter 3 (Experiments 4 and 5) it is known that under distress, i.e. as following recall of a personal past negative event, or a learned helplessness task, those who reported high levels of emotional avoidance, responded to such distress by overtly expressing an increased number of positive future experiences on the FTT. It was inferred therein that emotional avoidance, as a coping strategy, lead to the deliberate response of suppressing evaluations of future negative experiences by subsequently overemphasizing descriptions of positive future events. However, this same pattern was not found for implicit cognitions as assessed by the FT-IRAP, as such emotional avoidance may initially be shaped in the form of overt verbal behaviour, and with rehearsal may become relational and implicit in its form. The explicit and implicit responses only diverged for depressed/high emotional avoidance participants; thus discrepancies between implicit and explicit assessments may pertain the implicit task relations more strongly reflecting previous experiences and as such the past learning history of individuals, whereas the explicit task, reflects more recent experiences. Inconsistencies between past and present experiences may instigate thoughts of 'entrapment', that is, a state of hopelessness as past experiences are not concurring to expectancies in the present moment, with escalating inferences of the future offering more of the same. As the future is progressive, the fact is that the present moment of today, or the future of tomorrow, will in a few days be the past events of last week, as such the direct and immediate effect of emotional avoidance on overt verbal behaviour, if rehearsed under a prolonged depressive mood state, becomes the experiences of the past which forms relations in implicit knowledge of self. In this regard it is apparent that past and future thinking is related, that this relationship may become dysfunctional following use of inefficient coping strategies, and that this relationship is additive through natural temporal progression. Inconsistent self-perception in relation to the future may as such be a marker in depression relative to positive vs. negative outlook *per se*. That is, emotional avoidance may incur as a result of inconsistencies in implicit and explicit future outlook, and may be vital in regards to the progressive course of depression. It is thus imperative that individuals who experience depressive mood become aware of the cognitions and coping strategies which may be shaping their future behaviour

8.5.1 *Part I: Willingness to Experience Negative Content*

Techniques which encourage observing thoughts and feelings as passing events, relative to attributing these cognitions as personal, or a set reality, has gained much interest in regards to research on depression and hopelessness ideation (e.g. Teasdale et al., 1995; Segal et al., 2002). The postulate behind these techniques is that the significance of such cognitions will be perceived as less threatening, which subsequently leads to reduced psychological suffering and the impact of emotional distress. In this regard language based procedures, that consider the complexity of private cognitive accounts (e.g., Labouvie-Vief, Chiodo, Goguen, Diehl, & Orwoll, 1995), and autobiographical recall (e.g., Moore, Hayhurst, & Teasdale, 1996) have been noted as useful paradigms for investigating if acceptance facilitates a change in the context of 'the event' (Peterson & Reiss, 1992, 1993). In Chapter 6 a mindfulness induction (i.e. a Focused Attention task) proved effective in increasing willingness to experience negative content across three separate experiments; with participants reporting greater decentering (measured by the TMS) relative to the comparative group who completed an Unfocused Attention induction. The results thus support increased awareness of cognitions leading to a contextual change which sees negative cognitions as less threatening. Specifically, greater overall AMS was found for the Focused Attention group, with a notable increase in AMS in relation to past negative events; as previous experiments (e.g. 1a, 2a and 9) only found group differences in relation to AMS in recall of positive past events. Similarly, in Experiment 12, the FTT responses showed the Focused Attention group as reporting more negative events for the future, greater expectancy of negative future events occurring and increased levels of negative affect in the likelihood of these negative events occurring relative to the Unfocused Attention group. Although, only expectancy of negative events was found to be statistically significant, the pattern of responses is markedly different to that of the healthy participants in previous experiments (i.e. 3 and 10) who more strongly endorsed positive future expectancies. The FT-IRAP also found that there was a general trend by the Focused Attention group to be more flexible in their responses to the inconsistent trials where the trials requiring acceptance of negative future events were endorsed, relative to the Unfocused Attention group. Overall, across the experiments, the mindfulness induction was seen to facilitate psychological flexibility by increased engagement with negative content. These findings are consistent with Arch and Craske (2006) who found that a focused attention task increased acceptance of and willingness to endure unpredictable, negative stimuli. Furthermore, the results are in line with the clinical approach of Acceptance and Commitment Therapy, which suggests that the outcome is not to directly change psychological events; rather the focus is on shifting the *function* of, as well as the relation to distressing events (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

