THE UNIVERSITY OF HULL

Memory Biases in Worry

Being a Thesis submitted for the Degree of Doctor in Clinical Psychology

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by

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Finally, I would like to dedicate this portfolio to the loving memory of Lillian Ellen Nightingale, my Nan, who helped me to believe in myself

B. OVERVIEW

The portfolio has three parts. Part one is a systematic literature review, in which the experimental empirical literature relating to memory biases in Generalised Anxiety Disorder (GAD) is reviewed. Information processing models have suggested that anxious individuals should be characterised by a memory bias towards threat. However, other models have proposed that memory biases may not be evident, as anxious individuals avoid the elaboration of threatening material. Ascertaining whether or not a memory bias exists is fundamental to the development of theories and associated treatment of GAD and worry, its hallmark feature. To answer this question, a systematic and comprehensive search of the literature was undertaken. The results of the review highlight that there is a paucity of studies in this area, which are conflicting in their findings. The majority of the studies examined memory biases in GAD utilising explicit and implicit memory paradigms and only one previous study has examined autobiographical memory biases in GAD. A series of conceptual and methodological issues are outlined and areas for future research are discussed.

Part two, the empirical paper was derived from the recommendations described in the systematic literature review. This study explores Autobiographical Memory Biases in Worry. Sixty participants with varying levels of worry completed an autobiographical memory task in response to threatening worrisome thoughts which were rated by participants for personal relevance. The findings suggested that individuals high in pathological worry do not recall more threatening autobiographical memories when presented with highly personally relevant concerns, however when prompted with a concern that is not relevant evidence of a memory bias is suggested. It was also found that depression may be a key variable in whether a general memory bias towards threat is detected in worry. No significant results were found

with regards to the relationship between the level of worry and retrieval latency of memories or the coping strategies recalled. However, there are a number of methodological and conceptual issues that should be taken into account and may explain the non-significant findings. Areas for further research are highlighted.

Part three comprises the appendices

C. TABLE OF CONTENTS

D. LIST OF TABLES AND FIGURES

SYSTEMATIC LITERATURE REVIEW

EMPIRICAL PAPER

PART ONE

This paper is written in the format ready for submission to the Journal of Affective Disorders.

Please see appendix II for the guidelines for authors.

Memory Biases in Generalized Anxiety Disorder:

A Systematic Literature Review.

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ABSTRACT

Background: Studies have reported conflicting results regarding the presence of memory biases in Generalized Anxiety Disorder (GAD). In an attempt to address this issue a systematic literature review was undertaken. Ascertaining whether or not memory biases exist is fundamental to the development of theories and associated treatment of GAD.

Method: A comprehensive search of PsychInfo, Academic Search Elite, Science Direct and APA PsychARTICLES was conducted to identify studies that have examined memory biases in GAD.

Results: Fourteen studies examining memory biases were identified and these underwent a critical review. Of these fourteen studies, one examined autobiographical memory, one investigated implicit memory, eight explored explicit memory and four examined both explicit and implicit memory. The analyses showed that 38% of these studies provided support for the presence of a memory bias in GAD. Specifically, 25% found evidence of an explicit memory bias, 60% found evidence of an implicit memory bias and the one study that explored autobiographical memory biases also found evidence of a bias.

Limitations: Methodological and conceptual issues confounded any firm conclusions regarding the nature of memory biases in GAD. The limitations of the review are discussed.

Conclusion: At present, the evidence of a memory bias in GAD is inconsistent. The implications of the reviews' findings are discussed and future directions are considered.

Keywords: Generalized Anxiety Disorder; Memory bias, Systematic Literature Review.

Introduction

According to DSM-IV-TR (APA, 2000), Generalised Anxiety Disorder (GAD) is characterised by its hallmark feature of excessive worry. Typically, the excessive worry encompasses everyday concerns and occurrences and is perceived as difficult to control. This perception is accompanied by a range of associated physical symptoms and negative affect, which are present more days than not, for a minimum of six months in duration. Experimental empirical literature pertaining to GAD has produced uncertainty regarding a fundamental question: Is there a memory bias for threatening material in GAD? Two information processing models have proposed that anxious individuals will display a memory bias for threat; Beck's Schema model (Beck at al, 1985) and Bower's Associative Network model (Bower, 1981). These two models posit that in contrast to non-anxious controls, anxious individuals are more likely to recall threatening material than non-threatening material. More specifically, in Beck's Schema model, a memory bias occurs when the dysfunctional schemata pertaining to information relevant to the threat is activated, resulting in the selective processing of information congruent with that schema. Comparatively, in Bower's Associative Network model, the bias towards threatening information transpires when a node is activated. A node is a representation of an emotion, which is linked to other information pertaining to that node, such as memories. The activation of the node results in increased availability of information congruent with that node. However, to date, the body of evidence that has examined memory biases in GAD has been inconsistent, with some studies documenting the presence of memory biases for threatening stimuli and some studies failing to replicate these results. Indeed, one study (Mogg et al, 1987) has reported that individuals with GAD show a poorer memory for threatening stimuli.

Whilst Coles and Heimberg (2002) and Becker et al (1999) have provided narrative reviews of the evidence for and against memory biases across the anxiety disorders, a systematic review of studies related specifically to GAD has not been conducted. Therefore the aim of this review was to assess the current evidence for memory biases in GAD, with a view to clarifying important and relevant methodological issues, highlighting gaps in the knowledge base and discovering potential areas for future research. Ascertaining whether or not a memory biases exist is fundamental to the development of theories and associated treatment of GAD.

What evidence is there of memory biases in GAD?

Method

Search Strategy

A comprehensive and systematic review of the literature in the area of memory biases in GAD was conducted in February 2008. The four databases that were searched and the limiters that were applied to each of these are stated below:

- PsychINFO: (Limiters: 1980 to present, Peer Reviewed Journal, English Language, 18 years and older).
- Academic Search Elite: (Limiters: 1980 to present, Peer Reviewed Journal).
- Science Direct: (Limiters: 1980 to present, Within All Sciences).
- APA PsychARTICLES: (Limiters: 1980 to present, English Language, 18 years and older, human population, journal articles only).

Articles were searched for after the year 1980, due to the fact that models concerning memory biases in anxiety were proposed subsequent to this date. The search terms that were utilized relating to GAD included 'Generalized Anxiety Disorder,' 'Generalized Anxiety' and 'GAD.' Each of these terms were used in combination with the following keywords; 'memory,' 'memory bias,' 'explicit memory,' 'implicit memory' and 'autobiographical memory.' The Boolean operator used to define the relationship between the keywords was 'and.' All of these terms were searched for in the title and abstract of articles within each of the four databases.

Using this strategy, 15 papers were identified from PsychINFO; 15 from Academic search Elite; 68 from Science Direct; and 2 from APA PsychARTICLES. Taking into account the overlap between the databases, a total of 88 papers were derived from the four sources.

Inclusion and Exclusion Criteria

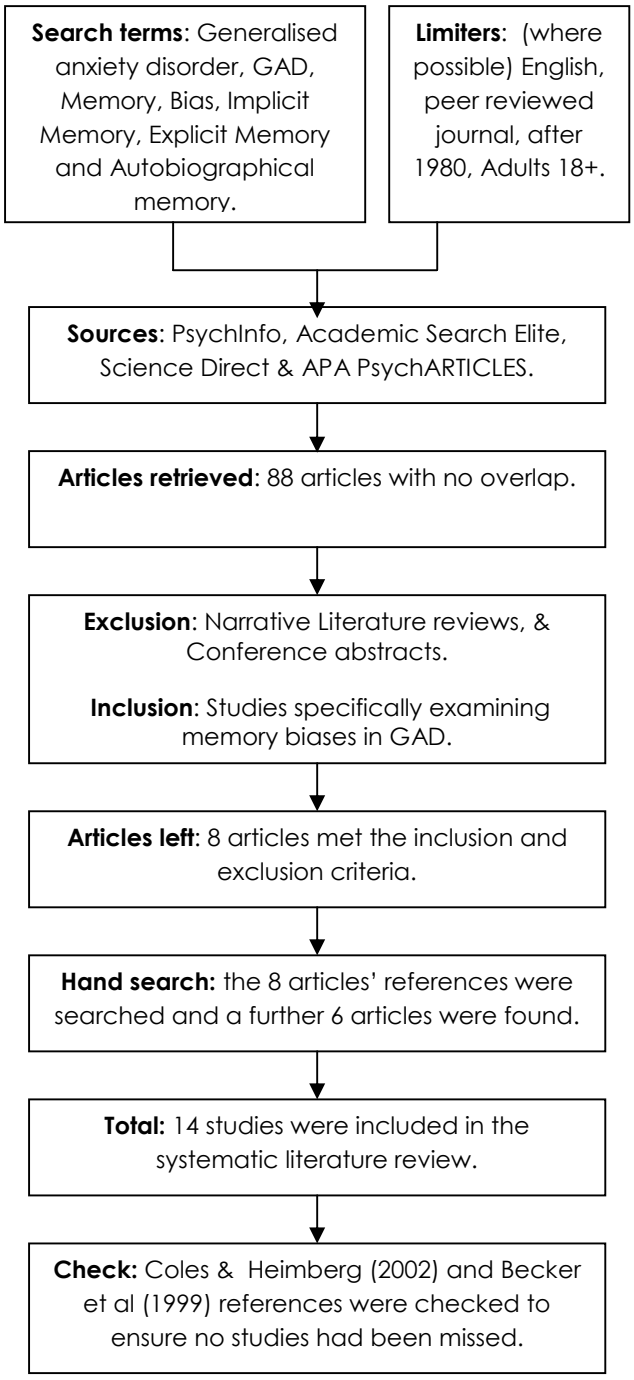
The following inclusion and exclusion criteria were then applied to the 88 articles. Studies were only included if they specifically investigated memory biases in GAD. Narrative literature reviews and conference abstracts were excluded from the review, thus only peer reviewed empirical papers were incorporated. After applying this criteria, a total of 8 studies were yielded. The references of the 8 studies were then hand searched, which resulted in a further 6 articles being discovered that met the inclusion criteria. The reason for this discrepancy lay in the fact that earlier articles referred to GAD as 'anxiety' or 'clinical anxiety' in the title and abstract, thus they did not specify GAD until their method sections. Therefore, a total of 14 studies were included in this review. Subsequent to this, the references of the narrative literature reviews of Coles and Heimberg (2002) and Becker et al (1999) were searched, but no further studies meeting the inclusion criteria were identified. The fourteen studies incorporated in the review are identified in the reference section with an asterisk.

Assessment of Study Quality

The four databases were also searched to identify an assessment checklist, which could be used to assess the quality of experimental studies of the type conducted to date in the area of memory biases in anxiety. The search terms utilized included 'quality assessment' and 'quality checklist'. In addition, the references of the 14 studies incorporated in this review were hand searched. However, a review of the literature did not identify a formal assessment

scale capable of reliably achieving this. Consequently, a quality assessment of the 14 studies was undertaken using a checklist originally developed by Downs and Black (1998), which was subsequently adapted by the authors (see appendix III). The adapted scale had 15 items, assessing three different areas. The first area examined the information reported in each of the studies, to ascertain whether it was sufficient to allow the reader an unbiased assessment of the methodology and findings. The second area investigated the internal validity of each study and the final area examined the power of the studies. Each item was scored 0 or 1. The total of each of the three subscales was then summed to give an overall score out of 15. Each study was rated using this checklist by the author and another reviewer with expertise in the area of anxiety disorders. The average of these two scores was then used as the quality assessment score for each of the studies. An intra-class correlation was conducted to evaluate the inter-rater reliability of the two raters' checklist scores.

Figure I. Flowchart of the process of article selection for the systematic literature review.



Results

Study Quality

Fourteen studies were identified (see figure I) and their methodological quality was assessed. The intra-class correlation coefficient of the quality assessments conducted by the two reviewers was high ($ICC = 0.72$, $df = 14$, $p < 0.001$), with the most discrepancy occurring on the reporting subscale. The mean quality score rating of the fourteen studies was 10.46 (SD = 1.00), ranging from a minimum of 9 and a maximum of 12.5. Seven of the studies scored between 9 and 10. The remaining seven scored between 11 and 12.5 out of 15. Eleven of the studies received a score of 0 out of 2 on the power subscale. Please see appendix IV for analyses.

Memory biases in GAD

Table I details the included studies, outlining their methodological features, key findings and their quality assessment score. The fourteen studies incorporated in the review can be broadly divided into three categories that relate to different facets of memory; implicit memory, explicit memory and autobiographical memory. Eysenck and Keane (2000) defined implicit memory as a form of memory that does not depend on conscious recollection. By contrast, they distinguished explicit memory as memory that involves conscious recollection. Conway and Rubin (1993) also defined autobiographical memory as 'the memory for the events of ones life.'

Table I. Characteristics of studies that have examined memory biases in GAD

Authors	Sample	Diagnosis	Type of memory Examined	Encoding and Retrieval Task	Stimuli	Key Findings	Quality Assessment Value
Coles, Turk & Heimberg (2007)	23 GAD & 23 NACs	DSM-IV	Implicit & Explicit Memory	Incidental learning task Implicit - a stem completion task Explicit - free Recall task	Participants each rated pool of words then based on ratings presented with 12 GAD-threat words, 12 positive and 12 Neutral words.	Participants with GAD showed an Implicit & Explicit memory bias compared to NACs	12
Friedman, Thayer & Borkovec (2000) Study 1	35 GAD 29 NACs	DSM-III-R	Explicit Memory	Presented colored dots paired with words and then asked to complete a free recall task	Participants presented with 10 threat words and 10 non-threat words	Participants with GAD showed an explicit memory bias for threat words compared to NACs	11
Friedman, Thayer & Borkovec (2000) Study 2	22 GAD 31 NACs	DSM-III-R	Explicit Memory	Presented colored dots paired with words and then asked to complete a free recall task	Participants presented with 10 threat words and 10 non-threat words	Participants with GAD showed an explicit memory bias for threat words compared to NACs	11
Becker, Roth Andrich, & Margraf (1999) Study 1	32 GAD 30 SP 31 NACs	DSM-III-R	Explicit Memory	Incidental learning task and then a free recall task	6 GAD-related words 6 speech phobia words 6 neutral words 6 positive words	Participants did not display an explicit memory bias for threat words.	12.5
Bradley, Mogg, & Williams (1995)	17 GAD 19 Depressed 18 NACs	DSM-III-R	Implicit & Explicit Memory	Presented with a series of words. Implicit - Primed lexical decision task Explicit – recall task	12 depressed words 12 anxiety related words 12 neutral words 12 positive words	Only the depressed participants showed a recall bias for depressed words	10

Key
NAC: non-anxious controls.
SP: Social Phobia.
DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, 4th edition.
DSM-III-R: Diagnostic and Statistical Manual of Mental Disorders, 3rd edition, revised.

