

THE UNIVERSITY OF HULL

Mental Imagery, Self-Defining Memories and Emotion in Individuals Likely to Develop  
Bipolar Disorder

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

By

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### **Overview**

The portfolio has three parts. Part one is a systematic literature review, in which the empirical literature relating to the relationship between mental imagery and emotion is reviewed. Part two is an empirical paper which explores self-defining memories, mental imagery and emotion in individuals likely to develop bipolar disorder. Part three comprises the appendices.

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PART ONE:  
Systematic Literature Review

The Relationship between Mental Imagery and Emotion: A Systematic Review of the  
Literature

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

Please see Appendix B for the Guidelines for Authors.

Length of Manuscript: 6,998 words (excluding Tables, Figures and References)

The Relationship between Mental Imagery and Emotion: A Systematic Review of the  
Literature

## Abstract

There is an assumption in psychology of a relationship between mental imagery and emotion when compared to other forms of processing. The purpose of this systematic review was to evaluate the existing evidence testing this relationship. Twelve empirical studies were qualitatively reviewed considering measurement methods, the use of a control or a comparison group and the level of evidence reported. All studies found support for the existence of a relationship. The majority of research however focused on negative imagery and its effect on negative emotion (anxiety), highlighting the need for more studies testing the effect of positive imagery. Two key excluded studies which found opposing results were also discussed as well as their implications on the conclusions. Clinical implications as well as directions for future studies are discussed.

*Keywords:* Mental Imagery, Emotion, Anxiety, Affect, Systematic Literature Review

## The Relationship between Mental Imagery and Emotion: A Systematic Review of the Literature

Not so long ago, it was written, "...it is true that if I think the sentence "I am about to be hit by a falling brick" I am not nearly as moved to action, or to emotion, as I am if I visualize a brick is falling down on me. There has not been a great deal of emphasis placed on this aspect of mental imagery, but it is surely important." (Pylyshyn, 2006, p. 471). The purpose of this systematic literature review is to evaluate the existing evidence testing the relationship between mental imagery and emotion. As the quote suggests, minimal research has looked at the idea that imagery appears to play a special role in representing emotionally charged material (Conway, 2002; Holmes & Mathews, 2005; Kosslyn, 2005), although this is often assumed in the context of clinical psychology. This review aims to critically assess the existing literature on this subject area, assessing clinical implications and those for future studies.

### **Mental Imagery**

Mental imagery occurs when perceptual information is accessed from memory, i.e. 'seeing from the mind's eye' (Kosslyn, Ganis, & Thompson, 2001, p.635) rather than from information that is registered directly by the senses. The terms 'pictures in the head', 'projection of images onto the inner screen' and 'visualisation' are also used when describing this phenomenon (Pylyshyn, 2006). Mental imagery is known to have many interesting properties which have been empirically tested over the years. More easily imagined, concrete words, are more easily recalled than those less imaginable, abstract words (Paivio, Yuille, & Madigan, 1968) and this was the early basis for research into the special effects of imagery on memory. Goals are likely to be more effective if stimulated as mental images (Conway, Meares, & Standart, 2004) and powerful effects

can be made on future events by simulating them in imagination than those we have thought about verbally. Participants who were asked to visually imagine themselves at the polls were found to be more likely to subsequently vote in the election (Libby, Shneffer, Eibach, & Slemmer, 2007). Interestingly the ease by which one can imagine the symptoms of a disease is also associated with the increased estimated likelihood of later contracting that disease (Sherman, Cialdini, Schwartzman, & Reynolds, 1985).

### **Emotion**

Emotions are typically described as aspects of physiological arousal or subjective experience (Izard, 2007). The amount of different emotions which exist, as well as what they are, however, is a source of controversy. The contemporary understanding is that they represent more than reactions to environmental stimuli, and are responses to various biological, psychological and social cues (Ekman, 1992; Farach & Mennin, 2007). The majority of theories accept that emotions are either positive or negative in orientation (Nesse & Ellsworth, 2009) however, beyond this the extent of categorically distinct or clusters of overlapping emotions is the subject of much debate (Barrett, 2006). For the purpose of this review, and in line with the literature, emotions will be categorised as positive and negative.

Predominately, with the exception of manic episodes in bipolar disorder, psychopathology is categorised by excessive negative affect or emotion. We are aware that emotion or more specifically negative emotion in anxiety disorders is sensitive to a multitude of factors (Moore, Chung, Peterson, Katzman, & Vermani, 2009). The topic of this review is mental imagery, and its mediating function in both increasing and decreasing positive and negative emotion will be discussed.

### **The Assumed Relationship between Mental Imagery and Emotion**

The extent to which CBT interventions target mental imagery illustrates not only the dependence on the existence of such a relationship, but also the extensive 'secondary' evidence which has been gathered regarding its treatment implications. It appears that the 'missing link' in theory practice linking, has been a broad yet pertinent and thoroughly conducted review of the literature, regarding this relationship. Whilst much research has since been conducted, the author of the following comments clearly outlines the basic rationale of this review; "One of the most interesting issues that has been raised about the emotion inducing properties of images and thoughts is their relative effectiveness in accessing emotion... However, these claims [of the mental imagery and emotion relationship] have largely been based on anecdotal reports of clinical observations." (Watts, 1997, p.175).

### **Theories of the Relationship between Mental Imagery and Emotion**

The aim of this systematic literature review is to evaluate the extent to which research depicts the existence of a relationship between mental imagery and emotion. It is therefore outside the scope of this review to evaluate the mechanisms or theories which underpin this relationship. The key three theories will however be discussed here briefly in relation to the proposed link between mental imagery and emotion (Holmes, Geddes, Colom, & Goodwin, 2008; Holmes & Mathews, 2010).

The view that emotional systems may be particularly sensitive to mental imagery is greatly endorsed by theorists due to the earlier evolution of basic emotions compared to other representational systems, such as language (Mathews & MacLeod, 2002). This earlier development of emotion enabled more direct and efficient pathways in the brain which were also more responsive to sensory-perceptual inputs. According to

this ideology, images can therefore more readily trigger emotions than language-based representations (Öhman & Mineka, 2001).

Mental imagery is known to share the neural processes which are involved with perceiving 'real events' (Kosslyn, et al., 2001). Memories for imagined events therefore are often confused with or incorporated into memories of actual events. This is more likely to happen when using imagery than using verbal techniques, as can be seen in studies illustrating failures of 'reality monitoring' (Hyman & Pentland, 1996).

The third theory is based on the idea that autobiographical memories are largely stored as images, and that this method of storing includes the associated emotional states (Conway, 2002). Images are therefore hypothesised as particularly effective cues for reactivating related episodes in memory, together with their associated emotion. This is related to evidence that imagining the future depends on much the same neural mechanisms as required to remember the past which has led to the developing concept of the 'prospective brain' (Schacter, Addis, & Buckner, 2007). The relevance of autobiographical memories is favoured and tested in a recent study where this connection was also supported by content analysis. Image descriptions were more likely to resemble personal memories describing a specific event (Holmes, Mathews, Mackintosh, & Dalgleish, 2008).

### **Clinical Relevance; Mental Imagery in Anxiety Disorders**

Distressing mental images are common in anxiety disorders such as; generalised anxiety disorder (GAD); social anxiety; post-traumatic stress disorder (PTSD) and obsessive compulsive disorder (OCD), and are known to play a key role in the maintenance of anxious difficulties (Hirsch & Holmes, 2007). Imagery has been recognised as being of importance in cognitive therapy from its early development, in yielding positive outcomes (Foa & Kozak, 1986). Early conceptualisations however



viewed images as the functional equivalence of thoughts which required the same cognitive therapy techniques (Beck, Rush, Shaw, & Emery, 1979). It was acknowledged that negative automatic thoughts, a fundamental element of cognitive behavioural therapy (CBT) often present in the form of images (Beck, Laude, & Bohnert, 1974). The unique qualities of mental images and their relevance to cognitive therapy were not fostered however until later (Stopa, 2009). Evidence clearly states that involuntary images and visual memories are prominent in many types of psychopathology (Brewin, Gregory, Lipton, & Burgess, 2010). Imagery is accepted as a key mediator in the distressing nature of symptomatology in post-traumatic stress disorder (PTSD), in the form of flashbacks (Ehlers, 2008; McTeague et al., 2010). Imagery linked to affect, beliefs and memories are particularly prevalent in the treatment of anxiety disorders such as social phobia (Hirsch, Clark, Mathews, & Williams, 2003; Hirsch & Holmes, 2007) but have also been found as key in symptoms of psychosis (Morrison, 2007). Imagery in anxiety disorders usually focuses on the individuals' feared outcome and predictions of a given situation; this forms an important 'target' for treatment as this usually constitutes the basis of a maintenance cycle, the mechanism by which difficulties do not decrease over time (Rapee & Heimberg, 1997).

### **Aim**

The aim of this systematic review is to review the evidence testing for both the presence and absence of a relationship between mental imagery and emotion, a relationship which is often assumed in the context of clinical psychology. It is hoped that the findings will contribute towards a unified evidence base informing the extent to which this assumption can be utilised in the future. A further aim of this review is to highlight methodologies which are particularly sound in the testing of this relationship, as well as the clinical implications.

## **Method**

### **Search Strategy**

An electronic search was conducted using the following databases; PsycINFO, Cochrane Review Library, Medline, SCOPUS and Web of Science. Search terms were mental imagery, emotion, affect, anxious, mood, relationship and result. Key journals were hand searched and reference lists from all included studies were searched. The search terms aimed to elicit studies which directly or indirectly tested or measured a relationship between mental imagery and emotion.

### **Inclusion Criteria**

- Quantitative research
- All age and population groups
- Published in peer reviewed journals
- Studies which reported both use of imagery and measurement of affect
- Include a form of comparison group

### **Exclusion Criteria**

- Case studies
- Studies reported in a language other than English
- Intervention studies
- Literature review articles / discussion papers
- Studies with no control or comparison group
- Receiving an inadequate score on the quality assessment criteria (<5)

### **Quality Assessment**

The quality of the studies selected for analysis in this review was assessed using an adapted version of the Methodological Quality Assessment Checklist (Downs & Black, 1998). The quality score allocated to each study considered the clear description of hypothesis/ aims / rationale and main findings, sample characteristics, use of appropriate statistical tests, validity and reliability and randomisation of procedures. An inadequate score on this quality assessment checklist was deemed as scoring below five out of a total of nineteen. This was based on a qualitative consideration of criteria not met by the studies. A copy of the checklist can be found in Appendix D and the scores for the included articles using this checklist can be found in Appendix E. Four papers were randomly selected and assessed on quality using the Quality Checklist by an independent reviewer. Inter-rater reliability was assessed and Cohen's Kappa was found to be .86 ( $p < .0001$ ) which supported significantly high inter-rater reliability.

### **Data Extraction**

Data was extracted from the selected studies using a proforma designed for the purpose of conducting this review (see Appendix G). Information regarding the sample, hypothesis, design and methodology, presence of mental imagery, measurement of emotion, presence of a control or comparison group, statistical tests used and significance of relationship (if present) and the key limitations of the study was collected.

### **Data Synthesis**

The heterogeneity of the selected studies meant that qualitative analysis was most appropriate.

### **Details of Included and Excluded Studies**

A total of 2226 articles were produced at the time of searching. A large proportion were deemed not relevant (1414), predominantly as they referred to differing forms of imagery, (such as neuroimaging studies using brain scans) and were excluded based on title alone. Of the remaining 812 papers, 778 were excluded as the title and/or abstract provided enough information to state that they were not relevant to the review question. The full papers were retrieved for the remaining 34 articles to be screened for inclusion. A further 22 studies were excluded as they were intervention studies, did not test for a relationship, or used no control or comparison group. Two further articles that did not meet the inclusion criteria for this review (Liu, Jin, Wang, & Hu, 2010; Myers, 2009) will be mentioned briefly later due to the nature of their results, one of which failed to meet the quality criteria. A total of 10 empirical papers were found to meet all of the inclusion criteria, and a pictorial representation of this process can be found in Appendix E. Contact with key authors yielded no further studies.

### **Results**

A total of 10 papers which met all of the inclusion criteria were included in this review, these were published between 1968 and 2010. Two of the studies used two separate experiments, with separate participant groups (Holmes & Mathews, 2005; Holmes, Mathews, et al., 2008) bringing the total of included empirical tests to 12. Table 1 highlights the main findings of the included papers.

### **Overview of the Quality of the Included Studies**

The aforementioned Methodological Quality Assessment Checklist provided a maximum score of 19. Scores ranged from six (Holmes, Mathews, et al., 2008,

Experiment 1) to 15 (Holmes, Mathews, Dalgleish, & Mackintosh, 2006), and had an average of 11, ( $SD = 2.75$ ). Total scores for each study can be found in Appendix F. All studies clearly described the main findings and used appropriate statistical tests. A common issue identified by the quality assessment procedure was that none of the studies reported whether or not they had sufficient power to detect a clinically important effect and only one reported the effect size. That said, even if effect sizes had been reported, comparison across studies would still have been difficult given the heterogeneity of designs and measures used. In addition, only two of the articles reported actual probability values (Holmes, Mathews, et al., 2008; Stanley & Cumming, 2010), and only in a further two of the studies had all important adverse events that maybe of consequence to the intervention been reported (Holmes & Mathews, 2005; Stanley & Cumming, 2010). In only two studies, were the individuals prepared to participate representative of the entire population from which they were recruited (Holmes, et al., 2006; Holmes, Mathews, et al., 2008, Experiment 2). Total scores for each included paper on the Quality Assessment Checklist can be found in Appendix E.

### **Participant Samples**

The sample sizes of the included studies varied between 12 (Hirsch, Mathews, Clark, Williams, & Morrison, 2006) and 88 (Stanley & Cumming, 2010). In the studies that used both males and females, the female group often appeared larger. One study used just females (Ceschi, Banse, & Van der Linden, 2009), and one just males (Reyher & Smeltzer, 1968). Participants in four of the studies were paid for their involvement (Hirsch, et al., 2006; Holmes, Lang, & Shah, 2009; Holmes & Mathews, 2005; Holmes, et al., 2006) as a database of community volunteers was utilised. A general population sample was used in all studies, except in one where a clinical sample of participants meeting the DSM criteria for social phobia was used (Hirsch, et al., 2003). Additional

characteristics of sample groups include: students who completed at least one hour a week of exercise (Stanley & Cumming, 2010); and individuals who smoke at least one pack of cigarettes per day (Maude-Griffin & Tiffany, 1996). The English-language was used in all studies with the exception of one where participants spoke French (Ceschi, et al., 2009); findings however were reported in English.

### **Method of Imagery Measurement**

11 of the studies requested the use of mental imagery. Of this group, the participants in seven studies were instructed to; combine a picture and a word using imagery (Holmes, Mathews, et al., 2008, Experiment 2; Reyher & Smeltzer, 1968); to use imagery of an auditory presented scenario (Holmes, et al., 2009; Holmes, et al., 2006); or imagine as if an event or situation was happening to them (Holmes & Mathews, 2005, Experiment 1 & 2; Maude-Griffin & Tiffany, 1996). Participants in the remaining four studies were requested to use imagery from or based on personal experience, more specifically this included; enjoyment/energy/technique imagery of using exercise (Stanley & Cumming, 2010); having given a speech that went well or was worried about (Hirsch, et al., 2006); a situation from the past year that elicited an anxious/calm/neutral response (Ceschi, et al., 2009); or a usual self-image/ less negative self-image (based on video feedback in individuals with social phobia) (Hirsch, et al., 2003).

The remaining study instead chose to measure the extent to which mental imagery is used naturally. Participants were asked 'when you were combining the picture and word combinations, how much did you find yourself thinking in mental images?'

### **Method of Emotion Measurement**

Two of the studies tested for the mere presence of affect, in both cases participants were asked 'how emotional did the described event seem?', responding on a scale from 1-not at all emotional to 7-very emotional (Holmes & Mathews, 2005, Experiment 2; Holmes, Mathews, et al., 2008, Experiment 1). In all cases, testing for the presence of affect had been conducted in supplement to other testing. In the remaining 10 studies, six measured exclusively negative affect, and four measured both positive and negative affect, no study however measured changes exclusively in positive affect.

Of the six studies testing the relationship between mental imagery and exclusively negative affect, the State Trait Anxiety Inventory was predominately used (STAI: Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI was used alone in one study (Holmes, Mathews, et al., 2008, Experiment 2) in combination with a Likert scale (0 - 10) of anxiety in another (Hirsch, et al., 2006) and with the Implicit Association Test (IAT-Anxiety: Egloff & Schmukle, 2002) to measure the implicit self-concept of anxiety in another (Ceschi, et al., 2009). Participants were asked to rate the presence of affect (1-not at all emotional, 7-very emotional) in addition to the STAI in one study (Holmes & Mathews, 2005, Experiment 1) and a rating of anxious mood (AMR) from 0-not at all anxious to 8-extremely anxious in addition to the STAI in another (Hirsch, et al., 2003). An alternative and out-dated method of measuring exclusively negative affect as a result of mental imagery was used in one study (Reyher & Smeltzer, 1968) where a Psychogalvanometer (GSR) measured skin conductance, counting the number of responses which were 500 ohms or greater in a 30 second interval.

Two of the four studies which measured both positive and negative affect used the STAI in combination with the Positive and Negative Affect Schedule (PANAS: Watson, Clark, & Tellegen, 1988) one used the full scales (Holmes, et al., 2006) and the

other used only positive affect scale on the PANAS (Holmes, et al., 2009). A Feeling Scale (FS: Hardy & Rejeski, 1989) which rates 'good' and 'bad' feelings during exercise was used by one study in the measurement of emotion (Stanley & Cumming, 2010). The combination of an Affect Intensity Measure (AIM: Larsen, 1985) to test for the presence of affect and a Mood Form (Diener & Emmons, 1984) to record positive and negative emotion was used in a final study (Maude-Griffin & Tiffany, 1996).

### **Control or Comparison Group**

As defined by the inclusion criteria, all studies used a form of control or comparison group. One study however, differed in its use of observational methodology and involved participants stating whether or not imagery was used, essentially forming groups for comparison (Holmes, Mathews, et al., 2008, Experiment 1). Of the remaining 11 studies, six compared the effects of mental imagery against verbal processing on emotion. For four of these studies, this meant that participants were asked to focus on the meaning of a description given as they heard it (Holmes, et al., 2009; Holmes & Mathews, 2005, Experiments 1 & 2; Holmes, et al., 2006). Participants were asked to make a sentence using the words given in one study (Holmes, Mathews, et al., 2008, Experiment 2) and to 'associate' verbal thoughts to words provided in another (Reyher & Smeltzer, 1968).

A 'no imagery' control group was used to compare to other imagery types (i.e. enjoyment imagery/energy imagery and technique imagery) in one paper (Stanley & Cumming, 2010). Self-imagery was used in two studies; one using a control imagery group who were asked to recall a recent shopping trip, compared to a recent speech that a) went well (positive) or b) they were worried about (negative) (Hirsch, et al., 2006). In the other, who used a social phobic sample, one group used their usual negative self-image, and the other group used a less negative self-image as elicited by video



feedback, as a comparison (Hirsch, et al., 2003). In the final two studies, imagery was compared between an anxious or negative situation vs. a calm or positive situation vs. a neutral situation (Ceschi, et al., 2009; Maude-Griffin & Tiffany, 1996).

### **Evidence of a Relationship**

In the single study using correlational analysis, a significant correlation between mental imagery and emotion was found, no significant correlation was found however between descriptive language and emotion. The difference between these two relationships also reached significance, (Holmes, Mathews, et al., 2008, Experiment 1). Henceforth the relationship between imagery and emotion will be grouped into the following four categories; positive imagery increases positive emotion; negative imagery increases negative emotion; positive imagery reduces negative and increases positive emotion and negative imagery reduces positive and increases negative emotion. These groupings reflect a trend for categorisation in the evidence reviewed. The terms negative emotion and anxiety will be used interchangeably here as the literature reviewed reflects their use as meaning the same thing with regards to the feelings produced following imagery.

