Pre-experiencing the Future in Dysphoria: The Role of Anticipatory Affect

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Executive Summary

Background

'Pre-experiencing' as referred to throughout this document, looks at one aspect of future-directed thinking, that is, the quality of the cognitive representations and associated affect in the here-and-now whilst imagining a future event. It has been proposed that while imagining future events, individuals draw on episodic memory of experience, recombining and elaborating specific details that are re-experiences to simulate possible happenings (Schacter, Addis and Buckner, 2007). If this is the case, then it is possible that people with psychological disturbance may experience differences in pre-experiencing, as they often tend to have more negative beliefs about the self, others and the world, often based on their past experiences.

Over-general memory (OGM) symbolises the tendency to retrieve more general past events referring to categories of similar events than specific ones relating to a singular event (Williams et al., 2007), with fewer sensory, time and place details. As our understanding of mental time travel has progressed to include that of future thinking, results have continued to show a consistent finding – that clinical groups, irrespective of the particular psychopathology, show reduced specificity in their future thinking. Numerous studies have looked at the relationship between specificity of future thought in depression and clinical groups with depression, but the results have been mixed. It is relevant to gain clarity of the current evidence base on specificity and depression, which forms the basis of Chapter 1, as reduced ability to form specific mental representations of the future may mean reduced ability and motivation to engage in goal directed behaviour that is often characteristic of people with mood disorders, which may in turn have impact on clinical work with this client group.

Whilst Chapter 1 aims to systematically review the evidence for reduced specificity of future thought in people with elevated depression, Chapter 2 presents an empirical study also investigating the *quality* of future thoughts but offers a novel contribution, that is, the *emotional reactions* to such thoughts about the future. Whilst the *quantity* of positive and negative future thoughts for people who are depressed has been looked at, as well as substantial literature on how people respond emotionally to events *as* they occur in depression, there has been little on the emotional response to *anticipating* such events.

There are three views regarding how MDD might alter emotional reactivity *as* events occur, which may be applied to *anticipated* events and thus formed the closest parallel to base predictions upon in the present study. The negative potentiation hypothesis proposes that depressed individuals will exhibit potentiated, or heightened, emotional reactivity to negative emotional stimuli. The second hypothesis is positive attenuation, where depressed individuals' low positive mood (as demonstrated in typical symptoms such as anhedonia, fatigue, apathy and behavioural inactivity) is an indicator that they are likely to show attenuated, or reduced, emotional reactivity to positive emotional stimuli. Finally, the third hypothesis is the emotion context insensitivity (ECI) hypothesis, which takes a more global view of emotional reactivity in depression, suggesting that such individuals will exhibit diminished reactivity to all stimuli, regardless of valence.

Chapter 1: Systematic Review

The aim of the systematic review was to determine whether depression is related to reduced specificity of future events by reviewing studies which compare adults with elevated depression to lower or non-depressed adult controls on a verbal

word cueing method of assessing specificity. An electronic literature search was conducted using two databases and articles were selected as eligible if they were in English, used a word or sentence completion cueing method, and comparing groups or using a dimensional design where the relationship of depression to specificity is examined within a cohort. The quality of included studies was assessed using a rating scale for non-randomised study designs.

Twenty-three eligible studies were identified. The weight of the evidence suggested that yes, people with elevated depression do show reduced specificity when thinking about things that could happen to them in the future. Of the 23 papers included in the present systematic review, 14 found a significant relationship between depression and reduced specificity and of the studies who reported effect sizes, five found a large effect size and two a medium effect size. Different methods of coding specificity elicited similar results, adding weight to this conclusion. Of the ten studies who recruited from clinical populations, eight found significant effects between reduced specificity and elevated depression, compared to only three out of the eleven studies who reported using a community or student sample, further strengthening the relationship of reduced specificity in clinical levels of depression.

The systematic review concludes that people with elevated depression do show less specific thoughts about the future. Future studies investigating the relationship between specificity of future thinking and depression may benefit from larger sample sizes and attention should be paid to the generalisability of findings based on cueing methodology, which should seek to represent everyday prospection as closely as possible. Future research and reviews could also look at moderators

which influence the strength of the relationship between depression and specificity in future thinking.

Chapter 2: Empirical Study

The empirical study employed a 2 x 2 mixed design to investigate whether there are differences between people who are experiencing dysphoric mood compared to controls in the cognitive representations of future events (that is, the quality of future thoughts) and the emotional reaction to thinking about these future events.

Based on existing literature on how depression may alter emotional reactivity *as* events occur, the hypotheses suggested in the present study were that participants in the depressed group may score lower on pre-experiencing measures than controls and show reduced emotional reactivity to all cues in line with the emotion context insensitivity (ECI) hypothesis; they may show reduced emotional reactivity and pre-experiencing for positive cues (positive attenuation hypothesis) and elevated emotional reactivity and pre-experiencing for negative cues (negative potentiation hypothesis).

Fifty-four undergraduate students were given eight cue words (positive and negative, in the next few weeks and the next few years) using a standard cuing methodology for future-thinking as used in previous studies, and asked to imagine and describe specific events in the future that the word makes them think of. The cognitive representations or quality of future thoughts were measured using the future-directed Autobiographical Interview where event descriptions were segmented into unique bits of information which were subsequently coded as internal (detailed in time, place, sensory information) or external (semantic, repetitions or general

information not directly related to the event); and by four questions on the Phenomenological Characteristics Questionnaire (PCQ) asking participants to rate how much the felt they 'pre-experienced' and travelled forward in time to the event, how vivid and difficult to imagine it was. The emotional response to imagining future events was also measured in two ways – by collecting an 'in-the-moment' affect rating on four mood states (happy, relaxed, anxious, sad) and by two questions on the PCQ assessing presence of emotions expected to occur at the event (anticipated emotions) intensity of positive or negative emotions in the here and now whilst imagining the future event (anticipatory emotions).

Dysphoric and non-dysphoric groups were created based on their scores on a self-report depression measure (PHQ-9). A score of 10 or more indicated the presence of depressive symptomology (n=25), and a score of 9 or less represented participants in the control group (n=29). There were no significant differences between groups with regards to the extent to which participants felt they pre-experienced the event, the extent they felt they travelled forward to the event, how vivid the event was, and how difficult the event was to imagine. However there was a significant difference between groups on the intensity of the emotions experienced when imagining the future events, with dysphoric participants experiencing more negative emotions than controls when thinking about the future events. In a similar vein, on the here and now mood ratings there were significant differences between groups on how happy they felt after imagining the events, indicating participants in the dysphoric group felt less happy than the control group after describing future events, after controlling for any initial variations in baseline happiness; and how relaxed they felt, indicating

participants in the dysphoric group rated themselves as less relaxed, and more anxious. There were no significant differences on ratings of 'sad.'

Whilst the findings of this study suggest there are no differences between people with or without low mood in the cognitive representations of future events, there were in the emotional response to thinking about the future. It was found that people who are even mildly depressed benefit less emotionally when thinking about things that could happen to them in the future. However, given high comorbidity it was not possible to partial out the effects of anxiety and this should be taken into account when interpreting results.

Chapter 3: Integration, Impact and Dissemination

The systematic review findings that people with elevated depression do show less specific thoughts about the future provided a conceptual basis for the empirical study and the proposed hypotheses. If people with more negative mood think about the future in more abstract, and less detailed ways, one would expect the same pattern in their ability to pre-experience – that the cognitive feelings, or 'autonoetic consciousness' of possible future events would also be harder to imagine and less vivid. Although the dysphoric group did not show differences in the cognitive representations, or quality, of their future thoughts in comparison to controls in the empirical study, there were differences in the emotional response.

This finding is interesting, because predominant cognitive models of depression emphasise the powerful role that cognition plays in affecting mood (Coombs, Coleman & Jones, 2002), that is, faulty cognition leads to depressed mood. Miranda and Persons (1988) mood-state hypothesis, proposes that dysfunctional

beliefs are vulnerability factors for depression but that reporting of the beliefs varies with current mood state, so when in a negative mood state, people readily endorse dysfunctional beliefs, but when they are in a positive mood state, people do not report dysfunctional beliefs. Teasdale (1983) supports the view that perhaps mood states precede dysfunctional thinking. The increased accessibility of negative memories during negative mood states (and decreased accessibility of positive memories) may mean that a person is likely to make gloomy predictions about the future when depressed, which fits with Schacter et al.'s (2007) constructive episodic simulation hypothesis but taking a more emotion focused than belief focused stance.

The systematic review identified that studies where participants (although in the elevated depression group) did not meet clinical cut off scores for depressive symptomology or were recruited from community or student samples were less likely to find an effect for reduced specificity. It is possible that depressive symptomology in the present empirical study were not severe enough to demonstrate a significant difference in the cognitive representations, or quality, of future thoughts. A clinically depressed sample may then demonstrate both, differences in cognitive representations as well as the emotional reactions to thinking about the future.

The findings of the empirical study have implications for clinical practice in that it may be that eliciting emotional expression in treatment sessions may be important. It has been argued that cognitive behavioural therapy tends to steer away from emotional experiencing in sessions in favour of focusing upon cognitive distortions as a way of reducing negative affect and behaviour (Coombes et al., 2002). Cognitive behavioural therapy already targets prospection through its focus on goal setting and behavioural activation to make future change and engage in future events.

Feeling heightened negative emotions when thinking about future stressful and/or negative events and reduced expectations of the success of positive outcomes may mean more emphasis on emotional expression related to thinking about future goals may be an important clinical aspect to focus on, and subsequent problem solving and planning needs to take place to help reduce some of these emotions. Future-directed therapy (FDT) has already been introduced as a way of alleviating depressive symptomology and hypothesises that when people *feel*, they have the power to thrive by creating a desired future state and obtain what is wanted, and focuses on emotions as indicators of thought processes rather than the other way round, and has been found effective in reducing depressive symptomology.

In order to achieve the clinical impact described above, it is important that the findings of this research are disseminated to appropriate forums. A target journal to submit the empirical study for publication is 'Consciousness and Cognition,' an international journal which focuses on a natural science approach to the issues of consciousness, voluntary control, and self. The empirical study may form a foundation for future research with a clinically depressed sample.

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Abstract

Specific future thoughts are characterised by possible events that are located in a particular time and place, and involve the generation of vivid information about that particular event (Hallford et al., 2018). Research has consistently shown that clinical groups, irrespective of the particular psychopathology, demonstrate reduced specificity in their future thinking. The aim of this systematic review is to determine whether depression is related to reduced specificity of future events by reviewing the studies comparing those with elevated depression (regardless of clinical diagnostic group) to those with lower or no depressive symptomology on specificity of future thinking, or prospection. Twenty-three studies eligible for inclusion were identified following a search of two databases. The quality of included studies was assessed using a rating scale for non-randomised study designs. It was concluded that the studies reviewed provide evidence that people with elevated depression levels do show reduced specificity when thinking about the future, particularly with higher, clinical levels of depressive symptomology. It is recommended that future studies investigating this relationship may benefit from larger sample sizes, and attention should be paid to the generalisability of findings based on cueing methodology, which should seek to represent everyday prospection as closely as possible. Future research and reviews could also look at moderators which influence the strength of the relationship between depression and specificity in future thinking.

Key Words: Specificity, Future-Directed Thinking, Depression, Adults, Word Cueing

Introduction

Episodic Future Thinking

Thinking about the future is an integral component of human cognition, and is an area that has accelerated during recent years in the fields of cognitive, clinical and neuropsychological research (Michaelian, Klein & Szpunar, 2016). Although there are many ways in which humans think about the future (Schacter, Benoit & Szpunar, 2017) research on thinking about the future has often focused on the simulation of future events, also talked about as episodic future thinking. Episodic simulation is the construction of a detailed mental representation of a specific autobiographical future event (Schacter, Addis, & Buckner, 2008) or the ability to project ourselves forward in time to pre-experience an event (Atance & O'Neill, 2001).

Literature on episodic memory helps inform the understanding of episodic future thinking. According to Tulving (2002), episodic memory allows us to engage in mental time travel from the present to the past, enabling us to re-experience through autonoetic awareness. Autonoetic consciousness can be considered as what it is that gives us the phenomenal flavour of re-experiencing something (Tulving, 1985), allowing us to remember the sense of self in previous events at which we were present (Gardiner, 2001). This is in comparison to just knowing, or semantic memory. For instance, knowing the name of the park next to the house you used to live in relies upon semantic memory, whereas remembering a specific event that took place in that park, such as playing football with friends requires episodic memory.

Tulving later proposed that the systems that underlie episodic memory also enable humans to project to self-relevant events that could happen in the future, thus allowing us to engage in 'mental time travel' into the future as well as the past.

Findings in the last decade or so have continued to support Tulving's original proposition that episodic memory and episodic future thinking may involve similar processes, or represent two sides of a single overarching capacity (Szpunar & Radvansky, 2016; Hassabis, Kumaran & Maguire, 2007). Research has indicated other similarities between recalling our personal pasts and imagining personal futures. D'Argembeau and Van der Linden (2004) found similarities in the phenomenal (sensory and contextual) characteristics of past and future events, where representations of positive events contain more sensory details and are clearer concerning time information, whilst also associated with a greater feeling of re-experiencing (or pre-experiencing), compared to representations of negative events. They also found temporally closer past and future events to have the same effect than more distant past or future events.

Schacter and Addis (2007) put forward the constructive episodic simulation hypothesis to explain the processes underlying the similarities between remembering the past and imagining the future. Episodic memory allows the retrieval of stored information about past events and experiences by extracting and recombining it into a simulation of a novel event (Schacter, 2012). By utilising past information in a flexible manner, future scenarios can be simulated without having to engage in the actual behaviours, highlighting its adaptive nature (Schacter & Addis, 2007).

Differences in how people think about the past versus how they think about the future have also been identified. Berntsen and Bohn (2010) suggest these differences can be summarised into two main findings – that episodic future thinking requires more constructive effort, and that it is more emotionally positive than episodic remembering. The first can be demonstrated in brain imaging studies where

future-thinking appears to involve a wider neural network, likely to be due to the increased cognitive processing required to think of things that have not yet happened (Addis et al., 2007). Research has also indicated that people think about the future in more abstract and less detailed ways (MacLeod, 2016), specifically demonstrating fewer sensory details as well as less specific in time and place (D'Argembeau & Van der Linden, 2004; Addis et al., 2008).

Episodic Future Thinking and Specificity of future thought

As mentioned above, people generally tend to be less specific about events in the future in comparison to events from the past. Specificity refers to the simulation of events that occur in a defined place and time, and relates to episodic detail, which refers to the number of contextual details about a specific event (Hallford, Austin, Takano & Raes, 2018). Over-general memory (OGM) describes the tendency to retrieve more general past events referring to categories of similar events than specific ones relating to a singular event (Williams et al., 2007). In line with evidence suggesting overarching processes in remembering and prospection, those who exhibit OGM tend to also show reduced specificity when simulating future events (Addis, Hach & Tippet, 2016). Specific future thoughts are characterised by possible events that are located in a particular time and place, and involve the generation of vivid information about that particular event (Hallford et al., 2018). For example, when instructed to think about an upcoming event such as graduation, one might vaguely think about how that is a likely possibility in the future. By thinking about the time of day, location, other contextual details such as details of the surroundings and sensory details such as how it feels to be there, temperature of the room and so on, this future thought becomes a specific episodic future thought.

But why is specificity and episodic future thinking important? According to Schacter et al. (2017), clinical studies support the notion that episodic future thinking serves a range of functions, including decision making, emotion regulation, intention formation and planning. According to Taylor, Pham, Rifkin & Armor (1998), mental simulations support planning and problem solving because they include specific information about people, places and social roles which help generate solutions to problems and by simulating the process needed to reach a goal, mentally rehearsing the steps needed to achieve it leads to appropriate changes in behaviour and thus increases the likelihood of that goal being achieved. Taylor et al. (1998) argue that simulations produce links to action by virtue of the self-regulatory activities they evoke, and make reference to athletes who improve performance via mental imagery and practice. In addition, several studies have also shown that episodic future thinking can enhance the ability to remember to carry out an intended activity, or prospective memory, as simulation may increase the probability that the intended action is triggered when the future event is encountered (Schacter, 2012).

Different methods and paradigms for measuring specificity in future thinking have been utilised. Some studies use generic word cues such as common nouns such as ‘beach’ to elicit events (Williams et al., 1996; Dickson & Bates, 2006); whilst others use event based cues such as ‘New Year’s Eve’ to elicit possible future events (Addis, Wong & Schacter, 2008; Levine, Svoboda, Hay, Wincour & Moscovitch, 2002). In addition to single cue words, specificity tasks often use sentence stems. Raes et al., (2007) developed the Sentence Completion for Events from the Past Test (SCEPT) which has been adapted by Anderson and Dewhurst (2009) into the SCEFT, to tap into prospection. This involved sentence steps which probe into thoughts

relating to the past or future, and participants can complete the sentence in any way, as long as each is unique (Anderson, Boland and Garner, 2016).

Events are commonly rated as specific on three point scales of specific (e.g. my husband might compliment me next week when I get my hair cut), intermediate (someone might tell me I've lost weight), or general (a friend could compliment me) or if they contain sufficient details, such as 'I am at the beach with my best friend, it is late in the afternoon and we are playing in the sand' compared to 'I'm at the beach.' Other studies score specificity based on the type of detail provided, for instance if the event description contains time, place and sensory details the specificity score would be higher the more detail provided. For example, "I am at the beach in Bournemouth, with my best friend, it is 4 o'clock in the afternoon and I can see the sun shining and hear people laughing next to me."

Episodic Future Thinking, Specificity and Psychopathology

Over-general memory has been found in emotional disorders. In their review, Williams et al., (2007) found over general memory to be a consistent characteristic of patients diagnosed with Major Depressive Disorder, in 11 studies with a large effect size (Cohen's d = 1.12). Several studies have shown links between reduced specificity and psychological disorder. Initial research spanning back 30 years or so indicated that different forms of psychopathology are associated with a reduced ability to recall specific autobiographical memories (Boelen, Huntjens & van den Hout, 2014), first observed by Williams and Broadbent in their 1986 study with suicidal patients.

As our understanding of mental time travel has progressed to include that of future thinking, results have continued to show a consistent finding – that clinical groups, irrespective of the particular psychopathology, show reduced specificity in

their *future* thinking. Reduced specificity has been found in schizophrenia (de Oliveira Cuervo-Lombard, Salame & Danion, 2009; Chen et al., 2016). Raffard, Esposito, Boulanger and Van der Linden (2013) similarly found that schizophrenia patients' pleasant and unpleasant imagined future events were less specific and contained fewer phenomenal characteristics, and that these difficulties imagining pleasant future events was associated with apathy, which may underlie motivational deficits often seen in this client group. Reduced specificity has also been found in bipolar disorder (King et al., 2011; Boulanger, Lejune & Blairy, 2013); post-traumatic stress disorder (Kleim et al., 2014); and developmental disorders such as Autism (Lind & Bowler, 2010; Crane, Lind & Bowler, 2013).

Episodic Future Thinking, Specificity and Depression

Depression is a common mental disorder, and one of the main causes of disability worldwide affecting an estimated 300 million people (WHO, 2017). According to the DSM-V, Major Depressive Disorder is characterised by depressed and/or diminished interest and pleasure in activities most of the day. Other common symptoms (five or more to meet criteria) include weight gain or loss, sleep difficulties, fatigue or loss of energy, feelings of worthlessness and diminished ability to concentrate. Some may also experience recurrent thoughts of death or suicidal ideation. The symptoms experienced cause clinically significant distress or impairment in functioning whether social, occupational or others (American Psychological Association, 2013).

Depressive symptomology has commonly been shown to be elevated in other clinical diagnostic groups with an estimated 50% rate of comorbidity in schizophrenia, (Buckley, Miller, Lehrer & Castle, 2009); between 30-50% in those

with post-traumatic stress disorder (Campbell et al., 2007); and in as many as 50% in those with an anxiety disorder, presenting in the community (Kessler et al., 1996) and up to 75% in those presenting with anxiety disorders in primary care settings (Hirschfield, 2011).

Numerous studies have looked at the relationship between specificity of future thought in depression and clinical groups with depression, but the results have been mixed. Some have shown there is a relationship between reduced specificity of future thought and depressive symptomology (King, MacDougall et al., 2011; Dickson & Moberly, 2013; Hach, Tippet & Addis, 2014), whilst others have found proportions of specific and over-general responses not to be significantly associated with concurrent depression (MacLeod & Cropley, 1995; Boelen et al., 2014). These studies have used various different methodology and samples, and so it is important to gain a consensus of the state of the evidence base, as considered in the present review.

Episodic Future Thinking, Specificity and Depression – Why is it relevant?