Table I. Characteristics of studies that have examined memory biases in GAD

Authors	Sample	Diagnosis	Type of memory Examined	Task	Stimuli	Key Findings	Quality Assessment Value
MacLeod & McLaughlin (1995)	16 GAD & 16 NACs	DSM-III-R	Implicit & Explicit Memory	Colour naming Encoding task. Implicit – tachistoscopic identification task Explicit - recognition task	Presented with 48 threatening & 48 non-threatening words	Participants with GAD showed an Implicit memory bias for threat words but not an explicit memory bias	10
Mathews, Mogg, Kentish & Eysenck (1995)	24 GAD 23 NACs	DSM-III-R	Implicit Memory	Count the number of 'e's then a word stem completion task	10 positive words 10 neutral words 10 physically threatening & 10 socially threatening words	All participants produced more completions of words that they had recently been exposed too	10
Otto, McNally, Pollack, Chin & Rosenbaum (1994)	12 GAD 12 PD & 12 NACs	DSM-III-R	Explicit Memory	Dichotic listening task and then rated emotionality of words and performed a cued recall task	24 panic words 24 general threat words 24 positive words 24 neutral words	No explicit memory bias. However, participants with a greater right ear advantage showed an explicit memory bias for threat words. Participants with a lower ear advantage displayed an avoidance of information	11
Burke & Mathews (1992)	12 GAD 12 NACs	Research Diagnostic Criteria.	Autobiographical Memory	Task 1 - presented with words and then asked to provide an autobiographical memory. Task 2 – presented with words and then asked to provide either an anxious or non-anxious autobiographical memory	Task 1 - 24 neutral words Task 2 – a new set of 24 words	Task 1 – Participants with GAD recalled more memories that they associated with nervousness and fewer pleasant memories Task 2 – Participants with GAD produced more anxiety provoking memories and did so more quickly than NACs.	11 11

Key
NAC: non-anxious controls.
PD: Panic Disorder.
DSM-III-R: Diagnostic and Statistical Manual of Mental Disorders, 3rd edition, revised.

Table I. Characteristics of studies that have examined memory biases in GAD

Authors Examined	Sample	Diagnosis	Type of memory	Task	Stimuli	Key Findings	Quality Assessment Value
Mogg & Mathews (1990)	16 GAD 16 NACs	ICD-9	Explicit Memory	Presented with words and then a recall task.	20 anxiety words 20 non-anxiety words Half of which were self-referent and half other-referent words.	Anxious participants recalled more mood congruent words but this was not specific to self-referenced material.	10.5
Mathews Mogg, May & Eysenck (1989)	18 GAD 18 recovered GAD & 18 NACS	DSM-III-R	Implicit & Explicit Memory	Presented with words and then an Implicit - Word completion task Explicit - Cued recall task	32 threat words (16 social, 16 physical) 32 non-threat words (16 neutral, 16 positive)	No difference between participants on explicit memory test. On Implicit memory test anxious participants produced more threat word completions	10.5
Mogg, Mathews, & Weinman (1989)	18 Anxiety state 18 normal controls	ICD-9	Explicit memory	Stroop Colour Naming task & then a recognition task.	20 physical threat words 20 social threat words 20 non-threat words	No evidence of a memory bias for threat words in anxious participants.	9
Mogg, Mathews & Weinman (1987)	10 'generally anxious participants' 10 NACS	ICD-9	Explicit Memory	Presented with words then an immediate recall & recognition task	20 threat words 20 non-threat words 40 positive.	Generally anxious participants recalled fewer threat words than non-threat words, compared to NACS	11.5
Mathews & MacLeod (1985)	24 'generally anxious' 24 NACs	Primary diagnosis of anxiety. Method of diagnosis not stated.	Explicit Memory	Stroop Color Naming task & then a recognition task	12 physical threat 12 social threat 24 control words	No difference in the recognition of threat words between anxious participants and NACs.	10

Key
NAC: non-anxious controls.
DSM-III-R: Diagnostic and Statistical Manual of Mental Disorders, 3rd edition, revised.
ICD-9: International Classification of Diseases, 9th revision.

- Implicit Memory

There were five studies which examined implicit memory biases for threat-relevant material in GAD. Three of the five studies provided support for an implicit memory bias (Coles et al, 2007; MacLeod and McLaughlin, 1995; Mathews at al, 1989). However, the two remaining studies failed to confirm its presence (Bradley et al, 1995; Mathews at al, 1995).

The most recent study of the five to investigate implicit memory biases was Coles et al, (2007). They took into account the relevance of the stimuli used to elicit a memory bias. To achieve this they asked participants to rate the personal relevance of a pool of automatic thoughts. These ratings were then used to form the stimuli in the incidental learning task. This was then followed by a stem completion task. Using this methodology they found evidence of an implicit memory bias in GAD.

MacLeod and McLaughlin (1995) also found evidence of a memory bias. They presented GAD participants and controls with a series of 96 words (48 threat words and 48 non-threat words). The implicit memory task consisted of tachistoscopic identification and the number of words that individuals accurately identified were recorded. The results showed that participants with GAD accurately identified more threat words than non-threat words, in comparison to the control group. Comparatively, the earliest study to examine implicit memory biases also used a stem completion task and also found evidence of an implicit memory bias, (Mathews, et al 1989). Interestingly, unlike the other two studies that reported the presence of a memory bias, this study mixed conceptual and perceptual tasks and still found evidence of a memory bias.

In contrast, Bradley and his colleagues (1995) employed a lexical decision task that incorporated both sub-threshold and supra-threshold primes. The stimuli used to elicit the bias included a series of anxiety-related, depressed, positive and negative words. They did not find an implicit memory bias for threat material in GAD, but this may be attributable to the mix of perceptual and conceptual encoding and retrieval tasks. Similarly, Mathews at al (1995) also failed to identify a memory bias in GAD. The encoding task involved counting the number of 'e's in a series of forty words; 10 positive, 10 neutral, 10 physically threatening and 10 socially threatening. This was followed by the word stem completion task and the results showed there was no significant difference between the groups with respect to the production of threatening word stems.

In summary, of the five studies that investigated implicit memory, 60% provided support for a memory bias in GAD. Within these five studies, the encoding task varied from study to study, with two of the encoding tasks being conceptual in nature and the remaining three being perceptual. However, there appeared to be no relationship between the nature of the encoding task and the detection of an implicit memory bias. Three of the encoding tasks matched the nature of the retrieval tasks (i.e. a conceptual encoding task followed by a conceptual retrieval task or a perceptual encoding task followed by a perceptual retrieval task). Interestingly, two of the studies mismatched the nature of the tasks and only one of the studies failed to find a memory bias.

With regards to the stimuli used to elicit a memory bias, all of the studies used single words, but the number varied from study to study. Also, the content of the single words varied i.e. whether they were positive, negative, neutral words or words related to other disorders.

Finally, of the five studies, four used the DSM-III-R (APA, 1987) to diagnose GAD and the most recent study used the DSM-IV (APA, 1994).

- Explicit Memory

Explicit Memory was the most studied type of memory and was investigated by twelve of the fourteen studies. Of these twelve studies, three studies found an explicit memory bias (Coles at al, 2007; Friedman et al, 2000, Study 1; Friedman et al, 2000, Study 2;) but the remaining nine did not (Becker et al, 1999; Bradley et al, 1995; MacLeod and McLaughlin, 1995; Otto et al 1994; Mogg and Mathews, 1990; Mogg et al, 1987; Mathews et al, 1989; Mogg et al, 1989 and Mathews & MacLeod, 1985).

Along with their investigation of implicit memory, Coles et al (2007) also investigated explicit memory biases in GAD. They used a free recall task of words relevant to the individual and found that GAD participants recalled more threat words in comparison to controls. Likewise, Friedman and his colleagues (2000, study 1) also identified an explicit memory bias in GAD. They paired coloured dots with threatening and non-threatening words and presented them to each participant one at a time. In a free recall task of these words, GAD participants recalled a higher number of threat words than non-threat words, in comparison to controls. The second study conducted by Friedman et al (2000) was an exact replication of the first, using different participants and similarly an explicit memory bias was found.

The most recent study that failed to find an explicit memory bias was conducted by Becker et al (1999) who used a free recall task. Bradley et al (1995) also investigated explicit memory biases in individuals with GAD, depression and controls. They employed a lexical decision

task that incorporated both sub-threshold and supra-threshold primes. The stimuli used to elicit the bias included 12 anxiety related words, 12 depressed words, 12 positive words and 12 negative words. In a free recall test, the results showed that the depressed participants recalled more depressed words in comparison to GAD and control participants.

MacLeod and McLaughlin (1995) conducted a conceptual replication of an earlier study by Mathews et al (1989). They did not find evidence of an explicit memory bias as measured by a recognition test. The encoding task involved saying each of the words as well as the colour of the words. The stimuli used incorporated 48 threat words and 48 non-threat words. The earlier study by Mathews and his colleagues (1989) also failed to find a memory bias for self-referenced encoded words.

Interestingly, Otto et al (1994) investigated hemispheric laterality on memory bias for participants with GAD, panic disorder and controls. The stimuli incorporated physical, positive and neutral words all of which participants rated for emotional relevance. Using an explicit stem completion task they also did not find an explicit memory bias. Likewise, Mogg and Mathews, (1990) also failed to find evidence of a self-referent explicit memory bias. They employed a self-referential encoding task that included 20 anxiety words and 20 non-anxiety words. Half of the 40 words were assigned to a self-referent condition and half to a other-person referent condition. Participants then completed a cued recall test and neither GAD or control participants differed in the number of self-referenced words they recalled. However, GAD participants did recall more mood-congruent words.

In the study by Mogg et al (1987) participants were presented with eighty adjectives; forty positive, twenty non-threatening and twenty threatening. Half of which were attributed to a

self-referent condition and half to a other-person referent condition. Following a distraction task, participants completed a recall task and this was followed by a recognition task. Interestingly, in contrast to the three studies presented above, the main finding of this study was that generally anxious participants recognised fewer threat words than non-threat words in comparison to control participants, suggesting no evidence of a memory bias.

The above studies were preceded by two early studies Mogg et al, (1989) and Mathews and MacLeod (1985). These two studies both used a Stroop Colour naming task as the encoding method and presented participants with a combination of threatening and non threatening words, but failed to find an explicit memory bias in a recognition test of the stimuli. However, one limitation of the latter study is it failed to state the tool used to diagnose the 'generalised anxiety state.'

In summary, of twelve studies, only twenty-five percent provided evidence of an explicit memory bias in GAD. The participants with GAD in the studies were diagnosed using a variety of instruments; 7 studies used the DSM-III-R (APA, 1987), 1 study used the DSM-IV (APA, 1994), 3 studies used the ICD-9 (U.S. Department of Health and Human Services, 1980) and one study did not state the instrument used (Mathews and MacLeod, 1985). The encoding task also varied widely, with 2 studies employing an incidental learning task, 5 simply presenting the words and 5 using a colour naming task, thus 5 of these encoding tasks were perceptual and 7 were conceptual. All of these studies then matched the encoding task (i.e. perceptual or conceptual) to the retrieval task. The retrieval tasks consisted of either a recognition task or a recall task and there did not appear to be any relationship between the type of encoding and retrieval task and the detection of an explicit memory bias. Finally, the

stimuli in the study also varied widely with regards to the number of words presented and their content.

- Autobiographical Memory

Only one study has addressed autobiographical memory biases in GAD, in which evidence of a memory bias was identified (Burke and Mathews, 1992). Participants with GAD were diagnosed using the Research Diagnostic Criteria (Spitzer et al, 1978). All participants were then presented with 24 neutral words and were asked to respond with an autobiographical memory. The results of the study showed that anxious participants recalled more memories that they associated with nervousness. In a second task, the same participants were presented with neutral words and were then asked to recall either an anxious or non-anxious autobiographical memory. Results showed GAD participants retrieved anxious memories more quickly than non-anxious memories, compared to controls.

Overall summary

In summary, only fourteen studies have examined memory biases in GAD and the findings are conflicting. There are some differences in the studies with regards to the type of memory examined, the encoding task, the retrieval task and the stimuli used. It should also be noted that the studies above utilised different diagnostic criteria to ensure all participants in the clinical sample met the criteria GAD. However, sample sizes in each of the studies were small and only three of the studies reported effect sizes.

Discussion

Summary of findings

This review has attempted to examine the evidence regarding memory biases in GAD. The results of this review found there to be a relative paucity of studies in this field, with only fourteen studies being identified, which varied with regards to their quality, study design, sample characteristics, as well as the encoding and retrieval tasks involved. The pattern of results that emerged suggests conflicting findings, with some evidence supporting the presence of memory biases in GAD and other evidence failing to do so. Examination of the findings suggests there appears to be more evidence of an implicit than an explicit memory bias in GAD; however the validity of this statement is restricted due to the limited number of studies in this area and certain key methodological issues.

Possible explanations of findings & limitations of studies

The mixed findings in this area may be attributable to variations in the type of memory examined. Williams et al (1988) noted that studies investigating memory biases in anxiety disorders have employed explicit memory paradigms whilst others have focused on implicit memory paradigms. They suggested that some evidence seems to indicate the presence of an implicit, but not an explicit memory bias for threatening material in anxiety. As an explanation they suggested that this pattern could be the result of the explicit and implicit memory being underpinned by different types of processing. They noted that implicit memory biases encompass enhanced retrieval of stimuli on tasks that do not require conscious recall. Comparatively, explicit memory involves the deliberate and conscious recall of stimuli, thus explicit memory is underpinned by elaborative processing. Therefore, as anxious individuals might tend to avoid the elaboration of threat-related material, this hypothesis suggests that threatening material is available (implicit memory) but not

retrievable (explicit memory). The results of this review provide some support for this hypothesis, with sixty percent of studies finding evidence of an implicit memory bias and only twenty-five percent of studies finding an explicit memory bias. This is also consistent with the ideas of Mogg et al (1987) who suggested a vigilance-avoidance cognitive process in anxiety, whereby individuals initially attend to threatening material but then avoid further elaboration to ensure that negative affect is not experienced.