#### **Positive imagery increases positive emotion.**

Only one study reported that imagery increased positive emotion. When compared to a 'no imagery' control, participants reported that they 'felt better' following the use of imagery during exercise, and this was reflected in the significant interaction between time points and imagery condition on the Feeling Scale (FS), as well as in the subsequent post hoc analysis (Stanley & Cumming, 2010). The minimal evidence available provides support that positive imagery indeed increases positive emotion when compared to a no imagery comparison.

**Negative imagery increases negative emotion.**

Seven of the studies specifically tested the effect of negative mental imagery on negative emotion. Significantly more negative emotion following negative imagery was found in two of those studies, when compared to positive or control imagery conditions. Both studies used self-imagery. A significant effect of negative imagery on anxiety was found using the STAI when compared to the control, as well as the Anxious Mood Rating (AMR) (Hirsch, et al., 2003). A significant difference was found between the effects of negative and positive self-imagery on anxiety as supported by the STAI as well as on anxiety Likert scale, a significant difference was also found between the use of negative and a control self-image on the STAI (Hirsch, et al., 2006).

Four studies found significantly more negative emotion following negative imagery, when compared to verbal processing (or descriptive language) of the same. Anxiety was greater in the imagery rather than the verbal condition (Holmes, Mathews, et al., 2008, Experiment 2). Following a significant interaction of time point, condition, and anxiety scores, the imagery condition showed a significant increase over time (Holmes & Mathews, 2005, Experiment 1). In their subsequent study, a significant interaction was found between time point, condition and valence, with post-hoc analysis finding a significant increase in mean anxiety in the negative imagery condition compared to the negative verbal condition (Holmes & Mathews, 2005, Experiment 2). In additional support for this relationship, mean skin conductance scores using a Psychogalvanometer (GSR) for imagery were found to be significantly higher when compared to those for verbal association, and this difference was significant (Reyher & Smeltzer, 1968).

Significant differences between situation-based imagery conditions were found on state anxiety as reported on the IAT-Anxiety and the STAI-State (Ceschi, et al.,

2009). Post hoc analysis found significantly more anxiety following anxious situation based imagery when compared to calm or neutral imagery.

In summary, seven studies provide support that negative imagery increases negative emotion (or anxiety). Evidence suggests that these effects exist beyond that of positive imagery or a control when using self-imagery; are more so than verbal association of the same material and are observed as greater on state anxiety when compared to calm or neutral situation based imagery.

### **Positive imagery reduces negative and increases positive emotion.**

Three studies found support for a significant reduction of anxiety and significant increase of positive emotion, following positive imagery. The findings of two studies were in comparison to verbal processing (or descriptive language) of the same. A significant decrease in anxiety in the positive imagery condition was observed, as well as a significant increase in positive affect (Holmes, et al., 2009). Significant findings were also demonstrated in an earlier study (Holmes, et al., 2006). When compared to negative or neutral imagery script conditions, positive scripts were found to increase positive mood and reduce negative mood (Maude-Griffin & Tiffany, 1996).

In summary, the evidence suggests positive imagery significantly reduces negative emotion and increases positive emotion when compared to verbal processing of the same material or negative or neutral imagery.

### **Negative imagery reduces positive and increases negative emotion.**

In a single study, negative imagery scripts as compared to neutral scripts were found to increase negative mood and reduce positive mood (Maude-Griffin & Tiffany, 1996). This study provides support that negative imagery reduces positive and increases negative emotion.

### **Evidence from Key Excluded Studies**

Due to the nature of publication bias based on successfully finding relationships between phenomena rather than an absence of such a relationship, two studies are briefly discussed here in an attempt to balance this bias. The finding of these studies must first be considered in relation to the nature of their non-inclusion; the first study was excluded as it scored below adequately (4 out of 19) on the Quality Assessment Checklist (Liu, et al., 2010). As the study included the pre-test only, failings involved not clearly describing the hypothesis/aim/objective of the study, inaccurate (not valid or reliable) use of outcome measures and a lack of randomisation between groups. The second study was not included primarily as it was an unpublished thesis, in addition it was not grounded in psychology and was instead business orientated (Myers, 2009). If we are able to consider these two studies, regardless of their failings, they provide the only evidence in the entirety of the literature reviewed that opposes the existence of a relationship between mental imagery and emotion.

In the first study, 60 students were divided into three groups and asked to; score 300 pictures (n = 20) using a 9-point scale for arousal (1 = completely calm, 9 = completely aroused) as well as valence, (1 = completely unpleasant, 9 = completely pleasant); score 300 words (n = 20) using the same scales; or rate the extent to which the contents of the picture and its corresponding word were congruent. A 2 (picture vs. word) x 3 (three conditions) x 3 (emotions) repeated measure ANOVA was conducted. Findings showed that the pictures and words were not significantly different in valence and arousal rating ( $F < 1$ ), and not significantly different across conditions (Liu, et al., 2010).

In the second study, 87 students were given one of two forms of a public health pamphlet about Human Papilloma Virus (HPV); a high vividness version containing a

personalised story, and a low vividness version that did not contain this story (Myers, 2009). The aim was to test for message persuasiveness based on the level of vividness. Message vividness, negative affect, affective arousal and mental imagery were among the measures completed. One way ANOVAs using mental imagery and negative affect reported that there is no significant difference between the vividness of the message and the degree to which participants' experienced negative affect. Nor was any support reported for a relationship between imagery vividness and emotion.

In summary, findings from these two studies suggested no difference in emotional arousal or valence between the use of pictures or words, and no relationship between imagery vividness and negative affect. Whilst providing the only opposing evidence in the literature reviewed, the rigour by which these studies were completed is not deemed sufficiently satisfactory, hence their non-inclusion. Considering the publication bias is essential to ensure that contrasting support is not overlooked. However, the manner by which they were conducted and the quality of the methodology used prevents any serious effect on the conclusions drawn from the 12 included studies.

## **Discussion**

This review aimed to systematically gather and analyse the evidence base for the often assumed relationship between mental imagery and emotion in clinical psychology. Existing empirical studies which tested for the presence of a causal relationship were evaluated. A unified evidence base has been constructed which can inform the extent of which this relationship is assumed. Methodological considerations including the measurement of mental imagery and emotion, as well as the use of a comparison or control group have also been reported. 10 papers were included in this review, which provided a total of 12 empirical studies which reported varying degrees of evidence to

support the presence of a relationship between mental imagery and emotion. Their findings will be discussed alongside the various limitations and strengths of the studies, clinical implications and considerations for future studies.

### **Overview of the Findings**

In all 12 of the empirical studies included, an association between mental imagery and emotion was reported. Evidence emerged to support all of the following four statements; positive imagery increases positive emotion; negative imagery increases negative emotion; positive imagery reduces negative and increases positive emotion and negative imagery reduces positive and increases negative emotion.

The extent of support did however vary between categories; with the majority of support for negative imagery increasing negative emotion (or anxiety). These seven studies who found support, were all of reasonable to high quality, and the variation of comparison groups (including positive or control imagery, verbal association and calm or neutral situation based imagery) provides a sound empirical basis in support of a relationship between negative imagery and negative emotion specifically. Following this, positive imagery increasing positive and reducing negative emotion was supported by three studies. All studies were reasonable to high quality and included comparison between verbal processing of the same material or negative or neutral imagery. The differing methods by which the relationship was tested increases the reliability of the findings, however subsequent studies are required in this area to permit sufficient empirical grounding. One study provided support for each of; positive imagery increasing positive emotion, and negative imagery reducing positive and increasing negative emotion. Whilst both studies provided support, and the quality was of a reasonable level, one study in each category is not satisfactory to allow generalisations of such relationships. With this in mind, it may be more appropriate that these studies

report their findings as preliminary support within their specific category. However, an overview of the 12 studies suggests a reasonable likelihood that a relationship between mental imagery and emotion exists, with more research required within the majority of the specific categories mentioned.

A variety of methods for comparison were utilised throughout the studies. Stronger conclusions can therefore be made regarding the relationship between mental imagery, when compared to verbal processing on emotion. The variety of comparison groups used is the strength of this study in terms of the support of a relationship, conclusions regarding the superior effects of mental imagery compared to no imagery, anxious or calm, and positive or negative conditions however require replication before adequate support can be concluded.

Due to publication bias the likelihood that studies successfully finding opposing evidence for the existence of a relationship not being published; information regarding two excluded studies had been included. The unpublished thesis (Myers, 2009) and the low quality pre-test (Liu, et al., 2010) were unsuccessful in providing support for the existence of a relationship. However as previously stated there are a lot of limitations in both of the studies which prevents sufficient grounds for serious consideration of their findings at this time.

### **Strengths and Limitations**

Whilst the evidence base formed as a result of this review provides evidence in support of the existence of a relationship, key limitations of the studies must be considered. The heterogeneity of the studies in terms of their design and measures used meant that a meta-analysis of cross study results was inappropriate. In addition the lack of reporting of effect sizes also made such a comparison problematic. It was difficult to gauge therefore the level of affect that might be clinically important from the studies

reported and quantitatively assess strengths and limitations of individual designs. As with much research, participants were predominately self-selecting i.e. were paid for their contribution or consisted of an opportunity sample. As they were not a representative sample from the general population, this again would limit the extent to which conclusions can be made of affects observed, however as variety existed between studies this does improve the validity of the overall review. Additional selection criteria existed in three of the studies and included; levels of exercise; diagnosis of social phobia and smoking behaviours. Whilst reducing the generalisability of the results in individual studies, they act to increase the validity of this review, as findings from other areas, such as sport psychology, particularly when not explicitly testing for such relationships, are likely to provide purer results. They are likely to not be optimised towards gathering specific findings in support of a hypothesis as relevant to this review.

Whilst overall scores for quality were satisfactory, one study was close to inadequate, with a score of just six (Holmes, Mathews, et al., 2008, Experiment 1). In this case, the main outcome measures used were judged as not valid and reliable, and the main outcomes measured were not clearly described in the introduction or method. As this study was the only correlation study, considering this low quality score affects the extent to which a correlation between mental imagery and emotion can be concluded. As the quality assessment was adapted for this review alone, and not standardised the cut-off of a score below five is somewhat meaningless and not grounded in empirical knowledge.

The variation in emotion measurement in the studies included in this review acts to reinforce the strength of the relationship found, conclusions can be made that observations of mood improvement and reduction are consistent and not dependent upon the use of a single measure. The request that mental imagery is used (or not used), in a majority of the studies, is however somewhat unreliable. If participants are asked to



'verbalise', one cannot be sure that this is completed in absence of 'visualising', and vice versa. The fact that visualising, for example, may instead be an automatic process, coexisting in any of the conditions of the studies included is barely documented as a limitation of findings produced. This cannot be ruled out as a coexisting process in any of included studies, as such, subsequent findings are judged accordingly.

The overall ecological validity of the studies varied, particularly the lab experiment (Stanley & Cumming, 2010) where conditions vary considerably to that of everyday life. Any study which requests participants combine pictures and words through the use of an image or a descriptive sentence may also have trouble in justifying the extent to which this may occur outside of the experiment. Other studies however include using imagery or thinking about the verbal meaning of auditory presented scenarios, or holding a less negative self-image in mind while giving a speech have considerably more validity, as well as implications for clinical practice (as discussed later).

Whilst the variety of measures used strengthens conclusions made, the unvalidated nature of some of the included measures must be considered. 'How emotional did you find the combination of this picture and word?' was not piloted as a measure of affect, and the Feeling Scale (FS) is more readily used in the arena of sport psychology, and is designed to measure pleasure and displeasure as well as feeling 'good', and feeling 'bad'. As such the extent to which they can record positive and negative emotion as effectively as the STAI or PANAS is unknown. The purity of the measures is questioned as evidence suggests the STAI may also reflect levels of depression as well as anxiety (Bieling, Antony, & Swinson, 1998). In addition, the STAI is not designed to reflect positive emotion, as in one study a reduction in score of this measure is stated as such (Holmes & Mathews, 2005, Experiment 2). Predominately all measures were self-report, this methodology permits key limitations (Greenwald et al., 2002) firstly the

limits of awareness of how one is feeling, as well as potential response biases possibly due to social desirability. Such limitations affect the validity of the explicit measures used and consequent conclusions drawn from them.

Other potential limitations of the studies include demand characteristics, as in one study participants were asked to generate a less negative view of themselves and then to give a speech, is very likely that participants were able to prejudge the hypotheses of such an experiment enabling them to 'act' accordingly or in an opposing manner, as either way would affect findings (Hirsch, et al., 2006). Final strengths however are the inclusion of studies involving a nonclinical, and a clinical sample, particularly when discussing the extent of clinical indications. The inclusion of the only two studies with opposing findings, whilst considering their limitations, is a key strength of this review.

### **Implications for Clinical Practice**

Strong evidence to support the causal relationship between mental imagery and positive and negative emotion has clear implications for clinical practice. Sufficient grounding has been provided here to support the large number of studies which have gathered 'secondary evidence' based on the assumption of the existence of this relationship. This review allows and encourages the recognition of imagery use as of being important in outcomes of therapy. Based on the evidence reviewed here alone, it may be suggested that imagery is of superior importance rather than functional equivalence to thoughts in the requirement of cognitive therapy techniques. Imagery use is already prevalent in the treatment guidelines for disorders such as PTSD, anxiety disorders and even psychosis. But based on the level of support for imagery when compared to verbal processing or descriptive language, in its effects on emotion, this review outlines the need for continued development of imagery orientated techniques and therapies for successful outcomes in clinical psychology.

### **Future Studies and Directions**

As outlined in the quality assessment criteria, it is essential that most if not all must be met in any research in this area. Specifically power calculations must be completed, and documented to allow readers to make judgements on clinical importance of findings. All important adverse events that may be of consequence to the outcome must be reported as well as all actual P values. Populations from which participants are gathered must be representative of the general population, and if this is not possible this must explicitly be stated as a limitation of any results received.

This review outlines the importance of selecting an appropriate methodology which allows generalisability and validity of results acquired. Methodology should be devised which allows testing of naturally occurring imagery use as compared to an adequate comparison or control group. This review has highlighted that verbal processing is the most common and it appears as an appropriate and comparable group once the knowledge that requesting individuals to use a certain method does not mean they will solely do so, is considered. If possible, studies should compare both positive and negative affect, and there is a definite research need for studies specifically testing for increases in positive affect following imagery, as much more research exists for negative affect. Standardised measures must be used which are pure and empirically validated, as statements regarding mere presence of emotion are not sufficient. Such measures, if available, should be based on more than self-report, and could draw from studies which measure physiological representations of anxiety, such as the one included here (Reyher & Smeltzer, 1968). High-quality correlational analyses are also required, allowing effect sizes to be documented in addition to the significance of differences between relationships. This is in addition to the requirement of studies completed in order to replicate the findings of key authors. Future studies may wish to

consider the findings that did not reach significance in the two studies detailed in this review.

### **Conclusions**

This review provides an overview of the empirical evidence base supporting the statement that mental imagery has a causal relationship on emotion. Consistent evidence from all of the included papers provides support for the conclusion that a relationship exists. Research however primarily focuses upon negative imagery and its effects on negative emotion or anxiety. Particular limitations of the included studies, as well as of this review include the lack of a statement of power; the use of self-reported unvalidated measures and low ecological validity. Strengths however include the variation of emotion measures used, clinical and nonclinical samples as well as studies which directly and indirectly test for a relationship. Clinical implications of this review include providing empirical grounding for the 'secondary evidence' assuming the relationship and the need for continued development of imagery orientated techniques and therapies. Suggestions for methodologies of future research have been outlined as well as the need for clear replication studies. The limitations discussed are not considered sufficient to disregard the consistent conclusion that a significant causal relationship exists although they should be considered in order to strengthen future research in this area.

### References

- Barrett, L. F. (2006). Are Emotions Natural Kinds? *Perspectives on Psychological Science, 1*(1), 28-58. doi: 10.1111/j.1745-6916.2006.00003.x
- Beck, A. T., Laude, R., & Bohnert, M. (1974). Ideational components of anxiety neurosis. *Archives of General Psychiatry, 31*(3), 319-325.
- Beck, A. T., Rush, J., Shaw, B., & Emery, B. (1979). *Cognitive therapy of depression*. New York: Guildford.
- Bieling, P. J., Antony, M. M., & Swinson, R. P. (1998). The state trait anxiety inventory, trait version, structure and content re-examined. *Behaviour Research and Therapy, 36*, 777 - 788.
- Brewin, C. R., Gregory, J. D., Lipton, M., & Burgess, N. (2010). Intrusive images in psychological disorders: Characteristics, neural mechanisms, and treatment implications. *Psychological Review, 117*(1), 210-232. doi: 10.1037/a0018113
- Ceschi, G., Banse, R., & Van der Linden, M. (2009). Implicit but Stable Mental Imagery Changes Explicit but not Implicit Anxiety. *Swiss Journal of Psychology, 68*(4), 213-220. doi: 10.1024/1421-0185.68.4.213
- Conway, M. A. (2002). Sensory-perceptual episodic memory and its context: Autobiographical memory. In A. Baddeley, J. P. Aggleton & M. A. Conway (Eds.), *Episodic memory: New directions in research*. (pp. 53-70). New York, NY US: Oxford University Press.
- Conway, M. A., Meares, K., & Standart, S. (2004). Images and goals. *Memory, 12*(4), 525-531. doi: 10.1080/09658210444000151
- Diener, E., & Emmons, R. A. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology, 47*(5), 1105-1117. doi: 10.1037/0022-3514.47.5.1105

- Downs, S. H., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal Of Epidemiology And Community Health, 52*(6), 377-384.
- Egloff, B., & Schmukle, S. C. (2002). Predictive validity of an implicit association test for assessing anxiety. *Journal of Personality and Social Psychology, 83*(6), 1441-1455. doi: 10.1037/0022-3514.83.6.1441
- Ehlers, A. (2008). Posttraumatic stress disorder. From theoretical model to effective treatment. *International Journal of Psychology, 43*(3-4), 529-529.
- Ekman, P. (1992). Are there basic emotions? *Psychological Review, 97*(3), 315-331.
- Farach, F. J., & Mennin, D. S. (2007). Emotion-Based Approaches to the Anxiety Disorders. In J. Rottenberg & S. L. Johnson (Eds.), *Emotion and psychopathology: Bridging affective and clinical science*. (pp. 243-261). Washington, DC US: American Psychological Association.
- Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*(1), 20 - 35.
- Greenwald, A. G., Banaji, M. R., Rudman, L. A., Farnham, S. D., Nosek, B. A., & Mellott, D. S. (2002). A unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychological Review, 109*(1), 3-25. doi: 10.1037/0033-295x.109.1.3
- Hardy, C. J., & Rejeski, W. J. (1989). Not what, but how one feels: the measurement of affect during exercise. *Journal of Sport and Exercise Psychology, 11*(3), 304-317.
- Hirsch, C. R., Clark, D. M., Mathews, A., & Williams, R. (2003). Self-images play a causal role in social phobia. *Behaviour Research and Therapy, 41*(8), 909-921. doi: 10.1016/s0005-7967(02)00103-1

- Hirsch, C. R., & Holmes, E. A. (2007). Mental imagery in anxiety disorders. *Psychiatry*, 6(4), 161-165. doi: 10.1016/j.mppsy.2007.01.005
- Hirsch, C. R., Mathews, A., Clark, D. M., Williams, R., & Morrison, J. A. (2006). The causal role of negative imagery in social anxiety: A test in confident public speakers. *Journal of Behavior Therapy and Experimental Psychiatry*, 37(2), 159-170. doi: 10.1016/j.jbtep.2005.03.003
- Holmes, E. A., Geddes, J., Colom, F., & Goodwin, G. (2008). Mental imagery as an emotional amplifier: Application to bipolar disorder. *Behaviour Research and Therapy*, 46(12), 1251-1258. doi: 10.1016/j.brat.2008.09.005
- Holmes, E. A., Lang, T. J., & Shah, D. M. (2009). Developing interpretation bias modification as a "cognitive vaccine" for depressed mood: Imagining positive events makes you feel better than thinking about them verbally. *Journal of Abnormal Psychology*, 118(1), 76-88. doi: 10.1037/a0012590
- Holmes, E. A., & Mathews, A. (2005). Mental Imagery and Emotion: A Special Relationship? *Emotion*, 5(4), 489-497. doi: 10.1037/1528-3542.5.4.489
- Holmes, E. A., & Mathews, A. (2010). Mental imagery in emotion and emotional disorders. *Clinical Psychology Review*, 30(3), 349-362. doi: 10.1016/j.cpr.2010.01.001
- Holmes, E. A., Mathews, A., Dalgleish, T., & Mackintosh, B. (2006). Positive Interpretation Training: Effects of Mental Imagery Versus Verbal Training on Positive Mood. *Behavior Therapy*, 37(3), 237-247. doi: 10.1016/j.beth.2006.02.002
- Holmes, E. A., Mathews, A., Mackintosh, B., & Dalgleish, T. (2008). The causal effect of mental imagery on emotion assessed using picture-word cues. *Emotion*, 8(3), 395-409. doi: 10.1037/1528-3542.8.3.395