Earlier in this chapter we have considered the adaptive value of specific episodic future thinking in helping to plan, problem solve, form action and engage in goals. It has long been known that people with depression tend to have a more hopeless and negative outlook of the future, the world around them and themselves (Beck, 1967). People with depression have shown reduced ability to form and take the steps required to achieve goals (Dickson & MacLeod, 2004), and are more pessimistic regarding the likelihood of achieving their goals compared to never depressed individuals (Dickson, Moberly, & Kinderman, 2011). Reduced ability to form specific mental representations of the future may therefore mean reduced ability and

motivation to engage in goal directed behaviour that is often characteristic of people with mood disorders.

Objectives of this Systematic Review

The purpose of this systematic review is to find and evaluate studies comparing those with elevated depression to those with lower or no depressive symptomology on specificity of future episodic thinking. The aim is to determine whether depression is related to reduced specificity of future events.

The review also focuses on adult samples rather than younger or older people. Older adults have been shown to communicate in a more general way than do young adults, so reduced specificity may not be because of differences in episodic memory mechanisms but because of general differences in descriptive ability and narrative style (Schacter & Madore, 2016).

Method

The review was conducted with reference to the PRISMA guidelines for reporting systematic reviews (Liberati et al., 2009).

Information Sources and Search Strategy

An electronic literature search was conducted using two databases, PsycINFO and Web of Science. The search included all articles written in English and published up until the date of the literature search on 5th November 2017. The search terms used for the titles and abstracts in the databases were as follows:

Future OR Future thinking OR future-thinking OR future-directed thinking OR thinking about the future OR prospection AND specific* AND depress* OR anx* OR schizophrenia OR bipolar OR PTSD OR post-traumatic stress disorder OR trauma.

The full search string is presented in Appendix 1. Once the initial search results were retrieved, duplicates were removed. The remaining titles and abstracts were screened for eligibility and subsequently the full texts of a smaller number of articles were assessed for suitability for inclusion in this review. Additional relevant articles were sourced and assessed by scanning the reference lists of already identified eligible articles. Due to time and resource constraints, this literature search focused on published journal articles only.

Eligibility and Study Selection

A predefined list of criteria was compiled to determine which articles would be eligible to be included in this review. Firstly, they needed to be accessible in the English language. Secondly, specificity of thought should be measured using a word cueing or sentence completion paradigm where response were coded for specificity.

Where the article addressed both, future thinking *and* memory, only information related to specificity of future thinking was extracted. Thirdly, in order to be eligible articles could either be categorical in design, whereby specificity is compared between a group of participants with elevated depression and a control group of non-depressed or lower-depressed participants, or dimensional in design where the relationship of depression to specificity is examined within a cohort. Articles were eligible even if the primary diagnostic criteria were not specifically depression, as long as there was evidence that the clinical group had significantly elevated levels of depression. Lastly, depressive symptom severity could be evidenced by either a structured clinical interview to assess individuals meeting the diagnostic criteria for major depression according to the DSM (American Psychiatric Association, 1994, 2013), or by self-reported elevated levels of depression using validated questionnaires. Studies were excluded if they used the same sample (or were a duplicate) of another eligible study.

Data Extraction

Data were extracted on the following characteristics using a predefined data extraction form:

- Author and year
- Study design (categorical vs dimensional)
- Sample size
- Sample characteristics (age, gender)
- Recruitment source(s) for sample
- Main method and/or measures used to assess presence of clinical disorder and/or elevated depression levels

- Method of assessing specificity of future thought and scoring of outcomes
- Key findings relevant to the review question

Table 1 presents the characteristics of each study included in this review. Due to time constraints, the data were extracted independently by the author only.

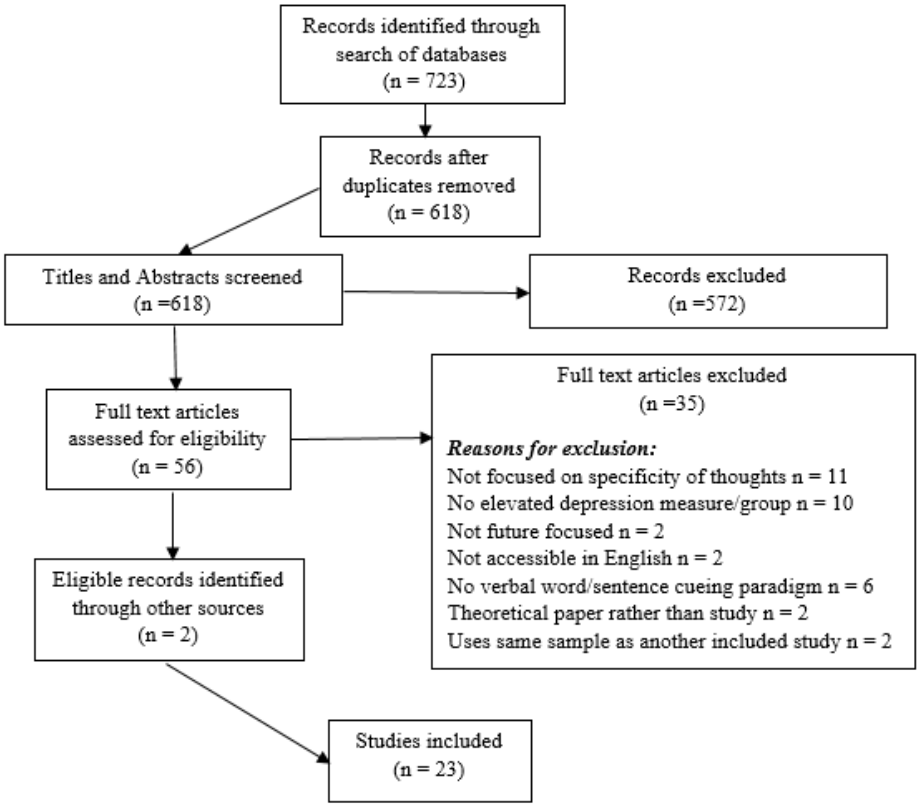
Quality Assessment

The quality of included studies was assessed using a rating scale for non-randomised study designs. This rating tool was taken from Everaert, Podina and Koster's (2017) meta-analysis on interpretation biases in depression, and is an adapted version of the Checklist for Measuring Quality by Downs and Black (1998). This scale consists of 18 items, assessing the reporting of participant characteristics, representativeness of the sample, validity and reliability of outcome measures, attention to potential confounders, accuracy of reported findings and study power (Appendix 2). Each item is rated on a two-point scale, where 0 indicates *no* or *unable to determine* answers; and 1 indicates *yes*, the item criteria for quality has been met. Question 11 on the rating tool allows the criteria to be partially met, in which case this was scored was given as 0.5, and those fully meeting the criteria were scored as 1. Higher scores indicate greater quality. Due to time and resource constraints, quality ratings were carried out independently by the author.

Results

Figure 1 demonstrates the process by which papers were selected for inclusion in this review. The initial search generated a combined 723 papers, where 105 duplicates were removed using referencing software. Following this, the titles and abstracts of the remaining 618 papers were screened for eligibility and a total of 56 were identified as potentially eligible for inclusion. Once the full texts of these papers were cross referenced against the inclusion criteria, 21 were judged as suitable. An additional two papers were identified from scanning the reference lists of these 21 papers, resulting in a total number of 23 papers included in the review. One paper had two studies within it, using different samples and so has been split into Experiment 1 and 2.

Figure 1: Flowchart of the study selection process



Characteristics of the included studies

Table 1 presents the characteristics based on extracted data for the 23 eligible papers in this review. The mean age of participants across the included studies ranged from 19.4 years to 52.16 years, and the proportion of female participants ranged from 8% to 100%.

Study Design

The majority (19) of reviewed studies used an independent design, involving a clinical group with elevated depression levels and a comparison control group with lower or no depressive symptomology reported. The sample size for these studies ranged from 28 to 72. The remaining four studies used a correlational design whereby there was one sample and depression was measured on a continuum, and the sample size for these studies ranged from 82 to 183.

Measures and Assessment of Depression

Of the 23 papers included in this review, 11 focused specifically on depression (Depression n = 9; Dysphoria n = 2) and two on Suicidal patients. The remaining 10 papers focused on PTSD (n = 4); Bipolar Disorder (n = 2), Complicated Grief (n = 2), Schizophrenia (n = 1) and anxiety (n= 1), all of which also provided evidence of significantly elevated levels of depression in the clinical group.

Three of the studies included in this review utilised a formal clinical diagnosis established using the Structured Clinical Interview for DSM-IV alongside self-report measures. Three studies utilised the Hamilton Depression Rating Scale (HAM-D, Hamilton, 1960) which is also clinician rated. The remaining 17 utilised self-report measures of depression. Six of the studies using self-report measures established cut

off scores to distinguish between depressed and control groups. The remaining 11 reported the clinical group to have elevated depression scores in comparison to the control group. The elevated depression group in two of the independent design studies (although higher than the control group) scored below the typical clinical cut off criteria (Brown et al., 2013; D'Argembeau, Raffard & Van der Linden, 2008), thus indicating very low presence of depressive symptoms, and two of the correlational studies also indicated mean depression scores were subclinical (Boelen et al., 2014; Szollosi, Pajkossi & Racsmany, 2015).

Table 1

Characteristics of studies included in the systematic review

Author (Year)	Design	Total n	% female	Mean Age	Country and group	Clinical Group	Depression Measure	Depression Status of CG	Specificity Measure	Specificity Scoring Method	Quality Score
Addis et al. (2016)*	Categorical	48	D: 88 C: 84 (M)	D:25 C:24 (M)	Australia students	MDD	BDI-II	Any history of MDD	Modified AMT	Proportion of specific responses	14
Anderson et al. (2016) (Experiment 1)	Categorical	61	D: 87 C:81	D:20.87 C:20.29	UK students	Dysph.	CES-D	Cut off 16+ on CES-D	SCEFT	Proportion of specific responses	11
Anderson et al. (2016) (Experiment 2)*	Categorical	53	D:70 C:50	D:20.70 C:20.12	UK students	Dysph.	CES-D	Cut off 16+ on CES-D	E-SCEFT	Proportion of specific responses	11
Belcher & Kangas (2014)*	Categorical	60	D:70 C:83	D:38 C:31	Australia Community	MDD	SCID-IV BDI-II	DSM-IV Diagnosis	FIT	Proportion of specific responses	15
Blix &	Categorical	46	D: 100	D:25.59	Norway	PTSD	BDI	Elevated	FCT	Proportion	11

Author (Year)	Design	Total n	% female	Mean Age	Country and group	Clinical Group	Depression Measure	Depression Status of CG	Specificity Measure	Specificity Scoring Method	Quality Score
Brennan (2011)			C:100	C:24.18	Emergency & Crisis Centres; Community					of specific responses	
Boelen et al. (2014)	Dimensional	142	90	21.5	Dutch University from existing data	MDD, OCD, PTSD, Anx.	BDI-II	Range of scores in single sample	SCEFT	Proportion of specific responses	14
Boulanger et al. (2013)*	Categorical	38	D:58 C:58 (M)	D:45.2 C:45.4 (M)	Belgian Psychiatric Clinics & Community	BD	SCL-90-R SCID-IV	Elevated	Future AMT French Version	Proportion of specific responses	12
Brown et al. (2013)*	Categorical	28	D:8 C:18	D:30.25 C:31.38	American Combat Veterans	PTSD	BDI-II	Elevated	Future-Oriented AI	Proportion of specific responses	12

Author (Year)	Design	Total n	% female	Mean Age	Country and group	Clinical Group	Depression Measure	Depression Status of CG	Specificity Measure	Specificity Scoring Method	Quality Score
D'Argembeau et al. (2008)*	Categorical	32	D:56 C:56 (M)	D:36 C:30 (M)	French sample, source not specified	Scz.	BDI-II	Elevated	FCT French Versions	Proportion of specific responses	10
Dickson & Bates (2006)*	Categorical	34	D:88 C:65	D:20-24 C:20-24	University population, location not specified	Dysph.	BDI	Cut off 16+ on BDI	FET	Three item ordinal rating of specificity	11.5
Dickson & Moberly (2013)	Categorical	44	D:62 C:71	D:37.9 C:31.2	UK Primary Care & Mental Health Trusts; Community	MDD	SCID IV BDI-II	Cut off 13+ on BDI	Goal Task & coding Goal Explanation Task & coding	Proportion of specific responses	13
Dickson et al.	Dimensional	82	Unclear	27.3	UK	Anx.	BDI	Range of	Personal	Three item	12.5

Author (Year)	Design	Total n	% female	Mean Age	Country and group	Clinical Group	Depression Measure	Depression Status of CG	Specificity Measure	Specificity Scoring Method	Quality Score
(2009)			due to exclusions		University			scores in single sample	Event Cuing Task	ordinal rating of specificity	
Hach et al. (2014)*	Categorical	33	D:88 C:88	D:23.53 C:20.63	New Zealand, source unspecified	MDD	BDI-II	Cut off 14+ on BDI	Modified AMT	Proportion of specific responses	10
King, MacDougall et al. (2011)*	Categorical	44	D:68 C:64 (M)	D:48 C:45.1 (M)	Canadian Mood Clinic	MDD	HAM-D	DSM-IV Diagnosis	Cue Word Test	Number of episodic details	12
King, Williams et al. (2011)*	Categorical	40	D:60 C:60 (M)	D:45.7 C:45.4 (M)	Canadian Mood Disorders Clinic	BD	HAM-D	Elevated	Future Oriented AI	Number of episodic details	11
Kleim, et al.	Categorical	50	D:67	D:42.3	Community	PTSD	BDI	Elevated	AMT-f	Proportion	13

Author (Year)	Design	Total n	% female	Mean Age	Country and group	Clinical Group	Depression Measure	Depression Status of CG	Specificity Measure	Specificity Scoring Method	Quality Score
(2014)			C:50	C:37	Assault & Vehicle Survivors					of specific responses	
Maccallum & Bryant (2011)	Categorical	45	D:92 C:86	D:50.67 C:50.76	Australian Traumatic Stress Clinic & Community	CG	BDI-II	Elevated	FIT	Three item ordinal rating of specificity	12
MacLeod & Cropley (1995)	Categorical	44	D: 70 C:58	D:19.4 C:19.7	UK University	Dysph.	BDI	Cut off 14+ on BDI	Subjective Probability & Example Generation Task	Number of specific responses	11
Parlar et al.	Categorical	41	D:52	D:41.3	Canadian	PTSD	HAM-D	DSM-IV	Future	Number of	13

Author (Year)	Design	Total n	% female	Mean Age	Country and group	Clinical Group	Depression Measure	Depression Status of CG	Specificity Measure	Specificity Scoring Method	Quality Score
(2016)			C:50 (M)	C:36.5 (M)	Healthcare Service		SCID-IV	MDD	Oriented AI	episodic details	
Robinaugh et al. (2013)	Dimensional	170	79	Not reported	American University & Community	MDD, PTSD	CES-D	Range of scores in single sample	SCEFT	Proportion of specific responses	11
Robinaugh & McNally (2013)*	Categorical	33	D:54 C:40	D:48.54 C:52.16	American Community	CG	CES-D	Elevated	FET	Proportion of specific responses	13
Szollosi et al. (2015)	Dimensional	183	74	25	Hungarian Community	MDD	BDI-13	Range of scores in single sample	Cue Words MCQ 7 item translated version	Proportion of specific responses	9
Vincent et al.	Categorical	48	D:63	D:40	UK A&E	Parasu.	HADS	Elevated	MEPGAP	Proportion of specific	11

Author (Year)	Design	Total n	% female	Mean Age	Country and group	Clinical Group	Depression Measure	Depression Status of CG	Specificity Measure	Specificity Scoring Method	Quality Score
(2004)			C:63 (M)	C:40 (M)	Department					responses	
Williams et al. (1996)	Categorical	72	D:67 C1:63 C2:67	D:34 C1:24 C2:34	UK Hospital & Volunteers	MDD/OD	BDI	Elevated	FCT	Three item ordinal rating of specificity	11.5

Note: * = study found an effect for reduced specificity in depression. C = Control Group, CG = Clinical Group, D = Diagnostic Group, (M) = Matched, AMT-f = Autobiographical memory test future version, Anx. = Anxiety, BD = Bipolar Disorder, BDI = Beck depression inventory, BDI-13 = Beck depression inventory shorter version, CES-D = Centre for epidemiological studies depression scale, CG = Complicated Grief, Dysph = Dysphoria, E-SCEFT = Sentence Completion for events from the future test, emotionally valenced, FCT = Future cueing task, FET = Future event task, FIT = Future imaginings test, HADS = Hospital anxiety and depression scale, HAM-D = Hamilton depression rating scale, MCQ = Memory characteristics questionnaire, MEPGAP = Measure to elicit positive future goals and plans, OCD = Obsessive Compulsive Disorder, OD = Overdose, Parasu = Parasuicide, PTSD = Post traumatic Stress Disorder, SCEFT = Sentence Completion for events from the future test, SCID-IV = Structured Clinical Interview for DSM-IV, SCL-90-R = Symptom checklist revised, Scz = Schizophrenia.

Eliciting Future Thought and Scoring Specificity

There were several methods in which future directed thoughts were elicited in the studies included in this review, all of which involved a variation of a verbal cueing method. Table 2 presents the main characteristics of each method, alongside an indication of whether a relationship between reduced specificity and elevated depression was found. The studies in the table have been grouped together by cueing methodology.

Autobiographical Interview – Future Version (F-AI)

Four of the studies used a future directed version of the AI. This was originally developed by Levine et al., (2002) for autobiographical memories, and later adapted by Addis et al., (2008) for future directed thoughts. Participants are given single word cues and asked to generate a specific event that could realistically happen to them in the future. They are typically given three minutes to generate as much detail about the event as they can, which is audio recorded for later transcription. Once transcribed, each description is separated into segments or unique bits of information, which are subsequently coded as either internal or external. Internal details involve episodic, specific details related to time and place for example, whilst external details are semantic bits of information or repetitions. Scores are then tallied. The higher the internal score, the greater the specificity of the event.

Of the four studies using the F-AI, three found that those in the clinical group (thus elevated depression) showed reduced specificity when thinking about future events. Parlar et al. (2016) found when comparing log transformed means for number of episodic and non-episodic details, there were no significant differences between the

groups but there was a medium effect size (d = .48) because those with MDD produced numerically fewer episodic details.

Autobiographical Memory Test Future Version (AMT-F)

Four studies used the AMT-F, however it tended to be modified in different ways. Typically, single word cues are given and participants have one minute to generate as much detail about a specific event as they can, which is audio-recorded and later transcribed. Hach, Tippett and Addis (2014) and Addis, Hach and Tippett (2016) used 24 event based cues rather than single words, because the events were being generated in a shorter time frame (20 seconds) to the usual one minute (due to participants undergoing fMRI at the same time), and event such as 'New Year's Eve' were less abstract than single word cues and thus easier to generate. In terms of scoring, these two studies scored specificity on a four-point scale of specific (temporally and contextually, lasting no more than one day), categoric (repeatedly occurring events/routines), extended (lasting more than one day) or semantic information. The latter three represent non-specific detail. One of the other two studies scored specificity on a three-point scale of specific, categoric or extended, and the last scored it as events lasting less than one day.

Of the studies utilising this method, three found that the clinical group (thus group with elevated depression) showed reduced specificity of future thoughts. Although Kleim et al., (2014) did not find a main effect for diagnostic group, they did find that those in the PTSD group produced fewer specific future events in response to positive cues than those without PTSD, and the effect size was medium.