Friedman et al (2000) suggested that one possible reason for the lack of evidence for an explicit memory bias is that in order to be elicited it requires a deeper level of processing in the encoding stage. This is a pertinent issue, since this review highlights that five of the studies examining explicit memory have used perceptual tasks, (which focus on the structural features of a stimulus) that involves lower level processing, as opposed to a conceptual task (which focuses on the meaning of an event) that involves deeper levels of processing. However, the results of these five studies were mixed, with some providing evidence of a memory bias and others failing to do so. Williams at al (1997) raised another issue regarding encoding and retrieval tasks. They suggested that to elicit a memory bias the nature of the encoding and retrieval task need to be equivalent (i.e. a conceptual encoding task followed by a conceptual retrieval task or a perceptual encoding task followed by a perceptual retrieval task). Therefore if the types of encoding and retrieval task are mismatched, then evidence of a memory bias may not be elicited. This review highlighted one study that found an explicit memory bias when the types of task were mismatched (Mathews et al, 1989). However, one other study failed to find a memory bias when the type of task was mismatched (Bradley et al, 1995). Therefore, conclusions about the extent to which the mismatch of type of task accounts for inconsistencies in existing findings are limited by the lack of studies.

It is also possible that methodological differences related to stimuli used in the memory tasks may be responsible for the discrepant findings noted above. With regards to the stimuli used to elicit memory biases, three major methodological limitations have been identified. Firstly, as Reidy and Richards (1997) noted, the content of the threatening stimuli needs to account for the type of anxiety being investigated. This is important in GAD since, as pointed out by Holaway et al (2006), a wide range of worry domains and fears are related to GAD. These include issues related to work, family, finances and health as well as miscellaneous topics. Therefore, given the wide range of concerns in GAD, the content of the stimuli used in previous studies of memory biases may not have tapped into each individual's specific domain of worry and so might not have produced reliable evidence regarding the presence or absence of memory biases in GAD. The second issue was highlighted by Rapee et al (1994) who noted that the stimuli used in past research has utilised single words to elicit memory biases. They suggested that single words may not adequately reflect the threat that anxious individuals experience in their everyday lives, therefore if these words do not tap or elicit a threat schema, it is unlikely a memory bias would be evident.

The third concern is that the list-learning procedures of the explicit / implicit memory paradigms may lack ecological validity and that is the reason underpinning the inconsistent findings in this area. To address this difficulty, Wenzel and Cochran (2006) suggested examining biases in anxiety with regards to autobiographical memory. They examined autobiographical memory biases in Panic Disorder and Social Phobia and found evidence of a memory bias towards threat when prompted by diagnosis-related automatic thoughts.

Two further limitations of the studies have been noted that were not related to the stimuli used in memory tasks. The first methodological difficulty noted was that the studies included

in this review have been conducted over two decades. During this time, the diagnostic criteria for GAD has changed significantly. As these changes have occurred new guidelines have been issued to facilitate diagnosis. Therefore, the changes to the criteria may partly account for some of the inconsistencies in the data. The final limitation of the studies in this review was that limited details were provided regarding effect sizes and statistical power. Therefore, given the small sample sizes, the interpretation of the results should be noted with caution. Future studies should include the effect sizes and power calculations and should ensure adequate sample sizes.

Limitations of this review

Two factors limit the validity of this systematic review. The review did not identify or employ a specific quality assessment instrument for assessing experimental studies of memory biases in the anxiety disorders. Consequently the authors adapted and developed an assessment tool by Downs and Black (1998). Future research should focus on developing an assessment tool which is capable of reliably assessing the quality of experimental psychopathological studies, which would be relevant to examining studies of memory biases in anxiety. A second limitation relates to the search strategy. Only half the studies incorporated in this review were found through the electronic data bases. The remaining six were found through searching the references of the articles identified through the electronic data-bases. The reason for this is that some of these studies did not mention GAD until their method sections and instead used the terms ‘anxiety’ or ‘clinical anxiety’ in the title and abstract. It was decided not to use those two terms in the search due to the fact that these elicited a plethora of studies which were irrelevant to the current review. However, to ensure that studies were not missed, the references of the narrative reviews conducted by Coles and Heimberg (2002) and Becker et al (1999) were searched.

Conclusions and Implications

To conclude, there are relatively few studies that have examined memory biases in GAD and the results of these studies are conflicting and confounded by various methodological and conceptual issues. Consequently, the debate regarding the existence and nature of memory biases in GAD is likely to continue and further research involving larger studies is required before any firm conclusions can be drawn. Such research should take into account the methodological issues highlighted above. Specifically, future research should ensure that the content of stimuli used to elicit a memory bias reflects the worry domains of the individual. Also worrisome thoughts should be used instead of single words to help accurately capture threat and to improve ecological validity. In addition, methodological difficulties concerning the list learning procedures involved in explicit and implicit memory paradigms could be overcome if future studies investigate biases in autobiographical memory. Similarly, future studies should also ensure that the statistical power is sufficient to detect a clinically significant effect. Finally, since all the previous research has examined memory biases in individuals diagnosed with GAD, future research should attempt to explore whether memory biases relate to core processes in GAD (e.g. worry) rather than just being associated with the diagnosis as a whole.

Author Disclosure

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Funding for this study was provided by NHS Yorkshire and The Humber. The funding source had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to write the paper for publication.

- **Conflict of Interest**

Both authors declare that they have are no conflicts of interests.

- **Contributors**

Lauren Brown wrote the protocol for the review under the supervision of Dr Chris Clarke. Lauren Brown then managed the literature searches and both authors undertook the quality analyses. Subsequently Lauren Brown wrote the first draft of the manuscript, which was modified in the light of feedback from Dr Chris Clarke. All authors contributed to and have approved the final manuscript.

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PART TWO

This paper is written in the format ready for submission to Cognitive Behaviour Therapy.

Please see appendix VI for the guidelines for authors.

Autobiographical Memory Biases in Worry

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Autobiographical Memory Biases in Worry

Abstract

Some models of information processing suggest that anxious individuals will display a memory bias for threatening information. Research has examined this concept with regards to explicit and implicit memory in groups of people with Generalised Anxiety Disorder (GAD) versus controls. The results of these studies have yielded conflicting findings, which are complicated by methodological issues and limitations. Only one study has examined autobiographical memory biases in GAD and there has been no previous research examining links between autobiographical memory and worry. This study was designed to examine autobiographical memory biases in worry. Sixty participants with varying levels of worry completed an autobiographical memory task in response to threatening worrisome thoughts, which were rated by participants for personal relevance. The findings suggested that individuals high in pathological worry do not recall threatening autobiographical memories when presented with highly personally relevant concerns. However, when prompted with a concern that is not relevant, evidence of a memory bias is discovered. It was also found that depression may be a key variable in ascertaining whether a general memory bias towards threat is detected in worry. However, caution is advised in the interpretation of these results, as there are a number of methodological and conceptual issues that should be taken into account. Areas for further research are highlighted.

Keywords: Worry, Autobiographical Memory, Memory Biases, GAD.

Introduction

Worry is a universal human experience (Belzer, D'Zurilla & Maydeu-Olivares, 2002). It has previously been conceptualised 'as a chain of thoughts and images, negatively affect-laden and relatively uncontrollable; it represents an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes,' (Borkovec, Robinson, Pruzinsky & DePree, 1983). More recently, Davey & Tallis (1994) suggested worry should be viewed on a spectrum, with pathological worry and non-pathological worry at opposite extremities. At the non-pathological end of the spectrum, worry is considered to be a 'constructive occupation,' which facilitates the reduction of anxiety, by enabling individuals to generate possible solutions and strategies to solve problems. Comparatively, pathological worry, a hallmark feature of Generalized Anxiety Disorder (GAD), is thought to be characterised by uncontrollable, intrusive thoughts about future events and it appears to disrupt the problem solving process (Davey, 1994). Therefore a fundamental difference between pathological and non-pathological worry is an individual's response to it.

Eysenck (1992) asserts that responses to worry depend on autobiographical memory. Conway and Rubin (1993) state that 'autobiographical memory is the memory for the events of ones life.' Bluck (2003) elaborated upon this, suggesting one important function of the autobiographical memory lies in facilitating an individual's current well-being and emotional regulation. This is achieved through the recall of memories that are positive in nature or through distorting memories in a positive fashion, thus diminishing negative affect.

Eysenck (1992) suggested worry serves three purposes, (1) alarm, (2) prompt and (3) preparation. The alarm function facilitates the detection of threatening stimuli; this is

proceeded by the prompt function which allows an individual to access information in long-term memory. Then during the preparation stage, individuals use their knowledge and understanding of how they coped in past situations, to guide their own decisions with regards to how to cope with worry in the present and the future. In Eysenck's model worry becomes a maladaptive process when it fails to contribute to effective problem-solving and this is influenced by the retrieval of autobiographical memories related to threat and coping.

Two other influential information processing models of emotion also predict that anxious individuals should broadly display a memory bias for threatening information, with anxious individuals encoding and retrieving more memories associated with threat in comparison to non-anxious controls. Specifically, Beck's Schema model (Beck, Emery & Greenberg, 1985) suggests that anxious individuals have dysfunctional schemata pertaining to information relevant to threat. The activation of the schemata is thought to result in the selective processing of information congruent with such schema. Bower's Associative Network model (Bower, 1981) suggests each emotion is represented as a node within an associative network, through which each emotion is linked with other information relevant to that node, such as memories related to that emotion. Therefore, activation of a node results in increased availability of information congruent with that node, which then results in memory biases.

To date, thirteen studies have attempted to verify the existence of explicit memory and implicit memory biases for threat in GAD, four of which examined both areas. The literature has provided conflicting results (see Coles & Heimberg, 2002), with only three of five studies providing support for an implicit memory bias (Coles, Turk & Heimberg, 2007; MacLeod and McLaughlin, 1995; Mathews, Mogg, May & Eysenck, 1989) and only three of twelve

studies documenting the presence of an explicit memory bias (Coles at al, 2007; Friedman, Thayer and Borkovec, 2000, Study 1; Friedman et al, 2000, Study 2).

One conceptual issue and three methodological factors could account for the inconsistencies in the findings of studies examining explicit / implicit memory biases in GAD. The conceptual issue was first outlined by Mogg et al, (1987). They examined biases in explicit memory and found that GAD participants recalled fewer threat words than non-threat words in comparison to non-anxious controls. Based on these findings, they suggest that a vigilance-avoidance cognitive process occurs in anxiety. Specifically, it is proposed that anxious individuals initially attend to threatening material, thus ensuring it is detected, but they then avoid further elaboration of this information, resulting in an absence of a clear memory biases. Williams, Watts, MacLeod and Mathews (1988) added to this explanation, noting that some results of studies suggest the presence of an implicit, but not an explicit memory bias (Mathews et al, 1989; MacLeod & McLaughlin, 1995). To account for this, they suggested as individuals initially attend to the information, this material would be available to the implicit memory. However, the avoidance of further elaboration ensures that it is not available to the explicit memory. In 1997, Williams and his colleagues offered a further explanation for these inconsistencies, articulating that negative results are primarily the result of utilising perceptual tasks (focus on low-level sensory features of stimuli) rather than conceptual tasks (focus on meaning of the stimuli), as well as the mismatch of these tasks during encoding and retrieval.

The first methodological factor relates to the stimuli used to elicit a memory bias. It has been suggested that the content of the threatening stimuli needs to encompass the type of anxiety being investigated. For example, Watts, Trexise and Sharrock, (1986) tested spider phobics

using freeze dried spiders and found evidence of a memory bias. This is fundamental to GAD since, as pointed out by Holaway, Rodenbaug & Heimberg (2006), a wide range of worry domains and fears are related to GAD. The second issue surrounds the encoding stimuli used in past research, which have predominantly involved single words. It has been suggested that single words do not adequately reflect the threat that anxious individuals experience in their everyday lives, therefore if these words do not elicit a threat schema, it is unlikely a memory bias would be evident (Rapee, McCallum, Melville Ravenscroft & Rodney, 1994). This methodological issue was addressed by Wenzel and Cochran (2006) who found evidence of a memory biases in Panic Disorder and Social Phobia, using automatic thoughts rather than single words as the stimuli.

The final reason suggested to account for the inconsistencies, surrounds the use of list learning procedures used in the explicit / implicit memory paradigms. Wenzel and Cochran (2006) suggested that these procedures may lack ecological validity. To overcome this issue they examined biases within the autobiographical memory. In summary, it may be possible that taking these three methodological concerns in to account is the key to discovering memory biases in GAD / worry.

The above literature highlights that there have been thirteen studies that have examined explicit / implicit memory biases in GAD. However, no studies, to date, have attempted to relate autobiographical memory biases specifically to pathological worry and only one previous study has examined autobiographical memory biases in GAD (Burke and Mathews, 1992). In this study participants were presented with neutral words and asked to retrieve either an anxious or non-anxious autobiographical memory. The results showed that GAD participants recalled more anxious memories and that they rated these memories as more

associated with nervousness and retrieved the memories more quickly than controls, suggesting the presence of an autobiographical memory bias towards threat in GAD.

Clearly there is a lack of research investigating autobiographical memory in worry and GAD. This is a fundamental gap in the research, due to the fact that Eysenck (1992) highlighted that worry becomes a maladaptive process when it fails to contribute to effective problem solving and this is influenced by the retrieval of autobiographical memories related to threat and coping. In addition, given the conflicting results of the studies examining implicit and explicit memory biases in GAD, firm conclusions regarding the underpinning cause of the conflicting results are difficult to ascertain and these are further confounded by methodological issues. Therefore, the objectives of the present study was to investigate whether there is an autobiographical memory bias in worry. In accordance with Beck's Schema theory, Bowers Associative Network model and the methodological issues highlighted above, two key questions, presented below were generated. It was not possible to make specific predictions about the relationships, as there are a number of competing hypotheses regarding the presence of a memory biases in anxiety (e.g. the vigilance-avoidance hypothesis, Mogg et al, 1987). However, Beck's Schema theory and Bowers Associative Network model may predict that the higher the level pathological worry, the higher the level of threat and the faster the retrieval latency. Finally, in terms of the relevance of the stimuli, it may be predicted that the more personally meaningful stimuli will elicit a memory bias.