- Hyman, I. E., & Pentland, J. (1996). The role of mental imagery in the creation of false childhood memories. *Journal of Memory and Language*, 35(2), 101-117. doi: 10.1006/jmla.1996.0006
- Izard, C. E. (2007). Basic Emotions, Natural Kinds, Emotion Schemas, and a New Paradigm. *Perspectives on Psychological Science*, 2(3), 260-280. doi: 10.1111/j.1745-6916.2007.00044.x
- Kosslyn, S. M. (2005). Mental images and the brain. *Cognitive Neuropsychology*, 22(3-4), 333-347. doi: 10.1080/02643290442000130
- Kosslyn, S. M., Ganis, G., & Thompson, W. L. (2001). Neural foundations of imagery. *Neuroscience*, 2, 635 - 642.
- Larsen, R. J. (1985). Theory and measurement of affect intensity as an individual difference characteristic. *Dissertation Abstracts International*, 45(Section B: The Sciences and Engineering.), 2297.
- Libby, L. K., Shneffer, E. M., Eibach, R. P., & Slemmer, J. A. (2007). Picture Yourself at the Polls: Visual Perspective in Mental Imagery Affects Self-Perception and Behavior. *Psychological Science*, 18(3), 199 - 203.
- Liu, B., Jin, Z., Wang, Z., & Hu, Y. (2010). The interaction between pictures and words: Evidence from positivity offset and negativity bias. *Experimental Brain Research*, 201(2), 141-153. doi: 10.1007/s00221-009-2018-8
- Mathews, A., & MacLeod, C. (2002). Induced processing biases have causal effects on anxiety. *Cognition & Emotion*, 16(3), 331-354. doi: 10.1080/02699930143000518
- Maude-Griffin, P., & Tiffany, S. T. (1996). Production of smoking urges through imagery: The impact of affect and smoking abstinence. *Experimental and Clinical Psychopharmacology*, 4(2), 198-208. doi: 10.1037/1064-1297.4.2.198



- McTeague, L. M., Lang, P. J., Laplante, M.-C., Cuthbert, B. N., Shumen, J. R., & Bradley, M. M. (2010). Aversive imagery in posttraumatic stress disorder: Trauma recurrence, comorbidity, and physiological reactivity. *Biological Psychiatry*, *67*(4), 346-356. doi: 10.1016/j.biopsych.2009.08.023
- Moore, P. J., Chung, E., Peterson, R. A., Katzman, M. A., & Vermani, M. (2009). Information integration and emotion: How do anxiety sensitivity and expectancy combine to determine social anxiety? *Cognition and Emotion*, *23*(1), 45-68. doi: 10.1080/02699930802214551
- Morrison, A. P. (2007). Case Formulation and Cognitive Schemas in Cognitive Therapy for Psychosis. In L. P. Riso, P. L. du Toit, D. J. Stein & J. E. Young (Eds.), *Cognitive schemas and core beliefs in psychological problems: A scientist-practitioner guide*. (pp. 177-197). Washington, DC US: American Psychological Association.
- Myers, J. R. (2009). *The persuasion effects and mechanisms of vivid imagery inducing strategies in negative health messages: Exploring the roles of motivation, affect, and message substance*. 70, ProQuest Information & Learning, US.
- Nesse, R. M., & Ellsworth, P. C. (2009). Evolution, emotions, and emotional disorders. *American Psychologist*, *64*(2), 129-139. doi: 10.1037/a0013503
- Öhman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review*, *108*(3), 483-522. doi: 10.1037/0033-295x.108.3.483
- Paivio, A., Yuille, J. C., & Madigan, S. A. (1968). Concreteness, imagery, and meaningfulness values for 925 nouns. *J Exp Psychol*, *76*(1), Suppl:1-25.
- Pylyshyn, Z. W. (2006). *Seeing and visualizing: It's not what you think*. London: MIT Press.

- Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*, 35(8), 741-756.
- Reyher, J., & Smeltzer, W. (1968). Uncovering properties of visual imagery and verbal association. *Journal of Abnormal Psychology*, 73(3), 218 - 222.
- Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: The prospective brain. *Nature Reviews Neuroscience*, 8(9), 657-661. doi: 10.1038/nrn2213
- Sherman, S. J., Cialdini, R. B., Schwartzman, D. F., & Reynolds, K. D. (1985). Imagining can heighten or lower the perceived likelihood of contracting a disease - the mediating effect of ease of imagery. *Personality and Social Psychology Bulletin*, 11(1), 118-127.
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stanley, D. M., & Cumming, J. (2010). Are we having fun yet? Testing the effects of imagery use on the affective and enjoyment responses to acute moderate exercise. *Psychology of Sport and Exercise*. doi: 10.1016/j.psychsport.2010.06.010
- Stopa, L. (2009). How to use imagery in cognitive-behavioural therapy. In L. Stopa (Ed.), *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy*. (pp. 65-93). New York, NY US: Routledge/Taylor & Francis Group.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.

Watts, F. N. (1997). Thoughts and images. In J. M. G. Williams, F. N. Watts, C.

Macleod & A. Mathews (Eds.), *Cognitive psychology and emotional disorders*

(pp. 169 -189). Chichester, UK: Wiley.

Table 1

*Overview of included papers*

Author / Date	Sample N (f/m)	Method	Hypothesis	Measures 1: Imagery; 2: Emotion	Details of Relationship	Descriptive Findings
Stanley & Cumming (2010)	88 (56f/32m)	Allocation to one of four conditions; enjoyment imagery, energy imagery, technique imagery or exercise alone. Effect measured before, during, and after 20 min of moderate intensity cycle ergometry.	Conditions using personally relevant imagery would have increased affective responses than exercising in absence of such a strategy.	1: Requested, using personal experience. 2: Feeling Scale (FS)	Significant interaction between time and conditions: FS; $F(8.40,233.80) = 2.60, p = .01$ Post hoc analysis: Enjoyment and energy imagery groups felt significantly 'better' than the control group post exercise.	The use of imagery during moderate intensity exercise can evoke significantly beneficial affective responses above and beyond those produced by exercise alone.
Holmes, Mathews, et al. (2008)	53 (46f/7m)	20 negative picture word pairs presented, with instructions to combine. No specific instructions given about method. Information regarding extent of emotion, and method used was recorded.	Self-selected use of mental imagery would be positively correlated with ratings of intensity of experienced emotion.	1: 'When you were combining the picture and word combinations, how much did you find yourself thinking in mental images?' 2: 'How emotional did you find the combination of this picture and word?' (1: not at all, 9: extremely)	Significant correlation; imagery and emotion: $r(51) = 0.37, p = .006$ Descriptive language and emotion: NS. Significant difference between relationships: $p = .003$	The extent of spontaneous use of imagery, relative to verbal representation, is associated with the degree of reported emotional response.

Exp. 1

Exp. 2	32 (24f/8 m)	108 picture word pairs presented, half of which, with negative valence, the other benign. Specific instructions given to combine using imagery or descriptive sentences.	Directed use of mental imagery, when compared to descriptive sentences would result in greater anxiety increases after negative picture word combinations.	1: Requested. 2: STAI	For negative pairs, anxiety was greater in the imagery than in the verbal condition: $t(30) = 2.81, p = .005, d = 1.04$	Mental imagery is more likely to elicit negative emotion than the use of descriptive sentences, when using picture word pairs.
	Hirsch, et al. (2006)	12 (7f/5m)	Low anxiety public speakers (>10 on PRCs) were directed to use negative, positive or control self-imagery (using personal scenarios) prior to giving a speech.	Negative self-imagery would have a detrimental effect (relative to positive self-imagery) on anxiety.	1: Requested, based on personal experience. 2: STAI; 0-10 anxiety Likert scale.	Significant difference between negative and positive self-imagery on anxiety; STAI: $F(1,21) = 6.60, p < .05$ Anxiety Likert: $F(1,21) = 5.11, p < .05$ Significant difference between negative and control self-imagery; STAI: $F(1,21) = 5.01, p < .05$

Holmes, et al. (2009)	40 (22f/18m)	100 auditory scenario's with ambiguous but consistently positive outcomes. Instructed to use imagery or think about verbal meaning. Positive and negative emotion recorded.	Participants in the imagery condition would show (a) greater reduction in state anxiety and (b) greater increases in positive affect; when compared to a verbal condition.	1: Requested. 2: STAI; Positive effect; PANAS.	(a) Significant interaction of time x condition: $F(1,38) = 15.20, p < .001$ Significant decrease in anxiety in the imagery condition: $t(19) = 2.28, p = .04, d = 1.31$ (mean change = 2.85, $SD = 5.60$ ) (b) Significant interaction of time x condition: $F(1,38) = 10.67, p = .002$ Sig increase in positive affect $t(19) = 5.80, p < .001, d = 0.37$ (mean change +4.95, $SD = 3.82$ )	There were significant interactions between the imagery and verbal conditions on both; reducing anxiety, and increasing positive affect. There was a significant increase in positive effect following imagery use, which was not found in the verbal condition.
Ceschi, et al. (2009)	60 (60f)	Randomly assigned to one of three mental imagery conditions; anxious, calm or neutral situation. Recall vivid personal memory and described in detail. Implicit and explicit anxiety assessed.	Mental imagery can alter explicit and implicit self-representations of anxiety in a content congruent direction.	1: Requested, based on personal experience. 2: Explicit anxiety state (EAS); STAI; Implicit Anxiety Measure (IAT).	Significant difference between conditions for state anxiety; EAS: $F(2,57) = 65.03, p < .01$ STAI-state: $F(2,57) = 64.03, p < .01$ Post hoc analysis: Anxious situation led to increased state anxiety than other conditions: Scheffe $p < .05$	State anxiety, but not trait anxiety, increases when a vivid mental image of a past anxiety provoking situation is created and held in mind.

Holmes & Mathews (2005)	Exp. 1	24 (15f/9m)	100 auditory scenarios with negative emotional outcomes. Instructed to imagine as if the event was happening to them, or to focus on the words and meaning of the description. Negative emotion recorded.	Participants in the imagery condition would show a greater emotional response than would those in the verbal semantic condition.	1: Requested. 2 STAI; 'How emotional did the described event seem?' (1: not at all emotional, 7: very emotional)	Significant interaction of time x condition; $F(1,22) = 6.10, MSE = 13.98, p = .022$ Anxiety scores within the imagery condition showed a significant increase over time; $t(11) = 3.83, p = .003, d = 0.91$	Mental imagery reportedly increases state anxiety, when compared to a verbal semantic condition.
	Exp. 2	51 (38f/13m)	100 audio scenarios with a negative valence and 100 that were benign. Instructed to imagine as if the event was happening to them, and to focus on the words and meaning of the description.	There will be a bigger increase in anxiety following the negative condition that involved imagery, when compared to verbal processing.	1: Requested. 2: 'How emotional did the described event seem?' (1: not at all emotional, 7: very emotional)	Significant interaction, time x condition x valence; $F(1,39) = 4.28, MSE = 13.58, p = .045$ Significant increase in mean anxiety in negative imagery condition compared to negative verbal condition; $t(21) = 1.73, p < .05, one-tailed, d = 0.69$	Negative imagery has great effects on self-reported anxiety than does verbal processing of the same material.

Maude-Griffin & Tiffany (1996)	100 (49f/51m)	Smokers presented with audiotaped smoking-related scripts describing positive, negative and neutral situations. Instructed to imagine vividly the situation has if actually happening. Positive and negative mood recorded.	The manipulation of imagery within the scripts will have a strong impact on self-reported mood.	1: Requested. 2: Affect Intensity Measure (AIM); Mood form.	Significant effect of imagery on emotion; Positive scripts compared to a combination of negative and neutral scripts on increased positive mood and reduction of negative mood: $F_s(1,94) \geq 1,174.42, p_s < .0001$ Negative scripts compared to neutral scripts on increased negative mood and reduced positive mood: $F_s(1,94) \geq 252.04, p_s < .0001$	Positive and negative emotions are significantly influenced by smoking-related scripts including positive and negative imagery in smokers.
Holmes, et al. (2006)	26 (17f/9m)	100 audio scenarios with ambiguous but consistently positive outcomes. Instructed to use imagery or think about verbal meaning. Positive and negative emotion recorded.	Participants in the imagery condition would show (a) greater reduction in state anxiety and (b) greater increases in positive affect; when compared to a verbal condition.	1: Requested. 2: STAI; PANAS	(a) Significant at interaction for time x condition; $F(1,24) = 7.36, p = .012$ Significant reductions in anxiety, in the imagery group, compared to the verbal descriptions group; mean change = -4.38 ( $SD = 8.37$ ) vs. +3.38 ( $SD = 6.04$ ), $t(24) = 2.71, p = .006$ , one-tailed, $d = 1.06$ (b) Significant interaction for time x condition; $F(1,24) = 11.43, p = .002$ Significant increase in positive affect in the imagery group, compared to the verbal descriptions group; mean change	The use of positive mental imagery significantly increases positive affect, and reduces state anxiety, when compared to verbal descriptions of the same.



					= +7.15 ( <i>SD</i> = 10.30) vs. -6.08 ( <i>SD</i> = 9.63), $t(24) = 3.38$ , $p = .001$ , one-tailed, $d = .11$	
Hirsch, et al. (2003)	16 (12f/4m)	Patients with social phobia held two conversations with a stranger; once holding their usual negative self-image, (NSI) and once holding a less negative (Control) self-image.	The negative imagery condition will be associated with higher levels of anxiety.	1: NSI; Requested, using personal experience. Control; Requested, using video feedback evidence. 2: STAI; Anxious Mood Rating (AMR).	Significant effect of negative imagery on anxiety, when compared to the control; STAI; 55.94 ( <i>SD</i> = 10.15) vs. 45.50 ( <i>SD</i> = 10.15) $F(1,14) = 43.12$ , $p < .001$ AMR; 5.56 ( <i>SD</i> = 1.67) vs. 4.61 ( <i>SD</i> = 1.85) $F(1,14) = 8.59$ , $p < .05$	Holding a negative self-image in mind resulted in significantly greater reports of anxiety, when compared to a control.
Reyher & Smeltzer (1968)	21 (21m)	Directed to 'image' or to 'associate' two words from different categories. Psychogalvanometer (GSR; measures skin conductance) used to record arousal.	Negative visual imagery is accompanied by more anxiety (as measured by GSR) than verbal association.	1: Requested. 2: Number of GSR responses of 500 ohms or greater for 30 seconds intervals.	Mean GSR score for imagery: 70.09, compared to verbal association: 64.76. Difference significant at .01 level.	Imagery produces heightened GSR activity, (understood as anxiety) through the use of visual imagery over verbal association.

PART TWO:  
Empirical Paper

Mental Imagery, Self-Defining Memories and Emotion in Individuals Likely to Develop  
Bipolar Disorder

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Mental Imagery, Self-Defining Memories and Emotion in Individuals Likely to Develop  
Bipolar Disorder

## Abstract

The Hypomanic Personality Scale (HYP) which is accepted as a screening tool for individuals likely to develop bipolar disorder was used to screen university students. No participants reached the significantly high score cut off. Scorers in the top 10% (HHYP) and bottom 10% (LHYP) recalled 4 self-defining memories (SDM's), rated them for imagery presence and vividness and their subsequent affect was recorded. The HHYP were not found to have more vivid imagery in their SDM's than the LHYP group. Imagery vividness was significantly positively related to positive emotion, but no significant relationship was found with negative emotion in the HHYP group. The theme 'disrupted sense of self' which is known to be present in bipolar patients SDM's was found to be more present in the HHYP group. A positive correlation was found between HYP scores and Sense of Hyper Positive Self Scores (SHPSS), a predictor of treatability in bipolar disorder, but only for Ideal not Usual or Total scores. These findings are considered in relation to the relevant literature and the theoretical and clinical implications are discussed as well as the various limitations and implications for future studies.

*Keywords:* Mental Imagery, Emotion, Bipolar Disorder, Anxiety, Hypomanic Personality, Self-defining Memories, Sense of Hyper Positive Self.

## Mental Imagery, Self-Defining Memories and Emotion in Individuals Likely to Develop Bipolar Disorder

The importance of mental imagery in the understanding of bipolar disorder is at present, undervalued and widely unacknowledged (Holmes, Deepro, Geddes, & Goodwin, 2009; Holmes, Geddes, Colom, & Goodwin, 2008). The evidence, whilst arguably based on the studies of a few key authors, allows the conclusion that mental imagery plays a causal role in both positive and negative affect (Ceschi, Banse, & Van der Linden, 2009; Hirsch, Clark, Mathews, & Williams, 2003; Hirsch, Mathews, Clark, Williams, & Morrison, 2006; Holmes, Lang, & Shah, 2009; Holmes, Mathews, Mackintosh, & Dalgleish, 2008). As the majority of self-defining memories are known to be stored as mental images, they provide sound access to testing of the theory of imagery's contribution to the progression and maintenance of the 'high' and 'low' episodes within bipolar disorder.

### **Mental Imagery**

'Seeing from the mind's eye' is the commonly held definition of mental imagery, describing the process by which perceptual information is accessed from memory (Kosslyn, Ganis, & Thompson, 2001, p.635). The terms 'pictures in the head', 'projection of images onto the inner screen' and 'visualisation' are also used when describing this phenomenon (Pylyshyn, 2006). Early research began to uncover some of the interesting properties of this imagery. More easily imagined, concrete words, are more easily recalled than those less imaginable, abstract words (Paivio, Yuille, & Madigan, 1968); goals simulated as mental images are more likely to be more effective (Conway, Meares, & Standart, 2004) and future events simulated in imagination are more likely to later occur, than those thought about verbally (Libby, Shneffer, Eibach,

& Slemmer, 2007) and that even includes the perceived likelihood of later contracting a disease (Sherman, Cialdini, Schwartzman, & Reynolds, 1985).

### **The Relationship between Mental Imagery and Emotion**

Early documented views on visual mental imagery described it as more easily influenced by 'unconscious processes' such as vulnerability, helplessness and anxiety; when compared to a verbal presentation of the same material (Reyher, 1963). With the implications for 'uncovering' repressed material, a process used in psychoanalytical psychotherapy, these properties of mental imagery were later tested by asking participants to 'image' or 'associate' words from categories such as; sex, hostility and family relationships (Reyher & Smeltzer, 1968). Results of skin conductance by a psycho-galvanometer, a measure of the physiological anxiety response, displayed a significantly higher level of physiological response to visual imagery than verbal association. Subsequent research shifted focus to measuring the comparative effects of mental imagery against verbal processing on reported emotional response. Common processing mechanisms in the brain are utilised when conjuring up a mental image in your mind's eye, or when actually perceiving it (O'Craven & Kanwisher, 2000). This enables the use of superior methods to record the presence of mental imagery, when compared to verbal thought as the sensory properties can be verbally communicated as well as demonstrated using functional Magnetic Resonance Imaging (fMRI).

The first study to explicitly test the relationship between mental imagery and emotion did so by asking participants to either imagine an aversive event was happening to them, or to focus on the words and meaning of a description provided (Holmes & Mathews, 2005). Significantly more anxiety was reported through the use of mental imagery, concluding mental imagery is more likely to elicit negative emotion than the use of descriptive sentences. Whilst these conclusions have been subsequently

supported (Ceschi, et al., 2009; Hirsch, et al., 2003; Hirsch, et al., 2006; Holmes, Mathews, et al., 2008) due to the methodology employed, generalisations were restricted to the presence of a relationship between requested use of mental imagery and the self-reported increase of negative affect. It is of importance, particularly as related to its role as theorised here in bipolar disorder, that there is support of mental imagery impacting both positive and negative emotional affect due to the bipolarity in affective responses within both manic and depressive episodes.