Two relevant issues arise from the findings within Chapter 6. First, if a demonstrable positive bias exists, examining decentering effects in a healthy sample is particularly relevant as it offers the opportunity for individuals to engage more readily with negative content. This is relevant as if the mindfulness exercise is not demonstrable at this level - interpretation of an effect would be difficult in a clinical sample. The foregoing experiments support the postulate of an optimistic/positivity bias in healthy samples, with healthy participants consistently, across task (i.e. the AMT, FCT, FTT and FT-IRAP) and experiments (1a, 1b, 2a, 2b, 3, 6, 9, 10, 14, 15 and 16) demonstrating such a positivity bias in their responses. Second, as awareness and acceptance of negative content will likely initially lead to an increase in reporting of such cognitions, merely looking at the quantity of negative events/expectancies could be wrongly interpreted. Given that such an increase would likely lead to an inflated number of reported negative events, e.g. on the FTT, methodological assessment following mindfulness tasks needs clarification. This is particularly pertinent given the fact that with the AMT and FTT responses pertaining to 'positive-more' and 'negative-less' are indicative of psychological health, thus increased reporting of negative future events may be taken as a dysfunctional future outlook. This notion adds to the importance of looking at the content in context, rather than by valence, and the ability to defuse from valence *per se* to allow for experiencing the event fully. In this regard MacLeod et al.'s suggestion that reduced positive future thought is functionally different to increased negative thought may constitute a valid presentation of this valence quandary, as here the experience of the event is somewhat targeted relative to valence in its own right. Although, without clear focus on the function of the experience, i.e. by priming the events as positive or negative, the FTT is inadvertently facilitating an evaluative condition where the content becomes the focus due to the nature of questioning where the request is for an experience related to valence categories. That is, by asking participants to think of something they 'look forward to' the experience needs to be evaluated as either positive or negative before it is reported, and as such the individual has to engage in an elaborative process related to the experience. In this regard the expectancy value is 'contaminated' by the elaborative process, i.e. with the event already evaluated as 'positive' or 'negative' the expectancy value is likely not novel. The Focused Attention task did generate differences between groups on the FTT, though the expectancy value did not add to this interpretation. It is likely that the mindfulness induction was able to inhibit this elaborative process and allowed for greater experience of the anticipated event, as reflected in the increased representation of negative future expectations. The FT-IRAP responses were equally seen to benefit from such elaborative inhibition, even at the implicit level, thus demonstrating that decentering extends to targeting implicit cognitions generally believed to be less elaborative in their construct. The focused attention task appears able to contribute to positive conscious expectancies being retained, but also directly increase decentering by facilitating monitoring of their private implicit responses. As such, conscious awareness of implicit responses that are incompatible with their explicit goals would likely lead to corrective explicit processing. The current findings are in line with emerging evidence from acceptance and mindfulness based interventions in clinical research, which have demonstrated that private cognitions can be targeted by mindfulness exercises in order to increase contact with private cognitions without arousing distress (e.g. Bach & Hayes, 2002; Feldman, Harley, Kerrigan, Jacobo, & Fava, 2009). Taken together, the current experiments, and previous clinical studies, imply that approaches which promote mindfulness and acceptance may shift the way that individuals respond to private thoughts and emotions, and potentially render such cognitions less upsetting.

Given that mindfulness is a general ability prospective benefits may arise from its' examination in a range of populations (Brown, Ryan, & Creswell, 2007), i.e. successful results have been noted in samples of undergraduate students (Shapiro, Brown, & Astin, 2008), as in the current experiments, as well as in more generic non-clinical samples (Chiesa & Serretti, 2009). Participant adherence to experimental instructions and procedures may be a concern in such tasks with participants being novice mediators', however subjective adherence reports of explicit following of instructions for the Focused and Unfocused Attention tasks in Experiments 11-13, support the observed mindfulness induction and decentering reports which were found to be consistent across all three experiments and tasks. Further research is warranted with clinical samples before the findings can be generalised to individuals with more severe depression and hopelessness. Overall, the series of experiments presented in Chapter 6 adds to the evidence supporting mindfulness as a potential process that may facilitate acceptance of past and future negative cognition. Additionally, the current Experiments (11-13) add to the clinical literature by examining the immediate effect of a specific mindfulness meditation practice on decentering. This is important as most acceptance and mindfulness based approaches contain many components and as such these experiments may aid in the process of singling out relevant effects related to the different exercises available (Roemer & Orsillo, 2003).