> *(Research question 1a)* Is there a relationship between levels of pathological worry and levels of threat recalled in autobiographical memories, as prompted by threat-related, worrisome thoughts?

(1b) Is there a relationship between levels of pathological worry and levels of threat recalled in autobiographical memories prompted by most and least relevant worrisome thoughts?

(Research question 2a) Is there a relationship between levels of pathological worry and the retrieval latency of recalled autobiographical memories, as prompted by threat-related, worrisome thoughts?

(2b) Is there a relationship between levels of pathological worry and the retrieval latency of autobiographical memories, as prompted by most and least relevant worrisome thoughts?

Based on the concepts put forward by Eysenck (1992) and Davey & Tallis (1994), suggesting that responses to threat and worry could be influenced by autobiographical memories of threat and coping and that high levels of pathological worry are associated with a disruption in the problem solving process, a secondary objective of the study was to examine what coping styles are remembered in pathological worry. Carver, Scheier and Weintraub (1989), suggested that there are essentially three different dimensions to coping. These three dimensions were used to operationalise and examine coping styles; problem-focused coping, emotion-focused coping and avoidance-focused coping.

(Research question 3a) Is there a relationship between levels of pathological worry and the style of coping recalled in autobiographical memories, as prompted by threat-related, worrisome thoughts?

(3b) Is there a relationship between levels of pathological worry and the style of coping recalled in autobiographical memories, as prompted by most and least relevant worrisome thoughts?

Method

Inclusion and exclusion criteria

The inclusion criteria:

- Aged 18 to 65.
- Primary presenting problem anxiety / worry.
- Anxiety / worry could be co-morbid with depression.

The exclusion criteria:

- Unable to communicate in English.
- Unable to verbalise autobiographical memories.
- Co-morbid psychosis.

Participants & Power estimation

To estimate the power needed to detect a clinically significant effect a rule of thumb was employed. Wilson VanVoorhis and Morgan (2007) suggest that no less than fifty participants are needed for studies employing a correlational design. Therefore 60 participants were recruited to the study. 40 of the participants were non-clinical university students (11 male and 29 female) and 20 were clinical participants recruited from psychology and counselling services in the north-east of England (6 male and 14 female). The age of the participants ranged from 18 to 61 years (M = 28.6, SD = 10.3). Non-clinical participants were recruited though posters and email. Clinical participants were recruited through advertisements and through mental health clinicians from whom they were receiving psychological therapy.

The rationale for recruiting a clinical sample was that it was assumed that these participants were likely to have high levels of pathological worry, which they thought that they were unable to cope with and were therefore receiving support from psychology and counselling

services. Consequently these participants were recruited to ensure that the study incorporated participants with high levels of pathological worry.

Measures

- Penn State Worry Questionnaire (PSWQ, Meyer, Miller, Metzger, & Borkovec, 1990)

The PSWQ consists of 16 items that evaluate the excessiveness and intensity of worry, as well as the tendency to worry about multiple topics. Responses to each item are scored on a five-point scale (1 = not at all typical; 5 = very typical). A total score is calculated by summing these items. Scores range from 16 to 80. A higher score is indicative of a greater degree of pathological worry. The PSWQ has been reported to have high internal consistency in both clinical (a = 0.88-0.95) and non-clinical populations (a = 0.93) (Meyer et al, 1990). (See appendix IX.I for the PSWQ).

- Patient Health Questionnaire (PHQ-9, Spitzer, Kroenke, & Williams, 1999)

The PHQ-9 is a nine item depression scale. The nine items relate to symptoms and attitudes of depression, where each item can be rated from 0-3 in terms of intensity. The maximum score is 27, with a higher score suggesting increased severity of depression. This measure of depression was incorporated to use as a covariate when correlating levels of worry with retrieval latency and level of threat. The reason for this was that previous literature has identified that depression is characterised by over-generalised autobiographical memories (Williams, 1996).

In terms of its psychometric properties Cameron, Crawford, Lawton & Reid (2008) reported that the PHQ-9 demonstrated high internal consistency (a = 0.83). (See appendix IX.III for the PHQ-9).

- Distress Measure

The distress measure consists of seven items ascertaining participants' levels of distress when recalling autobiographical memories. The first item serves as a base-line measure of distress and the remaining six items measure levels of distress after recalling each autobiographical memory. Each item consists of a seven-point likert scale (1 = not at all distressed; 7 = extremely distressed). A measure of distress was included to control for the possibility that threat and retrieval latency might be influenced by the state level of distress rather than the tendency to worry pathologically. Also if distress accumulated during the experiment it is possible that threat and retrieval of memories recalled last would be affected by this. (See appendix IX.II for the distress measure).

Autobiographical Memory Task (AMT, Rubin 1982)

The AMT is one in which participants are presented with stimuli and then they are asked to generate the first memory that comes to mind. In the current study six worrisome thoughts associated with pathological worry served as the stimuli. The level of threat value within each memory, as well as the retrieval latency was measured as evidence of a memory bias. The level of threat was measured through content analysis.

AMT Stimuli

The stimuli for the AMT were composed of 18 statements thought to be typical concerns of pathological worry. The statements were thought to be typical of worry by the author and another reviewer with expertise in the area of anxiety disorders. The items were created based upon a review of worry domains in working-aged adults (Holaway at al, 2006). These included issues related to work, family, friends, finances and health as well as miscellaneous

topics. The statements also included elements of uncertainty. This was due to the fact that stimuli used in previous studies investigating memory biases in GAD have not incorporated intolerance of uncertainty, which is thought to characterise worry in GAD. Dugas, Hedayati, Karavidas et al 2005 defined intolerance of uncertainty as 'an excessive tendency to find uncertain situations stressful and upsetting, to believe that unexpected events are negative and should be avoided'.

When presented with the resultant pool of thoughts, participants are asked to chose six statements; the three most relevant and the three least relevant. Subsequently they were asked to rate the personal relevance of these items on a seven-point scale (1 = not at all typical; 7 = very typical). (See Appendix X). These six items were then used as the stimuli in the AMT.

Procedure

Identified participants were initially provided with an information sheet and given at least a week to decide whether or not they would like to participate in the study. The initial part of the experiment involved obtaining demographic information and completing the PSWQ and the PHQ-9. Finally participants were also asked to fill in the first item on the Distress Measure.

During the second part of the experiment participants were asked to choose the three most and three least relevant thoughts from the pool of eighteen that served as the stimuli and then rate the personal relevance of these. These six thoughts were inputted into a computer by the researcher. Subsequent to this, participants were provided with specific instructions on how to complete the autobiographical memory task (see appendix XI). To ensure that each

participant had understood how to complete the task, a practice trial of the following procedure was given (see below).

From this point onwards, the session was tape-recorded. Each participant was presented with the six worrisome thoughts, which appeared one at a time on a computer screen and were also said aloud by a female voice from the computer. The participants were assigned to one of two orders of stimuli, either a most relevant worrisome thought followed by least relevant (MLMLML), or a least relevant worrisome thought followed by a most relevant (LMLMLM). As a thought appeared on the computer screen the participants were asked to generate a memory based upon this thought. They were then asked to indicate when they had retrieved a memory, by saying the word 'yes.' The time taken to recall the memory was recorded. This measurement occurred from when the worrisome thought had been said by the voice from the computer to when the individual articulated that they had recalled a memory. Subsequently, participants were then asked to talk about this memory aloud. After retrieving each memory, the participant was asked to rate how distressed they felt on a seven-point likert scale. Once this procedure was complete, the researcher offered a full debrief.

Results

The following results section will be divided into four sections:

(1) Participant Characteristics & Self-Report Questionnaires.

(2) Level of Threat - examining research questions 1a and 1b.

(3) Retrieval Latency - examining research questions 2a and 2b.

(4) Coping Style - examining research questions 3a and 3b.

(1) Participant Characteristics & Self-Report Questionnaires

Using an independent samples t-test it was revealed that the mean age of clinical participants (M = 36.8, SD = 11.9) was significantly higher than (t = -4.25, df = 58, two-tailed, $p < 0.001$) the mean age of non-clinical participants (M = 24.6, SD = 6.3). However, there was no difference between the observed and expected frequency of males and females in the clinical and non-clinical group (X_2 = 0.04, df = 1, p = 0.83). Also, as expected, it was shown that the mean PSWQ score for the clinical participants was significantly higher than the non-clinical participants (t = -8.19, df = 58, two-tailed, $p < 0.001$). This pattern was also replicated for the overall distress level (t = -4.73, df = 58, two-tailed, $p < 0.001$) and the Phq-9 (t = -6.40, df = 58, two-tailed, $p < 0.001$). Table I (displayed overleaf) shows the means and standard deviations for the self-report questionnaires.

There was a significant positive correlation between the PSWQ and the overall average distress level after recalling memories (r = 0.512, df = 58, $p < 0.001$). There was also a significant positive correlation between PSWQ and the distress level before recalling autobiographical memories (r = 0.428, df = 58, $p < 0.001$). Using a paired samples t-tests it was found that the mean level of distress before recalling autobiographical memories (M =

2.27, SD = 1.33) and the mean of the overall distress level after recalling each of the autobiographical memories (M = 2.19, SD = 1.01) did not differ significantly ($t = 0.45$, $df = 59$, two-tailed $p = 0.64$).

Table I. Means and Standard Deviations for the Self-Report Questionnaires

	PSWQ		Phq-9		Overall Distress After recalling memories	
	M	SD	M	SD	M	SD
Clinical Group	65.35	10.34	13.90	7.01	3.03	1.09
Non-Clinical Group	38.75	12.53	3.28	3.41	1.77	0.66
All participants	47.62	17.28	6.82	7.00	2.19	1.01

Note: M = mean; SD = standard deviation

Please see Appendix XIV for analyses.

(2) Level of Threat

The level of threat within each set of memories recalled by participants was content analysed using the coding frame and procedure presented in Appendix X. This analysis was conducted by two different raters. The intra-class correlation of the two individuals' ratings of threat for the memories recalled after seeing most relevant thoughts ($ICC = 0.96$, $df = 58$, $p < 0.001$) and least relevant thoughts ($ICC = 0.98$, $df = 58$, $p < 0.001$) was strong. As there was such a high intra-class correlation, either raters data could be used with confidence, therefore rater one's data was used to answer the research questions.

- *Research Question 1a*

There was evidence of a weak positive correlation between PSWQ and the overall threat represented in recalled autobiographical memories, but this was not statistically significant ($r = 0.234$, $df = 58$, $p = 0.071$). However, a subsequent partial correlation showed that there was a significant positive relationship between PSWQ and overall threat scores when depression (Phq-9) was controlled for ($r = 0.28$, $df = 58$, $p = 0.027$). Also there was no evidence of a significant correlation between the overall threat score and the average distress level after recalling autobiographical memories ($r = 0.22$, $df = 58$, $p = 0.090$).

- *Research Question 1b*

There was no evidence of a correlation between the PSWQ and the threat level of memories prompted by most relevant worrisome thoughts ($r = 0.131$, $df = 58$, $p = 0.318$) Interestingly, there was a significant positive correlation ($r = 0.257$, $df = 58$, $p = 0.047$) between, the PSWQ and threat level of memories prompted by least relevant worrisome thoughts. Please see Appendix XV for the analyses.

(3) Retrieval Latency

The retrieval latency of the recall of each autobiographical memory was calculated by measuring the time from when the voice on the computer finished stating the worrisome thought; to the time that the participant articulated that they had recalled a memory.

- *Research Question 2a*

There was no evidence of a significant correlation ($r = 0.008$, $df = 58$, $p = 0.954$) between overall retrieval times and worry as measured on the PSWQ. There was also no correlation between PSWQ scores and overall retrieval score when depression (Phq-9) was controlled for ($r = -0.017$, $df = 58$, $p = 0.196$). Also there was no evidence of a relationship between the overall retrieval score and the average distress level after recalling autobiographical memories ($r = 0.09$, $df = 58$, $p = 0.481$).

- *Research Question 2b*

There was no significant correlation between the PSWQ and the retrieval latency of memories prompted by most ($r = 0.045$, $df = 58$, $p = 0.730$) or least relevant thoughts ($r = -0.026$, $df = 58$, $p = 0.845$). Furthermore, there was no evidence of a relationship between PSWQ and the difference between the averages of retrieval latency for most and least relevant thoughts ($r = 0.065$, $df = 58$, $p = 0.620$).

Please see Appendix XVI for the analyses.

(4) Coping Style

The style of coping recalled by each participant was analysed using the coding frame and procedure presented in appendix XI. This coding frame was devised by the authors, based on research by Carver et al (1989), who suggested that there are essentially three different dimensions to coping, each with a series of sub-dimensions. The three dimensions included problem-focused coping, emotion-focused coping and avoidance-focused coping.

- *Research question 3a*

There was no relationship between the overall average problem-focused score and the PSWQ ($r = 0.204$, $df = 58$, $p = 0.11$). Likewise, there was no evidence of a relationship between the overall average avoidance-focused coping style score and the PSWQ ($r = 0.028$, $df = 58$, $p = 0.83$). There was also no correlation between the emotion-focused coping score and the PSWQ ($r = -0.089$, $df = 58$, $p = 0.49$).

- *Research question 3b*

There was no significant correlation ($r = 0.13$, $df = 58$, $p = 0.31$) between the PSWQ and the problem-focused coping score for memories prompted by least relevant thoughts or for most relevant worrisome thought ($r = 0.174$, $df = 58$, $p = 0.18$).

There was also no evidence of a relationship ($r = 0.196$, $df = 58$, $p = 0.13$) between the PSWQ and the avoidance-focused coping score for memories prompted by least relevant thoughts. In addition, there was also no correlation ($r = -0.125$, $df = 58$, $p = 0.34$) between the PSWQ and avoidance-focused score for most relevant worrisome thought.

There was also no correlation ($r = 0.055$, $df = 68$, $p = 0.67$) between the PSWQ and the emotion-focused coping score for memories prompted by most relevant thoughts. This patten was also replicated for the correlation between PSWQ and the emotion-focused score for memories prompted by least relevant thoughts ($r = -0.26$, $df = 58$, $p = 0.058$).

Please see Appendix XVII for the analyses.