Whilst using small samples, two subsequent studies were able to provide initial support that mental imagery is instrumental in both the reduction of negative affect, and increase in positive affect using the Positive and Negative Affect Schedule (PANAS: Watson, Clark, & Tellegen, 1988) in combination with the State Trait Anxiety Inventory (STAI: Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) (Holmes, Mathews, Dalgleish, & Mackintosh, 2006; Holmes, Mathews, et al., 2008). Similar methodology was used in a later study whereby participants were asked to focus on the meaning of the description, or to imagine it and both positive and negative affect were recorded (Holmes, Lang, et al., 2009). Findings supported a significant increase in positive affect following the use of mental imagery which was not found in the verbal condition. Whilst further research is still required, such studies contribute to the empirical breath sufficient to underpin the statement that 'mental imagery has a causal effect on emotion'.

### **Mental Imagery in Bipolar Disorder**

Some authors hypothesise that the tendency to be a 'visualiser' may be a neglected risk factor for psychological disorders (Holmes, Geddes, et al., 2008) as individuals are more likely to acquire specific fears or phobias have higher trait levels of imagery, compared to those who do not (Dadds, Hawes, Schaefer, & Vaka, 2004).



Patients with bipolar disorder, more specifically, are theorised as predominantly visualisers. Supporting evidence has found that a high percentage of individuals with a diagnosis had visual imagery for autobiographical memories (Mansell & Lam, 2004). In other research looking at prepositional versus implicational level of processing, it was found that individuals with bipolar disorder have a tendency to operate at a more abstract level of representation, which can be illustrated by the phrase 'a picture says a thousand words' (Lomax, Barnard, & Lam, 2009). In addition, a subsequent study reported bipolar patients as demonstrating significantly higher general imagery use, more vivid future event imagery as well as high levels of involuntary perspective imagery (Holmes, Deerprouse, et al., 2009).

### **The Application of a Relationship between Mental Imagery and Emotion to Bipolar Disorder**

A cognitive model of the imagery and emotion relationship, as applied to bipolar disorder has been developed, based on the notion that a) imagery amplifies anxiety and b) imagery amplifies mood elevation in bipolar disorder (Holmes, Geddes, et al., 2008). An adapted version of Clark's cyclical panic model (Clark, 1986) is drawn upon proposing an explanation of mood increase and decrease as amplified by imagery, contributing to the explanation for the 90% lifetime comorbidity between bipolar disorders and anxiety disorders (Merikangas et al., 2007). The model poses that triggers such as physiological bodily changes (Clark, 1986) as well as negative intrusive imagery (Tzemou & Birchwood, 2007) are met with negative interpretations, which are predominantly facilitated by imagery, which act to amplify anxiety. There does however appear to be a lack of differentiation between anxiety and depression in this model, which is important due to its claims to explain the development and maintenance of depressive episodes. The method proposed for mood elevation is again somewhat under

explained, and states that imagery associated with positive outcome is met with an overly positive interpretation, predominantly facilitated by imagery, as well as an increase in mood of relating beliefs, goals and action likelihood, leading to mood elevation (Holmes, Geddes, et al., 2008). Whilst having potential shortcomings, this model does appear to form the basis of a theory stating the importance of the relationship between both positive and negative mental imagery, and mood instability as well as outlining the need for additional research in the area.

As the majority of self-defining memories are known to be stored as mental images, most literature in the area have used them in the testing of the relationship between the presence of mental imagery and the resultant emotion. Current knowledge regarding the themes present in self-defining memories in bipolar disorder will then be discussed following an introduction to this memory type.

### **Self-Defining Autobiographical Memories**

A self-defining memory (SDM) is a highly significant personal memory which is of a specific event in one's life that is believed to contribute to their personal identity (Singer, 2005). Research suggests that this type of personal memory is paramount in the understanding of our personality (Conway & Pleydell-Pearce, 2000). SDM's are characterised by the following criteria; they are vivid memories which evoke strong emotion at the time of recollection, they are linked to many other similar memories, they are repeatedly recalled, and focus on an enduring concern or unresolved conflict of the personality (Blagov & Singer, 2004). The concept of autobiographical reasoning argues that connections are made between the self and memories of past events, and a crucial part of constructing one's life story is through these connections (McLean, 2008; McLean & Fournier, 2008). The majority of autobiographical episodic memories are stored in the form of images, as this permits the event related sensory, perceptual,

cognitive and affective details that invoke the experience of mentally 'reliving' a past event (Conway, 2002; Wheeler, Stuss, & Tulving, 1997).

### **Themes of Self-Defining Memories in Bipolar Disorder**

Many studies have identified vivid re-occurring distressing memories which have been characterised by their themes in psychological disorders such as PTSD and depression (Ehlers et al., 2002; Hackmann, Ehlers, Speckens, & Clark, 2004; Williams & Moulds, 2010). The themes of these memories appear to be related to the specific concerns of the individual with the disorder; it is therefore proposed that the themes of such memories for bipolar patients play a key role in the understanding of the disorder (Mansell & Lam, 2006). Research has found that patients with bipolar disorder show self-concept as strongly compartmentalised between positive and negative extremes, with less integration than a control (Power, de Jong, & Lloyd, 2002). This was further extended by a qualitative study, where it was suggested that bipolar disorder creates experiences of confusion, contradiction and self-doubt making it difficult for these patients to establish continuity in their sense of self (Inder et al., 2008). A further empirical study found evidence to support significantly more self-defining memory narratives related to a disrupted sense of self or 'acting out of character' than a nonclinical control (Raymond & Lam, 2009). The bipolar group were also found to recall more self-memories relating to external definitions of self that were based on their diagnosis of mental illness than any of the other themes coded.

No empirical literature however is available regarding the themes within self-defining memories for individuals pre-diagnosis. Diagnosis of a mood disorder such as bipolar disorder is highly likely to affect not only attribution to, but also memories of self-defining events. The presence of 'mental illness' is for example unlikely to be present in one's self memories prior to diagnosis. For this reason, substantial

information can be gathered by exploring the self-defining memories of individuals more likely to later develop the disorder, pre-diagnosis.

### **Hypomanic Personality as a Predictor of Bipolar Disorder**

There have been many attempts to evaluate the role of premorbid personality features in affective illnesses such as bipolar disorder (Tavormina, 2010). Neuroticism, extraversion and agreeableness, as well as the most widely researched hypomanic personality are among the factors thought to be related to later onset of bipolar disorder (Blechert & Meyer, 2005). There is on the whole inconsistent findings about elevated neuroticism in bipolar patients, studies into major depression however have found strong links between this trait and severity of symptoms (Hecht, van Calker, Berger, & von Zerssen, 1998; Kendler, Gatz, Gardner, & Pedersen, 2006). In a sample with undiagnosed bipolar symptoms, the 'tendency' to trait depression and to trait mania were tested as separate but correlated dimensions of a bipolar disorder predisposition (Murray, Goldstone, & Cunningham, 2007). Within this model, trait depression was determined solely by neuroticism, and trait mania was determined by extraversion and agreeableness. Subsequent studies have found additional support for high extraversion as predictive of future onset of bipolar disorder (Blechert & Meyer, 2005; Lönnqvist et al., 2009). Authors however, remain critical of assuming links between premorbid personality type and mood disorders stating many common mechanisms by which a relationship could be artificially represented, these include; mood state influences report of personality traits; the overreliance of self-report; and the issue of heterogeneity (Klein, Durbin, & Shankman, 2009).

Hypomania, or 'hypomanic personality' is defined as a mild form of mania characterised by elated mood, pressured speech and thought, irritability, paranoia, increased sexuality and energy (Goodwin & Jamison, 1990). The hypomanic

personality scale (HYP) was constructed to provide a measure of the vulnerability for bipolar disorders, in psychometric form (Eckblad & Chapman, 1986). 'Upbeat, gregarious, confident and energetic' (Eckblad & Chapman, 1986, p. 216) is the description given to high scorers on this scale, and represent individuals who will require less sleep than others, and are disposed towards being reckless and irresponsible, irritable and rude. Research has linked high scorers on the HYP to substance use problems, psychosocial impairment and a greater likelihood of experiencing depressive and hypomanic episodes (Eckblad & Chapman, 1986; Klein, Lewinsohn, & Seely, 1996). A 13 year follow-up assessment from Eckblad's original study, confirmed its predictive qualities finding 25% of the high scorers qualifying for diagnosis of bipolar disorder and 28% with an episode of DSM-IV hypomania (Kwapil et al., 2000). Competing explanations for the predictive capability of the HYP suggest it is a more general measure of affective dysregulation; a feature of numerous conditions such as mood disorders, externalising disorders and borderline personality disorders (Meyer & Hofmann, 2005). The HYP scale does however appear to identify individuals who display affective, cognitive and behavioural dysregulation consistent with the symptoms of bipolar disorders, supporting the scale as sufficiently valid.

Minimal research has explored the characteristics of high scorers on the HYP, as such little is known about these individuals more likely to later develop bipolar disorder. One recent study however reported this group as showing a strong relationship between greater use of imagery at the point of encoding and greater recall of self-referent, positive and high activation words (Pyle & Mansell, 2010). These findings are consistent with the model previously discussed that suggests intensity of images is associated with the amplification of emotions.

Little information is known about individuals likely to develop bipolar disorder, as measured by scores on the HYP. The current study was an opportunity to add to the

information base in this regard and to consider other possible related factors that may enable early indications of later disorder development. An additional concept, the hyper positive sense of self, was also tested to determine the overlap and correlation with the HYP.

### **Hyper Positive Sense of Self in Bipolar Disorder**

It is reported that a proportion of patients with bipolar disorder appear to enjoy being in a state of constant high arousal, positive mood and behavioural over-activity (Lam, Wright, & Sham, 2005). Whilst not reaching the severity of clinical hypomania, patients describe themselves as possessing the associated 'mildly high' personal attributes and see these as desirable (Lam, Jones, & Hayward, 2010). These attributes include being more dynamic, creative, entertaining, outgoing, and persuasive, and individuals aspire to achieve this 'sense of hyper positive self'. Lam and colleagues developed the Sense of Hyper Positive Self Scale (SHPSS: Lam, et al., 2005) which provides a Usual, Ideal and Total score reflecting those attributes. As this combination of traits arguably opposes the relapse prevention goals of cognitive therapy (CT) in regulating mood and behaviour, research has found that those scoring highly on SHPSS Total are less likely to respond to therapy (Lam, et al., 2005). This finding was also consistent using the SHPSS Usual score, but not using the SHPSS Ideal score, and it is suggested that it is how individuals perceive themselves to possess and value these attributes which affects outcome. The use of the Dysfunctional Attitudes Scale (DAS for Bipolar Disorder: Lam, Wright, & Smith, 2004) in recent research has found that the higher the goal attainment score, the higher the participants tendency to identify with attributes linked to that of hypomanic personality and also to engage in behaviour that may escalate the prodromal stage of mania (Lee, Lam, Mansell, & Farmer, 2010). Their findings also supported the SHPSS Ideal score as predicting an individual's preferred

internal state as that of mania. No research exist, to the knowledge of the researcher, using the SHPSS in conjunction with the HYP to test for the presence of a hyper positive sense of self within individuals more likely to later develop bipolar disorder. It may be expected that an overlap exists in one or more of the SHPSS scales when compared to the HYP, theoretical backing in this area however is lacking.

### **Aim of the Present Study**

The underlying cognitive models of bipolar disorder focus on depression and mania and have so far found no adequately robust psychological treatment. In a randomised controlled trial (RCT), cognitive behavioural therapy (CBT) was not supported as more effective than medication (Scott et al., 2006). This is reflected in the National Institute of Clinical Excellence (NICE) guideline for bipolar disorder. The authors of the RCT suggested this was as reported negative verbal thoughts alone did not significantly drive changes in mood, and made specific reference to participants' superior ability to describe and report mental imagery. Mental imagery, outlined here as the prime mode of storage for self-defining memories, and its relationship with emotional affect, along with the themes of these types of memories is the focus for this paper. Whilst evidence exists on the basic facets of personality for individuals more likely to later develop bipolar disorder, this knowledge base is not extensive. There is no information regarding the use of imagery in self-defining memories as well as the magnitude of the resultant emotional affect, in this population. There is also no precedent of literature in establishing themes of self-defining memories for individuals more likely to later develop this disorder pre-diagnosis. Not only would this knowledge broaden the understanding of this population but allow for early indicators and thus intervention of individuals who are pre-disposed to this disorder. It would also permit a somewhat purer assessment of the themes of the SDM's used autobiographically before

the integration of a diagnosis, and subsequent changes in attribution. The presence of mental imagery in SDM's, its effect on emotion, as well as the themes within these personal memories will be explored in a sample deemed more and less likely to later develop bipolar disorder. The SHPSS will also be used for the first time to test for a correlation between high scorers and those scoring highly on the HYP as literature would suggest an overlap in the traits and characteristics which they reportedly aim to measure. Findings are likely to be interesting, at the least novel and will certainly develop understanding and contributed to informing the direction of future studies.

### **Hypotheses**

Previous research has suggested a relationship between mental imagery and emotion which is hypothesised as specifically relevant in the case of bipolar disorder. This relationship will be broken down and empirically tested in individuals more likely to later develop the disorder in an attempt to provide support to a model which is at this point theoretical. The presence and vividness of mental imagery in self-defining memories of individuals more and less likely to later develop the disorder will be tested (hypothesis 1). The increased emotion resulting from mental imagery in self-defining memories could be a pre-existing trait and thus a key characteristic of the premorbid or predisposed individual to this disorder and will also be tested (hypothesis 2). Self-defining memories in patients with bipolar disorder are known to include significantly more reference to 'disrupted sense of identity', and 'mental illness'. Whilst minimal evidence is available, it could be hypothesised that a 'disrupted sense of identity' is present in these predisposed individuals, pre-diagnosis as well as more similarities with a bipolar group than would be expected by individuals less likely to later develop the disorder. The testing of this hypothesis, however will be more exploratory at this stage, and will instead aim to inform future studies (hypothesis 3). Due to the previously found



correlation between the Sense of Hyper Positive Self Scale (SHPSS) and previous manic episodes in bipolar disorder patients (Lam, et al., 2005) it is suggested that higher scorers on the HYP will also have high scores relating to a hyper positive sense of self, (hypothesis 4). In summary, the four hypotheses of this study were;

- 1) Individuals who score in the top 10% on the HYP will report more vivid mental imagery in their SDM's than those in the bottom 10%.
- 2) Vividness of mental imagery is significantly related to higher reported affect in individuals who score in the top 10% on the HYP.
- 3) The content of self-defining memories in individuals who score in the top 10% on the HYP will be more likely to contain the theme 'disrupted sense of self' than the LHYP group. Larger discrepancies are predicted between SDM content recalled by LHYP and the SDMs recalled by individuals with a diagnosis of bipolar disorder, whereas the content of SDMs for HHYP will be more similar to the clinical sample.
- 4) Individuals who score higher on the HYP will have higher scores on the SHPSS.

## **Method**

### **Design**

A cross sectional design was employed for this study. The independent variable was the group the participants were allocated to, as defined by scores in the top or bottom 10% on the Hypomanic Personality Scale (HYP) in the screening process. The dependant variables include; the prevalence and vividness of mental imagery when recalling the self-defining memories; the associated reported affect; the prevalence of

the themes extracted from the self-defining memories and scores on the Sense of Hyperpositive Self Scale (SHPSS).

Power calculations were based on testing an interaction between vividness of mental imagery and reported affect in individuals scoring in the top 10% on the HYP and were computed using G\*Power 3 software (Faul, Erdfelder, Lang, & Buchner, 2010). Using an effect size of .35, a Spearman's Rho correlational analysis will have approximately 80 % power to detect this effect size for the interaction following the recruitment of 61 participants for the second stage of the research.

### **Participants**

The research participants comprised of a convenience sample, recruited from students at the University of Hull. A total of 240 individuals completed the screening process, 83 males and 157 females, with a mean age of 25.4 (Median = 21, Range = 17 - 62, SD =9). Nine did not sign the consent form and 31 participants either did not fully complete the questionnaires or failed to include contact information. 65.4 % were female, 34.6% male and 89.1% were White British, 2.5% Black African. A majority of the sample were single (65.4%) followed by married (civil partnership) and then cohabiting with 18.8% and 14.2% respectively. 88.8% reported no psychiatric diagnosis or psychological disorder, details of reported psychological illnesses' predominately included depression (71.4%), followed by anxiety (14.3%), others included eating disorder, obsessive compulsive disorder, drug induced psychosis and personality disorder (totalling 14.3%). Further details regarding the full sample can be found in Table 1.

Scores on the HYP ranged from 3 – 34 ( $M = 21.37$ ,  $SD = 4.89$ ). Those scoring in the top 10% (HHYP) and bottom 10% (LHYP) of the sample were calculated as over 27 and under 14 respectively on the HYP were asked to return for the secondary stage of

testing (n=54). 10 out of 30 contacted in HHYP group and 9 out of 24 in the LHYP group returned to complete section 2 of the study (n = 19). One participant no longer lived in the country, one no longer wished to take part, two had recently given birth and four were not contactable through the details they provided (i.e. email failure), all others failed to respond. The HHYP group (n= 10) included 7 females and 3 males, with a mean age of 22.9 (Range = 18 - 41, SD = 6.9). 2 participants in the HHYP group (equal to 20%) reported psychological disorders which included anxiety attacks and depression. The mean score on the HADS on anxiety for this group was 10.4 (SD = 3.6) which is equal to mild anxiety, depression scores were in average range (M = 5.5., SD = 2.01). The low LHYP group (n= 9) included 5 females and 4 males, with a mean age of 27.8, (Range = 18 - 47, SD = 12.4). No participants reported psychological disorders, and scores on both HADS anxiety and depression were within average range (M = 5.33, SD = 3.24 and M = 2.33, SD = 2.29 respectively). Further information regarding the LHYP and HHYP groups can be found in Table 2.

In order to enrich analysis, data from a previous study regarding themes of SDM's in bipolar patients was utilised (Raymond & Lam, 2009). The sample, consisting of 28 individuals who all met the Diagnostic and Statistical Manual (DSM - IV) criteria for bipolar disorder, included 42.3% males, 56.7% female, and had a mean age of 46.8 (SD = 10.04) (see Raymond & Lam, 2009 for further details).

## **Materials**

### **Stage one.**

#### ***Hypomanic Personality Scale (HYP: Eckblad & Chapman, 1986)***

The HYP was developed in order to identify individuals at risk of bipolar disorder. It is a self-report measure containing 46 true-false items that explore the features of hypomanic personality, which is accepted as a pre-morbid personality type

in bipolar disorder (see Appendix H). The authors report good reliability with a coefficient alpha reliability of .87. A 13 year follow up assessment with the former college students' in Eckblad and Chapman's (1986) study was completed (Kwapil, et al., 2000). As hypothesised, individuals scoring 36 or above the HYP group reported more bipolar disorders and major depressive episodes than the control group, with 28% qualifying for an episode of DSM-IV hypomania in the follow up period. 25% of the HYP group qualified for a diagnosis of bipolar disorder. An additional study indicates that individuals identified in late adolescence / early adulthood by elevated scores on the HYP scale are at a heightened risk for DSM-IV bipolar disorders in adulthood (Kwapil, et al., 2000).

*Sense of Hyper Positive Self Scale (SHPSS: Lam, et al., 2005)*

The SHPSS was devised to measure the positive attributes bipolar patients possess when they are 'mildly high' e.g. confident and entertaining. Words are rated on how well they describe the person 'most of the time' (SHPSS Usual score) and how they would like to be 'ideally' (SHPSS Ideal score). The minimum and maximum scores are 7 and 49 respectively, and a Total score is a combination of two which can range from 14 to 98. A higher score suggests they are 'mildly high' but not clinically hypomanic or manic. This measure has good internal consistency (Cronbach's Alpha = .83) and good test re-test reliability (Pearson  $r = .68$ ,) (Lam, et al., 2005), (see Appendix I).