8.5.2 *Part II: Personal Values*

Chapter 7 found that across three experiments (14-16) depressed participants reported lower levels of appetitive reasoning relative to a sample of non-depressed participants. This is further supported by between group differences observed in Experiments 14 and 16, where it was found that depressed participants reported greater use of avoidant reasoning. One could assume that social desirability may explain the high frequency with which appetitive reasons were endorsed by the non-depressed group, but the fact that there are group differences, with the depressed individuals less likely to endorse appetitive reasons for their values choices, indicates that there was a level of truthful reporting on this measure. As avoidant reasoning was also seen to correlate with depression and hopelessness levels within these experiments, further indications merge of the respondents' willingness to disclose endorsing the items from an honest and reflective point of view. Thus, suggesting that social desirability may have played a limited role in these subjective accounts. This is further supported by findings from Experiment 15 where lower levels of emotional avoidance were associated with reports of appetitive reasoning in values following. No relation was found between emotional avoidance and pliant reasoning, thus it may be this item was a more likely result of social desirability. In this regard it may be inferred that reports of following values for personal reasoning, be it appetitive or avoidant, are more easily accounted for and justified. However, it may also, and quite likely, be that individuals are not explicitly aware of the role of other external influences on their behaviours, thus emphasising the relevance of values clarification in targeting behaviour change.

Also consistent across the experiments was the lack of group difference found for values importance, something which may be taken in support of the proposal that depressed or suicidal individual's may be painfully engaged with their goals, i.e. where people are attached to goals that they see as important even though they may not be able to see how to achieve such goals (MacLeod & Conway, 2007). That is, suicidals (e.g. MacLeod & Conway, 2007; Vincent, Boddana, & MacLeod, 2004) or those high in hopelessness more generally (Hadley & MacLeod, 2009), were reported by Macleod and colleagues to have goals but show reduced expectancy of such goals transpiring. This postulate is supported in the present series of experiments by the findings across two of the experiments (i.e. 14 and 16) where significance was found between groups for the 'Total Values Discrepancy' variable, indicative of depressed participants being more likely to report reduced success at living values noted as important, relative to the non-depressed individuals. This further demonstrates the importance of values clarification, as belief in future happiness, fulfillment, and even a sense of self-worth appear to be contingent on particular goals being achieved. Although a likely and powerful force for retaining a goal, this is an unhealthy approach given the unlikely obtainment of such goals. In the present experiments the sub clinically depressed samples rated values across domains as highly important, however, demonstrated a low level of positive future expectations. This discrepancy between outlook in relation to outcome and process may be inferred as a conflict reflected in different ways of attending to future experiences, i.e. there are beliefs about the future and mere fantasies. Whereas future beliefs are linked to planning all types of future outcomes and tackling obstacles, fantasies are noted as entirely positive in tone and mainly focus on the desired outcome being true (Oettingen

& Mayer, 2002). The 'problem' with fantasies is that a focus on the outcome relative to the process of obtaining a goal is not linked with the motivation to actively behave towards obtaining personal goals. Thus, it is clear that sub clinically depressed individuals are able to present ideal outcomes, but as demonstrated by the FT-IRAP, a lack of belief in positive outcomes may be hindering the motivation needed to act in accordance to obtain these goals. Recent studies also support this postulate, e.g. Vincent, Boddana and MacLeod (2004) and Danchin, MacLeod and Tata (2010) found that parasuicidal individuals were able to think about the future in a very positive way, but demonstrated a lack of belief in the actual event being likely to occur. It was argued in these studies that this aversion to relinquish unobtainable goals was linked not only to the loss of a goal, but also the positive reinforcement gained when engaging in this purely confabulated future fantasy. This was noted even in the absence of belief that the event would occur. As such this demonstrates further the potential psychological distress related to a loss of present moment contact, and the role of mindfulness in values pursuit. One clinical implication derived from these findings is thus that an understanding of the quality and function of goals in values pursuit, as demonstrated at a sub-clinical level, is important in clarifying why some goals are endorsed and also why such goals or values may not be working in the valued direction. This is consistent with suggestions from the literature which has proposed that hopelessness reflects a state of having and believing in goals, yet experiencing helplessness in a response to the inability to relive oneself from dysfunctional goals pursuit (Melges & Bowlby, 1969). These results also link to theories pertaining to 'conditional goal setting' where it has been noted that participants believe that *only* achievement of the goal will bring happiness and well-being (cf. Street, 2002).