Discussion

The current study was designed to examine autobiographical memory biases in pathological worry. Two of the findings from the study suggest the possibility that high levels of pathological worry are related to the recall of threat in autobiographical memory. The first finding was that participants with higher levels of worry had higher levels of threat in their autobiographical memories in response to worrisome thoughts which they judged to be least relevant to them, but not those that they judged to be most relevant to them. However, caution is needed when interpreting this result and the other results, as there have been three major methodological limitations that could account for any non-significant findings. Firstly, stimuli used in the autobiographical memory task were presented only in two different orders, therefore the study may be subject to order effects. Secondly, although the participant numbers are comparable to previous research, (i.e. Coles et al, 2007; Wenzel & Cochran, 2006) it is possible that the study lacked sufficient power to detect a clinically significant effect with the consequent danger of making type-II errors in hypothesis testing. The final limitation was that the clinical participants may have differed with regards to the type and number of therapy sessions received prior to their participation in the study and this could have been a confounding factor that was not controlled for.

The above methodological limitations may account for the non-significant results. However an alternative explanation for the findings above may be that they are consistent with the vigilance avoidance hypothesis (Mogg et al, 1987), in which anxious individuals are initially alert to threatening material and stimuli but avoid the elaboration of such material. Therefore, when presented with a highly relevant concern, the associated memories that are retrieved are not biased in favour of threat because of avoidance. However, when the worrisome thought is not congruent with the individual's domains of worry they are able to recall and report threat

within their memories. This may be consistent with the findings of Burke & Mathews (1992). They examined autobiographical memory biases in GAD, using neutral words as the stimuli (i.e. possibly words that are not of high personal relevance to the participant) and found evidence of a memory bias. However, this finding conflicts with previous research examining memory biases in GAD, which found evidence of memory biases using stimuli that was personally relevant to each participant (Coles et al, 2007). This inconsistency may be attributed to the differences in the content of the stimuli, with the current study using statements that incorporating elements of uncertainty and the latter study failing to do so. This is fundamental since uncertainty is thought to underpin worry and GAD (Dugas et al 2005). Therefore, the highly relevant stimuli used by Coles et al may not have been perceived to be as threatening as the most relevant stimuli used in this study, hence they found evidence of a memory bias.

The second finding that suggests the possibility of an autobiographical memory bias related to worry was that individuals with higher levels of worry recalled greater levels of threat when depression was controlled for, irrespective of whether it was prompted by a most or least relevant thought. It has been well documented in previous literature that depressed individuals produce more over-generalised autobiographical memories in comparison to non-depressed individuals (Williams, 1996). Therefore when individuals have high comorbid worry and depression they might be unable to retrieve specific autobiographical memories regarding threat, as a result of the over-general memory bias in autobiographical memory that results from depressed mood. However, when depression is controlled for, a memory bias towards threat appears to have been present, suggesting that depression may be the key variable in determining whether a memory bias is detectable in worry. To ascertain whether depression is the key variable, future research should endeavour to replicate these results

utilising four groups; pathological worry, depression, both pathological worry and depression and controls.

With regards to retrieval latency there was no evidence in this study of bias related to levels of worry. A methodological limitation which may account for this finding is that latency was measured in milliseconds and this may not have been sensitive enough to detect the biases in retrieval. However this was a similar methodology to that utilised in other studies when significant findings have been discovered (Wenzel and Cochran, 2006; Burke and Mathews, 1992). Also, once a memory was recalled by a participant there are a number of factors which may influence whether or not the individual reports that they have recalled a memory, including how distressing they perceive that they will find articulating the memory, the social acceptability of the memory and the relationship to the researcher. These issues may have resulted in participants not stating accurately when exactly they had recalled a memory.

Another possible factor relevant to the non-significant results discussed above is that previous studies have looked at memory bias in people diagnosed with GAD rather than examining levels of pathological worry. The current study is the first to attempt to relate biases in autobiographical memory with worry levels, rather than with the diagnosis of GAD per se. Therefore, non-significant findings might be attributable to the possibility that it is anxiety levels in GAD that result in an autobiographical memory bias (assuming they do exist in some form) rather than worry itself. However, this statement conflicts with Eysenck (1992) as he predicted that maladaptive worry is influenced by the retrieval of memories from the autobiographical memory. Future work could look at this issue by repeating the procedure and measuring both worry and anxiety and involving individuals diagnosed with GAD with a control sample for comparison.

There was also no evidence of a relationship between levels of pathological worry and the coping style recalled within the autobiographical memories. There are several methodological reasons which might account for this. Firstly, Carver et al (1989) suggested that there are essentially three different dimensions to coping, each with a series of sub-dimensions. The present study only examined the three over-arching dimensions and did not examine differences between the various sub-dimensions. Thus future research should examine levels of worry in GAD and the style of coping remembered with regards to the 15 sub-dimensions. The second concern is that only one individual conducted the content analyses, therefore conclusions about its inter-rater reliability are limited. Finally, the results may have also been affected if participants did not articulate the memory they actually recalled and substituted it with a different memory, perhaps due to some of the factors outlined above (e.g. social desirability). These issues should be taken into account in future research.

In summary, this study provides some preliminary evidence suggesting the presence of an autobiographical memory bias in worry. The results may be consistent with the vigilance-avoidance theory (Mogg et al, 1987), with individuals high in pathological worry recalling threatening autobiographical memories when presented with a worrisome thought that is not personally relevant. It was also found that depression may be a key variable in whether a general memory bias towards threat is detected in worry. However, there are a number of methodological and conceptual issues that should be taken into account, particularly when examining retrieval latency and coping styles. Therefore the primary research question, as to whether there is an autobiographical memory bias in worry remains uncertain and requires further research.

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PART THREE: THE APPENDIXES

APPENDIX I

Reflective Account

Word Count: 2023

REFLECTIVE ACCOUNT

Justification for choice of journals

- *Systematic Literature Review*

The Systematic Literature Review investigated Memory Biases in Generalised Anxiety Disorder (GAD). It was written in the format ready for submission to the Journal of Affective Disorders. The decision to write for this journal was based upon four reasons. Firstly, the Journal of Affective Disorders is an interdisciplinary journal that publishes papers pertaining to affective disorders, including GAD. The second motive for choosing this journal was that it accepted systematic literature reviews and encouraged theses reviews to be written in a systematic manor, providing details of the search strategy. The third reason was derived from the impact factor of the journal. According to Journal Citation Reports (2007) it is ranked 29th out of the 95 journals in the psychiatry category and 28th out of the 146 journals in the Clinical Neurology category and the journal had a high impact factor of 3.138. Furthermore the journal reported that the average monthly download of full-text articles was 40868. Therefore, should the review be published, it would reach a large audience. Finally, as a systematic literature review had not previously been conducted in this area, it was thought that a limit of 8000 words would be useful in enabling the researchers to conduct a comprehensive review, but also write in a clear and concise manor.

Journal Citation Reports® 2007, published by Thomson Scientific

- *Empirical Paper*

The empirical paper examined Autobiographical Memory Biases in Worry. It was written in the format ready for submission to Cognitive Behaviour Therapy. The decision to write for this journal was also based on four reasons. Firstly, this journal is a peer reviewed, multidisciplinary journal, which is concerned with behavioural and cognitive sciences in clinical psychology and psychotherapy. The suggested readers of this journal included clinical psychologists, psychotherapists and any other professions interested in this topic area. Therefore the area of interest and the target readers was coherent with the current study. Secondly, at the time of the decision it was noted that the journal did not have an impact factor, however the journal highlighted that the number of high quality scientific articles were increasing and was now able to maintain a rapid publication schedule. Thirdly, previous research examining Autobiographical Memory Biases in other disorders had been published in this journal. A final reason for choosing this particular journal was that the guidelines for authors were specific and provided a structured format to facilitate the write-up of the empirical paper.

Reflective statement

This statement will reflect upon and critically self-evaluate the learning process that has occurred during the creation of my research portfolio. This statement will begin by reflecting on the process of conducting research alongside a cohort of trainee clinical psychologists, followed by reflections of the systematic literature review and the empirical paper. These reflections will consider the professional and personal issues that have arisen during the course of the research. This statement will conclude by considering the implications of the learning process for conducting research in the future.

- *Conducting research alongside other trainee clinical psychologists*

Throughout the duration of my Clinical Psychology training I have been provided with opportunities to reflect on issues, including matters arising from conducting a systematic literature review alongside a year group. Within one of these sessions, it was clear that there was a diversity of opinions as to whether or not systematic literature reviews and research more generally was a useful occupation. This made my colleagues and I reflect upon the reasons which might underpin the opposing opinions. Some of the reasons in favour incorporated applying theory to practise in the alleviation of others distress, development of a scientific base, personal enjoyment of developing and conducting research, as well as providing a mechanism to maintain a balanced case-load. Comparatively, reasons against incorporated the time-consuming nature of research, the continuous focus on the scientific elements that ignore aspects of psychology that are difficult to measure and difficulties arising the more technical aspects of research, such as statistical analyses. However further discussion revealed that it was clear through that the opinions of research and the question of its usefulness depended on the individuals past experience of research and their understanding of this research.

These discussions then made me consider what it was about my experiences that made me value research as a way of developing knowledge that can then be used to facilitate practice. There appeared to be a number of factors that influenced this, including my positive experience of completing a piece of research as an undergraduate, my understanding of the skills and knowledge needed to conduct research, as well as the acknowledgement of how I already used structure and organisation in various areas of my own life, which is a skill that is useful, consistent and applicable to research.

In addition to the factors stated above, I thought I owed part of this positive experience to the process and use of research supervision. During the initial stages of supervision, this forum enabled me to enjoy discussing theoretical concepts that were pertinent to Memory Biases in Worry, as well as to provide direction to my work outside of supervision. This then highlighted the gaps in the current research and allowed for the development and implementation of the design of the research. Alongside the educational and practical support that it supplied, it also provided a regular space to reflect on the process of the work and discuss professional and personal matters that impacted upon this work.

In summary, I think that reflection on research as a group has helped me to understand some of the reasons why clinical psychologists' value research and others do not, as well as developing my understanding of what personal reasons and experiences have facilitated my opinions of research.

- *Systematic Literature Review*

When presented with the challenge of undertaking a Systematic Literature Review, the process felt somewhat daunting. This resulted in the gathering and reading of literature regarding the purpose of conducting systematic reviews, as well as discovering what makes a review systematic and finding information on how to conduct such a review. However, the most useful experience that occurred in relation to the systematic literature review was having to complete a presentation at the beginning of the sixth year on the progress of your review. The audience of this presentation incorporated other trainee clinical psychologist and members of course staff. There were two reasons which made this experience particularly useful. The first reason resulted from only half of the trainees that were meant to attend this

session and present their work doing so. Personally, this normalised my anxiety attached to completing this piece of work and allowed a discussion of why this task was anxiety provoking. There was a consensus that the anxiety arose from the uncertainty of not knowing how to complete a systematic review, accompanied by a lack of understanding of what being 'systematic' encompassed. The second reason came from presenting my own work and seeing the presentations of others trainees reviews, which further developed my knowledge of how to complete a review and reduced the associated anxiety.

At the initial stages of the systematic literature review, one disadvantage of working in a group with individuals at the same stage of training was that I found I had a tendency to ascertain what stage in the research process others individuals were and then put pressure on myself to ensure that I was at that stage and not behind in the completion of the work. However, this was easily overcome by gaining feedback from my supervisor as to whether I was on track and recognising that everybody is going to be at different stages with different aspects of training and trying to make comparisons is somewhat superficial.

Completing the systematic literature review involved a number of decisions with regards to what my question was, which search terms and limiters to use and which journals to write for. All these decisions had a number of advantages and disadvantages, however reflecting on these issues has been a useful learning experience in ensuring I remained actively aware of why I make decisions in research.

In summary, completing the systematic literature review was an anxiety provoking task at first, however it was useful as it ensured that I was aware of all the research relevant to my

research and resulted in the review highlighting gaps in the literature base, which strengthened my rationale for my empirical paper.

- *Empirical Paper*

At the prospect of undertaking my empirical paper, I was excited at the opportunity to undertake research that could be have implications for and be applied to practice. This enthusiasm was further reinforced when the systematic literature review strengthened my rationale for completing a study into Autobiographical Memory Biases in Worry. Specifically, the review highlighted a series of methodological limitations of previous research. My empirical paper took these issues into account and as a result of this I hoped to discover some significant results to the questions that were devised. However, this enthusiasm was diminished after analysing my results. My analyses yielded a magnitude of non-significant results that I found very disappointing. This made me recognise how I associated positive findings as useful. However, through supervision I came to acknowledge that the negative results were just as useful and their implications just as important in furthering our understanding and knowledge base in this area. It has also reinforced my view as research as a circular process, due to the fact that these non-significant results has raised a whole host of other questions which warrant further research.

The primary ethical issue which arose during this study was that the recall of autobiographical memories was distressing for some participants. However, I had considered this prior to the commencement of the research. Consequently, each participant was told prior recalling memories that they did not have to participate in the research if they did not want, and that they could withdraw at any point throughout the study. Furthermore, this placed

greater importance on debriefing each participants, ensuring that understood the research, had the opportunity to ask further questions and ensure that any participant left distressed by the memories recalled in the study were helped to make contact with either the clinician involved in their care or the University counselling service. Also, this made me appreciate the importance of having a leaflet that participants could take away, with contact telephone numbers on for services that they could contact at a later point to discuss matters should they desire. The above issues were highlighted and accounted for in the designing of the research and through the process of gaining feedback from the Local Research Ethics Committee (LREC).

In summary, I think it has been useful in recognising some of the assumptions that individuals bring to research and how this can affect their emotional responses to events that occur during this process. Also considering ethical issues prior to conducting research and gaining feedback from an third party (LREC) was fundamental in ensuring the welfare of participants in the study.

- *Conclusion and Implications*

In conclusion, I have valued the opportunity to undertake and complete research. I have particularly appreciated the chance to conduct research alongside a cohort of peers at the same stage of training. This has been useful in gaining feedback on different aspects of the research as well as to normalise feelings regarding conducting research. Feedback was also useful from other individuals such as other members of course staff and members of LREC. Similarly, supervision was of fundamental importance it the process of research, specifically in developing my knowledge, research design and interpreting my results.

As I am about to embark on my career as a qualified Clinical Psychologist, these experiences will be important in enabling me to know what mechanisms do and do not help me to undertake research. This may include the development of groups of peers to discuss and evaluate the development and implementation of research ideas. The continued use of supervision will also facilitate this. These concepts will also be useful to consider when beginning to supervise the research of others individuals.