**Stage two.**

*Hospital Anxiety and Depression Scale (HADS: Zigmond & Snaith, 1983)*

The HADS is a self-assessment scale developed to detect and measure states of depression and anxiety. In this study the function of the HADS is to describe the sample. There are a total of 14 questions, 7 for anxiety and 7 for depression. The anxiety and depression scales have high reliability with Cronbach Alpha's of .82 and .77 respectively, with the total scale scoring .86 (Crawford, Henry, Crombie, & Taylor, 2001), (see Appendix J).

***Adapted Self-Defining Memory Task (SDM Task: Singer & Blagov, 2000)***

Participants were asked to generate four self-defining memories using the criteria detailed on the self-defining memory task (Singer & Blagov, 2000) (see Appendix K). In addition, participants were required to rate their memories on 12 emotions as related to how they felt when recalling the memory (Appendix L). This was also completed for vividness of the memory and was rated on a 6 point Likert scale (1= not at all to 6= extremely).

***Manual for Coding Events in Self-Defining Memories (Thorne & McLean, 2001), (Adapted by Raymond & Lam, 2009)***

The following nine themes were used to code the self-defining memories; life-threatening events; undisrupted relationships; disrupted relationships; achievement mastery or goal attainment; guilt/shame; self being violated/abused; disrupted sense of self; failure and lack of self-efficacy; and mental illness. The themes were rated on a 6 point Likert scale (1 = not at all present to 6 = extremely present) in each case and the ratings of the themes for each memory were used to provide a mean score for each theme. The coding manual used in this study is based on 'The Manual for Coding Events in Self Defining Memories' (Thorne & McLean, 2001) which provided the first

five themes. Raymond (2009)'s adaptations to this coding manual emerged from their pilot study as well as previous related research into self-defining memories in patients with bipolar disorder. The following themes were therefore added; self being violated/abused; disrupted sense of self; failure/ lack of self-efficacy and mental illness were created (see Appendix M)

### **Procedure**

Potential participants were approached at the end of lectures taking place at the University of Hull. Individuals were informed that the nature of the study was to look at the relationship between personality and self-defining memories, this and the necessity of some participants to return for the section were detailed in the information sheet (Appendix N). Written informed consent was obtained for all participants after they were given time to ask questions or discuss the study (Appendix O). The HYP and the SHPSS were then administered to all participants and demographic information was obtained including; date of birth, gender, ethnicity, marital status, student and course information, history of mental illness and contact details (see Appendix P). Participants received a short debrief form that stated that they may be contacted and asked to return (Appendix Q).

Participants scoring in the top or bottom 10% on the hypomanic personality scale were contacted by telephone or email and asked to attend the second stage of testing. The HADS was then administered and participants were given a typed copy of the SDM task. Each memory recalled was audio-taped for later transcribing and coding. Participants were then asked to complete the SDM task, rating each memory on 12 emotions as well as for vividness. All participants were then fully debriefed about the nature of the study, and directed towards student support services if appropriate (see Appendices R & S)

## Coding

Using the adapted coding scheme for Self Defining Memories the first author rated all memories collected for the presence of the aforementioned nine themes. A six-point scale was utilised to rate the presence of all nine themes for each SDM provided, where 1 = not at all present, and 6 = extremely present. In order to transfer this data to represent 'present' or 'not present' themes with a score of four or higher were coded as 'present'.

## Results

### **Hypothesis One: Individuals Who Score in the Top 10% on the HYP (HHYP) Will Report More Vivid Mental Imagery in Their SDM's Than Those in the Bottom 10% (LHYP)**

Differences between the mean score for vividness in the HHYP group ( $M = 5.13$ ,  $SD = .738$ ) and the LHYP group ( $M = 5.22$ ,  $SD = .537$ ) were negligible. One outlier was highlighted in the HHYP group. A Mann Whitney test confirmed that the HHYP group (median = 5.38) did not report significantly higher levels of vivid imagery, compared to LHYP (median = 5.25),  $U = 42.5$ ,  $p = .85$ , *ns* (see Table 3). In order to further confirm the findings, the sum of imagery use (in the 4 SDM's) was compared between groups using a Pearson chi-squared test. No significant association was found using the linear by linear association  $\chi^2(1, n = 19) = .06$ ,  $p = .86$ , *ns* (see Table 4). Non – parametric statistical tests were used for all data analysis as the population from which the data was obtained was not normally distributed.

Whilst no significant relationship was revealed, Figures 1 & 2 shows the spread of the frequency of the average vividness. The HHYP shows a lower total vividness

score, as well as a higher standard deviation and range than the LHYP. The higher median can be observed in the HHYP when compared to the LHYP along with participant 66 which appears to be a clear outlier from the group. The LHYP group displays a larger standard deviation, and range, particularly at the top end, along with a lower median.

**Hypothesis Two: Vividness of Mental Imagery is Significantly Related to Higher Reported Affect in Individuals Who Score in the Top 10% on the HYP (HHYP)**

In the HHYP group, there was a significant positive relationship between imagery vividness and positive emotion,  $r_s = .64$ ,  $p = .045$  using a Spearman's Rho test for correlation. This provides partial support for the hypothesis that imagery vividness is linked to increased reported emotion as the same relationship was not found for negative emotion. No further significant correlations were found. An opposing negative correlation was found to exist but perhaps due to the small sample size, but did not reach significance between imagery vividness and positive emotion in the LHYP group, ( $r_s = -.46$  compared  $r_s = .64$ ). A similar pattern was mirrored in negative emotion, between the LHYP and HHYP but to a lesser degree with  $r_s = -.53$  and  $r_s = -.18$  respectively. Further information can be found in Table 5.

The association and strength of the relationship between imagery vividness and positive and negative emotion in both the HHYP and the LHYP groups are best represented on scatterplots, (Figures 4 & 5). Figure 4 depicts the strong positive linear relationship between imagery vividness and positive emotion in the HHYP group and also the clear contrast in this relationship to the negative association found between imagery vividness and negative emotion for the same group. The weaker negative associations show less of a linear trend between imagery vividness and positive and negative emotion in Figure 5.



**Hypothesis 3: The Content of Self-Defining Memories in Individuals Who Score in the Top 10% on the HYP will be more likely to contain the Theme 'Disrupted Sense of Self' than the LHYP Group. Larger Discrepancies are predicted between SDM Content Recalled by LHYP and the SDMs Recalled by Individuals with a Diagnosis of Bipolar Disorder, whereas the Content of SDMs for HHYP will be more similar to the Clinical Sample.**

A Kruskal-Wallis test found significant differences between the three groups for 'Undisrupted relationships'  $H(2, n = 47) = 2.10, p = .004$ ; 'Achievement, mastery and goal attainment'  $H(2, n = 47) = 9.58, p = .006$ ; 'Guilt / shame'  $H(2, n = 47) = 10.75, p = .004$ ; 'Disrupted sense of self'  $H(2, n = 47) = 9.47, p = .007$  and 'Mental illness'  $H(2, n = 47) = 9.54, p = .009$ . Table 6 shows the total presence of the different themes across all memories by groups.

Comparisons between the HHYP and LHYP groups using a Mann Whitney U test found the theme of 'Disrupted sense of self' significantly more present in the HHYP group  $U = 16, p = .01$ . This finding provides support for the hypothesis. No other differences in the presence of themes were significantly different (see Table 7).

Comparisons between the bipolar and the HHYP groups found the theme 'Disrupted sense of self' significantly more present in the HHYP group  $U = 82, p = .046$ . This finding provides support beyond that of the hypothesis that the theme would be more present in the HHYP group. 'Achievement, mastery and goal attainment' was also significantly more present in the HHYP group  $U = 61, p = .004$ , as was 'Self being violated/abused' and 'Failure and lack of self-efficacy' with  $U = 94.5, p = .048$  and  $U = 84, p = .041$  respectively. Conversely, the theme of 'Guilt/shame' was more present in the bipolar sample  $U = 77, p = .025$  as was the theme of 'Mental illness'  $U = 85, p =$

.037. No other differences in the presence of themes were significantly different (see Table 8).

Comparisons between the Bipolar and the LHYP groups found the theme 'Disrupted sense of self' as more likely present in the bipolar group, but this did not reach significance  $U = 76, p = .059, ns$ . This provided partial support for the hypothesis. 'Undisrupted relationships' was however significantly more present in LHYP group  $U = 41.5, p = .001$  as was 'Achievement, mastery and goal attainment',  $U = 74.5, p = .033$ . Themes of both 'Guilt/shame' and 'Mental illness' were both significantly more present in the bipolar sample with  $U = 58.5, p = .012$  and  $U = 76.5, p = .036$  respectively. No other differences in the presence of themes were significantly different (see Table 9).

#### **Hypothesis 4: Individuals Who Score Higher on the HYP Will Have Higher Scores on the SHPSS**

Whilst the Spearman's Rho test did not find evidence for a correlation between HYP scores and SHPSS Total scores, ( $r_s = .07, ns$ ) (see Table 10) a significant but weak positive relationship between HYP score and SHPSS Ideal scores was found,  $r_s = .13, p = .042$  (see Figure 6). This provided some support for the hypothesis that higher HYP scorers would be more likely to have higher scores on the SHPSS Total. Correlations between scores on SHPSS Usual and HYP did also not reach significance. Information regarding the SHPSS for the full sample, LHYP and the HHYP can be seen in Table 11.

#### **Additional findings using SHPSS.**

Total scores on the SHPSS ranged from 28 to 82 ( $M = 59, SD = 9.8$ ). As expected, a significant correlation was reported using the Spearman's Rho between the SHPSS Usual (range: 8 – 40,  $M = 25, SD = 6$ ) and SHPSS Ideal (range: 18 – 42,  $M = 34.1, SD = 4.83$ ),  $= .61, p < .001$ . Interestingly a significant positive relationship

emerged between SDM imagery use and increased SHPSS Ideal scores,  $r_s = .47, p < .05$ . Increased positive emotion as a result of discussing the SDM's was also found to be significantly positively correlated with SHPSS Ideal,  $r_s = .47, p < .05$ , both using a Spearman's Rho test for correlation.

### **Discussion**

This study investigated the use of imagery in self-defining memories as well as the magnitude of the resultant emotional affect in individuals deemed more and less likely to later develop bipolar disorder. The themes in these SDM's were compared with those of a bipolar sample from a previous study and comparisons were made between scores on the SHPSS and the HYP to test for a correlation or overlap.

### **Summary of Findings**

The results suggested no support for the hypothesis that individuals more likely to later develop bipolar disorder (within the sample) report more vivid mental imagery in their self-defining memories. In the HHYP group, support was found for vividness of mental imagery as significantly positively correlated to positive emotion. This reflects partial support for the hypothesis as this same relationship was not found for negative emotion. Results suggest support for the theme of 'disrupted sense of self' as not only more present within the HHYP group than the LHYP, but also significantly more so than the bipolar group which provides support beyond that of the hypothesis. Larger discrepancies however, were found between the HHYP and the bipolar sample than between the LHYP and the bipolar sample, opposing predictions. Individuals who scored higher on the HYP did not appear to subsequently score higher on the SHPSS. A weak, but significantly positive relationship was found however between the HYP and

the SHPSS Ideal scores providing some support for an overlap in what the measures aim to test for.

### **Theoretical Implications**

The theoretical background literature suggests that individuals with bipolar disorder have more visual imagery for autobiographical memories and generally utilise a more abstract level of representation. This study however, was unable to replicate such findings in individuals more likely to later develop bipolar disorder, within the sample used. Whilst general limitations of the study will be discussed later, there are a number of possible alternative explanations for these findings. Within the top 10% of scorers on the HYP, none in fact scored above the cut-off of 36 which has been utilised in the literature to suggest those significantly more likely to later develop the disorder. Based on the findings, it could instead be stated that higher scorers, but not necessarily significantly higher scorers (scoring >36) on the HYP do not report higher levels of vivid imagery use. It is also possible that imagery use is not a stable trait which could differ over time. Findings may have not reached significance pre-diagnosis as at this time point as a hypomanic personality may not be sufficient in the explanation of elevated imagery use. The mean ages of participants in the aforementioned studies of bipolar participants are considerably higher than those of this study. It could be possible that vivid imagery use increases with age, and as such was not present in the sample utilised here. Content of SDM's may also differ with age as discussed later, and these differences could impact vividness and extent of imagery used.

It could be argued that the method used to determine imagery use influenced findings, however the method by which imagery use was recorded was open to minimal misinterpretation and it was not felt that participants had difficulty understanding what was asked of them. Whilst measures were self-report, an accompanying verbal

explanation was given by the researcher to participants after recalling their memory, before completing the SDM form. A checkbox was used to report either 'imagery' or 'descriptive language' for ease of analysis; however alternatives could have included asking for a verbal or written account of methods used. This method however, may have led to increased levels of misinterpretation by the participant. The verbal clarification given could have acted to influence imagery use in subsequent SDM's, either through the suggestion of their presence, or the nature of using just one or the other. Individuals who used both, for example, had to choose just one, as the use of 'both' was not available to them, which could affect findings. It is important to note that imagery use was recorded as specifically present (or not present) as well as extent of vividness in participants self-defining memories, and are limited in the extent to which this can be generalised to overall levels of imagery use. This fact could sufficiently contribute to the discrepancies between findings reported for bipolar participants when compared to a nonclinical counterpart.

The cognitive model of an imagery and emotion relationship has been developed as applied to bipolar disorder. The key assumptions underpinning this model include a) imagery amplifies anxiety and b) imagery amplifies mood elevation in individuals with a diagnosis. Support was found for a positive relationship between imagery vividness and positive emotion in individuals scoring in the top 10% on the HYP within the sample. This evidence provides preliminary support for the model posed by Holmes et al (2008); not only for the development and maintenance of high episodes within bipolar disorder; but that this process may occur in high-scoring individuals of hypomanic personality and potentially bipolar patients pre-diagnosis. The absence of support of the same relationship with negative emotion however, prevents full support of the model in question, and particularly its application to episodes of depression. The opposing finding of a negative association, whilst not significant, between increased

vividness and decreased negative emotion in the HHYP group, is interesting. It appears that for individuals more likely to later develop bipolar disorder; more vivid positive memories evoke more positive emotion, whereas the more vivid negative memories evoke less negative emotion. The finding regarding negative emotion opposes the majority if not all of the literature in the area that would instead expect the presence of a positively orientated relationship. The sample size is clearly not great enough to uncover clinically significant findings but explanations of the opposing direction of relationship will be discussed. It is not sufficient to state that the range of participants did not meet significantly high scores on the HYP, as contributing to the findings, as the effects of mental imagery on emotion are accepted and predominately tested in a nonclinical population. The literature reviewed also supports the use of a variety of emotion measurements as reliable in reporting emotional response. The Likert scales used in this study are part of the validated SDM task and have also been used in linked previous research in the area. Alternatives could have included STAI for negative emotion or the PANAS for changes over time and have been more readily used in the testing of relationships between imagery and emotion, rather than emotion evoked by SDM's. In addition measurement of imagery vividness, as previously discussed is used among other studies, and accepted as a reasonable measure. As participants were provided with clear verbal and written instructions it is unlikely that participants misunderstood what was asked. It is possible that upon recalling a more vivid self-defining memory, individuals who scored highly on the HYP utilise a mechanism by which emotional response is blocked or defended against. It may be that a mild form of dissociation exists or the extent to which the memory had been processed is reduced leaving the memory content and the associated emotion as disjointed/ disconnected. It may be that upon the removal or prevention of these defence strategies, that vivid memories would then evoke the negative emotion sufficient for a subsequent

development or maintenance of a depressive episode, enabling a later diagnosis.

Alternatively, reporting emotions on the form may have instead captured the extent of an 'idealised' emotional response regarding such memories. As findings suggest that an increased HYP score is associated with an increased SHPSS Ideal score, which is discussed later, additional support is provided for this ideology. It is also of interest that the association between imagery vividness and positive emotion in the LHYP group, whilst not significant, was negative in its direction. This opposing direction may reflect the varying nature and content of the self-defining memories between the HHYP and LHYP, and this too will be discussed later.

Difficulty in establishing continuity in a sense of self, 'disrupted sense of self' as well as confusion, contradiction and self-doubt are among the memory narratives literature outlines as present in individuals with bipolar disorder. This study was able further extend previous research to suggest that the theme of 'disrupted sense of self' is also significantly more present in high scorers on the HYP, than in low scorers. The theme of 'disrupted sense of self' when present in a memory narrative, may represent an early indicator when coupled with elevated hypomanic personality, for a possible bipolar diagnosis. At least, the knowledge base regarding self-defining memory themes for this population has been developed. In the absence of individuals significantly more likely to later develop bipolar disorder (i.e. scoring over 36) as well as appropriate follow-up studies; the extent to which these findings can be generalised to themes present in the memories of individuals with bipolar disorder, pre-diagnosis is limited. However, as the first study to explicitly compare themes in an exploratory manner this certainly opens the door to future studies.

The contribution of a bipolar sample enriched findings and enabled the greater detail of comparisons completed. Possible explanations for the significantly more present theme of 'disrupted sense of self' in the HHYP compared to the bipolar group

will be discussed in a moment. It was not alone however, as 'self being violated / abused'; 'failure and lack of self-efficacy' and 'achievement, mastery and goal attainment' were also found as more present in the HHYP group. This totalled more discrepancies between the aforementioned groups than the HHYP and the bipolar group, opposing predictions. A likely consideration for these differences, particularly regarding 'disrupted sense of self' is that of the mean age difference between the sample used in this study, and that of the clinical bipolar sample.

Mean ages differed considerably with the HHYP having the lowest ( $M = 22.9$ ,  $SD = 6.9$ ), followed by the LHYP ( $M = 27.78$ ,  $SD = 12.37$ ) and then the bipolar sample ( $M = 46.79$ ,  $SD = 10.04$ ). A study looking for age-related differences in themes of life review found births and deaths as more prevalent in a middle age group, when compared to a young group, and older adults discussed career related themes more than younger participants (de Vries, Blando, & Walker, 1995). A later study comparing older adults and college students was not able to replicate the earlier findings of memories regarding illness and death, and instead found themes of relationships as more prominent among younger participants (Singer, Rexhaj, & Baddeley, 2007).

Considering the literature, the finding of differences between both the HHYP and the LHYP compared to the bipolar sample should be interpreted with caution as it appears both age and stage of life would considerably impact themes discussed regardless of diagnosis or score on the HYP. A further consideration is that of the methodology used to elicit themes. As the SDM's were audiotaped, transcribed and themes later coded based on presence by the author, the process is left vulnerable to various degrees of misinterpretation. This outlines the weakness of using a qualitative method in a quantitative manner as meaning and understanding are easily lost along the way. Comparisons between the HHYP and the LHYP represent generally more matched



groups, when compared to the bipolar sample, strengthening the validity of conclusions drawn.

Patients with bipolar disorder who reportedly enjoy a constant state of high arousal, positive mood and behavioural over activity and believe these mildly high attributes are desirable, receive high scorers on SHPSS Total, and are less likely to respond to cognitive therapy. Opposing the predictions made, no support was found for relationships between high scorers on the HYP, and SHPSS Total or Usual scores. SHPSS Ideal scores however, which are linked to a preferred internal state of mania for bipolar disorder sufferers in the literature, were positively related to HYP scores. A comparatively large sample was used to test this hypothesis ( $n = 240$ ) therefore it is unlikely that increased numbers of participants would affect results. The absence of significantly high scorers on the HYP (over 36) is also unlikely to influence findings as the full sample was used, which included a large range of scores. Age-related and stage of life based considerations should instead be inspected. All participants were University students, the likelihood therefore that characteristics such as being confident, dynamic, entertaining, creative and optimistic were scored highly as 'ideal' states is not surprising. This coupled with the mean age of participants in this study being considerably lower than that of the bipolar samples used in other studies could contribute to an explanation of the results obtained. Alternatively, higher scores on SHPSS Total and Usual may instead be related a third variable present when the DSM criteria for bipolar disorder are met i.e. not met with a hypomanic personality alone. Or perhaps following experience of manic and/or depressive episodes would one be more inclined to score high on SHPSS Usual, thus increasing the SHPSS Total score. Considering the additional findings that high scorers on SHPSS Ideal had a higher mean SDM imagery score (but not imagery vividness) and higher scores of positive emotion as a result, similar to the findings of the HYP in this study; preliminary hypotheses

could be made regarding the extent to which its independent use overlaps with the predictive qualities of the HYP. As a relatively new measure, the construct validity of the SHPSS is debatable; in addition the factors which underlie what a high score would aim to reflect is somewhat unclear in the handful of studies that have utilised it. With minimal reliability and validity data for the SHPSS and no prior use with a nonclinical sample or in a clinical sample with disorders other than bipolar disorder, inferences from this or any other study are limited.