Furthermore, it has been noted that when goals considered as personally important are not met, rumination surrounding this discrepancy is likely (Martin & Tesser, 1996). Rumination is generally considered in the clinical literature as intensifying negative emotions. For example, rumination in depression has been noted as an attempt to 'problem solve' by invariable consideration of the perceived failure to achieve the expected outcome (Nolen-Hoeksema, 1991). It has also been noted that rumination indicates an attempt to recover a perceived loss of identity or worth related to achieving personal goals (Pyszczynski, & Greenberg, 1987); with such ruminative thought patterns likely to continue until the unobtainable goal is relinquished (Martin & Tesser, 1989). This corresponds with conditional goal setting and suggestions that the process is reliant on a hierarchy of goals (McIntosh, 1996), that is, individuals put their happiness on 'hold' during the process of goal pursuit, and may ruminate about the lack goal success and a lack of happiness, i.e. where 'being happy' is strongly dependent on another goal, e.g. 'to be married'. Such disengagement, in lieu of the perceived importance of goals, has been emphasized by O'Connor et al. (2008) as relating to suicidal ideation. In this regard defusion from the maladaptive goals pursuit would relieve rumination and dysfunctional cognitions, and subsequently the increased vulnerability to depression. In this context it is hoped that individuals will become more flexible in their values approach, as defusion from hopeless ideation should facilitate the recognition that the values pursued may be maladaptive and as such the rumination may dissolve. To this end it has been proposed that in order to more effectively encourage values engagement it is useful to identify the individual organization of goals perceived as important in regards to achieving happiness (Street, 2002); i.e. aiming to increase recognition of the function behind the retained motivation to maintain such unhelpful goals pursuit. The focus on an ideal outcome, i.e. as a fantasy, may not be useful, and linked with low attainable goals such cognitions are likely inhibiting acceptance and awareness required in undertaking what is likely a more painful engagement with the planning and anticipation of potential difficulties in order to implement the process needed in order to work towards personal values. As was seen in Chapter 6, mindfulness is likely a useful tool in this regard as it will centre the focus on present moment rather than wishful future outcomes, and will facilitate contact with the more negative aspects of future anticipation. It may be somewhat beneficial to include a way of reporting the perceived likelihood of values obtainment when considering values, as clearly the strength of belief in such goals and values pursuit may inform the researcher about differences pertaining to 'real' and more imagined values outcomes. As an initial assessment, additionally requesting information about the current values experience relative to future outcomes may increase focus on the present behaviour and more easily identify the first point of treatment targets; though in a therapeutic context such an agenda would likely be identified during the treatment process. Thus, overall Chapter 7 shows that sub-clinical depression is linked with low values success thus proposing that psychological health is related to living consistently with values. This is an important finding as by demonstrating that there is a pre-clinical link between depression levels and successful engagement with values directed behaviours the use of values clarification to facilitate committed action are supported. The discrepancy between having values and actively engaging with these should be emphasised in regards to the finding that values between depressed and non-depressed individuals was similar and the diverge emerged in relation to differences in acting in accordance with these values, and as such informs us about relevant starting points for clinical interventions. Having values and not acting accordingly, so called 'painful engagement', likely serves to maintain the depressive symptoms. It is proposed that acceptance and mindfulness processes would aid the willingness required to engage in such committed action, as there may be a level of discomfort arising in following the valued direction. For instance, accepting that certain life changes may be required or that the valued action may involve contacting negative content may be perceived as aversive or painful to the individual.

In relation to the link between values and past and future thinking it was found that AMS did not relate to any of the PVQ variables, this may be due to the previously stated argument that detail is not as relevant as the awareness of past experiences. That is, the relations between past and future thinking in regards to values may likely draw on more contextual factors relative to specific past events, as well as the individual interpretation of such past events in the context of future outcomes. Although it is likely that past experiences inform such planning and motivation there may not be a link between specific instances of experience, rather it is the experience across a continuum of past events and the learned behaviours acquired during this process which informs values. The role of values success was however seen to relate to both positive affect and decreased anticipation of negative events occurring, as well as implicit optimistic future biases. This link between positive future thinking and appetitive reasoning and values success further underlines the importance of looking at values in therapy in order to gain insight to the function of behaviours. This also supports the findings throughout the thesis in regards to positive future outlook and its relevance in depressive and hopeless future ideation, and it may be that this reduced positive future expectancy is brought on by the lack of appropriate values understanding and subsequently values following/living.