APPENDIX II

Guidance for Authors for the Systematic Literature Review

Guidance for Authors for the Systematic Literature Review

Journal of Affective Disorders

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APPENDIX III

Quality Assessment Checklist

CHECKLIST FOR MEASURING STUDY QUALITY

TITLE OF ARTICLE: _____
AUTHORS: _____
DATE PUBLISHED: _____

REPORTING

1. Is the hypothesis / aim / objective of the study clearly described?

Yes	1
No	0

2. Are the main outcomes to be measured clearly described in the Introduction or Methods section? If the main outcomes are first mentioned in the Results section, the question should be answered no.

Yes	1
No	0

3. Are the characteristics of the participants included in the study clearly described? In cohort studies and trials, inclusion and/or exclusion criteria should be given. In case-control studies, a case-definition and the source for controls should be given.

Yes	1
No	0

4. Are the methods of diagnosing GAD clearly stated as well as other inclusion and exclusion criteria for clinical participants?

Yes	1
No	0

5. Are the distributions of principal confounders in each group of subjects to be compared clearly described? E.g. Gender, age or socio-economic status.

Yes	1
No	0

6. Are the main findings of the study clearly de scribed? Simple outcome data should be reported for all major findings so that the reader can check the major analyses and conclusions. (This question does not cover statistical tests which are considered in the next section).

Yes	1
No	0

7. Does the article clearly identify the limitations of the study?

Yes	1
No	0

8. Are the stimuli used in the study clearly stated? E.g. the number of words and whether or not they were positive or negative.

Yes	1
No	0

9. 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?

Yes	1
No	0

10. Does the study use the same type of task at the encoding and retrieval stage i.e. a conceptual encoding task followed by a conceptual retrieval task or a perceptual encoding task followed by a perceptual retrieval task?

Yes	1
No	0

INTERNAL VALIDITY – bias

11. 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. If no retrospective unplanned subgroup analyses were reported, then answer yes.

Yes	1
No	0
Unable to determine	0

12. Were the statistical tests used to assess the main outcomes appropriate? The statistical techniques used must be appropriate to the data. For example nonparametric methods should be used for small sample sizes. Where little statistical analysis has been undertaken but where there is no evidence of bias, the question should be answered yes. If the distribution of the data (normal or not) is not described it must be assumed that the estimates used were appropriate and the question should be answered yes.

Yes	1
No	0
Unable to determine	0

13. Were the main outcome measures used accurate (valid and reliable)? For studies where the outcome measures are clearly described, the question should be answered yes. For studies which refer to other work or that demonstrates the outcome measures are accurate, the question should be answered as yes.

Yes	1
No	0
Unable to determine	0

POWER

14. Is the power calculation reported?

Yes	1
No	0
Unable to determine	0

15. If the effect size was reported, did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%? If the effect size was not reported than this question should be answered unable to determine.

Yes	1
No	0
Unable to determine	0

OVERALL SCORES

SUBSCALES	SCORES
Reporting	
Internal Validity – Bias	
Power	
TOTAL	

.

APPENDIX IV

Analyses related to the Systematic Literature Review

Analyses related to the Systematic Literature Review

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Quality Assessment Value Rater 1	14	9	12	10.57	.852
Quality Assessment Value Rater 2	14	9	13	10.43	1.222
Quality Assessment Value	14	9.0	12.5	10.464	1.0089
Valid N (listwise)	14				

Correlations

Correlations

		Quality Assessment Value Rater 1	Quality Assessment Value Rater 2
Quality Assessment Value Rater 1	Pearson Correlation	1	.724(**)
	Sig. (2-tailed)		.000
	N	28	28
Quality Assessment Value Rater 2	Pearson Correlation	.724(**)	1
	Sig. (2-tailed)	.000	
	N	28	28

** Correlation is significant at the 0.01 level (2-tailed).

APPENDIX V

LREC & Research Governance Documentation

APPENDIX VI

Guidance for Authors for the Empirical Paper

Guidance for authors for the empirical paper

Cognitive Behaviour Therapy

Note to Authors:** please make sure your contact address information is clearly visible on the **outside** of all packages you are sending to Editors.

PREPARING FOR SUBMISSION
When submitting a paper, the author should always make a full statement to the editors about all submissions and previous reports that might be regarded as duplicate publication of the same or very similar work. If accepted the manuscript should not be republished in any other journal without the editors' and publisher's written consent.

SUBMISSION OF MANUSCRIPTS

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All manuscripts must be in English. Writing should be concise and correct. English or American spelling is accepted if used consistently throughout the manuscript.

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2. Do not break words at the end of lines. Use a hyphen only to hyphenate compound words.
3. Enter only one space after the full-stop at the end of a sentence.
4. When emphasising words please use the italic feature of your word processor software.
5. Do not justify your text; use a ragged right-hand margin.
6. Use a double hyphen (--) to indicate a dash in text.
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8. The space bar should only be used as a word separator.

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Double-space the entire manuscript -- even the reference list -- and leave an all around margin of 1 inch or 2,5 cm. The ***Title page*** should include: 1) A brief but informative title, 2) First name, middle initial and surname of each author, 3) institution(s) to which the author(s) are affiliated, 4) full name and address, including telephone, fax and e-mail address, of the corresponding author, 5) word count including number of tables and figures (see below for word equivalent approximations) but excluding title pages and abstract.
Page 2 should carry the title only. ***Page 3*** should include an abstract, not exceeding 250 words, stating the purpose of the study, methods and main results. List up to ten key words. Organise the ***Main text*** under the following headings if possible: *Introduction, Methods, Results, Discussion, Acknowledgements and References*.

Illustrations. For electronic submission see above. With hardcopies, submit unmounted illustrations in four sets. Figures and half tones should be professionally drawn or photographed but computer-drawn figures are also accepted provided they are of high quality. Figure number and an arrow indicating 'top' should be on the back of each illustration.

Length of manuscript
Manuscripts for case studies and brief reports should not exceed six double spaced manuscript pages, inclusive of text, references, tables, and figures (approximately 2000 words). Regular articles should not exceed 5500 words. Theoretical and review articles should not exceed 8000 words. As a guideline, tables and figures approximate 150 words of text.

Submittal form
Please print out the submittal form fill in and send it together with your diskette and printed copies to the Editorial office. As a general rule manuscripts from North America should be submitted to the North American Office and all others to the European office:

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APPENDIX VII

Student Information Sheet and Consent Form

Patient Information Sheet (Version 2)

University Volunteers

Dated: 3rd March 2007

Autobiographical Memory biases in worry

We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Talk to others about the study if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of this study?

Most people worry. It is quite normal to do so. However, it is not uncommon for worry to become troublesome for some people. Some theories suggest how we cope with worries may depend upon how we use and recall autobiographical memories, i.e. our memories about things that have happened directly to us. However, there has been very little research into the relationship between worry and autobiographical memory. Research is therefore needed to address this oversight. This study hopes to investigate potential autobiographical memory biases in worry – this means that we think it is possible that when we are very worried we may remember personal events differently and this could have an effect on how we cope with worry. This study will ask people about their memories after being show certain worry-related thoughts. We would like to investigate this because it could very well hope to improve our understanding of worry and it could, in the longer term, contribute to the development of more effective psychological treatments for high anxiety and worry.

Why have I been chosen?

We are asking a broad range of people to get involved with the study and we are inviting people who may be having problems with worry at the moment as well as those who might not be. You have been invited to take part in this study because you are a student at the University of Hull, aged 18 to 65.

Do I have to take part?

It is up to you to decide. We will describe the study and go through this information sheet, which we will then give to you. We will then ask you to sign a consent form to show you have agreed to take part. You are free to withdraw at any time, without giving a reason.

What will happen if I take part?

This research is being conducted with people in this area from April 2007 until December 2007. If you agree to take part you will be asked only to attend one appointment with the researcher, which will take approximately twenty minutes. This appointment will be held typically in

private at an appointment service base that you are currently attending or a location more convenient to you. The researcher will explain the purpose of the study and then ask you if you still wish to take part. If you decide to take part your signature on a consent form will be taken and the study will begin.

The study will begin by asking you to fill in two short questionnaires relating to the way you have been feeling recently. You will then be shown a series of statements and asked to talk about any memories that come to mind in response to each of these statements. Before and after each statement you will be asked to indicate on a questionnaire how distressed you are feeling at the present time. These memories will be audio taped. These recordings will be kept in a locked filing cabinet at the University of Hull and will be destroyed when the research has been completed.

Our main aim is to compare how memories are recalled when people are worried compared to other people who may be less worried at the moment.

What are the possible risks or disadvantages of taking part?

There are no perceived risks to this study. If you agree to take part you are only required to talk about your memories of the pat for a short period of time.

What are the possible benefits of taking part?

We cannot guarantee that taking part in this study will benefit you personally and directly. The information we get from this study may help us to improve psychological treatments for individuals who are very anxious and who worry excessively.

What happen if new information becomes available?

If after completing the study it is felt that you are experiencing a previously unrecognized level of worry or depression that has not been picked up by you or your GP then the researcher will discuss this with you and decide with you who else involved in your care should also know this information. The researcher will not contact your GP without your written consent to do so.

Will my taking part in this study be kept confidential?

Yes. Throughout this study your name and address will be kept anonymous. Each participant will be only recorded and identified by a number. Disclosure of your name, address and participation in this study would only be done strictly with your written consent. The audio recordings gathered in this research will be kept in a locked filing cabinet at the University of Hull and will be destroyed when the research has been completed.

What will happen to the results of this study?

It is hoped that this study will expand our knowledge of the function of worry and how this may be influenced by the autobiographical memory. It is the purpose of this study to publish the results in one of the academic psychology journals. However, no individual participants who agreed to take place will be identified in the published article.

Who is organizing and funding this research?

This study is being conducted by the researcher as part of the academic requirements for qualification for a Doctorate in Clinical Psychology. The research is being supported by Hull and Medical School at the University of Hull, Department of Clinical Psychology. This is an NHS funded course.

Who has reviewed this study?

This study has been reviewed and approved by the Hull and East Yorkshire Research Ethics Committee

Contact for further information.

If you would like to take part in this study then please contact me at:

Lauren Winter, Trainee Clinical Psychologist
Department of Clinical Psychology
The University Of Hull
HU6 7RX

Or

l.winter@psy.hull.ac.uk

Patient Identification Number:

CONSENT FORM

Title of Project: Autobiographical memory biases in worry

Name of Researcher: Lauren Winter, Trainee Clinical Psychologist

	Please initial box
1. I confirm that I have read and understand the information sheet dated ..... for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.	☐
5. I agree to take part in the above study.	☐
6. I agree to this session being audio recorded.	☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person Taking consent	Date	Signature

APPENDIX VIII

Patient Information Sheet and Consent Form

Patient Information Sheet (Version 2)

Dated: 3rd March 2007

Autobiographical Memory biases in worry

We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Talk to others about the study if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of this study?

Most people worry. It is quite normal to do so. However, it is not uncommon for worry to become troublesome for some people. Some theories suggest how we cope with worries may depend upon how we use and recall autobiographical memories, i.e. our memories about things that have happened directly to us. However, there has been very little research into the relationship between worry and autobiographical memory. Research is therefore needed to address this oversight. This study hopes to investigate potential autobiographical memory biases in worry – this means that we think it is possible that when we are very worried we may remember personal events differently and this could have an effect on how we cope with worry. This study will ask people about their memories after being show certain worry-related thoughts. We would like to investigate this because it could very well hope to improve our understanding of worry and it could, in the longer term, contribute to the development of more effective psychological treatments for high anxiety and worry.

Why have I been chosen?

We are asking a broad range of people to get involved with the study and we are inviting people who may be having problems with worry at the moment as well as those who might not be. You have been invited to take part in this study because you are a suitable candidate being aged between 18 and 65 and are presently receiving support for your emotional well-being.

Do I have to take part?

It is up to you to decide. We will describe the study and go through this information sheet, which we will then give to you. We will then ask you to sign a consent form to show you have agreed to take part. You are free to withdraw at any time, without giving a reason. This would not affect the standard of care you receive.

What will happen if I take part?

This research is being conducted with people in this area from April 2007 until December 2007. If you agree to take part you will be asked only to attend one appointment with the researcher, which will take approximately twenty minutes. This appointment will be held typically in private at an appointment service base that you are currently attending or a location more

convenient to you. The researcher will explain the purpose of the study and then ask you if you still wish to take part. If you decide to take part your signature on a consent form will be taken and the study will begin.

The study will begin by asking you to fill in two short questionnaires relating to the way you have been feeling recently. You will then be shown a series of statements and asked to talk about any memories that come to mind in response to each of these statements. Before and after each statement you will be asked to indicate on a questionnaire how distressed you are feeling at the present time. These memories will be audio taped. These recordings will be kept in a locked filing cabinet at the University of Hull and will be destroyed when the research has been completed.

Our main aim is to compare how memories are recalled when people are worried compared to other people who may be less worried at the moment.

What are the possible risks or disadvantages of taking part?

There are no perceived risks to this study. If you agree to take part you are only required to talk about your memories of the pat for a short period of time.

What are the possible benefits of taking part?

We cannot guarantee that taking part in this study will benefit you personally and directly. The information we get from this study may help us to improve psychological treatments for individuals who are very anxious and who worry excessively.

What happen if new information becomes available?

If after completing the study it is felt that you are experiencing a previously unrecognized level of worry or depression that has not been picked up by you or your GP then the researcher will discuss this with you and decide with you who else involved in your care should also know this information. The researcher will not contact your GP without your written consent to do so.

Will my taking part in this study be kept confidential?

Yes. Throughout this study your name and address will be kept anonymous. Each participant will be only recorded and identified by a number. Disclosure of your name, address and participation in this study would only be done strictly with your written consent. The audio recordings gathered in this research will be kept in a locked filing cabinet at the University of Hull and will be destroyed when the research has been completed.

What will happen to the results of this study?

It is hoped that this study will expand our knowledge of the function of worry and how this may be influenced by the autobiographical memory. It is the purpose of this study to publish the results in one of the academic psychology journals. However, no individual participants who agreed to take place will be identified in the published article.

Who is organizing and funding this research?

This study is being conducted by the researcher as part of the academic requirements for qualification for a Doctorate in Clinical Psychology. The research is being supported by Hull and Medical School at the University of Hull, Department of Clinical Psychology. This is an NHS funded course.