### **Clinical Implications**

Due to the limitations discussed, the clinical implications for the lack of significantly more imagery in the HHYP group are minimal. This is primarily due to the sample spread not reaching a maximum score of 36 on the HYP. Clinical implications however include how individuals with higher levels of a hypomanic personality do not appear to have more imagery in their self-defining memories than those with lower levels of this personality type.

The positive relationship between vivid imagery and positive emotion has significant implications for clinical models looking to better understand individuals with bipolar disorder, but also to further extend the knowledge base of hypomanic personality. The existence of this relationship provides some grounding for cognitive models posed. The negative association between imagery and negative emotion, whilst not significant, opposes the direction of the majority of research in the area. Clinically this has relevance as processes that exist to block or defend emotion in response to vivid self-defining memories, if present, are likely to affect the direction of work completed within psychological therapies. If this process is functional in reducing negative emotion from self-memories, the change or removal of such a function may perhaps add further understanding to the onset of a diagnosis such as bipolar disorder.

Finding support for 'disrupted sense of self' as more present in high scorers on the HYP, thus potentially an individual more likely to later develop bipolar disorder, has several clinical implications. It is acknowledged that replication of such a finding is required, however if this is possible, individuals deemed 'at risk' of this disorder, could be additionally assessed using this new found dimension. In addition, preliminary suggestions could be made that the theme of 'disrupted sense of self' as found to be significantly present in individuals with bipolar disorder which may predate a diagnosis. Implications for therapy could include re-integration of a sense of self, reducing feelings of confusion and contradiction based on self-memory narratives over the lifetime of the individual rather than just post diagnosis. Attribution bias based on a diagnosis i.e. 'I have never understood myself since I have been diagnosed with bipolar disorder' could be explored and later adjusted with reference to earlier self-defining memories.

The overlap between the SHPSS Ideal and HYP has various clinical implications. This finding may relate to the scales' potentially similar predictive qualities or 'early indicators' for bipolar disorder, but requires further investigation. Considering these initial findings, it could be suggested that at an early time point individuals who are more likely to later develop the disorder are more likely to prefer an internal state of mania. If a third variable exists which acts to increase both SHPSS Total and Usual scores post bipolar diagnosis; this has implications for therapeutic intervention. More information regarding this proposed third factor may enable its reduction therapeutically. In turn, this may contribute to the reduction of the SHPSS Total score, which according to the literature may increase the likelihood of a successful outcome from cognitive therapy.

### **Limitations of the Study**

Whilst hypothesis specific limitations have been discussed, overall limitations of the study will be discussed here. A key limitation affecting the entirety of this study was that adequate power to detect a sufficient effect size was not met. It was an aim of this study to gain adequate power; however, in order to keep the HHYP and LHYP groups sufficiently representative of their respective 10% of the sample, this was not possible due to dropout numbers. The use of university students also carries with it limitations of generalisability due to academic ability as well as possible age restrictions and reduction in variation of stages of life. The extent to which the HYP sufficiently captures individuals more likely to later develop the disorder has already been discussed as debatable. Personality traits are known to be influenced by mood at time of completion and self-report measures of personality are also known to overestimate prevalence (Zimmerman, 1994). Other authors argue that the HYP is instead a general measure of affective dysregulation. The combination of this evidence places the likelihood of its true predictive qualities in an unfavourable light. The range of scores on the HYP, as previously commented, did not reach sufficient highs as well as lows, despite the reasonable sample size. This has considerable impact on most conclusions drawn as instead of the HHYP group representing a group of individuals significantly more likely to later develop bipolar disorder; they instead only reflect higher scorers on the HYP within the constraints of the available sample. As such, this is the primary limiting factor in this study, but does by no means suggest that interesting and novel findings have not been observed.

### **Areas for Future Research**

It is essential that future research looking to compare imagery use in self-defining memories for individuals more likely to develop the disorder with individuals with a diagnosis sources participants with HYP scores higher than 36. This does have to

be considered in terms of feasibility as this would require a very large sample size. In order to receive sufficient high scorers to enable significant levels of power of data analysis completed, participants numbers would need to be in the thousands (as illustrated in Klein, Lewinsohn, & Seeley, 1996). In addition an aged matched group would be preferable to reduce the likelihood of discrepancies reported based on the content of SDM's or other age differences. Research looking to replicate the findings of a negative association between vivid imagery and negative emotion in individuals scoring highly on the HYP is essential, particularly involving a larger sample to provide more meaningful effect sizes. If a mechanism exists blocking or defending or even moderating the extent of negative emotion resulting from vivid imagery within a self-defining memory, further understanding of this would greatly develop clinical interventions as well as the knowledge base regarding imagery and emotion relationships in individuals high in hypomanic personality or pre-bipolar disorder diagnosis. Replication of findings that 'disrupted sense of self' is more present in high scores on the HYP is necessary. In addition age-matched comparison groups are essential for an accurate report of discrepancies between clinical and nonclinical samples, and researchers should look to complete this in a single study, removing the many extraneous variables present in using combined samples from different studies. Follow-up studies looking at self-defining memories at the point of scoring highly on the HYP, through to diagnosis would also greatly enhance the validity of findings. Studies using the HYP may wish to consider a sample of similar age ranges to those used in bipolar studies in order to reduce age-related mediating factors. Future research may wish to further examine potential overlap between these shared characteristics and potential predictive qualities of the SHPSS Ideal and the HYP. Hypotheses regarding a third mediating variable which increases SHPSS Usual and Total scores following the meeting of DSM criteria for bipolar disorder should be investigated in terms of

theoretical grounding as well as empirical testing. Such research would certainly contribute to the ever developing understanding of bipolar disorder and individuals characteristics pre-diagnosis.

### **Conclusions**

This study investigated the use of imagery in self-defining memories, but found no support for more imagery use in the HHYP group. Imagery vividness was found to be significantly positively related to positive emotion, but not negative within the HHYP group. The theme of 'disrupted sense of self' was significantly more present in individuals scoring high on the HYP, but differences between the sample used here and that of the bipolar group limited the potential for any further conclusions to be made. The HYP scores were found to be significantly correlated to SHPSS Ideal scores and the likelihood of an overlap between the scales has been discussed. This study is not without its limitations but provides preliminary as well as novel information expanding the knowledge base of individuals more likely to later develop bipolar disorder, paving the way for future research.

### References

- Blagov, P. S., & Singer, J. A. (2004). Four dimensions of self defining memories (specificity, meaning, content, and affect) and their relationship to self-restraint, distress, and repressive defensiveness. *Journal of Personality, 72*(3), 481 - 511.
- Blechert, J., & Meyer, T. D. (2005). Are measures of hypomanic personality, impulsive nonconformity and rigidity predictors of bipolar symptoms? *British Journal of Clinical Psychology, 44*(1), 15-27. doi: 10.1348/014466504x19758
- Ceschi, G., Banse, R., & Van der Linden, M. (2009). Implicit but Stable Mental Imagery Changes Explicit but not Implicit Anxiety. *Swiss Journal of Psychology, 68*(4), 213-220. doi: 10.1024/1421-0185.68.4.213
- Clark, D. M. (1986). A cognitive approach to panic. *Behaviour Research and Therapy, 24*(4), 461-470. doi: 10.1016/0005-7967(86)90011-2
- Conway, M. A. (2002). Sensory-perceptual episodic memory and its context: Autobiographical memory. In A. Baddeley, J. P. Aggleton & M. A. Conway (Eds.), *Episodic memory: New directions in research*. (pp. 53-70). New York, NY US: Oxford University Press.
- Conway, M. A., Meares, K., & Standart, S. (2004). Images and goals. *Memory, 12*(4), 525-531. doi: 10.1080/09658210444000151
- Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*(2), 261-288. doi: 10.1037/0033-295x.107.2.261
- Crawford, J. R., Henry, J. D., Crombie, C., & Taylor, E. P. (2001). Normative data for the HADS from a large non clinical sample. *British Journal of Clinical Psychology, 40*, 429 - 434.

- Dadds, M. R., Hawes, D., Schaefer, B., & Vaka, K. (2004). Individual differences in imagery and reports of aversions. *Memory, 12*(4), 462-466. doi: 10.1080/09658210444000070
- de Vries, B., Blando, J. A., & Walker, L. J. (1995). An exploratory analysis of the content and structure of the life review. In B. K. Haight & J. D. Webster (Eds.), *The art and science of reminiscing: Theory, research, methods, and applications*. (pp. 123-137). Philadelphia, PA US: Taylor & Francis.
- Eckblad, M., & Chapman, L. J. (1986). Development and validation of a scale for hypomanic personality. *Journal of Abnormal Psychology, 95*(3), 214 - 222.
- Ehlers, A., Hackmann, A., Steil, R., Clohessy, S., Wenninger, K., & Winter, H. (2002). The nature of intrusive memories after trauma: The warning signal hypothesis. *Behaviour Research and Therapy, 40*(9), 995-1002. doi: 10.1016/s0005-7967(01)00077-8
- Faul, F., Erdfelder, E., Lang, A. E., & Buchner, A. (2010). G\* Power 3. Kile, Germany.
- Goodwin, F. K., & Jamison, K. R. (1990). *Manic-depressive illness*. New York, NY US: Oxford University Press.
- Hackmann, A., Ehlers, A., Speckens, A., & Clark, D. M. (2004). Characteristics and content of intrusive memories in PTSD and their changes with treatment. *Journal of Traumatic Stress, 17*(3), 231-240. doi: 10.1023/B:JOTS.0000029266.88369.fd
- Hecht, H., van Calker, D., Berger, M., & von Zerssen, D. (1998). Personality in patients with affective disorders and their relatives. *Journal of Affective Disorders, 51*, 33 - 43.
- Hirsch, C. R., Clark, D. M., Mathews, A., & Williams, R. (2003). Self-images play a causal role in social phobia. *Behaviour Research and Therapy, 41*(8), 909-921. doi: 10.1016/s0005-7967(02)00103-1



- Hirsch, C. R., Mathews, A., Clark, D. M., Williams, R., & Morrison, J. A. (2006). The causal role of negative imagery in social anxiety: A test in confident public speakers. *Journal of Behavior Therapy and Experimental Psychiatry, 37*(2), 159-170. doi: 10.1016/j.jbtep.2005.03.003
- Holmes, E. A., Deerprouse, C., Geddes, J., & Goodwin, G. M. (2009). Does mental imagery act as an emotional amplifier in Bipolar Disorder? Initial findings for a catalyst of mood instability. *Bipolar Disorders, 11*, 47-48.
- Holmes, E. A., Geddes, J., Colom, F., & Goodwin, G. (2008). Mental imagery as an emotional amplifier: Application to bipolar disorder. *Behaviour Research and Therapy, 46*(12), 1251-1258. doi: 10.1016/j.brat.2008.09.005
- Holmes, E. A., Lang, T. J., & Shah, D. M. (2009). Developing interpretation bias modification as a "cognitive vaccine" for depressed mood: Imagining positive events makes you feel better than thinking about them verbally. *Journal of Abnormal Psychology, 118*(1), 76-88. doi: 10.1037/a0012590
- Holmes, E. A., & Mathews, A. (2005). Mental Imagery and Emotion: A Special Relationship? *Emotion, 5*(4), 489-497. doi: 10.1037/1528-3542.5.4.489
- Holmes, E. A., Mathews, A., Dalgleish, T., & Mackintosh, B. (2006). Positive Interpretation Training: Effects of Mental Imagery Versus Verbal Training on Positive Mood. *Behavior Therapy, 37*(3), 237-247. doi: 10.1016/j.beth.2006.02.002
- Holmes, E. A., Mathews, A., Mackintosh, B., & Dalgleish, T. (2008). The causal effect of mental imagery on emotion assessed using picture-word cues. *Emotion, 8*(3), 395-409. doi: 10.1037/1528-3542.8.3.395
- Inder, M. L., Crowe, M. T., Moor, S., Luty, S. E., Carter, J. D., & Joyce, P. R. (2008). "I Actually Don't Know Who I Am": The Impact of Bipolar Disorder on the Development of Self. *Psychiatry, 71*(2), 123 - 133.

- Kendler, K. S., Gatz, M., Gardner, C. O., & Pedersen, N. L. (2006). Personality and major depression: a Swedish longitudinal, population-based twin study. *Archives of General Psychiatry*, *63*(10), 1113-1120.
- Klein, D. N., Durbin, C. E., & Shankman, S. A. (2009). Personality and mood disorders. In C. L. Hammen & I. H. Gotlib (Eds.), *Handbook of depression*. New York: Guildford Press.
- Klein, D. N., Lewinsohn, P. M., & Seely, J. R. (1996). Hypomanic personality traits in a community sample of adolescents. *Journal of Affective Disorders*, *38*, 135 - 143.
- Kosslyn, S. M., Ganis, G., & Thompson, W. L. (2001). Neural foundations of imagery. *Neuroscience*, *2*, 635 - 642.
- Kwapil, T. R., Miller, M. B., Zinser, M. C., Chapman, L. J., Chapman, J., & Eckblad, M. (2000). A longitudinal study of high scorers on the Hypomanic Personality Scale. *Journal of Abnormal Psychology*, *109*(2), 222-226. doi: 10.1037//0021-843x.109.2.222
- Lam, D. H., Jones, S. H., & Hayward, P. (2010). *Cognitive therapy for bipolar disorder: A therapist's guide to concepts, methods and practice (2nd ed.)*: Wiley-Blackwell.
- Lam, D. H., Wright, K., & Smith, N. (2004). Dysfunctional assumptions in bipolar disorder. *Journal of Affective Disorders*, *79*(1-3), 193-199.
- Lam, D. H., Wright, K. I. M., & Sham, P. A. K. (2005). Sense of hyper-positive self and response to cognitive therapy in bipolar disorder. *Psychological Medicine*, *35*(1), 69-77. doi: 10.1017/s0033291704002910
- Lee, R., Lam, D. H., Mansell, W., & Farmer, A. (2010). Sense of hyper-positive self, goal-attainment beliefs and coping strategies in bipolar I disorder. *Psychological Medicine*, *40*(6), 967-975. doi: 10.1017/s0033291709991206

- Libby, L. K., Shneffer, E. M., Eibach, R. P., & Slemmer, J. A. (2007). Picture Yourself at the Polls: Visual Perspective in Mental Imagery Affects Self-Perception and Behavior. *Psychological Science, 18*(3), 199 - 203.
- Lomax, C. L., Barnard, P. J., & Lam, D. H. (2009). Cognitive processing in Bipolar Disorder conceptualised using the Interacting Cognitive Subsystems (ICS) model. *Psychological Medicine, 39*(05), 773-783.
- Lönnqvist, J.-E., Verkasalo, M., Haukka, J., Nyman, K., Tiihonen, J., Laaksonen, I., . . . Henriksson, M. (2009). Premorbid personality factors in schizophrenia and bipolar disorder: Results from a large cohort study of male conscripts. *Journal of Abnormal Psychology, 118*(2), 418-423. doi: 10.1037/a0015127
- Mansell, W., & Lam, D. (2006). A preliminary study of autobiographical memory in remitted bipolar and unipolar depression and the role of imagery in the specificity of memory. *Memory*.
- Mansell, W., & Lam, D. H. (2004). A preliminary study of autobiographical memory in remitted bipolar and unipolar depression and the role of imagery in the specificity of memory. *Memory (Hove, England), 12*(4), 437-446.
- Maude-Griffin, P., & Tiffany, S. T. (1996). Production of smoking urges through imagery: The impact of affect and smoking abstinence. *Experimental and Clinical Psychopharmacology, 4*(2), 198-208. doi: 10.1037/1064-1297.4.2.198
- McLean, K. C. (2008). Stories of the young and the old: Personal continuity and narrative identity. *Developmental Psychology, 44*(1), 254-264. doi: 10.1037/0012-1649.44.1.254
- McLean, K. C., & Fournier, M. A. (2008). The content and processes of autobiographical reasoning in narrative identity. *Journal of Research in Personality, 42*(3), 527-545. doi: 10.1016/j.jrp.2007.08.003

- Merikangas, K. R., Akiskal, H. S., Angst, J., Greenberg, P. E., Hirschfeld, R. M. A., Petukhova, M., & Kessler, R. C. (2007). Lifetime and 12-month prevalence of bipolar spectrum disorder in the National Comorbidity Survey replication. *Archives of General Psychiatry, 64*(5), 543-552.
- Meyer, T. D., & Hofmann, B. U. (2005). Assessing the Dysregulation of the Behavioral Activation System: The Hypomanic Personality Scale and the BIS–BAS Scales. *Journal of Personality Assessment, 85*(3), 318 - 324.
- Murray, G., Goldstone, E., & Cunningham, E. (2007). Personality and the predisposition(s) to bipolar disorder: heuristic benefits of a two-dimensional model. *Bipolar Disorders, 9*(453 - 461).
- O'Craven, K. M., & Kanwisher, N. (2000). Mental imagery of faces and places activates corresponding stimulus-specific brain regions. *Journal of Cognitive Neuroscience, 12*(6), 1013-1023.
- Paivio, A., Yuille, J. C., & Madigan, S. A. (1968). Concreteness, imagery, and meaningfulness values for 925 nouns. *J Exp Psychol, 76*(1), Suppl:1-25.
- Power, M. J., de Jong, F., & Lloyd, A. (2002). The Organization of the Self-Concept in Bipolar Disorders: An Empirical Study and Replication. *Cognitive Therapy and Research, 26*(4), 553 - 561.
- Pyle, A., & Mansell, W. (2010). Cognitive Biases in Hypomanic Personality: Preliminary Findings Indicating the Relevance of Self-Versus-Other Encoding and High-Versus-Low Levels of Activation. *Behavioural And Cognitive Psychotherapy, 1*-14. doi: 10.1017/s1352465810000299
- Pylyshyn, Z. W. (2006). *Seeing and visualizing: It's not what you think*. London: MIT Press.
- Raymond, K., & Lam, D. H. (2009). *The influence of mood on self-defining memories*. Doctorate in Clinical Psychology, University of Hull, Hull.

- Reyher, J. (1963). Free imagery, an uncovering procedure. *Journal of Clinical Psychology, 19*(4), 454 - 459.
- Reyher, J., & Smeltzer, W. (1968). Uncovering properties of visual imagery and verbal association. *Journal of Abnormal Psychology, 73*(3), 218 - 222.
- Scott, J., Paykel, E., Morriss, R., Bentall, R., Kinderman, P., Johnson, T., . . . Hayhurst, H. (2006). Cognitive-behavioural therapy for severe and recurrent bipolar disorders: Randomised controlled trial. *British Journal of Psychiatry, 188*(4), 313-320. doi: 10.1192/bjp.188.4.313
- Sherman, S. J., Cialdini, R. B., Schwartzman, D. F., & Reynolds, K. D. (1985). Imagining can heighten or lower the perceived likelihood of contracting a disease - the mediating effect of ease of imagery. *Personality and Social Psychology Bulletin, 11*(1), 118-127.
- Singer, J. A. (2005). *Memories that matter: How to use self-defining memories to understand and change your life*. Oakland, CA: New Harbinger Publications.
- Singer, J. A., & Blagov, P. S. (2000). *Classification system and scoring manual for self-defining autobiographical memories*. Paper presented at the Paper presented at the meeting of the Society for Applied Research on Memory and Cognition., Miami Beach, Florida.
- Singer, J. A., Rexhaj, B., & Baddeley, J. (2007). Older, wiser, and happier? Comparing older adults' and college students' self-defining memories. *Memory, 15*(8), 886-898. doi: 10.1080/09658210701754351
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stanley, D. M., & Cumming, J. (2010). Are we having fun yet? Testing the effects of imagery use on the affective and enjoyment responses to acute moderate

exercise. *Psychology of Sport and Exercise*. doi:

10.1016/j.psychsport.2010.06.010

Tavormina, G. (2010). The temperaments and their role in early diagnosis of bipolar spectrum disorders. *Psychiatria Danubina, 22 Suppl 1*, S15-S17.