Emotional avoidance was not found to relate to values following at the sub-clinical level, as such it may be that this is something which develops at a later stage, e.g. once appetitive reasoning becomes less reinforcing. As emotional avoidance has previously been seen to relate to depression, the role of a mediating relationship with values requires further investigation to understand when such reasoning strategies become endorsed by individuals. Emotional avoidance did differ between the two groups but the most significant relationship at the sub-clinical level pertains to appetitive reasoning. Given that no relationship was found for AMS and values, it may be that the functional role attributed to AMS (i.e. reducing contact with aversive past content) is less evident in values following due to the activation of future schemas and pliant reasoning. Although pliant reasoning was not endorsed within these samples this may be due to the negative connotations related to endorsing such reasoning. The assessment of behaviour as under pliant, appetitive or avoidant control is not easily targeted by self-report as such measures in their construct, as well as the inherent properties of the content required, are susceptible to demand characteristics and social desirability – or even a lack of awareness of the controlling influences on one's behaviour, i.e. the measures are vulnerable to effects of the very aspects that are sought to be assessed. At the very least such measures should thus be applied and considered in relation to behavioural measures pertaining to the attributing factors of an individual's behaviour. Given the successful application of the IRAP methodology in a future thinking paradigm it may be relevant to also consider the use of such implicit behavioural measures in values assessment, particularly given the currently limited empirical support for values as an assessment tool. The PVQ should also, in its own right, be further evaluated in regards to its sensitivity and specificity over time.

8.6 Analogue versus Clinical Depression

In the medical literature there has been substantial debate about the relationship between syndromal depression (clinical) (major depressive disorder) and sub-threshold depressive symptoms (sub-clinical depression) (e.g. Enns, Cox, & Borger, 2001). The debate was noted by Flett (1997) as of conceptual as well as practical importance. The discussion has centred on the differences in clinical depression and sub-clinical depression in regards to qualitative features or merely on a quantitative continuum, that is, if sub-clinical depression is in fact a less severe form of clinical depression. A relevant concern in this debate has been related to the correctness of utilising sub-clinical student (e.g. convenience) samples in depression research. Notably, this is a concern which holds practical implications given that many researchers in the depression field have relied on undergraduate students as participants in their studies (Vredenburg, Flett, & Krames, 1993). A particular issue in this regard relates to the matter of generalising findings from students to the more general population. The most widely used instrument for measuring depression in students is the Beck Depression Inventory (BDI) (Beck, Steer, & Brown, 1996). The BDI is for the most part accepted as a reliable and valid measure of depression and in analogue depression studies with students, a cut-off score on the BDI (commonly, ≥ 9) has frequently been used, with students levels of depression found to be relatively similar to depression in clinical populations (Cox, Enns, Borger, & Parker, 1999; Hill, Kemp-Wheeler, & Jones, 1987); though notably depression in students has been found to be more transient (Vredenburg, O'Brien, & Krames, 1988). Agreement has emerged in support of clinical and sub-clinical depression as representative of varying levels in a continuum. The support for this came from several large clinical and community studies (e.g. Angst & Dobler-Mikola, 1984; Judd et al., 1998, 2000; Kendler & Gardner, 1998).