Table 2
Cueing Methods and Specificity Scoring

Study	Name of Cueing Method	Type of Cue	Number of Future Directed Cues	Specificity Scoring	Effect Found	Effect Size
Brown et al. (2013)	Future AI	Single Word	10	Internal/External Detail	**Yes** those with PTSD produced fewer internal details ($F(1,26)=10.79$, $p=.003$, $n^2=.29$	Large
King, Williams et al. (2011)	Future AI	Single Word	9	Internal/External Detail	**Yes** those with BD produced significantly fewer internal details ($t=3.41$, $df=38$, $p<.01$)	Not reported
King, MacDougall et al. (2011)	Future AI	Single Word	9	Internal/External Detail	**Yes** those with MDD produced significantly fewer internal details ($t_{42}=-3.45$, $p=<.01$)	Not reported
Parlar et al., (2016)	Future AI	Single Word	9	Internal/External Detail	**No** did not reach significance	
Hach et al., (2014)	AMT-F	Event Based	24	Specific/Categoric/Extended/ Semantic	**Yes** depressed group had lower proportion of specific detail	Large

Study	Name of Cueing Method	Type of Cue	Number of Future Directed Cues	Specificity Scoring	Effect Found	Effect Size
					($F(1,31)=8.93$, $p=.005$, $n^2p=.224$)	
Addis et al., (2016)	AMT-F	Event Based	24	Specific/Categoric/Extended/ Semantic	**Yes** depressed group generated lower proportion of specific events ($F(1,46)=8.58$, $p=.005$, $n^2=.16$)	Large
Kleim et al., (2014)	AMT-F	Single Word	12	Lasting less than 1 day, contextual	**No** difference between groups ($d = 0.57$)	Medium
Boulanger et al. (2013)	AMT-F	Single Word	10	Specific/Categoric/Extended	**Yes** those with BD showed significant decrease in number of specific future events ($F(1,33)=9.8$, $p=.003$, $n^2=.23$)	Large
Anderson et al. (2016) Exp 1	SCEFT	Sentence	11	Specific/Categoric/Extended/ Semantic	**No**	
Anderson et al. (2016) Exp 2	E-SCEFT	Sentence	11	Specific/Categoric/Extended/ Semantic	**Yes** dysphoric group produced significantly fewer specific events when cues were emotionally valenced ($F(1,51)=10.38$, $p=.002$, $n^2p=.17$)	Medium

Study	Name of Cueing Method	Type of Cue	Number of Future Directed Cues	Specificity Scoring	Effect Found	Effect Size
Robinaugh et al. (2013)	SCEFT	Sentence	9	Specific/Categoric/Extended/ Semantic	**No**	
Boelen et al. (2014)	SCEFT	Sentence	11	Specific/Categoric/Extended/ Semantic	**No**	
Blix & Brennan (2011)	FCT	Single Word	15	Specific/Categoric/Extended/ Semantic	**No**	
D'Argembeau et al. (2008)	FCT	Single Word	10	Specific/Categoric/Extended	**Yes** those with schizophrenia reported less specific responses ($F(1,30)=20.80$, $p<.001$)	Not reported
Williams et al. (1996)	FCT	Single word in sentence	15	Specific/Intermediate/General	**Yes** overdose subjects were less specific than controls ($F(1,70)=5.7$, $MSe = 1.60$, $p=.05$)	Not reported
Dickson & Bates (2006)	FET	Single Word	6	Specific/Intermediate/General	**Yes** dysphoric individuals were less specific than controls ($F(1,32)=58.70$, $p<.001$, $n^2=.65$)	Large

Study	Name of Cueing Method	Type of Cue	Number of Future Directed Cues	Specificity Scoring	Effect Found	Effect Size
Robinaugh & McNally (2013)	FET	Single Word	8	Specific/General/Non-response	**Partially** – individuals with CG were less specific only when events did not include deceased ($t(31) = 4.48$, $p < .001$)	Not reported
Belcher & Kangas (2014)	FIT	Single word & goals	6	Specific/Intermediate/General	**Yes** depressed sample were less specific in general & on goals ($F(1,57)=8.23$, $p=.006$, $n^2p=.126$)	Medium
Maccallum & Bryant (2011)	FIT	Single word in sentence	10	Specific/Intermediate/General	**Yes** those with CG were less specific in imagining positive future events ($t(40.55)52.57$, $p=<.015$)	Not reported
Szollosi et al. (2015)	Cue Word Test	Single Word	12	Specific/General	**No**	
Dickson et al. (2009)	Personal Event Task	Single Word	8	Specific/Intermediate/General	**No**	
Dickson &	Goal Task	Goals	As many in	Specific/General	**Yes** those with depression reported less	Large

Study	Name of Cueing Method	Type of Cue	Number of Future Directed Cues	Specificity Scoring	Effect Found	Effect Size
Moberly (2013)			90 seconds		specific goals (F(1,43,=10.74, p=.002, n^2p=.20	
MacLeod & Cropley (1995)	Example Generation Task	Statements	16	Specific/Intermediate/General	**No**	
Vincent et al. (2004)	MEPGAP	Goals	As many in 60 seconds	4 point scale on life domain, amount of detail and no need for sub goals	**Yes** Parasuicide groups produced lower proportion of specific goals (t(46) = 2.22, p<.05)	Not reported

AI = Autobiographical Interview, AMT-f = Autobiographical memory test future version, BD = Bipolar disorder, CG = Complicated grief, E-SCEFT = Sentence Completion for events from the future test, emotionally valenced, FCT = Future cueing task, FET = Future event task, FIT = Future imaginings test, MDD = Major depressive disorder, PTSD = Post traumatic stress disorder, SCEFT = Sentence Completion for events from the future test.

Sentence Completion for Events in the Future Task (SCEFT)

The SCEFT is a version of the Sentence Completion for Events in the Past Task (SCEPT, Raes et al., 2007), adapted for future events by Anderson and Dewhurst (2009). This comprises sentence stems, such as "Next week I…" and participants are instructed to complete the stem. These sentence completions are then coded, into one of four categories, as previously mentioned – specific or categoric, extended, semantic. Three studies included in this review used this method to elicit future events. None of the studies using this method found a significant effect for specificity and elevated depression. However, in their second experiment, Anderson, Boland and Garner (2016) did find that when the sentence stems were emotionally valanced (E-SCEFT), dysphoric participants reported fewer specific events than controls, and there was a medium effect size.

Future Cueing Task (FCT), Future Events Task (FET) & Future Imaginings Task (FIT)

These methods are variations of the original Future Events Task by Williams et al., 1996. Participants are given positive and negative (and sometimes neutral) single cue words and asked to generate as much detail about a specific event that could happen to them in the future within a one-minute time frame. Three studies used a variation of this task. Blix and Brennan (2011) scored specificity of responses on a four-point scale as described above, whilst the remaining two studies utilised a three point scale of specific, extended or categoric; and specific (e.g. my husband might compliment me next week when I get my hair cut), intermediate (someone might tell me I've lost weight), or general (a friend could compliment me). Two studies used the FET and scored specificity on the three-point scale of

specific/moderate/general and specific/general/non response, and two studies used the FIT (scoring specificity on specific/moderate/general scales), both of which are very similar to the FCT.

Two of the three studies using the FCT found that the clinical groups showed reduced specificity in future event descriptions. For those that used the FET, Dickson and Bates (2006) found a large effect size for dysphoric individuals being less specific than controls; whereas Robinaugh and McNally (2013) found this to be the case for people with complicated grief (compared to those without complicated grief) only if the future event being described did not involve the deceased. For the two studies that used the FIT, both found the group with elevated depression to be less specific in their event descriptions.

Other methods for eliciting future directed thoughts

The remaining five studies in this review used slightly different methods of eliciting future thoughts and or scoring specificity. Szollosi, Pajkossy and Racsmany (2016) presented participants with 10 positive and negative cue words and asked them to generate an event that could happen in one year's time, following which they rated the phenomenal qualities. Following this, the descriptions were categorised as either specific or general. They did not find any relationship between depression scores and specificity.

Dickson, Moberly and Hannon (2009) used a variant of the FET, but asked participants to write down four specific future events associated with different negative emotion cues. For example, "a future situation I can anticipate myself feeling…" The descriptions were then coded as specific, extended or categoric. A

total specificity score was calculated by summing the points for each of these three coding categories. They did not find any relationship between depression severity and specificity scores.

MacLeod and Cropley (1995) first used a subjective probability task where a list of 16 positive and negative statements were given, and participants were required to estimate how likely they thought each item could happen to them in the future on a seven-point Likert scale. They then completed an example generation task, where they were given one minute to generate a specific example for each of the 16 statements and a brief description of what it was. Specificity was scored in terms of the specific, moderate or general methods outlined previously. Although they found depressed participants provided more general examples to positive and negative cues, partial correlations indicated this was due to hopelessness rather than depression specifically.

The remaining two studies focused on goals as a measure of future directed thinking. Dickson and Moberly (2013) provided cues to elicit approach goals ("in the future it will be important for me to…") and avoidance goals ("in the future it will be important for me to avoid…"). They had 90 seconds to write down as many personally meaningful and plausible goals in each goal condition. Following this, participants were given prompts to elicit reasons for and against goal achievement in each goal condition. Again, they had 90 seconds to write down as many explanations. Goals were scored as specific if they described an explicit aim and made reference to at least one of the following – time, place or people. General goals were those that were abstract aspirations such as 'to be happy.' Specific goal explanations were those which gave more detail as to why the goal could/could not be achieved. They found a

large effect size indicating depressed participants reported less specific approach and avoidance goals.

Vincent, Boddana and MacLeod (2004) also used a goal focus for future thinking. They devised the Measure for Eliciting Positive Future Goals and Plans (MEPGAP). Participants were asked to generate as many goals as they could for the coming year in one minute. They then did the same but in response to seven different life domain cues. The first two goals given in each category were then taken and participants rated how much control they had over achieving the goal on a seven-point Likert scale. A four-point coding scheme (unclear what each point represents) was used to score specificity of each goal. The authors found that the parasuicide group produced proportionately fewer specific plans than controls. They did produce less specific goals but this was confounded by group differences in employment status.

Of the ten papers included in this review where depression was not the main group differentiator (but instead showed elevated levels of depression in another diagnostic group), six studies specifically investigated the relationship between depression scores on the chosen depression measure and specificity scores. Of these six studies, only one (King, Williams & MacDougall, 2011) found a significant effect indicating reduced specificity in the clinical group. This study was focused on bipolar disorder. Of the four that did not do a separate analysis on depression scores and specificity, all four found a significant effect between the clinical group with elevated depression scores and specificity.

Quality Ratings of the included studies

Table 3 presents the mean score across all papers included in this review for each question on the quality assessment tool. The total quality score for each paper is presented in Table 1. A full table of the scores for individual papers on each question on the quality rating tool are presented in Appendix 3.

There were specific areas in terms of quality that were particularly low. In order to determine if those willing to participate were representative of the entire population from which they were recruited, the proportion of those asked who agreed should be stated. Only six studies made this clear. In order to reduce bias, all participants in each group should be recruited from the same population. This was the case for 48% (n = 11) of the studies included in this review, but for 22% it was not made clear enough to determine. 96% of the studies also did not make it clear enough whether participants were recruited from a specific time frame, which resulted in a low quality score for this question. 83% of studies did not make it clear enough as to whether task engagement was assessed, and 96% did not report whether there were any withdrawals or dropouts, both of which may influence bias in reporting of results. Only two studies reported they carried out a power analysis, which again may influence results if studies are underpowered. Small sample size was frequently referred to as a limitation of studies included in the review.

Table 3
Ratings for the adapted Checklist for Measuring Quality

Item	Question	M	SD
1	Study hypothesis, aims and objectives described?	0.87	0.34
2	Main outcomes described in introduction or method?	1.00	0.00
3	Participant characteristics described?	0.96	0.21
4	Contacted participants representative?	0.87	0.34
5	Prepared participants representative?	0.26	0.45
6	Participants recruited from the same population?	0.48	0.51
7	Participants recruited over the same time?	0.04	0.21
8	Measures and tasks clearly described?	1.00	0.00
9	Main outcome measures valid and reliable?	1.00	0.00
10	Task engagement assessed?	0.17	0.39
11	Possible confounders considered, assessed and controlled for?	0.63	0.46
12	Appropriate statistical tests used?	1.00	0.00
13	Main findings described clearly?	1.00	0.00
14	Estimates of random variability provided in main outcome data?	0.91	0.29
15	Exact probability values reported?	0.57	0.51
16	Withdrawals and dropouts reported?	0.04	0.21
17	Data-dredging made clear?	1.00	0.00
18	Sufficient power analysis provided?	0.09	0.29

Note: M = Mean, SD = Standard Deviation. Maximum score of 1.00 for each item.

Discussion

Discussion on findings of this review

The weight of the evidence suggests that yes, people with elevated depression do show reduced specificity when thinking about things that could happen to them in the future. Of the 23 papers included in the present systematic review, 14 found a significant relationship between depression and reduced specificity and of the studies who reported effect sizes, five found a large effect size and two a medium effect size.

With regard to the measurement of specificity, two themes emerged, some studies coded events as either specific or not, thus distinguishing levels of specificity *between* events. For example, scoring events as specific, categorical, extended or general. Other studies looked at specificity *within* events, by calculating the number of episodic details, such as within the future directed AI. The different methodologies produced similar effects, thus adding weight to the conclusion that there is a relationship between reduced specificity of future thought and depression.

However, there are some considerations that need to be taken into account. Of the studies included in this review that did not find an effect for reduced specificity in elevated depression, four of them used a sentence cueing paradigm. The only study using this paradigm to find supportive evidence for the review question had emotionally valenced sentence stems. One reason for this may be that the SCEPT (sentence completion for events in the past test) has been shown to yield a significantly higher proportion of over-general responses compared to the AMT, perhaps because it taps in to the way everyday events are recalled in everyday life, as opposed to single word cueing tasks (Raes et al., 2007). Following on from this, the SCEFT may be a more accurate measure in assessing habitual future thinking

(Anderson & Dewhurst, 2009). Furthermore, Anderson, Boland and Garner (2016) suggest that when cues are particularly emotional (as were in the majority of studies included in this review), they may not provide a clear representation of everyday simulation, where cue types are situation dependent and extremely variable. Therefore, emotionally valenced cues may impact ease of generation of events as well as the type generated, which may explain why the study using emotionally valenced sentence stems was the only one of this method to find significant results.

So, if the argument that single word cues (as used in the majority of these studies) possibly produce less specific responses by their nature as being further from everyday experience is to be accepted, then results where significant relationships between reduced specificity and elevated depression have been found may not be representative of real life experience.

Within the studies investigated in this review, there were differences in the ways depression was measured. As mentioned previously, only three studies included a sample with clinically diagnosed depression. Of these three, two found reduced specificity in depression. The study which did not find a significant effect of this relationship was that by Parlar et al. (2016), who focused mainly on PTSD rather than depression. Of all the studies not primarily focused on depression, half of them found a significant effect of reduced specificity in the clinical group. However, four out of these five studies did not conduct specific analyses comparing scores on the self-report depression measures with specificity scores, so it cannot be ruled out that other factors related to these clinical groups were also involved in producing a significant effect. Furthermore, in two of these studies focusing on other clinical groups (not depression specifically) although demonstrating elevated depression in comparison to

controls, participants still did not meet the clinical cut off scores for depressive symptomology but did find a significant effect of reduced specificity in the clinical group. There were two studies where depression *was* the main focus that also had subclinical depression cut off scores and interestingly, these studies did not find a significant relationship between depression scores and reduced specificity. Taken together, this may either mean that again, other factors in clinical groups may contribute to reduced specificity or the latter two studies failed to find an effect because depressive symptomology was not severe enough to contribute to an inability to imagine specific future scenarios.

In a similar vein, a number of studies in this review used student or community samples rather than clinical samples. In the past, the validity of studying depressed students as an analogue of clinical depression has been questioned, mainly whether the presentation of depression in student samples is similar enough to those clinically depressed (Vredenburg, Flett & Kramer, 1993). In this review, of the 10 studies who reported recruiting from clinical populations, eight found significant effects between reduced specificity and elevated depression. Only three out of the eleven studies who reported using a community or student sample found this effect. This finding again strengthens the conclusion that reduced specificity is related to elevated depression, when it is at a clinical level.

The quality ratings of the studies in this review were generally good. There was a clear indication of low quality on some aspects, particularly the lack of a power analysis. A number of the studies in this review reported small sample size being a limitation, however they did still find significant effects between reduced specificity and elevated depression. Effect sizes were not frequently reported, and given the

relatively small sample sizes in many of the studies in this review, significance testing alone can be misleading, and makes findings trickier to compare across studies.

Recommendations for future

Future studies investigating the relationship between specificity of future thinking and depression may benefit from larger sample sizes, clearer distinguishing between clinical and non-clinical groups with regard to depression severity and formal diagnosis. Attention should be paid to the generalisability of findings based on cueing methodology, which should seek to represent everyday prospection as closely as possible. Future research and reviews could also look at moderators which influence the strength of the relationship between depression and specificity in future thinking.

Strengths and limitations of this review

This review has helped to synthesis the evidence base for specificity of future thinking in people with elevated depression, and outlined some recommendations for future reviews. There are some limitations of this review that are important to note. Due to time and resource constraints, the search strategy and quality ratings were carried out by the author only. The inclusion and exclusion of studies and subsequent quality ratings were discussed with the supervisor for this review, however independent blind ratings were not carried out by a second person, in order to produce interrater reliability calculations for both extraction and quality ratings. Time constraints also meant that authors of included studies were not contacted for missing information which may bias the quality ratings as they are then in part based on how well a study was written as opposed to carried out. Unpublished studies were not

sought for the purposes of this review, which may increase the likelihood of publication bias.

It is also worth noting that a meta-analysis on psychopathology and specificity in future thinking was published (Hallford et al., 2018) whilst this review was being undertaken. Hallford et al., (2018) found an overall effect indicating individuals with a psychiatric disorder have significantly less specific and less detailed episodic future thoughts, but relevant to this review, sub-group analyses showed significant effects for depression (but not all diagnoses such as PTSD or complicated grief), consistent with the current findings. Importantly, the papers included in their review differed to those in the present review as they did not focus specifically on elevated depression in clinical groups, and therefore the present review arguably compliments the former rather than replaces or is replaced by it.

Conclusions

Overall, the studies reviewed here provide evidence that people with elevated depression levels do show reduced specificity when thinking about the future. Further research addressing some of the limitations outlined here would be beneficial to advancing the understanding of the cognitive mechanisms that underlie prospection, and subsequently inform interventions for depression.

Chapter 2: Empirical Study

Pre-experiencing the Future in Dysphoria: The role of anticipatory affect

Abstract

Pre-experiencing is the future-directed equivalent of re-experiencing. The present study aims to investigate whether there are differences in how people with dysphoria think about the future in terms of cognitive feelings, that is, autonoetic consciousness, and emotional feelings. A sample of 54 undergraduate students (dysphoric mood n =25; non-dysphoric controls n=29) participated in a future-directed Autobiographical Interview, where they were presented with positively and negatively valenced single word cues to which they described related possible future events they could be involved in, either within the next few months or next five years. Following each cue word, the quality of the cognitive representations of events were measured in two ways – by rating the phenomenological characteristics of the event they described and by coding the events for the number of episodic (internal) details, with a higher internal score indicating a richer description of the event. Emotional responses to thinking about future events were measured using an 'in-the-moment' affect measure on four mood states (happy, relaxed, anxious and sad) and ratings on intensity of positive and negative emotions.

Results indicated that there were no differences in the *qualities* of cognitive representations people with dysphoria had about the future compared to controls, but they benefit less *emotionally*, that is, they have more negative and less positive anticipatory emotions. The theoretical implications of these findings are discussed, lending support for mood-state hypotheses suggesting mood states precede dysfunctional thinking, in comparison to more recent predominant cognitive models

which emphasise the powerful role cognition plays in affecting mood. This highlights implications for clinical practice, particularly the importance of eliciting emotional expression in therapy sessions, related to thinking about future goals, with engagement in problem solving and planning to subsequently reduce negative emotions about the future.

Key Words: Pre-experiencing, Future-Directed Thinking, Dysphoria, Depression, Anticipatory Emotions, Word Cueing, Future-Directed Autobiographical Interview, Phenomenological Characteristics

Introduction

Pre-experiencing: A definition and functional qualities

Pre-experiencing is the future-directed equivalent of re-experiencing. 'Pre-experiencing' as referred to in this study looks at one aspect of future-directed thinking (or prospection as it is sometimes referred to), which is how the person feels in the here-and-now whilst imagining a future event, whether positive or negative. There are other cognitive and motivational aspects of future-directed thinking, such as probability estimates, goal setting, planning, and so on, which are not in competition with the view being taken here, but rather describe different facets of future-thinking. In the general population, episodic future thinking (EFT), or prospection, which is thinking about potential personal future experiences, constitutes a substantial portion of cognitive activity.

There are two key processes involved in future-directed thinking that are central to the present study. As well as sensory-perceptual qualities, episodic future thoughts (EFT's) are accompanied by 'cognitive feelings' including autonoetic consciousness, or the sense of pre-experiencing the event in some way in the here and now (Rebetez, Barsics, Rochat, D'Argembeau, & Van der Linden, 2016). Cognitive representations of future events give the flavour of its vividness in imagination, the extent to which a person feels it is happening to them and the level of detail in the imagined event. The other aspect of future-directed thinking relevant to the present study is the emotional reaction to thinking about those future events. Barsics, Van der Linden & D'Argembeau (2016) distinguish between *anticipatory* and *anticipated* emotions. *Anticipatory* emotions are those experienced in the present in response to the prospect of future events, whilst *anticipated* emotions on the other hand, are

emotions that are expected to be experienced in the future, if and when the imagined events occur.

As mentioned previously, pre-experiencing influences one's beliefs about what might happen in the future and allows us to plan accordingly, which in turn influence one's decisions and actions, improving coping and goal-directed behaviour. For instance, Rebetez et al. (2016) found that when asking 103 undergraduate students to project themselves into possible future events and to rate the amount of sensory perceptual details and autonoetic consciousness associated with their representations, episodic future-thinking was associated with procrastination. The results suggested that procrastination is related to difficulties in simulating future events, as reflected by poor mental representations of imagined events (i.e., less vivid, with fewer details concerning places, people, and objects); and in particular with procrastination-related decision making abilities and procrastination-related motivational dispositions.