Thorne, A., & McLean, K. C. (2001). *Manual for coding events in self defining memories*.

Tzemou, E., & Birchwood, M. (2007). A prospective study of dysfunctional thinking and the regulation of negative intrusive memories in bipolar I disorder: Implications for affect regulation theory. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 37*(5), 689-698. doi: 10.1017/s0033291706009470

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.

Wheeler, M. A., Stuss, D. T., & Tulving, E. (1997). Toward a theory of episodic memory: The frontal lobes and autonoetic consciousness. *Psychological Bulletin, 121*(3), 331-354. doi: 10.1037/0033-2909.121.3.331

Williams, A. D., & Moulds, M. L. (2010). The content, nature, and persistence of intrusive memories in depression. In J. H. Mace (Ed.), *The act of remembering: Toward an understanding of how we recall the past*. (pp. 361-383): Wiley-Blackwell.

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica, 67*(6), 361-370. doi: 10.1111/j.1600-0447.1983.tb09716.x

Zimmerman, M. (1994). Diagnosing personality disorders: A review of issues and research models. *Archives of General Psychiatry, 51*(3), 225-245.

Table 1

*Descriptive Information for the Full Sample*

Full Sample	
Total Participants	240
Sex	65.4 % Female, 34.6% Male (157 Females; 83 males)
Age	Range: 17 - 62 (M = 25.4, SD = 9)
Ethnicity	89.1% White British; 2.5% Black African (214 White British; 6 Black African; 20 other)
Marital Status	65.4% Single; 18.8% Married (Civil Partnership); 14.2% Co-habiting; 1.3% Divorced and .4% Widowed. (157 Single; 45 Married (Civil Partnership); 34 Co-habiting; 3 Divorced and 1 Widowed)
Psychiatric Diagnosis, Psychological Disorder	88.8% None; of 10.4% - (213 None; 25 Yes) - 71.4% Depression - 14.3% Anxiety - 14.3% Other; Eating Disorder; Obsessive Compulsive Disorder; Drug Induced Psychosis and Personality Disorder.
HYP Score (Max. = 48)	Range: 3 - 34 (M = 21.37, SD = 4.89)
SHPSS Usual (Max. = 48)	Range: 8 - 40 (M = 25.04, SD = 5.98)
SHPSS Ideal (Max. = 48)	Range: 18 - 42 (M = 34.09, SD = 4.830)
SHPSS Total (Max. = 48)	Range: 28 - 82 (M = 59.13, SD = 9.78)

Table 2

*Descriptive Information for the LHYP and HHYP Groups*

	Group	
	LHYP	HHYP
Total Participants	9	10
Sex	55.6% Female (5 Females; 4 males)	70% Female (7 Females; 3 Males)
Age	Range: 18 - 47 (M = 27.78, SD = 12.37)	Range: 18 - 41 (M = 22.9, SD = 6.9)
Ethnicity	88.9% White British (8 White British; 1 British African)	100% White British (10 White British)
Marital Status	44.4% Married (Civil Partnership); 44.4% Single (4 Married (Civil Partnership): 4 Single: 1 Co-habiting)	80% Single (8 Single; 1 Co-habiting; 1 Married (Civil Partnership))
Psychiatric Diagnosis, Psychological Disorder	None	20% (2) Yes: Anxiety Attacks; Depression
HYP Score	Range: 11 - 14 (M = 12.56, SD = .88)	Range: 27 - 34 (M = 29.2, SD = 2.15)
SHPSS Usual	Range: 19 - 33 (M = 28, SD = 5)	Range: 12 - 34 (M = 23, SD = 7.02)
SHPSS Ideal	Range: 26 - 42 (M = 35.78, SD = 4.6)	Range: 28 - 42 (M = 35, SD = 4.35)
SHPSS Total	Range: 45 - 71 (M = 63.78, SD = 8.48)	Range: 40 - 72 (M = 58, SD = 10.36)
HADS Anxiety	Range: 0 - 12 (M = 5.33, SD = 3.24)	Range: 6 - 15 (M = 10.4, SD = 3.6)
HADS Depression	Range: 0 - 7 (M = 2.33, SD = 2.29)	Range: 2 - 9 (M = 5.5, SD = 2.01)
Vividness	Range: 4.5 - 6 (M = 5.22, SD = .54)	Range: 3.25 - 5.75 (M = 5.12, SD = .74)
Positive Emotion	Range: 2.17 - 4.5 (M = 3.31, SD = .79)	Range: 1.67 - 4.83 (M = 3.36, SD = .97)



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Negative Emotion	Range: 1.19 – 2.5 (M = 1.63, SD = .44)	Range: 1.59 – 3.69 (M = 2.36, SD = .70)
SDM Imagery Total	Range: 0 - 4 (M = 3.44, SD = 1.33)	Range: 0 - 4 (M = 3.3, SD = 1.34)

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Table 3

*Group and Imagery Vividness*

	Group		<i>U</i>
	HHYP	LHYP	
Imagery Vividness	5.13 (.74)	5.22 (.54)	42.5

Note. Standard deviations appear in parentheses below means.

Table 4

*Group and Total Imagery Use*

	Group		$\chi^2$	<i>df</i>
	HHYP	LHYP		
Imagery Use	3.30 (1.34)	3.44 (1.33)	.95	1

Note. Standard deviations appear in parentheses below means.

Table 5

*Imagery Vividness and Emotional Response*

Emotion	Group	
	LHYP	HHYP
Positive	$r_s = -.46$	$r_s = .64^*$
	Range: 2.17 – 4.5	Range: 1.67 – 4.83
	M = 3.31	M = 3.36
	SD = .79	SD = .97
Negative	$r_s = -.53$	$r_s = -.18$
	Range: 1.19 – 2.5	Range: 1.59 – 3.69
	M = 1.63	M = 2.36
	SD = .44	SD = .70

Note. \*  $p = .045$ .

Table 6

*Themes of SDM's Between Groups*

Theme	Group			<i>H</i>	<i>df</i>
	HHYP (n = 10)	LHYP (n = 9)	Bipolar <sup>a</sup> (n = 28)		
Life-threatening events	Sum = 8 M = .80 SD = .79	Sum = 9 M = 1 SD = 1	Sum = 17 M = .61 SD = .63	1.24	2
Self being violated / abused	Sum = 9 M = .90 SD = 1.1	Sum = 3 M = .33 SD = .71	Sum = 7 M = .25 SD = .44	3.6	2
Disrupted relationships	Sum = 8 M = .80 SD = .63	Sum = 5 M = .56 SD = .53	Sum = 14 M = .50 SD = .69	2.1	2
Undisrupted relationships	Sum = 9 M = .90 SD = .88	Sum = 13 M = .144 SD = .53	Sum = 15 M = .54 SD = .64	10.19**	2
Achievement, mastery and goal attainment	Sum = 15 M = 1.5 SD = 1.08	Sum = 11 M = 1.22 SD = 1.09	Sum = 13 M = .46 SD = .58	9.58*	2
Guilt/shame	Sum = 2 M = .20 SD = .42	Sum = 1 M = .11 SD = .33	Sum = 19 M = .68 SD = .55	10.75**	2
Disrupted sense of self	Sum = 15 M = 1.5 SD = 1.35	Sum = 1 M = .11 SD = .33	Sum = 16 M = .57 SD = .63	9.46*	2
Failure and lack of self-efficacy	Sum = 12 M = 1.2 SD = 1.03	Sum = 8 M = .89 SD = 1.27	Sum = 14 M = .50 SD = .64	3.78	2
Mental Illness	Sum = 0	Sum = 0	Sum = 11 M = .39 SD = .50	9.53*	2

Note. <sup>a</sup>(Provided by Raymond & Lam, 2009) \* $p < .05$ , \*\*  $p < .005$ . Standard deviations appear in parentheses below means.

Table 7

*Difference in Themes between HHYP and LHYP Groups*

Themes	Group		<i>U</i>
	HHYP (n = 10)	LHYP (n = 9)	
Life-threatening events	.80 (.79)	1 (1)	41
Self being violated / abused	.90 (1.1)	.33 (.71)	31.5
Disrupted relationships	.80 (.63)	.56 (.53)	36
Undisrupted relationships	.90 (.88)	1.44 (.53)	28.5
Achievement, mastery and goal attainment	1.5 (1.08)	1.22 (1.09)	38.5
Guilt/shame	.20 (.42)	.11 (.33)	41
Disrupted sense of self	1.5 (1.35)	.11 (.33)	16*
Failure and lack of self-efficacy	1.2 (1.03)	.89 (1.27)	35.5
Mental Illness	0 (0)	0 (0)	45

Note. \* $p < .01$ . Standard deviations appear in parentheses below means.

Table 8

*Difference in Themes between HHYP and Bipolar Groups*

Themes	Group		<i>U</i>
	HHYP (n = 10)	Bipolar <sup>a</sup> (n = 28)	
Life-threatening events	.80 (.79)	.6 (.63)	122
Self being violated / abused	.90 (1.1)	.25 (.44)	94.5
Disrupted relationships	.80 (.63)	.50 (.69)	102
Undisrupted relationships	.90 (.88)	.54 (.64)	107.5
Achievement, mastery and goal attainment	1.5 (1.08)	.46 (.58)	61**
Guilt/shame	.20 (.42)	.68 (.55)	77*
Disrupted sense of self	1.5 (1.35)	.57 (.63)	82*
Failure and lack of self-efficacy	1.2 (1.03)	.50 (.64)	84
Mental Illness	0 (0)	.39 (.50)	85*

Note. <sup>a</sup>(Provided by Raymond & Lam, 2009) \* $p < .05$ , \*\*  $p < .005$ .  
Standard deviations appear in parentheses below means.

Table 9

*Difference in Themes between LHYP and Bipolar Groups*

Themes	Group		<i>U</i>
	LHYP (n = 9)	Bipolar <sup>a</sup> (n = 28)	
Life-threatening events	1 (1)	.6 (.63)	99.5
Self being violated / abused	.33 (.71)	.25 (.44)	126
Disrupted relationships	.56 (.53)	.50 (.69)	113
Undisrupted relationships	1.44 (.53)	.54 (.64)	41.5**
Achievement, mastery and goal attainment	1.22 (1.09)	.46 (.58)	74.5*
Guilt/shame	.11 (.33)	.68 (.55)	58.5*
Disrupted sense of self	.11 (.33)	.57 (.63)	76
Failure and lack of self-efficacy	.89 (1.27)	.50 (.64)	114
Mental Illness	0 (0)	.39 (.50)	76.5*

Note. <sup>a</sup> (Provided by Raymond & Lam, 2009) \* $p < .05$ , \*\*  $p < .005$ .  
Standard deviations appear in parentheses below means.



Table 10

*Correlations between HYP and SHPSS Scores*

	HYP Score
SHPSS	
Usual	.02
Ideal	.13*
Total	.07

Note. \*  $p = .042$ .

Table 11

*SHPSS scores for the full sample and the LHYP and HHYP groups*

SHPSS	Group		
	Full Sample	LHYP	HHYP
Usual	Range: 8 - 40	Range: 19 - 33	Range: 12 - 34
	M = 25.04	M = 28	M = 23
	SD = 5.98	SD = 5	SD = 7.02
Ideal	Range: 18 - 42	Range: 26 - 42	Range: 28 - 42
	M = 34.09	M = 35.78	M = 35
	SD = 4.830	SD = 4.6	SD = 4.35
Total	Range: 28 - 82	Range: 45 - 71	Range: 40 - 72
	M = 59.13	M = 63.78	M = 58
	SD = 9.78	SD = 8.48	SD = 10.36

Figure 1

*Frequency distribution of average imagery vividness for HHYP group*

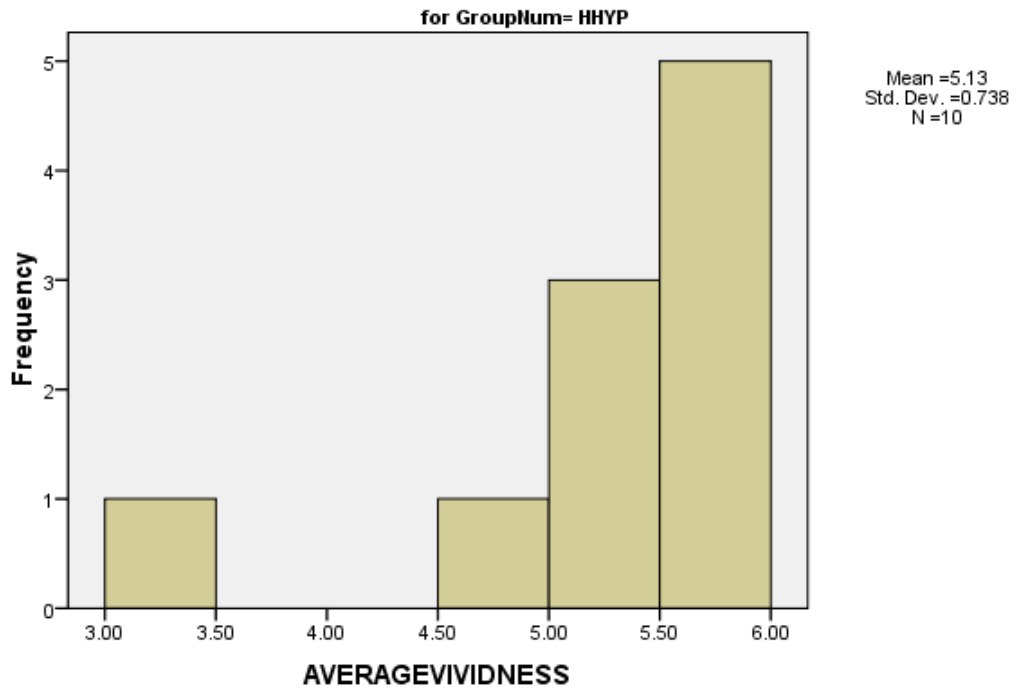


Figure 2

*Frequency distribution of average imagery vividness for LHYP group*

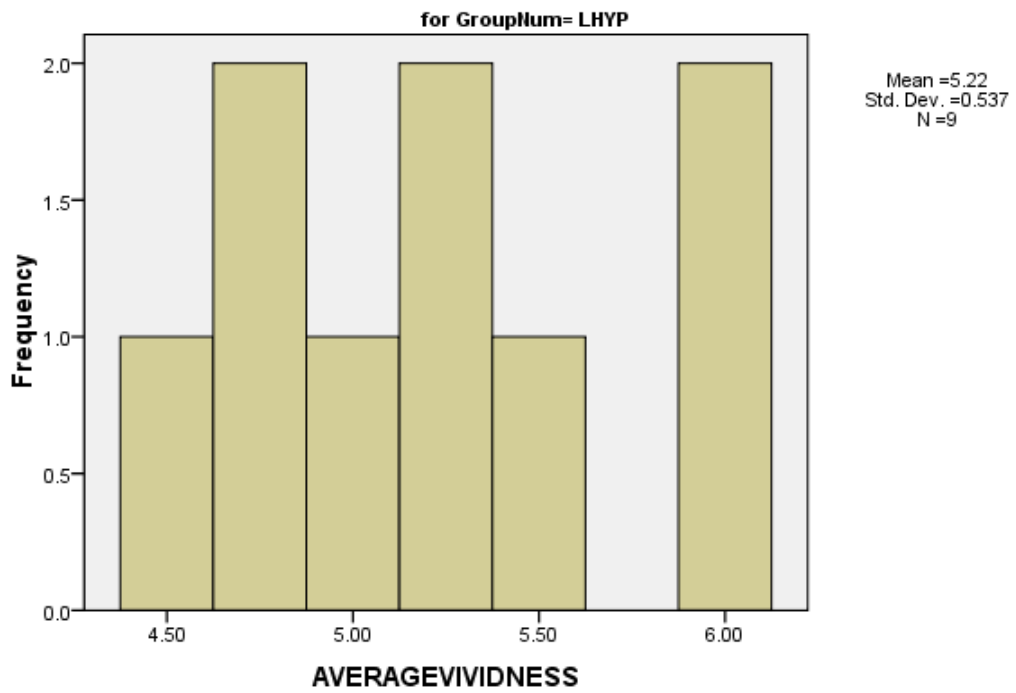


Figure 3

*Boxplot showing frequency distribution of average imagery vividness by group*

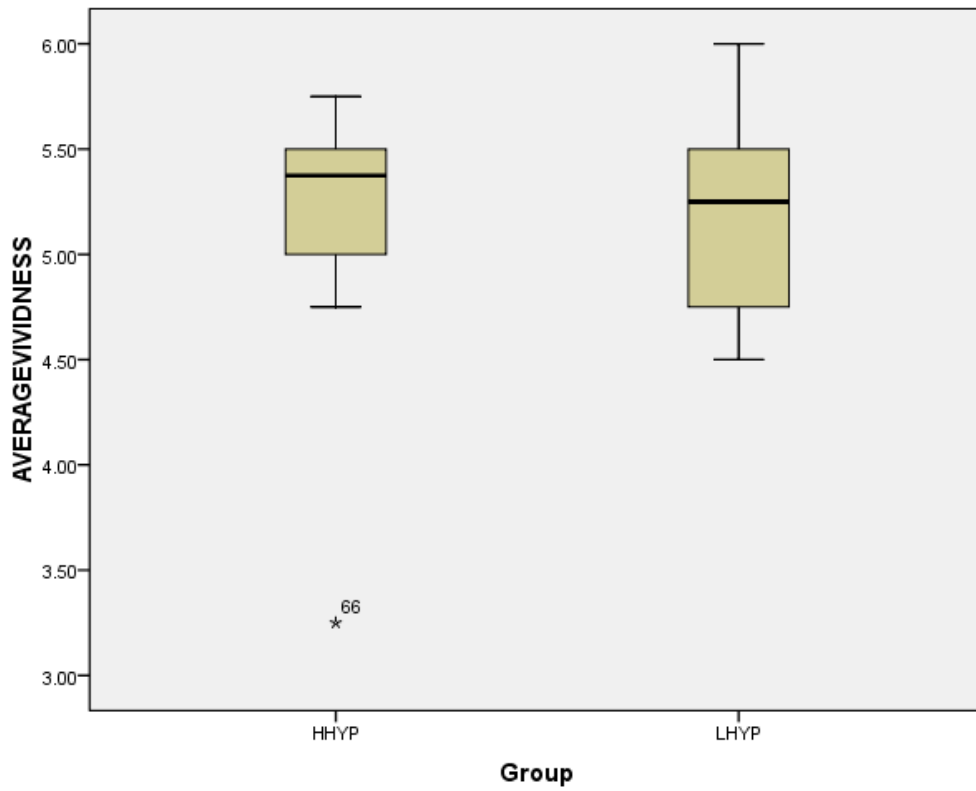


Figure 4

Scatterplot of average imagery vividness, positive emotion and negative emotion for HHYP group

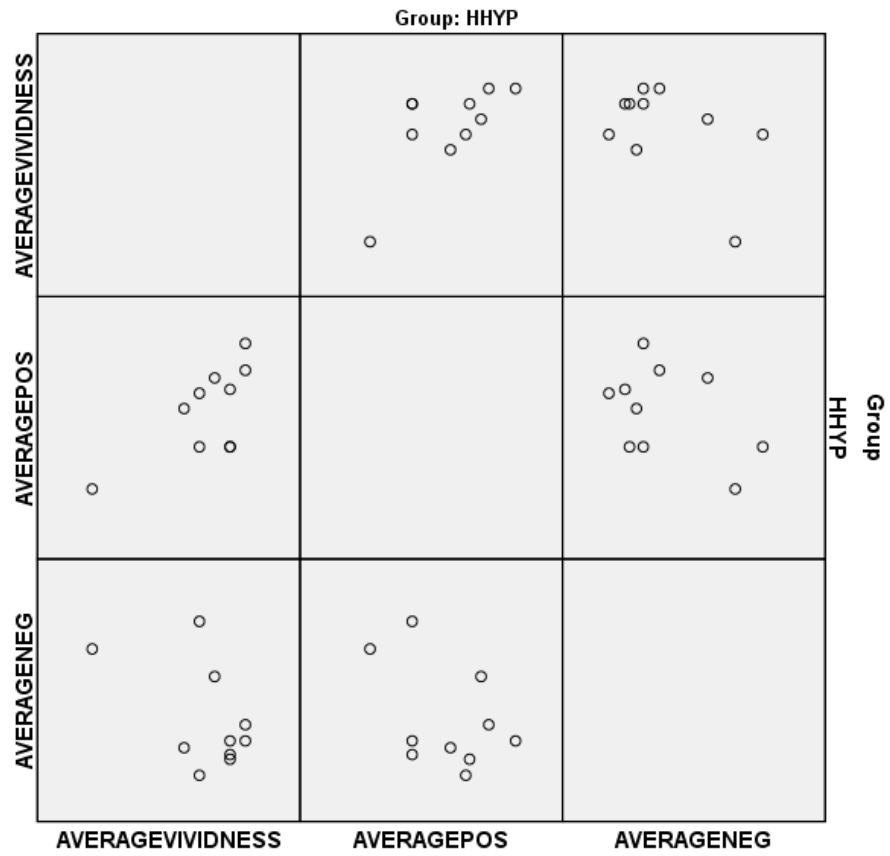


Figure 5

Scatterplot of average imagery vividness, positive emotion and negative emotion for