Certain characteristics of depression may be continuous across sub-clinical and clinical depression. However, it still remains that other features in depression are not (Haaga & Solomon, 1993). Continuity should as such not automatically be considered an 'all-or-nothing' issue. However, Flett et al. (1997) addressed this debate with an extensive review, which included looking at phenomenological, typological, etiological and psychometric continuity. The findings from the review led to the conclusion that most of the available evidence was consistent with the continuity assumption (Flett et al., 1997). Support for Flett's review comes from several studies by Cox and colleagues (e.g. Cox et al., 1999; Enns, Cox, & Borger, 2001; Cox, Enns, & Larsen, 2001) who in their studies focused on symptom construction in depression. Cox and colleagues have found that self-reported DSM-IV depression symptom profiles were quantitatively different, but qualitatively very similar in clinical and analogue samples. This notion of a dimensional view of depression has been supported by evidence of cognitive disturbances in clinical conditions presenting in a weaker form in individuals with non-clinical dysphoria (Watson, Gamez, & Simms, 2005; Clark, Beck, & Alford, 1999). The focus in the clinical vs. analogue samples debate has mainly been on the student population being of a convenience sample. Although the issue of convenience is not disputable *per se*, there are imperative reasons for studying depression in undergraduate students. One such factor pertains to the concerning number of university students who either commit suicide or demonstrate high levels of suicidal ideation, with numbers form the UK showing that approximately two people under the age of 24 commit suicide every day (UK, Statistics, 2008). For young people between the ages of 15 and 24 years, suicide is the third leading cause of death with an increase to the second leading cause within a student population (Center for Disease Control and Prevention, 2007; Suicide Prevention Resource Center, 2004). In their study Vredenburg, O'Brien and Krames (1988) found that around half of the depressed students in their sample reported having suicidal ideation. It has further been argued that being young and having a chronic level of negative affective distress increase the likelihood of major depression (Lewinsohn, Hoberman, & Rosenbaum, 1988). Vredenburg, Flett and Krames (1993) propose that as first year students tend to be young, and the transition to university life involves a great deal of stress, it seems that undergraduate students may on the whole be suitable for researchers interested in the initial development of depression. As noted by Beck and Young (1978), undergraduate students *'experience simultaneously all the transitions that are major stressors in adulthood'* (p.84). To this end research concerned with the link between coping and depression have proposed that the use of first year undergraduate students may in fact be predominantly suitable (e.g. Pennebaker, Colder, & Sharp, 1990). A recent meta-analysis pertaining to the use of implicit measures in depression found comparable relations between negative implicit self-referential biases and depression in undergraduate, clinical and community samples (Phillips, Heine, & Thorsteinsson, 2010). It was inferred from these findings that research on predisposition to depression in such varied samples supports a dimensional view of depression (Ruscio & Ruscio, 2000). Another criticism to the use of student samples in depression research has been that depression scores in these populations are related to other psychological constructs, e.g. anxiety, and as such the samples are not depressive specific but rather related to more general psychopathology issues (e.g. Gotlib, 1984). However, both clinical and sub-clinical samples are characterized by general distress (Vredenburg, Flett, & Krames, 1993); with anxiety commonly seen as co-morbid to depression in clinical samples also.

In addition to the above debate, which pertains to the student population being suitable for depression research, it has been noted that methodological advantages exist for use of such samples. Particularly, it is noted that as an ideal, a sample of participants would have been subjected to a relatively homogeneous environment, characterised by a relatively high frequency of personally stressful life events. Such an environment appears to exist with undergraduate students. For instance, there is a reduced likelihood that other psychiatric disorders are present and can account for the results (Kendall et al., 1987). Similarly, it is less likely that students have undergone drug treatments that may influence the data (Vredenburg, Flett, & Krames, 1993). Another methodological advantage may be found in the fact that undergraduate students do not typically seek help for depression – nor do they undergo various forms of psychological or psychiatric treatment (Vredenburg et al., 1988). In this regard they are more similar to the general population, because a large number of people do not seek help for depression (Amato &

Bradshaw, 1985; Goodman, Sewell, & Jmapol, 1984). Instead, both students and the general population tend to seek help from friends and family members (Padesky & Hammen, 1981; Tinlsey, de St.Aubin & Brown, 1982; Vredenburg et al., 1988). The fact that student depression often goes untreated is important because it is possible that various forms of psychiatric treatment may introduce a source of bias in to the findings when psychiatric patients are being studied, but this bias is simply not present among students (Vredenburg et al., 1993).