Who has reviewed this study?

This study has been reviewed and approved by the Hull and East Yorkshire Research Ethics Committee

Contact for further information.

If you would like to take part in this study then please contact me at:

Lauren Winter, Trainee Clinical Psychologist
Department of Clinical Psychology
The University Of Hull
HU6 7RX

Tel: 07920008826
Email: l.winter@psy.hull.ac.uk

Patient Identification Number:

CONSENT FORM

Title of Project: Autobiographical memory biases in worry

Name of Researcher: Lauren Winter, Trainee Clinical Psychologist

Please initial box

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

4. **I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.** ☐

5. **I understand that relevant sections of my medical notes and data collected during the study, may be looked at by the researcher, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.** ☐

4. **I agree to my GP being informed of my participation in the study** ☐

5. **I agree to take part in the above study.** ☐

6. **I agree to this session being audio recorded.** ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person Taking consent	Date	Signature

APPENDIX IX

Measures

APPENDIX IX.I

PSWQ

This questionnaire will ask you about how much you worry. Please read each item carefully.

Enter the number that best describes how typical or characteristic each item is of you, putting the number next to each item.

1	2	3	4	5
Not at all typical		Somewhat typical		Very typical

_____ 1. If I don't have enough time to do everything, I don't worry about it.

_____ 2. My worries overwhelm me.

_____ 3. I don't tend to worry about things.

_____ 4. Many situations make me worry.

_____ 5. I know I shouldn't worry about things, but I just can't help it.

_____ 6. When I an under pressure, I worry a lot.

_____ 7. I am always worrying about something.

_____ 8. I find it easy to dismiss worrisome thoughts.

_____ 9. As soon as I finish one task, I start to worry about everything else I have to do.

_____ 10. I never worry about anything.

_____ 11. When there is nothing more I can do about a concern, I don't worry about it anymore.

_____ 12. I've been a worrier all my life.

_____ 13. I notice that I've been worrying about things.

_____ 14. Once I start worrying, I can't stop.

_____ 15. I worry all the time.

_____ 16. I worry about projects until they are done.

Thank you. Please check you have answered all the items.

APPENDIX IX.II

Participant identification number:

DISTRESS QUESTIONAIRE

Distress refers to feeling upset in a low or anxious way. This questionnaire will ask you how distressed you feel before and after recalling a memory. Please circle the point on each scale which shows how distressed you are feeling.

How distressed are you feeling now?

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

Memory Number 1

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

Memory Number 2

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

Memory Number 3

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

Memory Number 4

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

Memory Number 5

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

Memory Number 6

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

APPENDIX IX.III

APPENDIX X

Stimuli

WORRISOME THOUGHTS

This document will ask you about which three thoughts you think are most relevant to you and which three thoughts are least relevant to you.

Please read all of the statements and then chose three statements that are highly relevant to you. Rate these three statements in terms of their relevance to you, using the seven point scale below. Then choose three statements that are the least relevant to you and rate there relevance using the scale below.

1	2	3	4	5	6	7
Not at all typical			Somewhat typical			Very typical

_____ 1. My partner might get fed up and leave me.

_____ 2. What if I forget my keys and get locked out of my house?

_____ 3. What if I lose my job? (How will I cope?)

_____ 4. A family member of mine could get very ill. (What would I do?)

_____ 5. What if I had to drive in very bad weather?

_____ 6. Perhaps I won't be able to pay my bills?

_____ 7. What if people think I am not a good friend?

_____ 8. What if my boss does not like my work?

_____ 9. My friends may start criticising me.

_____ 10. Supposing my health dramatically deteriorates. (What would I do?)

_____ 11. What if I don't have enough time to do everything I need to do?

_____ 12. What if I make a mistake at work?

_____ 13. I am not sleeping enough - I am too tired

_____ 14. What if I'm not as good as my colleagues at work?

_____ 15. Perhaps people won't like me?

_____ 16. I am under too much stress - this must be bad for me

_____ 17. I will never have enough money to enjoy life

_____ 18. I am not doing well enough at work / college

APPENDIX XI

Instructions for completing the Autobiographical Memory Task

PARTICIPANT INSTRUCTIONS

- You will see each statement on a computer screen. You will also hear this statement being spoken. Once you heard the statement I would like you to think about the first strong memory that comes to mind. This memory should be a memory from the past – not happening now or in the future.

- As soon as you have recalled a memory I would like you to indicate this by saying the word '*yes*'.

- Then talk about this memory in as much detail as you can. How old were you? How did you cope in that situation?

ANY QUESTIONS?

APPENDIX XII

Coding Frame for Threat

CONTENT ANALYSIS OF TRANSCRIPTS: THREAT

INSTRUCTIONS FOR ANALYSIS:

- There are six memories within each transcript. Please read the first memory of the transcript.
- Below is a list of themes that will be used to analyse each memory. Within each theme are a list of words and phrases related to that topic. Please read the list of themes.
- Highlight any words or phrases from theme one, which are present in the first memory. There are two examples shown for each theme.
- Add up the number of words or phrases highlighted for theme one and record in the Table.
- Repeat this procedure for the remaining four themes.
- Then add the total number of words or phrases highlighted for all five themes and record on in Table A.
- Repeat the above procedure for the remaining five memories.

THEME 1: APPRAISAL OF PHYSICAL THREAT TO SELF

EXAMPLES: 1. 'I thought I might have a broken arm and it was painful.'
2. 'I was in a nasty car accident and it hurt my back.'

WORDS & PHRASES: Ache/Aching, Agony, Harm/Harmful, Hurt/Hurting, Pain/ Painful.

THEME 2: APPRIASAL OF PSYCHOLOGICAL THREAT TO SELF

EXAMPLES: 1. 'I remember it distinctly being quite terrifying.'
2. 'I worried about my Dad worrying about it.'

WORDS & PHRASES: Afraid, Anxiety/Anxious, Awful, Concern/Concerned, Distress/Distressed, Embarrassed/Embarrassing, Fear/ Fearful, Frightened/Frighten, Humiliated, Horror/horrific/ Horrendous/horrid/horrifying/horrible, Intimidating / Intimidate, Nasty, Nervous, Panic/Panicked, Scare/Scared, Sad, Stressed/Stress/Stressful, Traumatic, Terrible/ Terribly/Terrified/Terrifying, Upset/Upsetting. Worrying/Worry/Worried, Petrify.

THEME 3: THREATENING UNCERTAINITY

EXAMPLES: 1. 'I didn't know if thing were going to be alright.'
2. 'They were unsure what to do.'

WORDS & PHRASES: Perhaps, Maybe, Possibly, I don't know, Unsure, Uncertain, Might, Could, What if, Supposing.

THEME 4: OVERWHELMED

EXAMPLES: 1. 'It was all a bit too much.'
2. 'I just had had too much to do.'

WORDS & PHRASES: Overwhelmed. Weighted down, too much.

THEME 5: HELPLESSNESS

EXAMPLES: 1. 'I felt unable to help her.'
2. 'There wasn't anything I could do, I was powerless.'

WORDS & PHRASES: Helpless, powerless, no control, unable, incapable.

APPENDIX XIII

Coding Frame for Coping

CONTENT ANALYSIS OF TRANSCRIPTS: COPING

INSTRUCTIONS FOR ANALYSIS:

- There are six memories within each transcript. Please read the first memory of the transcript.
- Below are three methods of coping; problem-focused coping, emotion-focused coping and avoidance-focused coping. These three methods of coping will be used to analyse each memory.
- For each method of coping there is a list example of phrases related to that topic. Please read the list of each of these.
- Highlight any phrases related to problem-focused coping, which are present in the first memory.
- Add up the number of phrases highlighted and record in the Table.
- Then highlight any phrases related to emotion-focused coping, which are present in the first memory.
- Add up the number of phrases highlighted for emotion focused coping and record in the Table.
- Continue with the same record procedure for avoidance-focused coping.
- Repeat the above procedure for the remaining five memories.

METHOD 1: PROBLEM-FOCUSED COPING

Problem-focused coping involves confronting the problem to reduce the associated distress. Examples of problem focused coping are outlined below:

- Active coping *"I did what had to be done, one step at a time."*
- Planning *"I make a plan of by creating a timetable".*
- Suppression of competing activities *"I put aside other activities in order to concentrate on this."*
- Restraint coping *"I forced myself to wait for the right time to do something."*
- Seeking social support for instrumental reasons "I got my Parents to help me."

METHOD 2: EMOTION-FOCUSED COPING

Emotion-focused coping involves alleviating and managing negative emotions. Examples of emotion-focused coping are outlined below:

- Seeking social support for emotional reasons *"I talk to someone about how I feel."*
- Positive reinterpretation and growth *"I learn something from the experience."*
- Acceptance *"I learn to live with it."*
- Turning to religion *"I just prayed."*
- Focus on and venting of emotions *"I just got really angry and let it all out."*

METHOD 3: AVOIDANCE-FOCUSED COPING

Avoidance-focused coping involves the denial and avoidance of a problem, involving minimising of problems. Examples of avoidance-focused coping are outlined below:

- Denial *"I refuse to believe that it has happened."*
- Behavioural disengagement *"I coped by not doing it again."*
- Mental disengagement *"I tried not to think about it."*
- Unable to recall " I don't know how I coped."

APPENDIX XIV

Analyses Related to Participant Characteristics & Self-Report Questionnaires

Participant Characteristics and Self-Report Questionnaires

Participant Characteristics

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	17	28.3	28.3	28.3
	Female	43	71.7	71.7	100.0
	Total	60	100.0	100.0	

Descriptives

	Participant source			Statistic	Std. Error
Age	Student	Mean		24.63	1.010
		95% Confidence Interval for Mean	Lower Bound	22.58	
			Upper Bound	26.67	
		5% Trimmed Mean		23.92	
		Median		24.00	
		Variance		40.804	
		Std. Deviation		6.388	
		Minimum		18	
		Maximum		47	
		Range		29	
		Interquartile Range		6	
		Skewness		1.768	.374
		Kurtosis		3.560	.733
	Counselling/Psychology Client	Mean		36.80	2.674
		95% Confidence Interval for Mean	Lower Bound	31.20	
			Upper Bound	42.40	
		5% Trimmed Mean		36.28	
		Median		32.50	
		Variance		143.011	
		Std. Deviation		11.959	
		Minimum		22	
		Maximum		61	
		Range		39	
		Interquartile Range		20	
		Skewness		.538	.512
		Kurtosis		-.937	.992

T-Test

Group Statistics

	Participant source	N	Mean	Std. Deviation	Std. Error Mean
Age	Student	40	24.63	6.388	1.010
	Counselling/Psychology Client	20	36.80	11.959	2.674

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Participant source	60	100.0%	0	.0%	60	100.0%

Gender * Participant source Cross-tabulation

			Participant source		
			Student	Counselling/Psychology Client	Total
Gender	Male	Count	11	6	17
		Expected Count	11.3	5.7	17.0
		Residual	-.3	.3	
	Female	Count	29	14	43
		Expected Count	28.7	14.3	43.0
		Residual	.3	-.3	
Total		Count	40	20	60
		Expected Count	40.0	20.0	60.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.041(b)	1	.839		
Continuity Correction(a)	.000	1	1.000		
Likelihood Ratio	.041	1	.840		
Fisher's Exact Test				1.000	.534
Linear-by-Linear Association	.040	1	.841		
N of Valid Cases	60				

a Computed only for a 2x2 table
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.67.

Self-Report Questionnaires

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
PSWQ	60	19	80	47.62	17.268
Phq-9	60	0	24	6.82	7.005
Distress level before	60	1	7	2.27	1.339
Average distress after least	60	1.00	5.00	2.1000	1.04024
Average distress after most	60	1.00	5.00	2.2889	1.03692
Overall average distress level	60	1.00	5.00	2.1944	1.01642
Average distress after most minus average distress after least	60	-.67	1.33	.1889	.42682
Valid N (listwise)	60				

T-Test

Group Statistics

	Participant source	N	Mean	Std. Deviation	Std. Error Mean
PSWQ	Student	40	38.75	12.533	1.982
	Counselling/Psychology Client	20	65.35	10.343	2.313
Phq-9	Student	40	3.28	3.419	.541
	Counselling/Psychology Client	20	13.90	7.011	1.568
Overall average distress level	Student	40	1.7750	.66404	.10499
	Counselling/Psychology Client	20	3.0333	1.09170	.24411

T-test

Correlation between PSWQ and the Phq-9.

Correlations

		PSWQ	Phq-9
PSWQ	Pearson Correlation	1	.647(**)
	Sig. (2-tailed)		.000
	N	60	60
Phq-9	Pearson Correlation	.647(**)	1
	Sig. (2-tailed)	.000	
	N	60	60

** Correlation is significant at the 0.01 level (2-tailed).

Correlation between PSWQ and the overall average distress level after recalling autobiographical memories.

Correlations

		PSWQ	Overall average distress level
PSWQ	Pearson Correlation	1	.512(**)
	Sig. (2-tailed)		.000
	N	60	60
Overall average distress level	Pearson Correlation	.512(**)	1
	Sig. (2-tailed)	.000	
	N	60	60

** Correlation is significant at the 0.01 level (2-tailed).

Correlation between PSWQ and distress level before recalling autobiographical memories.