Schacter, Addis and Buckner (2007) propose the constructive episodic simulation hypothesis that posits that while imagining future events, individuals draw on episodic memory of experience, recombining and elaborating specific memory details that simulate possible happenings (King, MacDougall, Ferris, Herdman, & McKinnon 2011). If this is the case, then it is possible that people with mental disorders may experience differences in pre-experiencing or prospection, as they often tend to have more negative beliefs about the self, others and the world, often based on their past experiences.

Pre-experiencing and the valence of thoughts

If imagining the future as described above is constrained by past experiences amongst other factors, then factors that influence the qualitative aspects of memory, such as the valence of an event should also affect representations of future events. Some studies suggest that the positive or negative valence of information may indeed influence future-oriented thinking (D'Argembeau & Van der Linden, 2004). Studies have shown there are differences between past and future mental time travel with regard to the emotional content of events and the effects of emotion on the phenomenological characteristics of events. Future events generated by individuals tend to be more emotionally positive and idyllic than recollections of past events. Rasmussen and Berntsen (2013) asked 158 participants to remember one positive and one negative event from their past, and imagine a positive and negative event from their personal future, and events generated were then rated on their phenomenological characteristics, such as how vivid it was and how much they felt they travelled back or forward in time. Findings from Rasmussen and Berntsen (2013) indicated that positive events were more phenomenologically vivid than negative events, and this was more pronounced for future thoughts than past ones; thus supporting the idea that future mental time travel is biased by uncorrected positive illusions, but past mental time travel is constrained by the reality of events that have actually happened.

Additional evidence for distinguishing between past and future directed thinking in the context of valence comes from Newby-Clark and Ross (2003), who found that extremely positive events were described for both past and future events, but extremely negative events were only found in the past events condition. Furthermore, D'Argembeau and Van der Linden (2004) provided participants with

positive and negative cue words and asked them to retrieve recent and distant memories, as well as events that could happen in the close and distant future. They found that for both memories and future directed thought, close events compared to distant events, and positive as opposed to negative events, were rated as having more sensory details and a stronger feeling of being experienced when they were thought about. There are functional and adaptive consequences of picturing a more positive future. For instance, it may encourage an individual to seek out new opportunities despite the possible risks of failure or disappointment (Taylor & Brown, 1988).

The valence of future directed thinking has also been looked at in individuals with mood disorders, and show contrasting results in comparison to the evidence on more idyllic future representations. For example, MacLeod & Byrne (1996) provided anxious participants, mixed anxious and depressed participants, and controls with an adapted verbal fluency paradigm to examine the ease at which they could think of positive and negative future experiences. They found that control participants tended to generate more positive than negative experiences, whereas those with anxiety and depression showed greater anticipation of negative experiences and reduced anticipation of positive experiences. Anxious-only participants anticipated more future negative experiences. These findings have been consistently replicated (MacLeod, Tata, Kentish, Carroll & Hunter, 1997). Existing research has indicated that affect can be divided into two higher order dimensions – positive affect (PA) and negative affect (NA), which are orthogonal dimensions rather than uni-dimensional (MacLeod, Byrne & Valentine, 1996). It has been demonstrated that anxiety consists of high NA, whilst depression is made up of high NA and low PA. Expanding on this distinction, Stöber (2000) found that anxiety only was related to enhanced imagery for

future negative events whilst Vilhauer et al. (2012) highlighted that people with depression do not have greater negative views of the future than non-depressed people, but rather they produce fewer positive anticipations about the future.

Whilst several studies such as these described above have reported differences in the *quantity* of positive and negative future thoughts for people who are anxious and/or depressed or dysphoric, the *quality* of the thoughts and pre-experiencing of positive and negative future directed thinking in people with anxiety and/or depression has not been looked as extensively. The closest study to look at the *quality* of future directed thoughts in those with a depressive disorder is that by King, MacDougall et al. (2011). They expanded on the study by MacLeod et al. (1997) by using a future-directed Autobiographical Interview (AI; Levine, Svoboda, Hay, Wincour & Moscovitch, 2002), which distinguishes between the episodic and non-episodic details given by participants when describing a future event, in addition to the number of positive and negative events generated. They found that patients with highly recurrent Major Depressive Disorder (MDD) showed a selective deficit in the generation of episodic details (details referring to the main event, including happenings, people, time, place, sensory perceptions, thoughts, and emotions) concerning imagined future events; whilst the generation of non-episodic (semantic, not related to main event) details was not affected. However, in this study they did not ask participants to complete a measure looking at the phenomenological characteristics of the events generated, that is, the extent to which they felt they 'pre-experienced' the event they were describing.

The present study also uses the AI as a means of distinguishing between episodic and non-episodic details in events described as it encourages participants to

provide a richer description of the event they are imagining. This will be complimented by the addition of a second measure to assess cognitive representations of future events - an adapted version of the Phenomenological Characteristics Questionnaire (Lehner & D'Argembeau, 2016) which asks participants to rate aspects such as the extent to which they felt they 'pre-experienced' the event, how much they felt they travelled forward to the event and how vivid it was, in order to get a sense of the 'here and now' experience.

Emotional responsiveness

As mentioned previously, pre-experiencing has both a cognitive element of the quality of the representation about the future and an affective aspect of how the person feels in-the-moment when thinking about the future. There is a substantial literature on how people respond emotionally to events *as* they occur, but little on how people *anticipate* such events.

Moods and emotions can be considered distinct from one another. Moods can be considered as diffuse, slow-moving feeling states weakly tied to specific environmental stimuli (Watson, 2000), whilst emotions are faster-moving reactions when a meaningful stimulus such as a threatening object is encountered (Bylsma, Morris & Rottenberg, 2008). Moods alter the probability of having specific emotions. Emotional reactivity is therefore multicomponential and will involve several response systems including perception, feelings, expressive behaviour and physiology; and moods are thought to potentiate like-valenced or matching emotions (Bylsma et al., 2008).

In their review on emotional reactivity in Major Depressive Disorder (MDD), Bylsma et al., (2008) highlight three views regarding how MDD might alter emotional reactivity *as events occur*, based on Rottenberg, Gross and Gotlib's (2004) theory. The negative potentiation hypothesis proposes that depressed individuals will exhibit potentiated, or heightened, emotional reactivity to negative emotional stimuli. This view is based on the work of Beck (1967) where it has long been suggested that depressed individuals show pervasive negativity of thought and affect when thinking about the self, world and future, and how negative mood states prime negative cognitive structures which precipitate negative emotions when negative stimuli are encountered, making them mutually reinforcing. The second hypothesis is positive attenuation, where depressed individuals' low positive mood, (as demonstrated in typical symptoms such as anhedonia, fatigue, apathy and behavioural inactivity) is an indicator that they are likely to show attenuated, or reduced, emotional reactivity to positive emotional stimuli. Finally, the third hypothesis proposed by Rottenberg et al., (2004) is the emotion context insensitivity (ECI) hypothesis. This takes a more global view of emotional reactivity in depression, suggesting that such individuals will exhibit diminished reactivity to all stimuli, regardless of valence. The basis of this hypothesis comes from the perspective that depression is characterised by disengagement with one's environment, which from an evolutionary perspective may prevent irresponsible actions (Nesse, 2000). Rottenberg et al., (2005) argue that compelling evidence for the ECI hypothesis comes from studies looking at how people react when viewing affective pictures, with depressed participants showing less affective modulation. Furthermore, when reviewing the findings on these three hypotheses in MDD, Bylsma et al., (2008) commented that although the findings are somewhat mixed, there is more support for the idea that depression is related to

reductions in both positive and negative emotional reactivity to events occurring but with a greater reduction in positive emotional reactivity.

Theoretical and clinical relevance

The findings outlined above offer the closest parallel for a framework within to which to make predications in the current study, which will aim to understand how people respond to emotional stimuli that they *anticipate* as opposed to events they have already experienced. Addressing this gap in the literature is clinically relevant, as when prospection goes awry, it negatively influences emotion and behaviour as well as other aspects of cognition (Roepke & Seligman, 2016). In fact, Roepke & Seligman (2016) argue that depression is in fact the consequence of faulty prospection. Understanding more about prospection and pre-experiencing in anxiety and depression and the related here and now emotional response may highlight barriers that could impact upon the success of therapeutic outcomes. When simulating possible futures, people pre-experience possible consequences of these futures in real time; feeling anxiety, joy, or sadness depending on the nature of their simulations and when functioning normally, pre-experiencing likely facilitates better decision-making by helping people plan, self-regulate and problem solve (Roepke & Seligman, 2016).

Evidence suggests that retrieving and simulating positive events can be useful in terms of repairing low mood and challenging negative perceptions that an individual may hold about themselves, their personal history and what the future may hold (Anderson et al., 2016). In line with this, evidence has also demonstrated how college students who simulated details and emotions associated with an ongoing stressful event reported using more effective coping strategies one week later compared with control groups (Taylor et al., 1998). In a similar vein, a study by

Brown, MacLeod, Tata and Goddard (2002) found that those pregnant women who were asked to simulate going into labour who experienced more detailed and coherent simulations, reported a higher subjective probability of a positive outcome related to the future event. Such findings can be considered in the context of the positivity bias mentioned previously, whereby when it comes to predicting what may happen in the future, humans tend to overestimate the likelihood of positive events, and underestimate the likelihood of negative event. Given the theme underlying these findings, it follows on that understanding more about the quality of future thoughts in those with elevated depression or dysphoria and how such thoughts make people feel has adaptive value. The potential application of positive future simulations may change the way people with depression not only think about the future, but also shape their sense of self and identity via the act of projecting oneself into meaningful future events, such as scenarios related to significant themes and concerns in one's life (Schacter, 2012).

With the negative cognitions that occur in anxiety and depressed mood, it can also be less disheartening to think things could change in the future – so focusing on dysfunctional beliefs about the future could foster greater resilience and coping. Cognitive Behaviour Therapy already targets prospection – (e.g. goal setting and behavioural activation). However, if the client is experiencing reduced emotional reactivity to future events, motivation to engage in goal directed behaviour is likely to be reduced. Thoughts about the future could be targeted and biases corrected through identifying imagery related to the thought.

The present study

Overview

Fifty-four undergraduate students were given cue words and asked to imagine and describe specific events in the future that the word makes them think of. Cognitive representations of future events were assessed by the future directed AI, which scores the number of episodic details in each description, and via ratings of various phenomenological characteristics of each imagined event as they experienced it. Emotional reactions to thinking about future events was measured using in-the-moment- affect ratings (both at baseline and after cues) on happy, relaxed, anxious and sad mood states and also via two questions on the phenomenal characteristics questionnaire asking for a rating on anticipated emotions (those expected to feel if the events occurred) and intensity of anticipatory emotions felt in the here and now. Finally, Participants also completed measures of depression and anxiety. Two groups - dysphoric and non-dysphoric were created based on scores on this depression measure.[1]

Hypotheses

The possible hypotheses put forward in this study on dysphoric participants are based on existing literature on the emotional experience of remembered and present events in those with depression outlined above, but there are no strong grounds for selecting between them given the novel aspect of this study:

[1] It is important to highlight that the 'dysphoric' group in the present study cannot be classed as clinically depressed. Previous research has indicated that depression in college students is an appropriate analogue for depression in clinical patients, evidenced by similar findings when comparing results of studies using student samples with those using clinical samples (Hill, Kemp-Wheeler & Jones, 1987; Vredenburg, Flett & Krames, 1993).

Hypothesis 1: Participants in the dysphoric group may score lower on measures of the quality of future thoughts than controls in response to *all* cues regardless of valence.

Hypothesis 2: Participants in the dysphoric group will show reduced emotional reactivity to *all* cues (regardless of valence) in line with the emotion context insensitivity (ECI) hypothesis in comparison to the control group.

Hypothesis 3: For positive cues, participants in the dysphoric group may score lower on measures of quality of future thoughts than the control group, in line with the positive attenuation hypothesis.

Hypothesis 4: For positive cues, participants in the dysphoric group will show reduced emotional reactivity in comparison to the control group, in line with the positive attenuation hypothesis.

Hypothesis 5: For negative cues, in comparison to the control group participants in the dysphoric group may show elevated emotional reactivity, that is, low mood will be associated with negative potentiation.

Hypothesis 6: For negative cues, participants in the dysphoric group may show greater quality of future thought in comparison to the control group, that is, low mood will be associated with negative potentiation.

Method

Design

The study employed a 2 (Group: Dysphoric, Control) x 2 (Cue Valence: Positive, Negative) mixed model design to investigate whether there are differences between the dysphoric group compared to controls on the Phenomenological Characteristics Questionnaire and future directed Autobiographical Interview for positive and negative events in the next few weeks and next few years.

Participants

A sample of University students was recruited (N = 54, 93% female, age range 18-44). Participants were grouped into dysphoric and non-dysphoric controls according to their scores on a depression measure.

Participants were students at RHUL, a minimum age of 18, and have a good understanding of written and spoken English. There were no other exclusion criteria. Of the 54 who attended their allocated time slot, all were suitable to participate. Recruitment and data collection took place over a three-month period (November 2017 to January 2018).

Power Analysis

Power analysis indicated that a required total sample size of 52 (26 in each group) is needed to achieve a large effect size, holding alpha at 0.05 with a power of .80 for comparisons between the dysphoric and control group. A large effect size is practically feasible and is the standard used in similar studies (Bylsma, Morris & Rottenberg, 2008).

Recruitment

Fifty participants were recruited from the RHUL Credit Pool. The study was advertised on the RHUL Experiment Management System where students who are interested sign up to an available time slot in exchange for course credits. Once they had signed up, each participant was emailed a Participant Information Sheet (Appendix 4) which provided more detail on the study and what they should expect if they participate. The remaining participants were recruited via advertisement posters put up around the RHUL campus. Only nine people responded to these posters. Once these participants expressed an interest in participating by emailing the researcher, they were sent the Participant Information Sheet for more information, and offered time slots if they were still interested in taking part. Four participants were eventually recruited from campus advertisements. A prize draw for participants recruited from campus was offered (for one £40, two £20 and two £10 Amazon Vouchers).

Ethics

The study received ethical approval by the Royal Holloway University of London Research and Ethics Committee in October 2017 (Appendix 5).

Materials

All measures below (with the exception of the AI Coding and Scoring) were embedded into an online questionnaire package designed by the researcher.

Demographics

All participants were asked to give demographic information on gender, age range and educational level at the start of the study, using a tick box questionnaire.

Depression and anxiety

The PHQ-9 (Kroenke, Spitzer & Williams, 2001; Appendix 6**)** is a self-report measure that establishes the severity of symptoms of depression, based on DSM-IV criteria for Major Depressive Disorder. This measure was selected for clinical usefulness in this analogue study. It is a measure typically used in clinical services and the same cut off scores were used to classify the two groups in this study as such services, thus the dysphoric group are participants who would typically be offered treatment for depression in clinical services. The internal reliability of the PHQ-9 is excellent, with a Cronbach's α of 0.89 in a study on primary care clients and 0.86 in a study in a different population (gynaecological). In terms of validity, ROC analysis showed that the area under the curve for the PHQ-9 in diagnosing major depression was 0.95, suggesting a test that discriminates well between persons with and without major depression. Construct validity was established by the strong association between PHQ-9 scores and functional status, disability days, and symptom-related difficulty. External validity was achieved by replicating the findings from the 3,000 primary care patients in a second sample of 3,000 obstetrics-gynaecology patients. With regard to cut off points, <5 indicates absence of depression; 5-9 indicates subthreshold depression; 10-14 identifies spectrum of clinical patients; >15 indicates major depression. Cronbach's alpha was calculated for the PHQ-9 ($\alpha = .86$) indicating a high level of internal consistency for this scale in the present study.

The GAD-7 (Spitzer, Kroenke, Williams, & Lowe, 2006; Appendix 7) is another self-report measure and has been shown to be an excellent severity measure of anxiety, where the criteria are based on those in the DSM-IV for generalised anxiety disorder. The internal consistency of the GAD-7 has been shown to be

excellent (Cronbach α=.92). Test-retest reliability is also good (intraclass correlation=0.83). Comparison of scores derived from the self-report scales with those derived from the mental health professional administered versions of the same scales yielded similar results (intraclass correlation=0.83), indicating good procedural validity. In terms of construct validity, a strong association has been found between increasing GAD-7 severity scores and worsening function on functional status, disability and other general health scales. With regard to symptom severity, cut off points of 5, 10, and 15 represent mild, moderate, and severe levels of anxiety.

In-the-moment affect

An additional measure was devised to capture participants' current or 'in the moment' mood ratings (Appendix 8) on four emotional states - happy, relaxed, anxious and sad, using a 7-point Likert Scale (1=not at all; 7=completely). These four mood states were chosen based on the circumplex model of affect (Russell, 1980). *Happy* represents active (or high arousal) pleasant emotion, *anxious* a high arousal unpleasant emotion, *relaxed* a low arousal pleasant emotion, and *sadness* a low activation unpleasant emotion.

Autobiographical Interview (AI) – Future Version (Addis, Wong, & Schacter, 2008)

The Future-Directed AI elicits descriptions of specific events which may occur in the participant's personal future (i.e., simulations). It has been used in several studies looking at future directed thinking with people with emotional disorders (Brown et al., 2013; King, Williams et al., 2011; King, MacDougall et al., 2011; Parlar et al., 2016). The administration of the AI followed the adapted manual

provided by Levine et al. (2002), but the references and instructions to past focused events were removed.

Cue words were selected from the Affective Norms for English Words (ANEW) database (Bradley & Lang, 1999). Using a graph presented with the database of valence means for each word, eight words that scored above the midline (score of 5 or above indicates positive valence) or below the midline (score of below 5 indicates negative valenced) were randomly selected. Each cue word had a time frame (next few weeks or next few years) presented alongside it. In total, there were eight cue words, which were divided into four blocks of two cues – two positively valenced cue words for the next few weeks (win, compliment) and for the next few years (gift, success); two negatively valenced cue words for the next few weeks (danger, mistake) and for the next few years (traitor, injury) (Appendix 9). For each word participants were asked to verbally describe a specific event that could realistically happen to them in the given time frame. They were given up to three minutes to describe the event in as much detail as possible. The interview was audio-recorded for later transcription and subsequent coding. The researcher was able to prompt the participant if the description needs to be more specific, or to ask for clarification on certain details.

Autobiographical Interview Scoring and Coding (Addis et al., 2008)

A Manual was obtained from Levine et al., (2002), which provides guidelines on categorizing responses as internal or external, and rules regarding segmentation of responses. Following transcription of the participants' responses to the AI, the scorer (main researcher) isolated or defined the main event, then segmented the entire response into individual idea units (details). These individual units are then coded and

internal or external. Internal details include event, place and time details, as well as perceptual and emotional/thought details. External details are semantic details of general knowledge/fact, repetition of prior information and other details such as meta-cognitive statements and inferences. The number of internal and external details are then tallied for each event and then the totals averaged across the events in each of the four conditions (the greater the number of internal details provided, the richer the pre-experiencing of the event). This measure tends to have high interrater reliability of the composite scores assessed by intraclass correlation (coefficients for internal and external detail composites in the original study by Levine et al., 2002 were 0.88 and 0.96 respectively for recall; and .96 and .92 respectively for Addis et al., 2008 in their future thoughts version). A proportion of the coding in the present study (283 segments of information) were blind rated by a second rater after a process of calibration of scoring rules, and achieved good level of agreement ($\kappa = .84$).

Adapted version of the Phenomenological Characteristics Questionnaire (PCQ, Lehner & D'Argembeau, 2016)

The PCQ- Future Version (Appendix 10) aims to measure participants' personal experience of the event they imagine, and quality of their experience. Specific questions relevant to the present study needs were selected from the pool of PCQ items. Each question was rated on a 7-point Likert Scale (1=not at all; 7=completely), and were as follows: When imagining the event, I feel I am experiencing it; I feel I travelled forward to the time when it happened; the event was vivid; the event was difficult to imagine. Two questions referred to the emotional experience of future thinking, specifically: I feel the emotions I would feel if the event

occurred; and the emotions I have when I think about the event were extremely positive to extremely negative.

Various versions of this scale have commonly been used in research examining the quality of memories and adapted for prospection/future directed thinking (D'Argembeau & Van Der Linden, 2004, 2006 & 2012; Arnold, McDermott & Szpunar, 2011; Lehner & D'Argembeau, 2016). It is most common for the items on this scale to be looked at as individual items, but in a larger version of the PCQ containing more questions, D'Argembeau and Van der Linden (2012) report good internal reliability ($\alpha = .82$) when combined properties of sensory-perceptual qualities of future thoughts are looked at.

Verbal Fluency Task (FAS)

The FAS task (Appendix 11), which is a test of phonemic verbal fluency, was included as a control task in this study, in order to control for possible effects of general verbal fluency when analysing coded descriptions given in the AI. Verbal fluency tasks are often included in neuropsychological assessment, in clinical practice, and in research given their face validity as tests of both verbal ability and executive control, thus making them an effective screening instrument of general verbal functioning (Shao, Janse, Visser & Meyer, 2014). Participants were given one minute to generate as many unique words as they could that began with each of three letters (F, A and S respectively). The total number of correct words comprises the overall score. The participants were informed that the words should not include names of people or places, numbers or sequences involving the same word (for example, give and given).