8.7 Future Directions

Approaches to depression have emphasized that reduced positive beliefs about self and the personal future serve as vulnerability factors pertaining to depression (e.g. Beck, 1967, 1976). In addition to this, hopelessness about the future is frequently endorsed by depressed individuals (e.g. Abramson et al., 1989; Beck, 1967), in that negative future events are perceived as certain to occur relative to positive future events which are not expected to occur (e.g. Andersen, 1990). It has been noted that healthy individuals show reduced certainty in such negative events occurring, relative to depressed individuals, where predictive certainty increases with exacerbated depressed mood (Andersen, 1990). Additionally, it has been argued that certainty in such expectations may be schematic in nature (Andersen et al., 1992). That is, experience and rehearsal of negative cognitions may lead to the formation of schema for predicting negative future events in depressed individuals, thus such schemata may facilitate automatic judgments about the future. Since these expectations have been noted to occur automatically, depressed individuals may not be able to intentionally engage in deliberating on the 'evidence' for and against negative future expectancies. In this regard, and with reference to the aims of the thesis, it was found that past and future thinking are related and that past experiences inform cognitions about the future. However, it is proposed that this influence is not independent of contextual factors and may not relate to episodic autobiographical memory *per se.* The finding that a shift in focus of cognitive processing, as facilitated by a brief mindfulness exercise, prior to completion of an autobiographical memory task can influence the specificity in recall of personal past experiences, suggests that AMS is subjective to the present mental state at the time of recall. As such, it is likely that increased AMS depends on continuous activation of a particular state or form of processing; i.e. shifting the focus away from this level of processing may increase AMS. As such the observed effects of defusion likely occur during retrieval, as the encoding of the autobiographical memories occurred prior to the experimental tasks. This has implications for the role of emotional avoidance as it may be inferred that the accessibility of content pertaining to past experiences which are inhibited at the retrieval stage due to the current state of mind, relative to more stable traits or affect during encoding. As such, the shift in the focus of attention from propositional to experiential knowledge allowed for enhanced contact with specific memories. This is in line with the improved levels of AMS found following exposure to mindfulness-based cognitive therapy, which also facilitates focus on present moment experiences (Williams et al., 2000). The current set of experiments support the link between past and future relations and the role of emotional avoidance therein. However, more longitudinal examination is required in order to determine whether increased awareness may retain this effect over periods of time, and if repeated use of such mindfulness strategies will be beneficial.

It has been suggested that theoretical frameworks which account for contextual influence, such as RFT, may be able to offer greater insight into the factors which are related to depression. This revival of behaviour analytic theory may be able to offer a more functional analytic approach to depression research relative to the more cognitively based, and currently endorsed, methodology. This is particularly pertinent in light of the FT-IRAP findings, (the composition of which is grounded in RFT), seen herein to be an effective measure of sub-clinical depression. Additionally, RFT and the REC model offer further insight to the very recent proposals occurring within the future thinking literature, with specific reference here to recent suggestions by Szpunar (2010) who suggests that, rather than episodic memory, it may be relevant to examine the impact of more relational constructs pertaining to historical personal events on future thinking. The RFT and REC model would offer such a framework for exploration and thus further developments with the IRAP methodology in clinical research is warranted. Although individuals may become aware of automatic thoughts implicit relations may be more difficult to access and modify. As such implicit measures may provide a means of access to implicit knowledge, and progress in defusion from such implicit knowledge, or at least the degree of acceptance and openness to such dysfunctional relations may be observed via implicit measures. Consistent with this suggestion components within ACT, as an approach to targeting psychological distress, such acceptance and defusion need further application across more clinical samples and over prolonged time periods to allow for longitudinal effects to be observed. Values clarification is another ACT component which is relevant in the current context, particularly in regards to the aspect of future thinking and the relevance of the link between personal values and depression and hopeless ideation. Values may be particularly relevant in targeting hopeless ideation and subsequently suicidal ideation. As such further validation and exploration of the use of values measures in research and clinical application is required. It may be particularly feasible to apply the IRAP methodology in the construction of an implicit values measure, as it has been recognized that individuals are not always conscious about the reasoning behind their particular values, or about the impact implicit cognitions have in regards to values pursuit. Social and cultural connotations may further inhibit explicit elaborative responding to such values exploration in a personal and therapeutic context, and as such slow down the therapeutic process. Thus, an implicit measure that raises awareness of personal values direction and endorsement would be able to facilitate the initial therapeutic process.