Correlations

		PSWQ	Distress level before
PSWQ	Pearson Correlation	1	.428(**)
	Sig. (2-tailed)		.001
	N	60	60
Distress level before	Pearson Correlation	.428(**)	1
	Sig. (2-tailed)	.001	
	N	60	60

** Correlation is significant at the 0.01 level (2-tailed).

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Distress level before	2.27	60	1.339	.173
	Overall average distress level	2.1944	60	1.01642	.13122

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Distress level before & Overall average distress level	60	.493	.000

APPENDIX XV

Analysis related to Level of Threat

Analysis of threat

Intra-class correlation between two ratings of threat for most relevant memories

		Average threat for most relevant memories - rater 1	Average threat for most relevant memories - rater 2
Average threat for most relevant memories - rater 1	Pearson Correlation	1	.962(**)
	Sig. (2-tailed)		.000
	N	120	120
Average threat for most relevant memories - rater 2	Pearson Correlation	.962(**)	1
	Sig. (2-tailed)	.000	
	N	120	120

** Correlation is significant at the 0.01 level (2-tailed).

Intra-class correlation between two ratings of threat for least relevant memories

		Average threat for least rater 1	Average threat for least rater 2
Average threat for least rater 1	Pearson Correlation	1	.981(**)
	Sig. (2-tailed)		.000
	N	120	120
Average threat for least rater 2	Pearson Correlation	.981(**)	1
	Sig. (2-tailed)	.000	
	N	120	120

** Correlation is significant at the 0.01 level (2-tailed).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Average threat for least rater 1	60	.00	3.67	1.2222	.83625
Average threat for most rater 1	60	.00	5.33	1.7944	1.22450
Average threat for least rater 2	60	.00	3.67	1.2056	.86595
Average threat for most rater 2	60	.00	5.33	1.7167	1.24846
Average threat most minus average threat least	60	-2.33	4.67	.5722	1.35309
Overall average threat	60	.00	3.50	1.5083	.80103
PSWQ	60	19	80	47.62	17.268
Valid N (listwise)	60				

Correlation between PSWQ and average overall threat score

Correlations

		PSWQ	Overall average threat
PSWQ	Pearson Correlation	1	.234
	Sig. (2-tailed)		.071
	N	60	60
Overall average threat	Pearson Correlation	.234	1
	Sig. (2-tailed)	.071	
	N	60	60

Correlation between PSWQ and overall average threat score when controlling for variability

Correlations

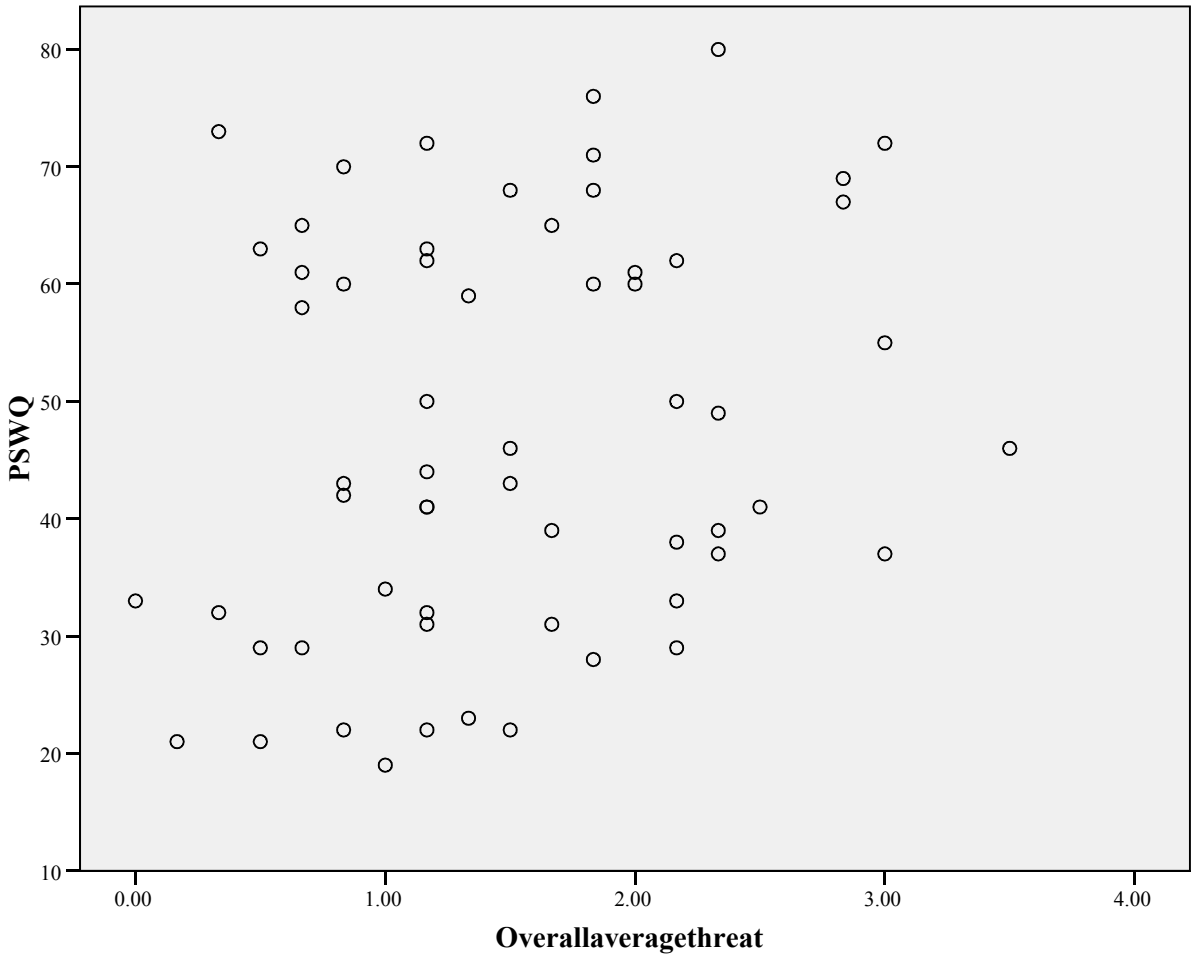
		PSWQ	Overall average threat score
PSWQ	Pearson Correlation	1	.263
	Sig. (2-tailed)		.052
	N	60	55
Overall average threat score	Pearson Correlation	.263	1
	Sig. (2-tailed)	.052	
	N	55	55

Correlation between the overall average threat level and the overall distress level after recalling autobiographical memories

Correlations

		Overall average distress level	Overall average threat
Overall average distress level	Pearson Correlation	1	.093
	Sig. (2-tailed)		.481
	N	60	60
Overall average threat	Pearson Correlation	.093	1
	Sig. (2-tailed)	.481	
	N	60	60

Scattergram of correlation between the overall threat level and PSWQ



Partial Correlation between PSWQ and the overall average threat score, controlling for Phq-9

Correlations

Control Variables			PSWQ	Overall average threat
Phq-9	PSWQ	Correlation	1.000	.289
		Significance (2-tailed)	.	.027
		df	0	57
	Overall average threat	Correlation	.289	1.000
		Significance (2-tailed)	.027	.
		df	57	0

Correlation between PSWQ and threat level for memories prompted by most relevant worrisome thought

Correlations

		PSWQ	Average threat for most rater 1
PSWQ	Pearson Correlation	1	.131
	Sig. (2-tailed)		.318
	N	60	60
Average threat for most rater 1	Pearson Correlation	.131	1
	Sig. (2-tailed)	.318	
	N	60	60

Correlations between PSWQ and threat level for memories prompted by least relevant worrisome thoughts

Correlations

		PSWQ	Average threat for least rater 1
PSWQ	Pearson Correlation	1	.257(*)
	Sig. (2-tailed)		.047
	N	60	60
Average threat for least rater 1	Pearson Correlation	.257(*)	1
	Sig. (2-tailed)	.047	
	N	60	60

* Correlation is significant at the 0.05 level (2-tailed).

Correlation between the average difference score for the most and least relevant worrisome thoughts

Correlations

		PSWQ	Average threat most minus average threat least
PSWQ	Pearson Correlation	1	-.040
	Sig. (2-tailed)		.760
	N	60	60
Average threat most minus average threat least	Pearson Correlation	-.040	1
	Sig. (2-tailed)	.760	
	N	60	60

APPENDIX XVI

Analyses Related to Retrieval Latency

Analysis of Retrieval Latency

Descriptives

	N	Minimum	Maximum	Mean	Std. Deviation
PSWQ	60	19	80	47.62	17.268
Average retrieval after least	60	2.27	65.33	22.6122	15.90192
Average retrieval after most	60	2.57	70.03	17.7761	13.13614
Difference score for average retrieval	60	-52.27	35.30	-4.8361	15.39964
Overall average retrieval score	60	3.98	52.38	20.1942	12.38658
Valid N (listwise)	60				

Correlation between PSWQ and the overall average retrieval score.

		PSWQ	Overall average retrieval score
PSWQ	Pearson Correlation	1	.008
	Sig. (2-tailed)		.954
	N	60	60
Overall average retrieval score	Pearson Correlation	.008	1
	Sig. (2-tailed)	.954	
	N	60	60

Partial correlation between PSWQ and overall average retrieval scores, when controlling for Phq-9

Correlations

Control Variables			PSWQ	Overall average retrieval score
Phq-9	PSWQ	Correlation	1.000	-.171
		Significance (2-tailed)	.	.196
		df	0	57
	Overall average retrieval score	Correlation	-.171	1.000
		Significance (2-tailed)	.196	.
		df	57	0

Correlation between PSWQ and the difference score for the average retrieval following most and least relevant worrisome thoughts.

		PSWQ	Difference score for average retrieval
PSWQ	Pearson Correlation	1	.065
	Sig. (2-tailed)		.620
	N	60	60
Difference score for average retrieval	Pearson Correlation	.065	1
	Sig. (2-tailed)	.620	
	N	60	60

Correlations between PSWQ and average retrieval prompted by most relevant worrisome thoughts.

		PSWQ	Average retrieval after most
PSWQ	Pearson Correlation	1	.045
	Sig. (2-tailed)		.730
	N	60	60
Average retrieval after most	Pearson Correlation	.045	1
	Sig. (2-tailed)	.730	
	N	60	60

Correlation between PSWQ and average retrieval prompted by least relevant worrisome thoughts.

		PSWQ	Average retrieval after least
PSWQ	Pearson Correlation	1	-.026
	Sig. (2-tailed)		.845
	N	60	60
Average retrieval after least	Pearson Correlation	-.026	1
	Sig. (2-tailed)	.845	
	N	60	60

Correlation between PSWQ and the overall average retrieval score

		Overall average distress level	Overall average retrieval score
Overall average distress level	Pearson Correlation	1	.221
	Sig. (2-tailed)		.090
	N	60	60
Overall average retrieval score	Pearson Correlation	.221	1
	Sig. (2-tailed)	.090	
	N	60	60

APPENDIX XVII

Analyses Related to Coping Style

Analyses related to Coping Style

Avoidance-focused coping

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
PSWQ	60	19	80	47.62	17.268
Average avoidance-focused coping most	60	.00	1.67	.2778	.37415
Average avoidance-focused coping least	60	.00	1.00	.2444	.31213
Diff-avoid	60	-.67	1.33	.0333	.46618
Overall average avoidance-focused coping	60	.00	1.00	.2611	.25372
Valid N (listwise)	60				

Correlation between PSWQ and the average overall avoidance-focused style of coping.

		PSWQ	Overall average avoidance-focused coping
PSWQ	Pearson Correlation	1	.028
	Sig. (2-tailed)		.830
	N	60	60
Overall average avoidance-focused coping	Pearson Correlation	.028	1
	Sig. (2-tailed)	.830	
	N	60	60

Correlation between PSWQ and the average avoidance focused coping score for memories prompted by most relevant thoughts.

		PSWQ	Average avoidance-focused coping most
PSWQ	Pearson Correlation	1	-.125
	Sig. (2-tailed)		.342
	N	60	60
Average avoidance-focused coping most	Pearson Correlation	-.125	1
	Sig. (2-tailed)	.342	
	N	60	60

Correlation between PSWQ and the average avoidance focused coping score for memories prompted by least relevant thoughts.

		PSWQ	Average avoidance-focused coping least
PSWQ	Pearson Correlation	1	.196
	Sig. (2-tailed)		.134
	N	60	60
Average avoidance-focused coping least	Pearson Correlation	.196	1
	Sig. (2-tailed)	.134	
	N	60	60

Emotion-focused coping

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
PSWQ	60	19	80	47.62	17.268
Average emotion-focused for most	60	.00	2.00	.7111	.53314
Average emotion-focused coping for least	60	.00	1.33	.5333	.38912
Diff emotion	60	-1.00	1.67	.1778	.56404
Overall average emotion focused coping	60	.00	1.50	.6222	.37188
Valid N (listwise)	60				

Correlation between PSWQ and the average overall emotion-focused style of coping.

		PSWQ	Overall average emotion focused coping
PSWQ	Pearson Correlation	1	-.089
	Sig. (2-tailed)		.497
	N	60	60
Overall average emotion focused coping	Pearson Correlation	-.089	1
	Sig. (2-tailed)	.497	
	N	60	60

Correlation between PSWQ and the average emotion focused coping score for memories prompted by most relevant thoughts.

		PSWQ	Average emotion focused for most
PSWQ	Pearson Correlation	1	.055
	Sig. (2-tailed)		.678
	N	60	60
Average emotion focused for most	Pearson Correlation	.055	1
	Sig. (2-tailed)	.678	
	N	60	60

Correlation between PSWQ and the average avoidance focused coping score for memories prompted by least relevant thoughts.

		PSWQ	Average emotion focused coping for least
PSWQ	Pearson Correlation	1	-.246
	Sig. (2-tailed)		.058
	N	60	60
Average emotion focused coping for least	Pearson Correlation	-.246	1
	Sig. (2-tailed)	.058	
	N	60	60

Problem-focused coping

Descriptives

	N	Minimum	Maximum	Mean	Std. Deviation
PSWQ	60	19	80	47.62	17.268
Average problem-focused for most	60	.00	2.33	.6611	.43153
Average problem-focused for least	60	.00	2.00	.7056	.47969
Diff-prob	60	-1.33	1.66	-.0445	.60883
Overall average prob-focused	60	.00	1.50	.6833	.33984
Valid N (listwise)	60				

Correlation between PSWQ and the average overall problem-focused style of coping.

		PSWQ	Overall average prob-focused
PSWQ	Pearson Correlation	1	.204
	Sig. (2-tailed)		.117
	N	60	60
Overall average prob-focused	Pearson Correlation	.204	1
	Sig. (2-tailed)	.117	
	N	60	60

Correlation between PSWQ and the average avoidance focused coping score for memories prompted by most relevant thoughts.

		PSWQ	Average problem-focused for most
PSWQ	Pearson Correlation	1	.174
	Sig. (2-tailed)		.183
	N	60	60
Average problem focused for most	Pearson Correlation	.174	1
	Sig. (2-tailed)	.183	
	N	60	60

Correlation between PSWQ and the average avoidance focused coping score for memories prompted by least relevant thoughts.

		PSWQ	Average problem-focused for least
PSWQ	Pearson Correlation	1	.133
	Sig. (2-tailed)		.312
	N	60	60
Average problem-focused for least	Pearson Correlation	.133	1
	Sig. (2-tailed)	.312	
	N	60	60