Piloting

Before recruitment for this study took place, a small pilot was carried out, with the aims of:

1. Determining whether the online questionnaire package was adequately presented and easy to follow visually and technologically
2. Determining whether the procedural instructions were adequate and clear
3. Estimating the time required for the full procedure to be carried out
4. Gathering feedback on participant experience of engaging in the study procedure

A small group of 5 doctoral students at RHUL took part in this pilot study, and completed a brief interview with the researcher to gather feedback on the above questions. A full list of feedback is provided in Appendix 12. The general feedback indicated that the online package was adequately presented, however two of five of these students suggested the text could be larger, especially for the cue words, and a label stating 'next page' should be added to the buttons to proceed at the bottom of the screen. Feedback related to the instructions suggested that it was not clear enough that the event should be completely new and not related to something that has happened before. Therefore, "think of a novel event" was replaced with the following instruction "instead of remembering things that have happened to you before, I want you to create or imagine or invent a scenario that hasn't happened to you before. That way, we can see how your mind is able to project into the future about things you haven't yet experienced."

The pilot identified that the full procedure including completion of all measures took a minimum of 35 minutes and a maximum of 55 minutes for the small

group upon which it was piloted. The overall comments on the experience of participating in the study was that although it was hard to generate novel events on the spot, it was enjoyable and did not feel distressing in any way.

Procedure

Participants completed the study on a computer screen in an office in the psychology department at RHUL. The researcher was present in the room throughout to clarify instructions, audio-record answers to each cue word in the AI and administer the verbal fluency task. The first set of questions obtained informed consent (Appendix 13), and were followed by questions on demographic information and a current mood rating on the four emotional states.

Following this, verbal instructions for the AI were read out to the participants by the researcher, as well as displayed on the screen in front of them. The instructions were as follows:

"I want you to think about a single event that might happen on a particular day in the future, but here instead of remembering things that have happened to you before, I you want to create or imagine or invent a scenario that hasn't happened to you before. That way, we can see how your mind is able to project into the future about things you haven't yet experienced. When creating these future scenarios, you can be creative, but you cannot be totally unrealistic, so you can't tell me about going to the moon, for example. So you want to think about scenarios which are plausible given your plans and thoughts about the future. For all these events, you will be given three minutes to tell me as much detail as you can about them. So remember, you can tell me everything you can imagine about the event, that particular day, what you are

doing, thinking or feeling. We are not so much interested in which events you choose to describe, but how much detail you can recall or imagine when you describe them. It doesn't matter whether the event is important or trivial, as long as it is an event which is specific in time and place, and was one that you are personally involved in (so not something someone else told you about). I will be guiding you to help make sure you come up with a specific event, so I may be interrupting you at some points. And when I say stop we will move on to the next part."

Once it was clarified that participants understood the instructions, two practice trials were completed using neutral cue words; and then the first positive or negative cue word in the AI was presented on the screen. Three minutes was timed on a stop watch, and if participants stopped talking sooner than three minutes, the researcher asked for clarification as to whether any more detail could be provided before stopping the time prematurely. After each event description for each cue word, participants were presented with the PCQ before moving on to the next cue word.

The four blocks (short term positive and negative, long term positive and negative) were presented to participants in four different versions to partially control for order effects. In between each block, participants were again presented with the rating questions for an 'in the moment' snapshot of where they were on the four mood states. An additional ninth positive cue word was included for all participants, to offset the effects of ending on a negative event description. The responses to this cue word were not included in any analyses.

Once all nine cue words had been presented and events described, the participants were presented with the PHQ-9 and GAD-7 questionnaires on screen. The completion of these measures indicated the end of their participation and they were

provided with a debrief sheet which included details on two organisations they could contact for support (Appendix 14) and given the opportunity to ask any questions. They were asked to contact the researcher if they would like to be sent an update on the outcome of the study via email and thanked for their participation.

Results

This section will begin by results from matching of the two groups in terms of demographics and depression scores. A series of 2 (Group: dysphoric vs control) x 2 (Valence: positive vs negative) x 2 (temporal distance) ANOVA's were conducted to explore differences between the two groups and their responses to each of the 6 questions on the Phenomenological Characteristics Questionnaires, which will be presented and discussed individually. Following this, results from a 2 (Group: dysphoric vs control) x 2 (Valence: positive vs negative) x 2 (temporal distance) x 2 (Type: internal vs external) ANOVA conducted to look at the group differences between the amount of internal and external details provided on the Autobiographical Interview for short term and long term, positive and negative cues will be presented. Finally, the group differences on the in-the-moment affect measures following each set of cue words will be presented. The results will focus mainly on the observed differences between the dysphoric and control groups, as these are the findings of interest pertinent to the aims of the study, but for completeness any additional results that were significant will also be reported. All data were analysed using The Statistical Package for Social Sciences (SPSS) Version 21.0.

Preliminary Data Analysis

All data were checked to ensure there are no missing data and values had been inputted correctly. There were no missing data, so the analyses presented in this chapter are based on totals.

Normality of Data

The distribution for each variable in the analyses was examined in the four separate blocks of short term positive, short term negative, long term positive and long term negative cues. Skew and kurtosis were calculated for each. The majority were in the normal range ($z < 2.58$, $p < .01$, Field, 2011). However, for all four blocks, the AI variables were positively skewed. For the short term and long term positive blocks, and the long term negative block, both the internal and external detail variables were skewed (short term $z = 3.43$, $z = 2.92$; long term positive $z = 3.12$, $z = 2.67$, long term negative $z = 3.58$, $z = 3.46$, for internal and external details respectively). For the short term negative block, the external details variable was skewed ($z = 2.97$). Examination of boxplots indicated that there were three participants who could be considered as outliers, defined by their scores being more than three standard deviations above the mean of that variable. Given that removing these three participants' data would mean a loss of power, it was decided that manually Winsorizing the scores would be more appropriate. Therefore, the three participants' values on these variables were changed to be closer to other values in the data set, whilst altering the lower end of the cut-off point (three standard deviations below the mean) to compensate for this change. The data for PCQ Question 5 in the short term negative block was also significantly positively skewed ($z = 4.00$), but there were no outliers upon examining the data. A square root transformation was carried out on all the PCQ5 scores which resulted in them being all normally distributed.

Group Characteristics

The groups were created based on their scores on the PHQ-9, following the recommended cut-off scores (Kroenke et al., 2001). A score of 10 or more indicated the presence of depressive symptomology, and therefore participants scoring at or above this score were allocated to the dysphoric group for analyses (n = 25, *M* = 15.36, *SD* = 4.56), and a score of 9 or less defined participants in the control group (n = 29, *M* = 5.59, *SD* = 2.58). As expected, there was a high level of overlap between depression and anxiety, with the dysphoric group reporting significantly higher levels of anxiety on the GAD-7 (*M* =11.44, *SD* = 4.76; Control *M* = 5.10, *SD* = 3.34, t(52) = 5.72, p <.001).

The majority of the sample were in the 18-24 age range. For the dysphoric group, 96% were in this age bracket (n = 24) and 90% for the control group (n = 26). One person in the dysphoric group was in the 25-34 age bracket, compared to two people in the control group. One person in the control group was in the 35-44 age group. A chi squared analysis indicated there were no significant differences between the groups on age (χ^2 (2) = 1.12, p = .570).

The sample was 93% female. The dysphoric group had 23 females, 1 male, and 1 person who identified as transgender. The control group had 27 females and 2 males. There were no significant differences between the groups on gender (t(52) = -.927, p = .358).

Table 4 presents the ethnic backgrounds of the sample. A chi-Squared analysis was conducted to determine if there were significant differences between the groups. For this, different ethnicities were grouped into three categories, based on the makeup

of the sample. These categories were White English, White Other and Other. There were no significant difference between the groups (χ^2 (2) = .349, p = .840).

The majority of the sample had achieved education up to A Level qualification. Table 5 presents the educational background for each group. A chi-Squared analysis indicated that there were no significant differences between the groups in terms of educational level (χ^2 (3) = .052, p = .997).

Table 4
Ethnicity of Groups

	Dysphoric Group n (%)	**Control Group n (%)**
White English	10 (40)	13 (45)
White Other	7 (28)	8 (28)
Asian Indian	3 (12)	2 (7)
Asian Pakistani	2 (8)	1 (3)
Mixed Other	1 (4)	2 (7)
Chinese	1 (4)	0
Arab	1 (4)	0
Asian Bangladeshi	0	1 (3)
Asian Other	0	1 (3)
Other	0	1 (3)

Table 5
Educational Background of groups

	Dysphoric Group n (%)	**Control Group n (%)**
GCSE	1 (4)	1 (3)
A Level	21 (84)	25 (86)
Bachelors Degree	2 (8)	0
Other	0	3 (10)
Did not disclose	1 (4)	0

An independent t-test was used to compare the verbal fluency scores of the dysphoric group (M = 37.20, SD = 10.38) and controls (M = 37.10, SD = 6.91). There were no significant differences between the groups (t(52) = -.041, p = .968).

Table 6 presents the means and standard deviations for each group on the baseline in-the-moment affect measures. Separate variance estimates were used since homogeneity of variance assumptions were not met for the happy, anxious and sad mood states. There were significant differences between the two groups on their baseline levels of happiness (t(42) = 2.79, p = .008), with the dysphoric group feeling less happy. There were also significant differences between the two groups on levels of feeling relaxed (t(52) = 3.05, p = .004) with the dysphoric group reported themselves as less relaxed. The dysphoric group also reported themselves as significantly more anxious (t(44) = 3.69, p = .001). However the differences between the dysphoric and non-dysphoric groups on their ratings of baseline sadness failed to reach significance (t(35) = 1.92, p = .063).

Table 6

Means and Standard Deviations between groups for each In-The-Moment Affect Rating

Mood State	Dysphoric Group M (SD)	Non-Dysphoric Group M (SD)
Happy	4.36 (1.38)	5.28 (0.96)
Relaxed	4.16 (1.43)	5.21 (1.08)
Anxious	3.40 (1.44)	2.10 (1.08)
Sad	2.20 (1.68)	1.48 (0.87)

Note: M = Mean; SD = Standard Deviation

Phenomenological Characteristics of Future Thoughts

Each item on the PCQ was treated independently for purpose of analyses. Table 7 provides the descriptive statistics for each group on each item, separated by temporal distance and valence of cue words. Six 2 (Group: dysphoric vs control) x 2 (Valence: positive vs negative) x 2 (temporal distance) ANOVA'S were carried out to determine if there were any significant differences between the groups' ratings.

PCQ Question 1 - "When imagining the event, I feel as though I am experiencing it"

There was no significant main effect of Group ($F < 1$), no Group x Valence ($F < 1$) or Group x Temporal Distance ($F < 1$) interaction and no three-way interaction ($F(1,52) = 1.81$, $p = .184$).

Table 7
Means and Standard Deviations between groups for each PCQ Item

PCQ Item		Short Term M (SD)		Long Term M (SD)	
		Positive	**Negative**	**Positive**	**Negative**
1	Dysphoric	4.54 (1.52)	4.68 (1.65)	4.56 (1.55)	4.46 (1.57)
	Control	4.72 (1.37)	5.01 (1.31)	4.84 (1.50)	4.27 (1.14)
2	Dysphoric	4.46 (1.45)	4.66 (1.60)	4.54 (1.61)	4.28 (1.67)
	Control	4.37 (1.64)	4.63 (1.60)	4.63 (1.54)	3.89 (1.19)
3	Dysphoric	4.50 (1.25)	4.52 (1.59)	4.30 (1.67)	4.52 (1.57)
	Control	4.58 (1.46)	4.65 (1.51)	4.58 (1.68)	4.24 (1.64)
4	Dysphoric	4.40 (1.35)	4.70 (1.37)	4.34 (1.59)	4.02 (1.66)
	Control	4.39 (1.06)	4.65 (1.36)	4.37 (1.50)	4.17 (1.25)
5	Dysphoric	3.22 (1.43)	2.78 (1.64)	2.80 (1.18)	3.08 (1.32)
	Control	2.50 (1.34)	2.31 (1.56)	2.62 (1.55)	2.96 (1.30)
6	Dysphoric	4.72 (1.39)	2.30 (0.92)	5.20 (1.13)	2.24 (0.85)
	Control	5.65 (1.04)	2.75 (0.91)	5.96 (1.03)	2.77 (1.07)

Note: M = Mean; SD = Standard Deviation

PCQ Question 2 – "When imaging the event, I feel that I travel forward to the time when it would happen"

There was no significant main effect of Group ($F < 1$), no Group x Valence ($F(1,52) = 1.32$, $p = .254$) or Group x Temporal Distance ($F < 1$) interaction. There was also no significant three-way interaction ($F(1,52) = 1.01$, $p = .321$).

PCQ Question 3 – "When imagining the event, I feel the emotions I would feel if the event occurred"

There was no significant main effect for Group ($F < 1$), Group x Valence ($F(1,52) = 1.21$, $p = .275$), or Group x Temporal Distance ($F < 1$) interactions. There was also no significant three-way interaction ($F(1,52) = 1.74$, $p = .193$).

PCQ Question 4 – "The event was vivid"

There was no significant main effect for Group ($F < 1$), and no significant Group x Valence interaction ($F < 1$). There was no significant interaction for Group x Temporal Distance either ($F < 1$). There was a significant effect for Temporal Distance ($F(1,52) = 5.42$, $p = .024$) indicating that participants felt that shorter term events were more vivid than long term events.

PCQ Question 5 – "The event was difficult to imagine"

There was no significant main effect of group ($F(1,52) = 1.84$, $p = .181$). There was no Group x Valence ($F < 1$) or Group x Temporal Distance ($F(1,52) = 2.19$, $p = .145$) or three way interaction ($F < 1$).

PCQ Question 6 – Emotions when thinking about the event

For PCQ6, there was a significant main effect of group ($F(1,52) = 16.46$, $p = < .001$, $n^2_p = .24$), with dysphoric participants experiencing more negative emotions than controls when thinking about the future events. There was also a significant effect for valence ($F(1,52) = 331.15$, $p = <.001$, $n^2_p = .86$), indicating, as would be expected, that participants' emotions felt when imagining future events were more negative in response to the negative cues, and more positive in response to the positive cues. No other effects were significant (Group x Valence ($F(1,52) = 1.26$, $p =$

.268), Group x Temporal Distance (F < 1) and Group x Valence x Temporal Distance (F < 1).

Future Directed Autobiographical Interview

Table 8 presents the descriptive statistics for the groups on the AI. There was no significant main effect of Group (F < 1), or Group x Valence x Type (F < 1) and Group x Temporal Distance x Type (F < 1) interactions. There was also no significant interaction between Group x Valence x Temporal Distance x Type (F(1,52) = 2.01, p = .163). There was a significant effect for Valence (F(1,52) = 13.01, p = .001) indicating that participants gave significantly more detail in general (internal and external) for negative cues. A significant interaction between Valence x Type was also found (F(1,52) = 11.08, p = .002). Post hoc t-tests indicated there was significantly more episodic (internal) detail provided for negative cues than for positive cues (t(215) = 3.86, p <.001).

Table 8
Means between groups for internal and external details on the AI

AI		Short Term M (SD)		Long Term M (SD)	
		Positive	**Negative**	**Positive**	**Negative**
Internal	Dysphoric	26.76 (10.48)	31.92 (12.98)	27.40 (12.76)	28.00 (9.45)
	Control	27.46 (11.58)	35.01 (14.34)	29.84 (14.47)	31.36 (15.14)
External	Dysphoric	14.90 (9.98)	16.40 (8.89)	16.44 (7.76)	13.96 (7.49)
	Control	16.20 (9.09)	14.48 (8.76)	16.27 (7.14)	16.75 (8.46)

Note: M = Mean; SD = Standard Deviation

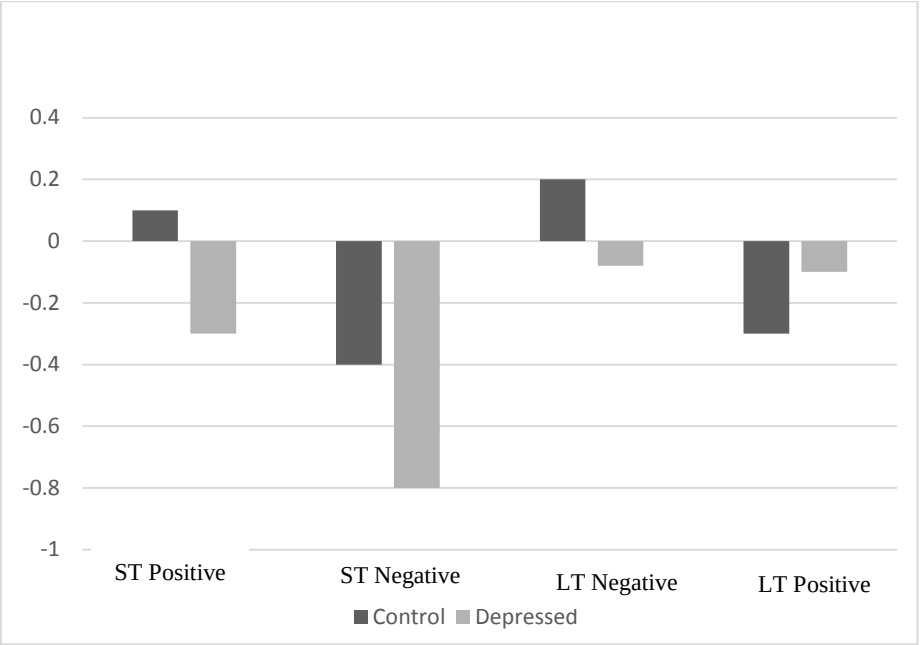
Mood Ratings

Table 9 presents the descriptive statistics for both groups on each of the four mood states collected after each block. 2 x 2 x 2 ANCOVAS, covarying the relevant baseline scores, were conducted to explore differences between the two groups on here and now mood ratings following each block of cues. The means have been adjusted to account for baseline mood.

Happy

There was a significant main effect of Group ($F(1,51) = 16.29$, $p = < .001$, $n^2_p = .24$), because participants in the dysphoric group felt less happy ($M = 3.78$, $SD = 0.45$) than the control group ($M = 5.17$, $SD = 0.33$) after describing future events, after controlling for any initial variations in baseline happiness. Figure 2 illustrates this effect visually by showing the change scores for the happiness mood state in each of the four blocks. The dysphoric group presented as less happy after all of the blocks. There was no interaction for Group x Valence ($F < 1$) or Group x Temporal Distance ($F < 1$) or a three way interaction between Group x Temporal Distance x Valence ($F < 1$). There was an effect for valence ($F(1,51) = 6.60$, $p = .013$) indicating that participants rated themselves as significantly happier after positive cues than negative cues.

Figure 2: Change Scores for Happy Mood Rating



Relaxed

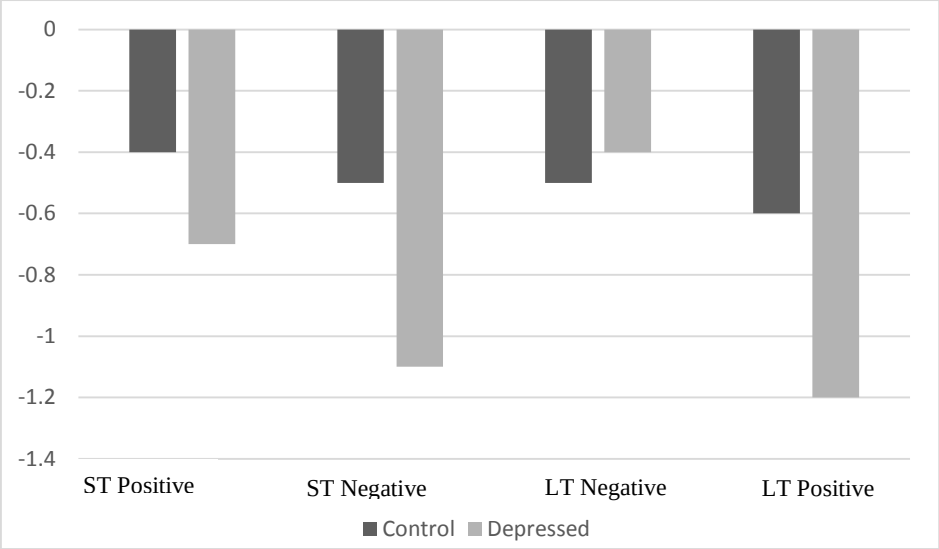
There was a significant main effect for Group ($F(1,51) = 9.00$, $p = .004$, $n^2_p = .15$), indicating participants in the dysphoric group rated themselves as less relaxed ($M = 3.30$, $SD = 0.42$) after future event descriptions compared to those in the control group ($M = 4.69$, $SD = 0.05$) after controlling for any initial variations in baseline levels of relaxation. To illustrate this, Figure 3 shows the change scores for the relaxed mood state in each group for each condition. There was no significant Group x Valence interaction ($F(1,51) = 3.84$, $p = .055$) or Group x Temporal Distance interaction ($F < 1$) or three way Group x Valence x Temporal Distance interaction ($F(1, 51) = .290$, $p = .593$).