The FT-IRAP may be relevant in the assessment and treatment of underlying dysfunctional relations before depressive symptoms become more serious. Implicit assessment, such as by the FT-IRAP, may as such also be used in prevention of relapse, by use of individualized implicit depression measures in addition to self-report. Further research is needed to investigate conditions under which implicit cognitive vulnerability takes effect. Considering the diverse nature of implicitness, overlap may exist between implicit and explicit cognitions. As such, the structure of negatively-biased implicit and explicit cognitions may benefit from a person-level approach. That is, vulnerability may be derived from patterns of implicit and explicit cognitions, and by examination of how individual profiles may be individually related to depression. Understanding of high-risk profiles would likely be able to inform individual treatment approaches. As such, rather than focusing on latent negative beliefs about self, it may be beneficial to focus on strengthening the underlying positive beliefs about self that already exist. Across experiments with the FTT (i.e. Experiments 3, 10 and 15) there were some indications of an effect for period, however the effect varied across experiments and no consistent pattern of response emerged in terms of group differences for temporal distance of anticipated future events with the FTT. However, in Chapter 2, clear differences were observed between depressed and non-depressed samples in regards to the generation of cued future events as reported on the FCT and FCQ (i.e. Experiment 1b and 2b). It was seen here that healthy participants anticipated significantly more positive events to take place in the near future relative to sub clinically depressed individuals. Bjärhead et al. (2010), in analysis of the FTT index score, observed a significant time effect between the depressed and non-depressed samples, in relation to the near future, although the groups did not differ in regards to the more distant future expectancies. The depressed group were found to expect proximate positive future events, as less likely to occur relative to the non-depressed sample. However, it has been argued that if episodic future thoughts do serve a function of directing behaviour, it may not be helpful to engage with events perceived as unlikely to occur for some time (Spreng & Levine, 2006). In relation to the discussion of findings from Chapter 2 above, although there were clear group differences pertaining to specificity and the time of event s occurring, there was a lack of detail found in relation to future events generated. It might be argued that this may be due to a lack of belief that such future events are likely to occur in the near future. In view of the proposal that behaviour is not automatically activated or inhibited through the occurrence of a positive or negative event, but through the *anticipation* that such an event will occur (Andersen, 1990; Andersen & Lyon, 1987; Andersen, Spielman, & Bargh, 1992), MacLeod and Salaminiou (2001) argued that emotional avoidance can result in reduced approach behaviours (Macleod, 1999). This reduction in approach behaviours corresponds to the reduced positive future generation observed, and with the postulate that expectancy for proximate future would likely be influenced by the current context relative to more distant future events (Szpunar & McDermott, 2008). Temporal distance could thus be important, and may have some implication in regards to treatment approaches and particularly in regards to values following as more distant events may be interpreted as more neutral or isolated from affective relations (i.e. negative connotations of the events are weakened due to the remoteness of the event). This implies that progression towards an overarching personal value, as opposed to more immediate and contingent goals, would facilitate the ongoing values process. Future FT-IRAP experiments should consider incorporating stimuli that account for such temporal relations. For instance, the target stimuli in an IRAP may integrate temporal relations such as before/after, I did [not] expect positive (negative) before – I do [not] expect positive (negative) now; or now/then, e.g. 'I [don't] expect positive (negative) today/next-week/next-year/next 5-10 years.

The mounting appreciation of the link between past and future thinking, along with the consideration of implicit processes in depression, holds implications for improving assessment and treatment of depression. Continued examination of implicit future cognition in depression may provide answers in the following areas: (i) how reduced positive future expectancy precipitates depression; (ii) which features in future cognitions constitute vulnerability to depression; (iii) the role of emotional avoidance, as stemming from past experiences, in future directed cognition, (iv) how reduced positive future thinking may facilitate continued depression, (v) and how cognitive vulnerabilities may be detected and altered. The recent functional-analytic framework emerging from RFT by way of the REC model may offer research in this area greater understanding of the behavioral effects accrued from explicit and implicit methods of assessment. This framework significantly offers a practical methodology in form of the IRAP which specifically targets implicit cognition, i.e. via brief and immediate relational responses. The current research is exploratory in its nature and further application of the FT-IRAP is needed within clinical samples before any final conclusions can be drawn in relation to implicit future thinking and depression.

8.8 Conclusion

The thesis has revealed a significant relationship between reduced positive self-referential implicit cognition and depressive status. Emotional avoidance is linked to deficits in autobiographical memory which has been linked herein to implicit future cognitions. Explicit assessment of future thinking was found to be challenging, though positive future expectancy was seen to be more stable and stronger predictor of depression relative to the amount of positive thoughts for the future. Although the distinction between implicit and explicit processes in future thinking and depression have not yet been determined, the current thesis suggests that implicit relations represent significant predictors of sub-clinical depression. Additionally, it has been demonstrated that psychological inflexibility likely works as a contributing factor in many of the problems that lead to suicidality. Given that ACT processes alters such inflexibility - these processes could be used in preventative interventions to alter the path known to lead to suicidality. Taken together the experimental series reported herein suggests that implicit negative cognitions about the past and future can be a predictor of sub clinical depression. Additionally, mindfulness and values-based skills can moderate the link between past and future cognitions and sub clinical depression. Future work should take the short procedures outlined in the current thesis and apply them to clinical populations at both the basic (testing implicit cognitions) and applied (employing mindfulness and values interventions that target past and future cognitions directly) level.

9. References

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