Table 9
Means and Standard Deviations for each mood state

Mood State	Short Term Positive M (SD)		Short Term Negative M (SD)		Long Term positive M (SD)		Long Term Negative M (SD)	
	Dysphoric	Control	Dysphoric	Control	Dysphoric	Control	Dysphoric	Control
Happy	4.04 (1.24)	5.38 (1.14)	3.48 (1.26)	4.86 (1.09)	4.28 (1.48)	5.52 (.87)	3.32 (1.28)	4.93 (1.13)
Relaxed	3.48 (1.44)	4.76 (1.27)	3.04 (1.51)	4.69 (1.46)	3.80 (1.41)	4.69 (1.44)	2.88 (1.39)	4.62 (1.56)
Anxious	3.68 (1.70)	2.10 (1.34)	3.84 (1.79)	2.38 (1.56)	3.48 (1.32)	2.07 (1.51)	4.12 (1.61)	2.17 (1.51)
Sad	1.92 (1.47)	1.41 (.98)	2.20 (1.70)	1.45 (.87)	1.76 (1.16)	1.41 (1.08)	2.32 (1.57)	1.38 (.77)

Note: M = Mean; SD = Standard Deviation

Figure 3: Change Scores for Relaxed Mood Rating



Anxious

There was a significant main effect for Group ($F(1,51) = 8.29$, $p = .006$, $n^2_p = .14$), indicating participants in the dysphoric group rated themselves as more anxious ($M = 3.78$, $SD = 0.27$) than controls ($M = 2.18$, $SD = 0.14$) after thinking about future events after controlling for any initial variations in baseline anxiety. The difference between the groups is demonstrated in Figure 4. There was no significant interaction between Group x Valence ($F < 1$) or Group x Temporal Distance ($F(1,51) = 2.79$, $p = .101$) or a three way Group x Temporal Distance x Valence interaction ($F(1,51) = 1.09$, $p = .301$). There was a significant effect for temporal distance ($F(1,51) = 4.72$, $p = .034$) indicating that participants rated themselves as more anxious after longer term cues (events in the next few years) than following short term cues (events in the next few weeks).

Sad

There was no significant main effect for Group ($F(1,51) = 1.01$, $p = .320$). There were also no significant interactions between Group and Valence ($F(1,51) = 2.05$, $p = .158$) or Group and Temporal Distance ($F < 1$). There was also no significant three way interaction between Group x Temporal Distance x Valence ($F < 1$). Figure 5 demonstrates the change scores for this mood rating.

Figure 4: Change Scores for Anxious Mood Rating

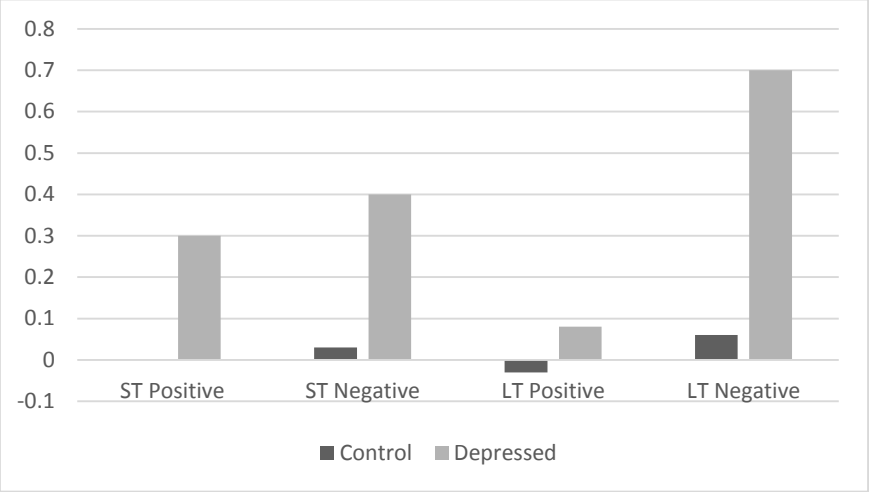
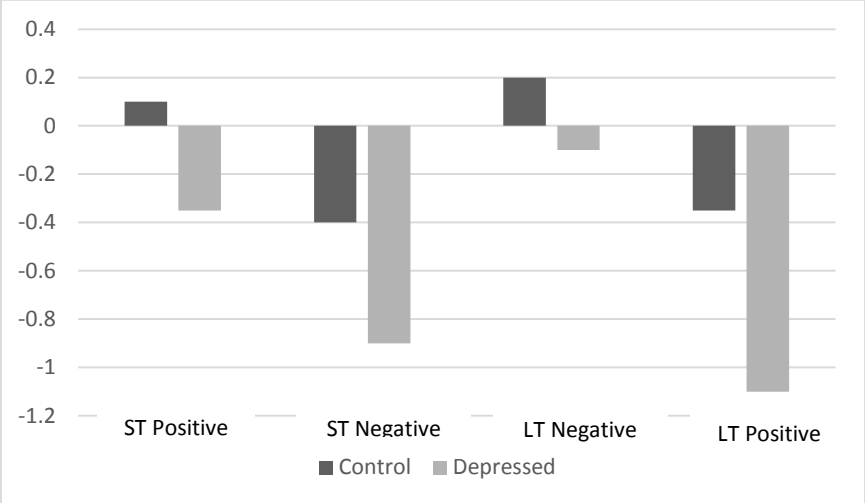


Figure 5: Change Scores for Sad Mood Rating



Discussion

The present study aimed to examine the here-and-now experience that arises when people with and without low mood contemplate future events, to understand how people respond to emotional stimuli that they anticipate as opposed to events they have already experienced or are currently experiencing. Whilst the findings of this study suggest there are no differences in the kinds of thoughts people with or without dysphoric mood have about the future, the emotions felt when thinking about anticipated events are different.

Cognitive representations of future events

Based on existing literature on the emotional experience of recalled past events or present events, it was suggested that participants with low mood may score lower on measures of the quality of future-directed thoughts than controls, in line with the emotional context insensitivity (ECI) hypothesis (Rottenberg et al., 2005; Bylsma et al., 2008). Results of the present study indicated that there were no significant differences in the quality of future thoughts between dysphoric and control participants, even when valence was taken into account. This was consistent across the two measures of quality of future thoughts - the future-directed AI looking at the amount of episodic detail provided in the event descriptions *and* the PCQ, which indicated there were no differences in the extent to which participants in each group felt they 'pre-experienced' the event, travelled forward to the time of the event or on how vivid and difficult the event was to imagine.

The finding above is in contrast to previous work by King, MacDougall et al., (2011) which found depressed participants to have deficits in generating specific episodic (internal) details when thinking about possible future events, when compared

to non-depressed controls. One possible reason for this disparity is that the depressed sample in King et al.'s study were clinically depressed, compared to the sample used in the present study where depression in university students was measured by a self-report measure only, and therefore considered as analogous to clinical depression. Although there is literature on how depression in university students is comparable to those in clinical populations (Vredenburg, Flett & Krames, 1993), it is likely that the depression symptomology in the present sample were less severe. There is also the possibility that the types of future events described by the student sample are very different to that of a general adult population. For example, the types of events described by the sample in this study were commonly centred on student-specific themes such as graduation, exams and meeting coursework deadlines, being away from family, and making friends. These kinds of events may be considered as generally quite anxiety provoking, as well as having a possible impact on mood. In line with this, there was such a high degree of overlap between depression and anxiety in this sample that it was not possible to partial out the effects of anxiety on the overall results, and so it cannot be ruled out that anxiety had an influence on the extent to which the events were pre-experienced, rather than depression.

Furthermore, the questions selected to assess pre-experiencing may have influenced the findings of this present study. The six questions were taken from previous studies looking at autonoetic consciousness (D'Argembeau & Van der Linden, 2004; 2006; Lehner & D'Argembeau, 2016), but typically these studies tend to use considerably longer measures of pre-experiencing phenomena. Longer measures of phenomenological characteristics assess specific sensory aspects such as sights, sounds, spatial arrangements of objects and people, and the visual perspective taken for the event (observer perspective or first person perspective). Longer versions

of the questionnaires also look at aspects such as clarity of time of day, clarity of the location and the personal importance of the events described. For the purpose of the present study a shorter version was selected due to the inclusion of two measures of pre-experiencing – through the phenomenal characteristics of descriptions as well as the level of episodic detail provided (AI). Similarly, given that the pre-experiencing questionnaires were given to each participant eight times, it is possible that responder fatigue may encourage participants to answer the Likert scale questions quickly and without much thought.

Although not pertinent to the research questions the present study did find that participants (irrespective of mood status) rated events that were temporally closer as more vivid. This finding replicates a finding by D'Argembeau and Van der Linden (2004) where people constructed more detailed representations when they thought that imagined events may happen in the near rather than distant future. Trope and Liberman (2003) offer a possible explanation for these findings, by suggesting that distant future events are more abstract, so people may have clearer representations of the kinds of events that may happen in the near future and already begun adapting their behaviour in order to achieve them. This could be the case for this particular sample, where events typically described such as meeting coursework deadlines and awaiting exam results were already likely to be underway.

Emotional reactions to thinking about future events

The second aim of the present study was to look at the emotional impact of thinking about the future. Hypotheses four and five suggested that those in the dysphoric group may show reduced emotional reactivity for positive cues, in line with the positive attenuation hypothesis, and elevated emotional reactivity for negative

cues, thus low mood would be associated with negative potentiation when people think about the future. The results of the present study do not indicate any group differences in emotional response specifically to positive versus negative cues.

The inclusion of an 'in the moment' rating of mood states captured after each temporal distance and valence block (short term positive, short term negative, long term positive and long term negative) was a novel contribution of this study to the existing research. Interestingly, it was found that people who are even mildly depressed benefit less when thinking about things that could happen to them in the future. Specifically, they rated themselves as being less happy, less relaxed and more anxious after describing events, regardless of the valence of the events, even after controlling for initial mood levels.

In a similar vein, additional measures of emotional reactivity to future events were included in the phenomenal characteristics questionnaire which also demonstrated a difference between groups on the emotional reaction related to thinking about the future. PCQ6 assessed the intensity of *anticipatory* emotions (emotions experienced in the present in response to anticipated future events), and the results of the present study show dysphoric participants experienced more negative and less positive emotion than controls when thinking about future events, regardless of their valence. PCQ3 on the other hand asked for a rating on *anticipated* emotions, that is, emotions the person thinks they *would* feel if the event occurred. The present study found no significant differences between the dysphoric and control group on anticipated emotions, lending support for the need to distinguish between the two types of emotional responses - anticipatory and anticipated (Barsics et al., 2016). Another account of emotional responsiveness in the moment is that by Kringelbach and Berridge (2012) who distinguish between two types of positive emotional states

in the moment - 'liking' and 'wanting.' Liking may be considered as the positive response that occurs to a pleasant stimulus as it is experienced, whilst wanting is the emotional response to a future pleasant stimulus that is anticipated but not yet occurred (Macleod, 2017). Kringelbach and Berridge (2012) argue that similar but separable neurological pathways are associated with anticipation to those involved in liking. In their study, rats with excess dopamine move quickly towards a food reward, but don't show elevated pleasure response on gaining the reward; whilst dopamine-free rats show no interest in gaining reward but do show normal lip-licking when the reward is placed in their mouths, suggesting unimpaired ability to enjoy a reward when it happens. In the present study, the focus is on anticipatory 'wanting' states, however it could be argued that by asking people to project themselves into the future scenario and trying to elicit feelings as if it has actually happened, liking as an emotional state is also included.

Interestingly, and contrary to what we might expect based on the present study findings related to differences in emotional reactivity to future events for people with low mood, there were no significant differences between the groups in the mood state 'sad' when thinking about future events. One possible reason for this may be that the meaning of the word 'sad' has changed over time. For the current generation of young adults, the word 'sad' may be more commonly used as a synonym for words such as 'lame,' or 'pathetic' rather than more typical mood related associations such as 'glum' or 'miserable.' Future studies employing this method of capturing mood states may benefit from using a less subjective word to represent melancholy or feeling 'down.'

Strengths and limitations of the present study

Strengths

The present study offered a novel contribution to the current literature on pre-experiencing the future by asking participants to rate how they felt in the here and now when they anticipated events, based on four mood states. This has provided new insight into how the emotional response related to prospection varies as a function of mood. In addition to this, the present study employed two methods of assessing pre-experiencing, through the self-rating of phenomenal characteristics (PCQ) and the researcher-rated measure of episodic detail provided in event descriptions (AI) to focus on the qualitative details that make up the cognitive representation of an event description. This can be considered a more robust and thorough way of assessing pre-experiencing phenomena.

Limitations

There are limitations of the present study that need to be taken into account when interpreting results. Firstly, as mentioned previously this study was based on a student population who were not clinically depressed. As mentioned briefly before, whilst some studies have found student samples to be acceptable analogues, it is important to consider differences which may have implications for how generalisable the findings are to a clinically depressed adult population, both in terms of depression status but also socioeconomic status of students compared to the general population (Hanel & Vione, 2016). The experience of distress is transient and not as severe as clinical depression, and being a university student in an unfamiliar environment having experienced a drastic change in lifestyle can be daunting, but these stressors

tend to be mild and last for a short period of time only (Barua, 2012). Students have also been found to show a different pattern of depressive symptomology than clinically depressed individuals, for instance, anhedonia has been shown to be significantly lower in student samples (Cox, Enns, Borger & Parker, 1999).

There are also psychometric issues with self-report measures for depression in students. This study utilised the PHQ-9 due to its frequent use in clinical services, however it is important to note this whilst this measure has been used in student samples (Eisenberg, Golberstein & Gollust, 2007; Young, Fang & Zisook, 2010), it has yet to be validated on UK student samples. A study has validated the use of the PHQ-9 in a sample of Nigerian University Students, which is promising (Adewuya, Ola & Afolabi, 2006). Nonetheless, there is a lack of evidence for use of alternative measures of depressive symptomology in student samples. Whilst the Beck Depression Inventory –II (BDI) has been commonly used for depression studies in student samples (Nyer et al., 2015; Villatte, Marcotte & Potvin, 2017) and been shown to be comparable to clinical samples (Reiside et al., 2018), like the PHQ-9, the measure was not designed for this purpose, and the conventional cut-off points that are used in clinical samples have not been validated for students (Coyne, 1994). In their report on its psychometric properties, Beck, Steer and Garbin (1988) state that high scores on the BDI for university students should not be interpreted as indicative of depression and that they may simply represent diffuse maladaptive functioning.

Another limitation of the sample is that it was predominantly female. The present study was focused on the emotional response of participants when describing possible positive and negative events. There is evidence highlighting that women show greater emotional expressivity, especially for positive emotions and

internalizing negative emotions such as sadness, guilt and fear (Chaplin, 2015). Therefore, it may be that the results of the present study that there were differences between dysphoric participants and controls on the here and now emotional experience may be biased by the lack of representativeness of the sample both in terms of mood status and reporting of emotions in the here and now.

Secondly, order effects were only partially controlled for in this study. The four blocks of cues – short term positive, short term negative, long term positive and long term negative were presented in four different orders, however there are potentially 24 different orders the blocks could have been presented in. Finally, the choice of single word cues may influence findings. For instance, some of the words used typically evoked events where the participant was the main influencer, such as 'win,' 'success,' 'mistake' and 'injury;' whilst other words used in this study typically tended to evoke events where the participant was the passive recipient, such as 'compliment,' 'traitor' and 'gift.' Future studies should use different sets of positive and negative words to investigate whether this is a potential source of bias (MacLeod & Cropley, 1995). It has been argued that sentence stems represent a more reliable way of accessing everyday future thinking as opposed to single word cueing tasks (Raes et al., 2007; Anderson & Dewhurst, 2009), and so replication of this study using sentence completion task may yield different results.

Conclusion

The present study demonstrated that whilst there were no differences in the types of future-directed thoughts between dysphoric and non-dysphoric individuals on two measures of the quality of future thoughts, the emotional response did in fact vary as a function of mood. This in turn has implications for clinical interventions targeting

future behaviour change, where consideration of the overwhelming nature of thinking about the future as well as impact of this on motivation to make change could be beneficial. Clinical implications are discussed further in Chapter 3. Future studies may wish to replicate the procedure used in the present study but with a clinically depressed sample of adults and using a more detailed measure of phenomenal characteristics of future events and/or using emotionally valenced sentence completion stems rather than single cue words.

Chapter 3: Integration, Impact, and Dissemination

This section aims to synthesise the different aspects of Chapters 1 and 2, in the context of the theoretical and real-world impact of the findings, alongside a critical reflection on the process of undertaking these pieces of work.

Integration

Synergy between the Systematic Review and Empirical Study

The systematic review identified that people with elevated depression do show less specific thoughts about the future in comparison to people with lower levels of depression. If people with elevated negative mood think about the future in more abstract, and less detailed ways, one would expect the same pattern in their ability to pre-experience – that the cognitive feelings, or 'autonoetic consciousness' of possible future events would also be harder to imagine and less vivid. This provided a conceptual basis for the empirical study and the proposed hypotheses that there may be differences in the quality of future directed thoughts in people with elevated depression. Interestingly, the empirical study did not find any significant difference between those with elevated depression and controls with regard to the quality of cognitive representations, but did for the emotional response.

The systematic review in Chapter 1 identified that studies where participants (although in the elevated depression group) did not meet clinical cut off scores for depressive symptomology or were recruited from community or student samples were less likely to find an effect for reduced specificity. It was suggested that depressive symptomology in these studies may not have been severe enough to contribute to an inability to imagine specific future scenarios. As mentioned previously, the present

study used a self-report depression measure in an undergraduate student sample and an elevated depression group was created on the basis of their scores on this measure. It could therefore be argued that the levels of depression in the sample used in the present study were not severe enough to demonstrate a significant difference in the cognitive representations, or quality, of future thoughts. A clinically depressed sample may then demonstrate both, differences in cognitive representations as well as the emotional reactions to thinking about the future.

Reflections on the Processes of Undertaking this Work

Sample and Recruitment

The present study began as a clinical study, with the aim of using a clinical sample recruited from NHS primary care depression services. The proposed study would have accessed participants presenting to such services at the initial assessment phase, where clients meeting the clinical criteria for depression (which is typically assessed by the PHQ-9 in such services) would be asked by the practitioner carrying out the assessment if they are interested in taking part. If a client was interested, they would be asked for consent for their contact details to be passed onto the lead researcher who would then contact them to provide more information before consenting to participate in the study. The data collection phase was to be carried out at the service base or clients' home if more convenient.

However, there were two main difficulties which created obstacles to proceeding in this way. Firstly, it proved more difficult than anticipated to find relevant services in a time pressured NHS to participate. Five Primary Care NHS services focused on providing psychological treatment for depression were

approached by the researcher, however the typical feedback was that these services were too pressured and had a lack of staff resources to promote the study in their setting. Secondly, the proposal of the present study as a clinical study received unfavourable opinion from the Health Research Authority (HRA) in the ethical application phase. The main feedback from the HRA Committee who were responsible for reviewing the application stated there was a concern over participants' wellbeing if they are approached at the routine initial assessment stage (before being put on a waiting list for treatment), especially if there was potential for increasing or aggravating their symptoms; and that a therapist should be present at all times during a participants' time in the study in case of any distress or upset caused, as the protocol provided for the lead researcher to manage instances of any distress was not deemed sufficient. The Committee also stated that a pilot of the study should be carried out on service users before resubmitting the ethics application for a full Research Ethics Committee (REC) Review. I felt that any potential negative impact of asking participants to imagine and describe future events related to negative cue words were offset by asking them to recall an equal number of positively valenced events, but in the case of any distress caused, it was not practicable to have another therapist available for the full duration of the data collection phase.

Given the limited time frame to complete the research and resubmit an ethics application for a full review, it was decided that a realistic amendment would be to use a student sample. The aim of this was to minimise potential risks whilst investigating the same topic in a (necessarily) shorter time frame. The University ethics process is typically shorter than completing NHS ethics, and there is an accessible credit pool where Psychology students are required to earn a certain

amount of course credits as an incentive to take part. Using this pool of students also meant that a base was more readily available for data collection and there was no need for lone working and/or home visits – another ethical concern when recruiting from NHS services within limited clinic space; therefore changing the sample source was seen as a more viable option. As described previously there is evidence that using an analogue sample with subclinical levels of depression is an appropriate comparison for clinical depression, the generalisability of findings needs to take the difference between the two into account. For instance, there is also evidence that self-report measures and clinician rated measures of depression are not in fact equivalent, and they both provide unique information relevant to clinical prognosis (Uher et al., 2012).

The fact that the sample and therefore focus (and possible impact) of the present study had to be changed from a clinical sample to an analogue one left me feeling quite disheartened in the early phases. I had initially found my interest drawn to a subject area (future-directed thinking) I was not familiar with at all but felt it was worth contending with a completely new knowledge and theory base in order to contribute to clinical research in depressive disorders, which was my primary aim. As a result of the unexpected obstacles, I was able to reflect on the process of recruiting from clinical services and the associated ethics of doing so, which I hope will prepare me for future research experiences. If I had the chance to redo this research, I would do a number of things differently. Firstly, I feel my unfamiliarity with the NHS ethics procedure meant I for one underestimated the time it would take to navigate through this process, and two produced an application that was not as robust or detailed as it should have been. Now that I have had this experience I feel I would benefit from

better preparation in future. Secondly, my experience of trying to recruit a clinical sample encouraged me to reflect on the dichotomy between how the NHS perceives research as vital in transforming and advancing services and improve outcomes and quality of care; and the reality of achieving this in busy NHS services. I had approached notoriously busy primary care psychological therapies services which are known for their high targets on frequency of client contacts. My rationale for approaching such services was purely that they specialise in treating depression, however I realise in retrospect that this meant I did not consider their likely reduced availability in being able to accommodate my research. Again, if I were to hypothetically redo this research, I would firstly consider selecting alternative recruitment sources, for instance there are charitable organisations for depression which may also be suitable. I would also take the time to visit the services in person at the preliminary stages in order to improve the interface between the researcher and clinician, emphasise the benefits of the research in terms of its possible clinical impact, and provide reassurance regarding the burden to the service, as qualitative research has indicated that services and clinicians are more reluctant to support a study if they do not feel it is important, due to the time and effort required (Bucci et al., 2015).

Study Design and Associated Data Analysis

A 2 x 2 mixed model design was chosen, where two groups were chosen on the basis of cut off scores on a self-report depression measure. Another way of approaching the research questions would have been to use a correlational design, investigating the relationships between the variables of pre-experiencing and elevated depression. Although this was considered, there were several reasons why this design

was not chosen. Firstly, the final sample size was not considered large enough to sufficiently power a correlational design, where it was calculated a minimum of 85 participants were required. Not only was it difficult to gain that many participants given the lack of take up from advertising around the university, but it was also not feasible in terms of the time frame available for data collection. For instance, each participant is expected to be in the study for approximately one hour, and following this, it took on average and hour and a half per participant to transcribe their responses to the Future-Directed Autobiographical Interview and subsequently code this data for internal and external details. In addition to this, in order to analyse the data to sufficiently investigate the research questions, a correlational design would mean a large number of correlational analyses (minimum 64) would need to be carried out, which was deemed a rather inelegant way of approaching data analysis.

Dual Role – Clinical and Research

Another aspect for reflection was my position as both a Trainee Clinical Psychologist *and* Researcher, in terms of the overall research process and more specifically on the relationship with participants during the data collection phase. Although the empirical study did not involve a clinical sample and thus the boundaries are less blurred, the study did involve participants thinking about potentially negative future events, which are typically based in worries and concerns they have (offset by asking for an equal number of positive experiences). I was mindful that engaging in a discussion about fears and worries with somebody you know is also a mental health clinician might create a slightly different dynamic compared to having the same discussion with somebody who is not trained in a

clinical field. As a result of this, I ensured I kept a neutral, nonreactive demeanour as much as possible when participants were describing future events.

In a more general sense, conducting this research encouraged me to think about my role as a scientist-practitioner. The scientist-practitioner model provides a framework within which clinicians are constantly allowing empirical research to influence their practice and vice versa. There is a greater emphasis and scrutiny in the current financially constrained NHS climate for clinical psychologists to demonstrate their unique skills in comparison to other, perhaps less costly, clinically trained professionals. Carrying out this research alongside my clinical work made me question the feasibility of adhering to these expectations. The data collection and subsequent transcription and coding of event descriptions in the methodology utilised for the empirical study proved to be much more time consuming and demanding than I had initially anticipated, in my naivety to this research area and associated methods. At a point half way through I found myself feeling increasingly anxious and stressed, which in turn further impacted my ability to carry out the required tasks in a timely manner. Through the use of research supervision, I was able to reflect on how these stress-induced thoughts were inhibiting me from taking a longer-sighted view of my role as a scientist-practitioner. As a qualified psychologist, I am unlikely to face such stringent deadlines, there is generally greater flexibility in the whole research process, and I am more likely to be in a position to receive help from other more junior members of staff in some of the research tasks – such as data collection, transcribing and coding for instance.

Impact

Theoretical Implications

In Chapters 1 and 2, it was implied that future thinking is related to the constructive episodic simulation hypothesis (Schacter et al., 2007), which suggests that individuals draw on episodic memory of events which are recombined and elaborated to simulate possible future happenings. The implication of this might be that as people with depression have commonly been found to have more negative beliefs about the self, others and the world based on their past experiences, they are likely to think about the future in similar ways. However, the findings of the present study highlighted that rather than differences in the *types* of thoughts experienced by people with elevated depression, there were differences in anticipatory emotions. This finding is interesting, because predominant cognitive models of depression emphasise, as noted above, the powerful role that cognition plays in affecting mood (Beck, 1967; Coombs, Coleman & Jones, 2002), that is, faulty cognition leads to depressed mood.

Miranda and Persons (1988) mood-state hypothesis, proposed that dysfunctional beliefs are vulnerability factors for depression but that reporting of the beliefs varies with current mood state, so when in a negative mood state, people readily endorse dysfunctional beliefs, but when they are in a positive mood state, people do not report dysfunctional beliefs. Teasdale & Russell (1983) support the view that perhaps mood states precede dysfunctional thinking. Here, state-dependent learning is considered, where information learned in one state is usually inaccessible in other states becomes accessible once the original state is reintroduced. When applied to past thinking, memories of negative personal episodes would tend to have

been originally encoded in the context of an unhappy mood state and would therefore be more accessible when the context of a similar mood state prevailed than in the context of a dissimilar, happy, mood state (and the opposite for positive memories). The increased accessibility of negative memories during negative mood states (and decreased accessibility of positive memories) may mean that a person is likely to make gloomy predictions about the future when depressed (Teasdale & Russell, 1983), which fits with Schacter et al.'s (2007) constructive episodic simulation hypothesis but taking a more emotion focused that belief focused stance. The negative mood states may also lead to reduced expectations of success for the outcome of coping behaviours, and thus reduce motivation to take action to reduce depression.

Furthermore, Bower (1981) found that participants in whom angry moods had been induced tended to give angry interpretations of ambiguous pictures and angry free associations to stimulus words, whereas subjects in induced happy moods tended to give happy interpretations and free associations. The suggestion of mood states precipitating dysfunctional cognitions does not necessarily argue against popular cognitive theories if we distinguish between negative mood and clinical depression (Miranda, Persons & Byers, 1990).

In their study, Miranda et al., (1990) assessed current mood states and dysfunctional thinking in a sample of clinically depressed participants. They found that thinking was more dysfunctional when mood was at its worst, and less dysfunctional when mood was at its best. Thinking about this in the context of the results of both the systematic review in Chapter 1 and the empirical study in Chapter 2, people with subclinical levels or of depressive symptomology or from non-clinical community and student samples did not demonstrate different cognitive

representations of future events, in comparison to those from clinical samples. It may be that people with elevated, but subclinical depression, so more akin to mild low mood, benefit less from thinking about the future because their negative mood state may *prime* dysfunctional interpretations or beliefs even about positive events (as they have lower expectations about the success of the positive events actually happening to them or anticipate more obstacles to get the desired outcome), but it is the activation of such beliefs (through environmental triggers for one instance) that may be what leads to worsening of low mood and development of clinical depression and thus differences in cognitive representations of future thoughts.

Clinical Implications

The findings of this study have implications for clinical practice, particularly in settings where low to moderate depressive symptomology is common, rather than severe. At the outset, it was suggested that understanding more about prospection and pre-experiencing in depression and the related here and now emotional response may highlight barriers that could impact upon the success of therapeutic outcomes. In the context of the stance that negative mood states prime dysfunctional thinking in low levels of depression, it may be that eliciting emotional expression in treatment sessions when thinking about goals for the future for example, may be important.

There are differing theoretical perspectives about the importance of focusing on and experiencing feelings in psychotherapy (Coombes et al., 2002). Early psychodynamic theories emphasise the expression of emotion as a way of understanding an individual's difficulties, however it has been argued that cognitive behavioural therapy tends to steer away from emotional experiencing in sessions in favour of focusing upon cognitive distortions as a way of reducing negative affect and

behaviour (Coombes et al., 2002). Teasdale & Barnard (1993) also highlight that there is difficulty distinguishing between an "intellectual belief" and "emotional belief," as the cognitive model focuses on only one level of meaning. They give the example of the patient who reports they know logically they are not worthless, but they don't believe it emotionally, arguably because of their negative mood state. If applied to future thinking, this may be "I want this nice event to happen but it doesn't feel like it is going to." If considered within the cognitive model, this would be considered the degree to which they believe in the dysfunctional thought, which many clinicians have found unconvincing, drawing upon a qualitative difference between the intellectual and emotional belief, arguing the emotional belief has greater impact on functionality (Teasdale & Barnard, 1993).

Cognitive behavioural therapy already targets prospection through its focus on goal setting and behavioural activation to make future change and promote engagement in future events. Feeling heightened negative emotions when thinking about future stressful and/or negative events and reduced expectations of the success of positive outcomes may mean more emphasis on emotional expression related to thinking about future goals is an important clinical aspect to focus on. Subsequently, problem solving and planning needs to take place prior to engaging in goal directed behaviours to help reduce some of these emotions. The finding that people with depression show less positive and more negative emotional response following prospection, and that they feel less happy and less relaxed when thinking about *any* kind of future event (irrespective of valence) may mean motivation to make change is compromised, by anticipating less benefit from making that change. So again, intervention may benefit from a more explicit focus on emotions related to and

benefits of future actions and/or change prior to attempting any behavioural activation type tasks.

Future-directed therapy (FDT) has already been introduced as a way of alleviating depressive symptomology. Although it has components based in cognitive theory, it explicitly does not focus on assessing the accuracy or rationality of thought processes (Vilhauer et al., 2012). FDT hypothesised that when people *feel*, they have the power to thrive by creating a desired future state and obtain what is wanted. Psychological distress occurs when the perceived ability to move forward into a desired future state is hindered. If the ratio of attentional resources becomes disproportionately allocated in the direction of thinking about what is unwanted (for example obstacles to achieving positive outcomes as mentioned previously) this focus on the unwanted moves them away from a state of thriving and leads to distress. FDT focuses on emotions as indicators of thought processes rather than the other way round, and has been found effective in reducing depressive symptomology (Vilhauer et al., 2012).

Personal Impact

Elsewhere in this chapter I have reflected broadly on my role as an effective scientist-practitioner. In addition to the previous thoughts, the findings of this research have encouraged me to consider how I might adapt my own clinical practice when working with people with depression. My predominant treatment model is cognitive behaviour therapy, and I noticed how I could not recall the last time I spent a significant amount of time exploring emotions related to achieving goals for example, and reflected upon how this tends to take a backseat in favour of the more tangible and practical focus on specific strategies when I have worked within this framework

in previous settings. I found myself considering the feasibility of doing so in time and cost pressured services where the number of recommended sessions that can be offered to clients is becoming increasingly fewer with time, and ways in which I could accommodate this potentially helpful aspect in assisting therapeutic change. Conducting this research also encouraged me to think about alternative forms of therapy, such as the aforementioned FDT. I am always keen to learn new ways of managing distress in order to be the most effective practitioner I can be. Perhaps learning more about the FDT approach and further contributing to its evidence base as a development of this current piece of work could be a valuable avenue to explore in future.

Dissemination

In order to achieve impact, it is important that the findings of this research are disseminated to appropriate forums. A short presentation of the empirical study has been disseminated to current trainees on the DClinPsy course at Royal Holloway University of London. This presentation included recommendations for future improvements and developments to investigating the research topic which current or upcoming Trainee Clinical Psychologists may wish to explore further. A target journal to submit the empirical study for publication is 'Consciousness and Cognition,' an international journal which focuses on a natural science approach to the issues of consciousness, voluntary control, and self. The rationale for choosing this particular journal is that the research topic is a good fit for their areas of focus and they have previously published many articles on future directed thinking. Given that the research topic is quite specific or niche, it is important to choose a journal based

on desired audience rather than how popular or far reaching it is. The journal accepts open access articles and is referenced in search databases too.

Conclusion

This chapter considered the impact of this work as well as reflections on the processes involved in undertaking it. Although obstacles were faced in recruiting a clinical sample for the study which meant changing to a student population, this process enabled me to reflect on the challenges of conducting research within a busy NHS and how to adapt my practice and expectations in future. I also developed confidence in my ability to conduct research effectively and am pleased with the final result. A series of relevant clinical implications of the findings from this work have been discussed, and to conclude, whilst the present contribution to the research topic has some limitations, it provides useful insight into how people feel in the here and now when they think about the future, and how elevated depression may influence this. Furthermore, it provides a basis for expanding the design into clinical populations to determine if the results are generalisable before further contributing to our theoretical understanding of depression and adapting subsequent future thinking or goal based interventions to facilitate more emotional expression.

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Appendices

Appendix 1 Search Strings for Systematic Review

Database	Search Terms	Number of Papers Found
PsychINFO	TOPIC: (future thinking) OR TOPIC: (future-thinking) OR TOPIC: (future-directed thinking) OR TOPIC: (thinking about the future) OR TOPIC: (prospection) AND TOPIC: (specific*) AND TOPIC: (depress*) OR TOPIC: (anx*) OR TOPIC: (schizophrenia) OR TOPIC: (bipolar) OR TOPIC: (PTSD) OR TOPIC: (posttraumatic stress disorder) OR TOPIC: (trauma)	216
Web of Science	TOPIC: (future thinking) OR TOPIC: (future-thinking) OR TOPIC: (future-directed thinking) OR TOPIC: (thinking about the future) OR TOPIC: (prospection) AND TOPIC: (specific*) AND TOPIC: (depress*) OR TOPIC: (anx*) OR TOPIC: (schizophrenia) OR TOPIC: (bipolar) OR TOPIC: (PTSD) OR TOPIC: (posttraumatic stress disorder) OR TOPIC: (trauma)	507

Appendix 2 Quality Rating Tool for Systematic Review

1. Is the hypothesis, aim, objective of the study clearly described? The hypotheses, aims, and objectives must be explicitly formulated. Scoring: 1=YES, 0=NO.
2. Are all primary outcomes to be measured clearly described in the Introduction or Methods section? If the main outcomes are first mentioned in the results section, the answer should be no. If all primary outcomes are described in the Introduction, the answer is yes. Scoring: 1=YES, 0=NO.
3. Are the characteristics of the participants included in the study clearly described? For studies involving clinical samples, the inclusion and exclusion criteria (in terms of age, sex, diagnosis) should be given as well as the definition and the source for the control participants should be provided. For studies involving nonclinical samples, an operational definition of dysphoric depressive state should be provided. For all studies, demographic information should be provided (age, sex) as well as depressive symptom severity levels for each group (categorical study designs) or the total sample (dimensional study designs). Scoring: 1=YES, 0=NO.
4. Were the subjects asked to participate in the study representative of the entire population from which they were recruited? The study must identify the source population for patients and describe how the patients were selected. Scoring: 1=YES, 0=NO, 0=Unable to determine.
5. Were those subjects who were prepared to participate representative of the entire population from which they were recruited? The proportion of those asked who agreed should be stated. Scoring: 1=YES, 0=NO, 0=Unable to determine.
6. Were the participants recruited from the same population? Participants should be selected from the same population. For example, all patients should be recruited from the sample hospital, undergraduate students should be from the same university. Scoring: 1=YES, 0=NO, 0=Unable to determine.
7. Were study participants recruited over the same time? Participants should have been recruited within a specified time window. Scoring: 1=YES, 0=NO, 0=Unable to determine. For a study which does not specify the time period over which patients were recruited, the question should be answered as unable to determine. Studies must be <3 years for yes, if >3 years then no.
8. Are the tasks and measures clearly described? The tasks and measures should be explicitly described with examples of the stimulus materials used. Scoring: 1=YES, 0=NO.
9. Were the main outcome measures used valid and reliable? The validity and reliability of the task and measures should be proved by referring to relevant prior work or by providing data supporting the use of the task to measure the key constructs (interpretation bias, depression). All primary outcomes need to be valid and reliable for yes. Scoring: 1=YES, 0=NO, 0=Unable to determine.
10. Was the participants' engagement with the experimental task(s) assessed? Did the study report checks for outliers, RTs from errors discarded, and/or exclusion of individuals not conforming to the task instructions? Scoring: 1=YES, 0=NO, 0=Unable to determine.
11. Did the study consider principal confounders (e.g., such as race, sex, marital status/family, age, SES (income or class), education) and was there adequate adjustment for confounding in the analyses from which the main findings were drawn? Studies need to examine potential group differences on potentially

confounding variables (when utilizing a categorical design) or assess correlations with depression severity and potentially confounding variables (when utilizing a dimensional design). If the effect of the main confounders was not investigated or no adjustment was made in the final analyses the question should be answered as no. If no significant difference between groups or no relation between confounder and key variable, then YES. Scoring: 2=YES, 1=PARTIALLY, 0=NO, 0=Unable to determine.

12. Were the statistical tests used to assess the main outcomes appropriate? The statistical techniques used must be appropriate to the data. If no tests done but it would have been appropriate to do then the item should be scored as no. Scoring: 1=YES, 0=NO, 0=Unable to determine.
13. Are the main findings of the study clearly described? Simple outcome data (including denominators and numerators) should be reported for all major findings so that the reader can check the major analyses and conclusions. Scoring: 1=YES, 0=NO.
14. Does the study provide estimates of the random variability in the data for the main outcomes? In non-normally distributed data the inter-quartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported. Scoring: 1=YES, 0=NO.
15. Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001? Scoring: 1=YES, 0=NO.
16. Were withdrawals and drop-outs reported in terms of numbers and/or reasons? Scoring: 1=YES, 0=NO.
17. If any of the results of the study were based on “data dredging”, was this made clear? Any analyses that had not been planned at the outset of the study should be clearly indicated. Retrospective analyses should be rated as ‘no’, prospective as ‘yes’. Scoring: 1=YES, 0=NO, 0=Unable to determine.
18. Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance <5%? The study needs to report a power analysis (calculating the required sample size given an effect size and desired power). Scoring: 1=YES, 0=NO.

Appendix 3 Individual Quality Ratings for Papers included in Systematic Review

AUTHORS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
Addis, Hach & Tippett (2016)	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1	0	1	1
Anderson, Boland & Garner (2016)	1	1	1	1	0	0	0	1	1	0	0	1	1	1	1	0	1	0
Belcher & Kangas (2014)	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	0
Blix & Brennan (2011)	1	1	1	1	0	0	0	1	1	1	0	1	1	1	0	0	1	0
Boelen, Huntjens & van den Hout (2014)	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	0	1	0
Boulanger, Lejeune & Blairy (2013)	1	1	1	1	0	0	0	1	1	0	1	1	1	1	1	0	1	0
Brown, Addis, Romano, Marmar, Bryant, Hirst	1	1	1	1	0	1	0	1	1	0	0	1	1	1	1	0	1	0

AUTHORS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
& Schacter (2013)																		
D'Argembeau, Raffard & Van der Linden (2008)	1	1	1	0	0	0	0	1	1	0	0	1	1	1	1	0	1	0
Dickson & Bates (2006)	1	1	1	1	0	0	1	1	1	0	0.5	1	1	1	0	0	1	0
Dickson & Moberly (2013)	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	0	1	0
Dickson, Moberly, Hannon & Bates (2009)	1	1	1	1	1	1	0	1	1	1	0.5	1	1	0	0	0	1	0
Hach, Tippet & Addis (2014)	0	1	1	0	0	0	0	1	1	0	1	1	1	1	1	0	1	0
King, Williams, MacDougall, Ferris, Smith, Ziolkowski & McKinnon (2011)	1	1	1	1	0	1	0	1	1	0	1	1	1	1	0	0	1	0

AUTHORS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
King, MacDougall, Ferris, Herdman & McKinnon (2011)	0	1	1	1	0	1	0	1	1	0	1	1	1	1	0	0	1	0
Kleim, Graham, Fihosy, Stott & Ehlers (2014)	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1	0	1	0
Maccallum & Bryant (2011)	1	1	1	1	0	1	0	1	1	0	1	1	1	1	0	0	1	0
MacLeod & Cropley (1995)	1	1	1	1	1	1	0	1	1	0	0	1	1	0	0	0	1	0
Parlar, Lee, Haqquee, Rhooms, Lanius & McKinnon (2016)	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1	0	1	0
Robinaugh, Lubin, Babic & McNally	1	1	1	1	0	0	0	1	1	0	0	1	1	1	1	0	1	0

AUTHORS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
(2013)																		
Robinaugh & McNally (2013)	1	1	1	1	0	0	0	1	1	0	1	1	1	1	1	0	1	1
Szollosi, Pajkossy & Racsmany (2015)	1	1	0	0	0	0	0	1	1	1	0	1	1	1	0	0	1	0
Vincent, Boddana, & MacLeod (2004)	1	1	1	1	0	0	0	1	1	0	1	1	1	1	0	0	1	0
Williams, Ellis, Tyers, Healy, Rose & MacLeod (1996)	0	1	1	1	1	1	0	1	1	0	0.5	1	1	1	0	0	1	0

Appendix 4 Participant Information Sheet

PARTICIPANT INFORMATION SHEET

Study Title:

Pre-experiencing the Future and mood

Brief Summary:

We would like to invite you to take part in a research study about how people feel when they think about the future.

Why are we doing this research?

This research project will investigate how people feel in the here and now when they think about things that could happen in the future. Specifically, we want to see if people who are anxious or depressed have a different kind of experience when they think about the future compared to others who feel less anxious or depressed.

Why am I being asked to take part and what does it involve?

You are being asked to take part because we are looking for a group of 85 students to complete the study. For the study, the researcher will meet with you for around 1 hour. During that time, you will be asked to fill in two short questionnaires that ask how much you experience different feelings of anxiety and depression.

You will then be shown some words on a screen and asked to think about and describe things that you might experience in the future that the word makes you think of. This will be audio-recorded for later analysis. After thinking about each future event, you will be asked to fill out a brief 6 item questionnaire rating how you felt when thinking of each event. The whole study should last no more than 1 hour. We will also ask you for some demographic information, such as your gender, age and ethnicity. All the information you provide will be anonymous and kept confidential.

What are the possible benefits of taking part?

Although there may not be any direct benefit of taking part, your participation will help us understand and possibly aid future treatment adaptations in anxiety and/or depression.

What are the possible disadvantages and risks of taking part?

You will need to be available for around 1 hour to take part in the study, however the researcher will arrange to meet you at a convenient location on campus.

The questions asked in the study are not expected to be distressing, however you will be thinking of things that might produce momentary changes in how you feel, but this will be both positive and negative. The measures have been used lots of times before with different groups of people, including those who are depressed and/or anxious. You are in control of what events you choose to describe for this part of the task, and should you feel distressed you can stop at any time, and there will be someone available for you to speak to. You can also choose to withdraw from the study at any time.

Further Information

Do I have to take part?

Participation is voluntary so it is your decision. If you decide to take part now but later change your mind, you are free to withdraw from the study at any time, without having to give reason. If you do choose to take part, you will be given course credit. We anticipate recruiting around 85 people.

What will happen if I do choose to take part?

You will be asked by the researcher to confirm whether you would like to take part after you have had time to read this sheet. If you are happy to take part in the study, we will arrange a time to meet and you will be asked to sign a consent form before the study begins as described above.

Will my taking part in this study be kept confidential?

All of the information collected will be made anonymous. The information you provide will be coded with a Participant Identification Number so you cannot be identified from it. All data will be kept securely according to the Data Protection Act 1998. The research team has a duty of confidentiality to you as a research participant. If you score highly on the anxiety or depression measures the researcher will advise you to contact your GP but will not break confidentiality unless there are clear signs that you are at risk of harming yourself.

What will happen to the results of the study?

The overall results of the study may be published in a peer-reviewed journal. The results will be in the form of average scores across the group of participants as a whole rather than any individual responses. You can also request a copy of a summary of the results of this study.

Who is organising and funding the research?

This study is being conducted as part of a doctoral programme at Royal Holloway University of London, and they are funding the research.

Who to contact if you have any questions at any time in your involvement in this study:

Gurveen Ranger (Trainee Clinical Psychologist and Chief Investigator) – gurveen.ranger.2015@live.rhul.ac.uk
Professor Andy MacLeod (Academic Supervisor) – a.macleod@rhul.ac.uk

Royal Holloway University of London, Egham Hill, Egham, TW20 0EX.

Appendix 5 Ethics Application and Approval Email

Ethics Review Details

You have chosen to submit your project to the REC for review.
Name: Ranger, Gurveen (2015)
Email: PCVA066@live.rhul.ac.uk
Title of research project or grant: Pre-experiencing the future in anxiety and depression
Project type: Royal Holloway postgraduate research project/grant
Department: Psychology
Academic supervisor: Andy MacLeod
Email address of Academic Supervisor: a.macleod@rhul.ac.uk
Funding Body Category: No external funder
Funding Body:
Start date: 15/05/2017
End date: 29/06/2018

Research question summary:
This research project aims to ask whether people with higher anxiety and depression symptoms show differences in their ability to preexperience
the future, in comparison to those with lower anxiety/depression scores.
Research question 1 - Are higher anxiety and depression scores in the whole sample correlated with lower scores on the pre-experiencing
measure (PCQ).
Research Question 2 - Do those higher on the depression measure show more positive attenuation, thus reduced pre-experiencing scores
in response to positive cues.
Research Question 3 - Do those who score higher on the anxiety measure show more negative potentiation, thus higher pre-experiencing
scores in response to negative cues.
Research method summary:
This study will use a correlational design.
Participants will be asked to complete the PHQ-9, GAD-7 anxiety and depression measures. They will also be asked to describe how they
are feeling in the moment (E.g. happy, relaxed, tense, sad) and rate the intensity of these emotions on a 7-point scale.
Participants will then begin a future-directed Autobiographical Interview:
1. They will be presented with 8 cue words in total (2 positive with the time specified as next few weeks; 2 positive with time specified as
next few years; and 2 negative for the next few weeks; 2 negative for next few years) in a random order – one at a time. Cue words will be
taken from existing research e.g. Williams et al., (1996). Positive cue words include: Successful, smile, gift, relaxed, compliment. Negative
cue words include: Danger, mistake, angry, tears, guilty.
2. For each cue word on screen, the participant will be instructed to orally describe (for up to 3 minutes) in detail a novel, specific account of
a future event related to the cue word in front of them, from a field perspective. a. They may be prompted twice for more detail using a
standard script of “what else happens on that day” and “can you tell me a little more about that”
3. Following the description, participants will be asked to rate the phenomenological characteristics of the imagined event using the adapted
version of the PCQ.
4. Participants will then move onto the next cue word, until all 8 have been completed. We will include a verbal fluency task to enable us to
examine whether results are linked to general verbal fluency.
The Autobiographical Interview is expected to take approximately 45 minutes’ maximum, and coded according to a standard procedure.
Risks to participants

Ethics Review Details

You have chosen to submit your project to the REC for review.
Name: Ranger, Gurveen (2015)
Email: PCVA066@live.rhul.ac.uk
Title of research project or grant: Pre-experiencing the future in anxiety and depression
Project type: Royal Holloway postgraduate research project/grant
Department: Psychology
Academic supervisor: Andy MacLeod
Email address of Academic Supervisor: a.macleod@rhul.ac.uk
Funding Body Category: No external funder
Funding Body:

Start date: 15/05/2017
End date: 29/06/2018
Does your research involve any of the below?
Children (under the age of 16),
No
Participants with cognitive or physical impairment that may render them unable to give informed consent,
No
Participants who may be vulnerable for personal, emotional, psychological or other reasons,
Yes
Participants who may become vulnerable as a result of the conduct of the study (e.g. because it raises sensitive issues) or as a result of
what is revealed in the study (e.g. criminal behaviour, or behaviour which is culturally or socially questionable),
No
Participants in unequal power relations (e.g. groups that you teach or work with, in which participants may feel coerced or unable to
withdraw),
No
Participants who are likely to suffer negative consequences if identified (e.g. professional censure, exposure to stigma or abuse, damage to
professional or social standing),
No
Details,
We will be asked participants to think of possible negative events that could happen in the future, which may be distressing. However,
participants will be in control of what they choose to think of, and we will also be asking them to generate an equal number of positive
events.
We would be seeking informed written consent, as well as providing a detailed information sheet on the project outlining the purpose of the
study, what will be expected in terms of participation, confidentiality of data, and the right to withdraw. A standard statement on the
information sheet given to all participants will advise them to discuss with their GP if they have concerns about their mood. A protocol will be
developed to manage distress should this arise.

Design and Data

Does your study include any of the following?
Will it be necessary for participants to take part in the study without their knowledge and/or informed consent at the time?,
No
Is there a risk that participants may be or become identifiable?,
No
Is pain or discomfort likely to result from the study?,
No
Could the study induce psychological stress or anxiety, or cause harm or negative consequences beyond the risks encountered in normal
life?,
No
Does this research require approval from the NHS?,
No
If so what is the NHS Approval number,
Are drugs, placebos or other substances to be administered to the study participants, or will the study involve invasive, intrusive or
potentially harmful procedures of any kind?,
No
Will human tissue including blood, saliva, urine, faeces, sperm or eggs be collected or used in the project?,
No
Will the research involve the use of administrative or secure data that requires permission from the appropriate authorities before use?,
No
Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?,
Yes
Is there a risk that any of the material, data, or outcomes to be used in this study has been derived from ethically-unsound procedures?,
No
Details,
Participants will be entered into a prize draw for 1 x £40; 2 x £20 & 2 x £10 Amazon Vouchers.

Risks to the Environment / Society

Will the conduct of the research pose risks to the environment, site, society, or artifacts?,
No
Will the research be undertaken on private or government property without permission?,
No
Will geological or sedimentological samples be removed without permission?,

No
Will cultural or archaeological artifacts be removed without permission?,
No
Details,

Risks to Researchers/Institution

Does your research present any of the following risks to researchers or to the institution?
Is there a possibility that the researcher could be placed in a vulnerable situation either emotionally or physically (e.g. by being alone with
vulnerable, or potentially aggressive participants, by entering an unsafe environment, or by working in countries in which there is unrest)?,
No
Is the topic of the research sensitive or controversial such that the researcher could be ethically or legally compromised (e.g. as a result of
disclosures made during the research)?,
No
Will the research involve the investigation or observation of illegal practices, or the participation in illegal practices?,
No
Could any aspects of the research mean that the University has failed in its duty to care for researchers, participants, or the environment /
society?,
No
Is there any reputational risk concerning the source of your funding?,
No
Is there any other ethical issue that may arise during the conduct of this study that could bring the institution into disrepute?,
No
Details,
Declaration
By submitting this form, I declare that the questions above have been answered truthfully and to the best of my knowledge and belief, and
that I take full responsibility for these responses. I undertake to observe ethical principles throughout the research project and to report any
changes that affect the ethics of the project to the University Research Ethics Committee for review.
Certificate produced for user ID, PCVA066
Date: 15/05/2017 11:05
Signed by: Ranger, Gurveen (2015)
Digital Signature:
Certificate dated: 5/15/2017 12:04:37 PM
Files uploaded: Student Consent Form V3, 24.03.17.doc
Student PIS V3, 24.03.17.docx
Student Debrief V2, 17.03.17.docx
Poster V1, 01.03.17.docx
PCQ Future Version V2, 24.03.17.docx
PHQ-9.docx
GAD-7.docx
Demographics Q. V1, 17.03.17.docx
Verbal Fluency Task.docx
Proposal for RHUL Ethics V3, 15.05.17.docx

From: Ethics Application System <ethics@rhul.ac.uk>
Sent: 03 October 2017 14:20
To: Ranger, Gurveen (2015); Macleod, A; ethics@rhul.ac.uk
Subject: Result of your application to the Research Ethics Committee (application ID 504)

PI: Andy MacLeod
Project title: Pre-experiencing the future in anxiety and depression

REC ProjectID: 504

Your application has been approved by the Research Ethics Committee.
Please report any subsequent changes that affect the ethics of the project to the University Research Ethics Committee ethics@rhul.ac.uk

Appendix 6 PHQ-9

PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(Use "✔" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

Appendix 7 GAD-7

GAD-7				
Over the last 2 weeks, how often have you been bothered by the following problems? *(Use "✔" to indicate your answer)*	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

Appendix 8 'In the moment' Mood Ratings Questionnaire

Participant Identification Number:

MOOD RATING SCALES

Title of Project: Pre-experiencing the Future

Name of Researcher: Gurveen Ranger

Please circle the number that best applies to how you are feeling

Right now I feel….

1. **Happy**

Not at all						Completely
1	2	3	4	5	6	7

2. **Relaxed**

Not at all						Completely
1	2	3	4	5	6	7

3. **Anxious**

Not at all						Completely
1	2	3	4	5	6	7

4. **Sad**

Not at all						Completely
1	2	3	4	5	6	7

Appendix 9 Protocol and Cue Words

PROTOCOL

Title of Project: Pre-experiencing the Future

Name of Researcher: Gurveen Ranger

1. *"Thank you for agreeing to take part in this study. We are interested in how people feel in the here-and-now when they imagine things that might happen in the future".*
    a. Check participant understands this concept and that they have read the Participant Information Sheet – answer any questions they have.
    b. Collect written and signed consent form.

2. *"Great, let's start with some simple information about you."*
    a. Do demographics questionnaire
    b. Collect current mood rating using 7-point scales.

3. *"Thank you. Now let's begin with the main part of the study" (Autobiographical Interview) You will see a single word on the screen, and I want you to use the word to help you to imagine a specific event that might realistically occur to you in the future. Try to think of a specific event, one that happens in a particular place and in a particular time, and also not just something that has happened to you in the past. The event does not have to specifically involve the word, which is just there as a prompt".*

    "For each event, you will also be given a time-period, so you will be asked to imagine something that may occur <u>either</u> in the next few weeks, or in the next few years (up to 5 years from now). Once you have thought of something I would like you to describe it out loud in as much detail as you can. When describing it try to be specific, as if you were there at the time. I will give you up to 3 minutes to do that and I will be recording what you say. After you have finished describing an event I will ask you to do some ratings on it". I will ask you to do that a number of times, using new cue words each time."

    "It's probably not something you have done before so I am going to give you a couple of practices goes at it"
    a. Check participant understands what they need to do.
    b. Practice

c. Proceed with cue words, timed by 3 minutes, and then present with Phenomenological Characteristics Questionnaire & Mood Rating Questionnaire after each description.
    i. Can prompt up to two occasions with *"can you tell me more about that…"*

(Shown on computer screen with three-minute timer)

DANGER

Next few weeks

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

WIN

Next few weeks

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

TRAITOR

Next few years

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

GIFT

Next few years

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

MISTAKE

Next few weeks

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

COMPLIMENT

Next few weeks

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

INJURY

Next few years

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

SUCCESS

Next few years

(At end of three minutes: Thank you now please complete this questionnaire – PCQ)

4. “Thank you, now I would be grateful if you could complete some questionnaires looking at your mood, by circling the number that you think most applies to you.”
    a. PHQ-9 & GAD

5. Thank you. I would now just like you to complete a brief task, where I give you a letter of the alphabet and ask you to come up with as many words beginning with that letter as possible. Don’t use the same word with different endings, for example, give and giving, and try to avoid proper nouns like names of places or people. I am going to do that with three different letters.
    a. Administer Verbal Fluency Task

6. That is the end of the study, thank you for taking part. Do you have any questions or concerns?
    a. Take the time to address any questions or concerns participants might have at this stage
    b. Provide participant with debrief sheet

Appendix 10 Phenomenological Characteristics Questionnaire

PHENOMENOLOGICAL CHARACTERISTICS QUESTIONNAIRE – FUTURE VERSION

Below is a list of questions about the characteristics associated with your imagined future events. Circle only one response, and please answer honestly. Your answers are confidential.

Please indicate how much you agree with each statement by choosing a response between 1 and 7:

1. **When imagining the event, I feel as though I am experiencing it**

Not at all						Completely
1	2	3	4	5	6	7

2. **When imaging the event, I feel that I travel forward to the time when it would happen**

Not at all						Completely
1	2	3	4	5	6	7

3. **When imagining the event, I feel the emotions I would feel if the event occurred**

Not at all						Completely
1	2	3	4	5	6	7

4. **The event was vivid**

Not at all						Completely
1	2	3	4	5	6	7

5. **The event was difficult to imagine**

Not at all						Completely
1	2	3	4	5	6	7

6. **The emotions I have when I think about the event are**

Extremely Negative						Extremely Positive
1	2	3	4	5	6	7

Appendix 11 Verbal Fluency Task

VERBAL FLUENCY TASK

Title of Project: Pre-experiencing the Future

F	A	S
TOTAL:	**TOTAL:**	**TOTAL:**

Appendix 12 Feedback from Pilot

1. **How easy to follow (visually) is the online questionnaire package?**

1 2 3 4 5 6 7

Not at all **Very easy**

Participant 1: 6
Participant 2: 5
Participant 3: 5
Participant 4: 5
Participant 5: 6

Any other comments:

Participant 2: Text not big enough
Participant 4: The button at the bottom just has an arrow on it, I had to ask if that was the one to go to the next page or not – could be clearer
Participant 5: The words could be bigger, especially on the cue words which are small on a big screen. |

2. **How easy to follow (technologically) is the online questionnaire package?**

1 2 3 4 5 6 7

Not at all **Very easy**

Participant 1: 6
Participant 2: 6
Participant 3: 6
Participant 4: 5
Participant 5: 6

Any other comments:
None

3. **How easy to understand were the instructions for the main word cueing task?**

Not at all **Very easy**

1 2 3 4 5 6 7

Participant 1: 4
Participant 2: 6
Participant 3: 5
Participant 4: 5
Participant 5: 4

Any other comments:
Participant 1: I had to check if the event I was describing had to be completely new

Participant 5: The instructions were quite long and I wasn't completely clear if I could chose something similar to what has happened to me

4. How did you find engaging in this study?

Distressing

	Not at all						Very
	1	2	3	4	5	6	7
Participant 1: 1							
Participant 2: 1							
Participant 3: 1							
Participant 4: 1							
Participant 5: 2							

Interesting:

	Not at all						Very
	1	2	3	4	5	6	7
Participant 1: 5							
Participant 2: 5							
Participant 3: 5							
Participant 4: 6							
Participant 5: 6							

Enjoyable:

	Not at all						Very
	1	2	3	4	5	6	7
Participant 1: 6							
Participant 2: 5							
Participant 3: 4							
Participant 4: 4							
Participant 5: 6							

Boring:

	Not at all						Very
	1	2	3	4	5	6	7
Participant 1: 1							
Participant 2: 1							
Participant 3: 1							
Participant 4: 2							
Participant 5: 2							

Any other comments:

Participant 1: It was quite hard to think of new events

Participant 3: I found it hard to generate ideas but it was quite fun to do

Appendix 13 Consent Form

Participant Identification Number:

CONSENT FORM

Title of Project: Pre-experiencing the Future

Name of Researcher: Gurveen Ranger

I confirm that I have read the information sheet for the above study, and I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. ☐

I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers. ☐

I understand that all data will be kept confidential, and that no personal identifying information will be disclosed in any reports on the project, or to any other party ☐

I agree to take part in the above study. ☐

Name of Participant	Date	Signature
Name of Person taking consent	Date	Signature

Appendix 14 Debrief Form

Participant Identification Number:

DEBRIEF FORM

Title of Project: Pre-experiencing the Future

Name of Researcher: Gurveen Ranger

Thank you for your participation in the above research study. Your involvement with this study has now ended and you will not be approached for any further information. You will only be contacted again if you have won the prize draw you were entered in at the start of your participation.

If you need to talk to someone about any distress that may arise or have any concerns about your mental health, please contact your GP.

Alternatively, please call:

Samaritans – 08457 90 90 90 or

Mind – 0300 123 3393.

Results of this study will not include your name or any other identifying characteristics. The aim of this study was to understand more about the way people think about the future when they are feeling anxious and/or depressed. Specifically, we are interested in how anxiety and depression might affect the feelings you have in the here and now when thinking about future events. If people react with less positive feeling when they think about positive future events, and more negative feeling when they think about negative future events then both of those are likely to affect motivation to do things. We also want to understand more about how anxiety and depression affect these thoughts and feelings in different ways. You can request a copy of the summary of the research findings of this project (once it is completed) – please contact Gurveen Ranger at the email address/number below if you would like a copy.

If you have any concerns or questions about your participation in this study or would like to withdraw your data, please do not hesitate to contact the research team on the contact details below. The researcher has written your participant number at the top of this sheet. As your data is identified only by this number, you will need to quote it if you would like your data to be removed at a later date, so please take care to make a note of the number.

Researcher Contact Details:

Gurveen Ranger (Trainee Clinical Psychologist & Chief Investigator)

Email: gurveen.ranger.2015@live.rhul.ac.uk

Professor Andy MacLeod (Academic Supervisor for project)

Email: a.macleod@rhul.ac.uk