LHYP group

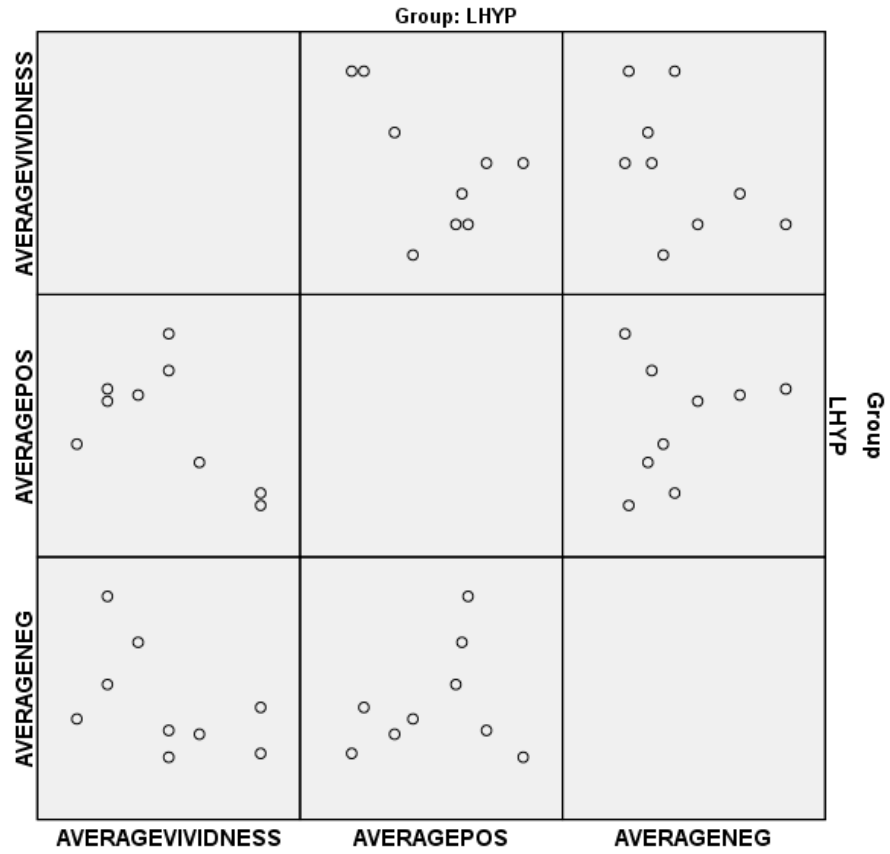
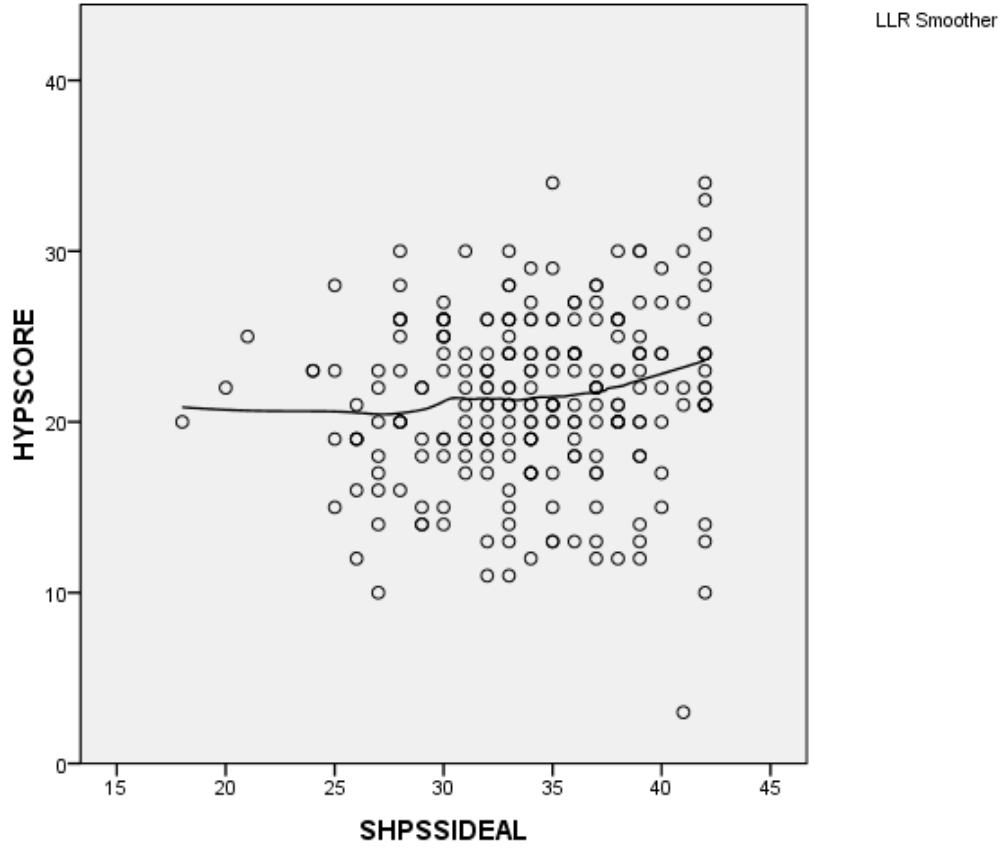


Figure 6

*Scatterplot of correlation between HYP score and SHPSS Ideal score*





PART THREE:

Appendices

## Appendix A

### Reflective Statement

I have certainly found the research journey an interesting and enjoyable one, and I am keen to reflect on the process of planning and carrying out a large scale research project. Whilst only previously completing research for my undergraduate degree this certainly felt like a large 'step-up' from my previous experience of empirical work. The rigorous nature of carrying out such a large and complex piece of literature has enabled me to learn a lot about my personal approach to research. I have become aware that my organised and thorough nature was heavily relied upon, as along the process I reflected on my tendency to create detailed timetables as well as in depth progress reports (for supervision). This also extended to my written work where, at times, my excessive categorising and compartmentalisation was visible in headings and subheadings which sometimes was at the detriment of the flow and 'telling a story' which I later corrected. I also learnt that my personal style is better reflected in the use of quantitative data analysis methods as I found definitive 'support' or 'no support' statements easier to grasp. I do however appreciate the place of qualitative analysis, which I also gained experience of completing through quality assessing a colleagues articles.

I feel that completing this process has filled me with countless pieces of information that I would like future researchers to know, primarily through lessons I have learnt myself. The importance of finding the topic area in which you are working, interesting, is paramount. It was through my interest in imagery and its effects on emotion that I was encouraged and eager to learn and find out more which enabled me to keep going. This process had developed my interest, and I am certainly keen to look to complete research in this area in the future. I think not having too many hypotheses would also be advice I would give. My four hypothesis which all included differing

areas of theory meant my introduction, results and discussion had to be separated out for each one, as well as this not particularly aiding the flow of the report. I would ensure that your personal style is reflected in either quantitative or qualitative methodology as a mis-match may cause the researcher to struggle to report findings or be satisfied with the level of results gained. Not assuming that there will be the number of articles you would expect in a given subject is a must. A commonly held assumption, such as that of the topic of my systematic literature review (SLR), yielded minimal results, and this was certainly not expected given the extent of evidence which assumes its existence. A key issue also for me which arose from the order by which I completed the two sections; completing them side by side limited the extent by which limitations in methodology as outlined by the SLR could be considered and accounted for in the empirical paper. For this reason I would advise completing the SLR first and utilising this depth of review to aid the development of the empirical paper. For anyone who has not completed extensive research through gathering information from participants in person (which I had not previously done) I would suggest preparing yourself for the diversity in and, at times, conflict in roles between researcher and psychologist. I found it difficult to not utilise additional questioning, reframing or containment / warmth or comfort in response to participants who were recalling vivid and upsetting memories. I battled with the importance of letting the participant recall the memory, with instinctual responses as a result of my clinical psychology training.

The two key areas of difficulty faced (other than that of the ethical consideration discussed later), were in relation to recruitment. I was surprised of the numbers of individuals who did not adequately complete the questionnaires or contact details or sign the consent form. I was often frustrated by those who had completed the entirety of the two questionnaires, but not included any contact details or signing a consent form that they were happy with being contacted as this rendered all of the measures un-

usable. For this 30 + questionnaire packs were reprinted, and there was much time along the way were I considered if there was any other way in which I could ensure accurate completion of the forms. However due to the personal nature of the information included, of course sitting next to them and looking over the shoulder at every page was of course not an option! My understanding of why this arose was due to the individual's level of investment in the study, and as this occurred earlier on, I did change the way in which it was presented in lectures to improve understanding of the importance of 'if you chose to complete it, please complete the whole pack'. I also struggled with getting individuals in the top and bottom 10% to return. I was also surprised and again frustrated at the extent of people who, for various reasons, could not return. This probably reflected the individual's response of frustration in being asked to come and meet me to talk to me about their personal memories, which is understandable. A likely factor in this was time gap between section 1 and section 2 which, for some participants, was up to 3 or even 4 months. During this period participants were likely to have forgotten what they had agreed to, generally not be contactable with the information given or no longer be interested / willing to comply.

I feel there are many elements of this research project which were strengths and enhanced the progress of its completion. The initial direction from a supervisor who is respected in the field of bipolar disorder was definitely a strength of this study. His input in shaping, challenging and developing my ideas was invaluable and absolutely contributed level of empirical grounding as well as complexity. And it is through this that I have been able to learn and develop my research style as much as I have. I completed a lot of reading and information gathering early on and I think in contrast to others who were instead completing it for RP3 or RP4, I had extensively reviewed the literature with fortnightly meetings at an early stage. The numbers of participants I was able to gather was a plus. I was persistent in persevering with talking to very large

classes of students, waiting around for hours on end to return for just a handful of participants. Something I was proud of was gathering 240 participants and certainly felt like it was a result of my hard work. My planning, organising and deadline setting also felt like a strength of mine which aided to the study's timely completion, allowing adequate time for review by my supervisor. A final strength in the way the study was carried out was the time slot allocation for completing the self-defining memory task. It would have been easy for me to book participants in back to back, i.e. in 30 minute slots, but being mindful that either the emotion evoked from the memories or the information that they might be more likely to develop the disorder might cause distress, I always allowed 1 hour. In the couple of cases where this occurred, (in relation to self-memories only) I was pleased that I was able to not rush them out the door, and happy that this was planned for and not an afterthought.

My future research endeavours will certainly benefit from the multitude of knowledge and experience gained from this process. I feel I am now proficient in quickly and effectively extracting important information from journal articles; and I feel that through reading other authors and completing my own critical appraisal I feel that this has improved substantially. I absolutely value the participants, more so now following this process due to their willingness to give up time in the interest of research and for no personal gain of their own. I appreciate the need for use of validated measures as well as those with appropriate construct validity, and with reflections made in my SLR I feel that perhaps my empirical paper could have benefited from this knowledge base as an earlier stage. Through quality assessing colleagues' papers I have received an introduction to qualitative analysis, which I feel will aid me decisions of completing qualitative and quantitative methods in the future. I have of course learnt a great deal about the entire topic areas included in this study, which will certainly aid future clinical work as well as that of research. Additionally, in the later stages, I have

learnt a great deal about SPSS as well APA styling which will of course be of benefit for future research. I have learnt the value of patience when asking participants to recall memories, as they rarely came quicker or were of the correct type; as well as the need to leave more time to do things that I thought I needed as this also tends to be the case when completing large scale research projects such as this. The fact that different individuals can have dramatically different viewpoints on completing research was an eye opener for me, where some lecturers were very keen that all of their students completed the initial questionnaires, where some would not allow me to talk to their students at all. A final important factor that will aid my future in research, was perhaps based on my naivety, and is the knowledge that participants do not read through the entirety of information sheets or consent forms or instruction sheets before agreeing to them or signing them. I will always endeavour to verbalise these in addition to a written form in the future.

The primary ethical consideration met during the process of my research was whether or not participants were to be informed that they were statistically more likely to later develop bipolar disorder, and if so, when this should occur. Initially it was the opinion of both myself and my supervisor that participants should not be told due to the actual levels of likelihood, and the issue of a false positive response based on mood and the resultant worry that may be expected given such information. The ethics committee however believed that this was not acceptable, stating initially that they should know this information before completing the measures. Eventual agreement was made that this information would be given following completion of section 2 based on its potential mood priming effects of being given earlier. This was a struggle for me as even at this time point, whilst I respect individual's right to have access to information about them, I feel that excessive worry with uncertain knowledge was unfair. Having had experience of giving out this information to 10 individuals (that they are more

likely but not significantly more likely to develop bipolar disorder) I feel than an effective compromise in approach was made. My more recent reflections are that the giving of this information was a just and fair process, and I respect that in hindsight the ethics committee are experienced and knowledgeable in their area and that they had made a sound decision.

In relation to choosing a journal for my SLR, the Journal of Emotion appeared an obvious choice. Publishing significant contributions to the study of emotion and accepting comprehensive reviews of empirical literature were among the reasons for this choice as well as two of the ten papers that were reviewed were previously published by this journal. The Journal of Abnormal Psychology was selected for the empirical paper as it is a major peer reviewed journal with a high impact factor. Its general topics of focus include 'pathological or atypical features of the behaviour of normal persons' which is relevant to the subject matter of the empirical paper.

In conclusion, the process of reviewing the literature and completing research of my own from start to finish has taught me a great deal both academically and personally. It has absolutely been a valuable experience, and I am keen to embark on subsequent studies in the future. The process of empirically testing out a personally constructed hypothesis or theory is exciting at the least, and potential implications in the area are limitless. Producing a thesis which pulls together and represents three years of work in a way that I would feel proud of was certainly a challenge, however I am proud to say that I feel I have finally achieved it.

## Appendix B

### Journal of Emotion – Author Guidelines

Taken from <http://www.apa.org/pubs/journals/emo/index.aspx> (accessed 23/05/11)

#### Instructions to Authors

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Please consult APA's [Instructions for All Authors](#) for information regarding

- Manuscript Preparation
- Submitting Supplemental Materials
- Abstract and Keywords
- References
- Figures
- Permissions
- Publication Policies
- Ethical Principles

#### Submission

---

Submit manuscripts electronically through the [Manuscript Submission Portal](#) in Word Document format (.doc). All tables and figures should be included in the manuscript file.

David DeSteno  
Northeastern University  
Boston, MA 02115

General correspondence may be directed to the [Editor's Office](#).

#### Masked Review Policy

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Masked reviews are optional, and authors who wish masked reviews must specifically request them when they submit their manuscripts. For masked reviews, the manuscript must include a separate title page with the authors' names and affiliations, and these ought not to appear anywhere else in the manuscript.

Footnotes that identify the authors must be typed on a separate page. Authors are to make every effort to see that the manuscript itself contains no clues to their identities.

#### Manuscript Submission Guidelines

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In addition to addresses and phone numbers, authors should supply electronic mail addresses and fax numbers for use by the editorial office and later by the production office. The majority of correspondence between the editorial office and authors is handled by e-mail, so a valid e-mail address is important to the timely flow of communication during the editorial process.

Authors should provide electronic mail addresses in their cover letters and should keep a copy of the manuscript to guard against loss. Manuscripts are not returned.

Manuscripts for *Emotion* can vary in length; typically they will range from 10 to 40 double-spaced manuscript pages. Manuscripts should be of sufficient length to ensure theoretical and methodological competence.

Most of the articles published in *Emotion* will be reports of original research, but other types of articles are acceptable.



- Case studies from either a clinical setting or a laboratory will be considered if they raise or illustrate important questions that go beyond the single case and have heuristic value.
- Articles that present or discuss theoretical formulations of emotion and related affective phenomena that evaluate competing theoretical perspectives, or that offer innovative commentary or analysis on timely topics of inquiry may also be accepted.
- Comprehensive reviews of the empirical literature in an area of study are acceptable if they contain a meta-analysis and/or present novel theoretical or methodological perspectives.
- Comments on articles published in the journal will be considered.

## Brief Reports

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*Emotion* also publishes brief reports. Manuscripts submitted as Brief Reports should not exceed 2,500 words, exclusive of references and figure captions. There should be no more than 2 figures or tables and no more than 30 references.

## Appendix C

### Journal of Abnormal Psychology – Author Guidelines

Taken from <http://www.apa.org/pubs/journals/abn/index.aspx> (accessed 23/05/11)

#### Instructions to Authors

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Please consult APA's [Instructions for All Authors](#) for information regarding

- Manuscript Preparation
- Submitting Supplemental Materials
- Abstract and Keywords
- References
- Figures
- Permissions
- Publication Policies
- Ethical Principles

#### Submission

---

[Submit manuscripts electronically](#) (in .rtf or .doc format) via the Manuscript Submission Portal.

Sherryl H. Goodman, PhD  
Editor, *Journal of Abnormal Psychology*  
Department of Psychology  
Emory University  
36 Eagle Row  
Atlanta, GA 30322

General correspondence may be directed to the [Editor's Office](#). In addition to postal addresses and telephone numbers, please supply electronic mail addresses and fax numbers, if available, for potential use by the editorial and production offices.

#### Masked Reviews

---

Masked reviews are optional and must be specifically requested in the cover letter accompanying the submission. For masked reviews, the manuscript must include a separate title page with the authors' names and affiliations, and these ought not to appear anywhere else in the manuscript. Footnotes that identify the authors must be typed on a separate page. Make every effort to see that the manuscript itself contains no clues to authors' identities.

#### Types of Articles

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Most of the articles published in the *Journal of Abnormal Psychology* are reports of original research, but other types of articles are acceptable.

- Short Reports of replications or of failures to replicate previously reported results are given serious consideration.
- Comments on articles published in the journal are also considered.
- Case Studies from either a clinical setting or a laboratory will be considered if they raise or illustrate important questions that go beyond the single case and have heuristic value.
- Manuscripts that present or discuss theoretical formulations of psychopathology, or that evaluate competing theoretical formulations on the basis of published data, may also be accepted.

The *Journal of Abnormal Psychology* publishes articles on basic research and theory in the broad field of abnormal behavior, its determinants, and its correlates.

The following general topics fall within its area of major focus:

- psychopathology - its etiology, development, symptomatology, and course
- normal processes in abnormal individuals
- pathological or atypical features of the behavior of normal persons
- experimental studies, with human or animal subjects, relating to disordered emotional behavior or pathology
- sociocultural effects on pathological processes, including the influence of gender and ethnicity
- tests of hypotheses from psychological theories that relate to abnormal behavior

Thus, studies of patient populations, analyses of abnormal behavior and motivation in terms of modern behavior theories, case histories, and theoretical papers of scholarly substance on deviant personality and emotional abnormality would all fall within the boundaries of the journal's interests.

Each article should represent a significant addition to knowledge and understanding of abnormal behavior in its etiology, development, or description.

In order to improve the use of journal resources, it has been agreed by the two Editors concerned that the *Journal of Abnormal Psychology* will not consider articles dealing with diagnosis or treatment of abnormal behavior, and the *Journal of Consulting and Clinical Psychology* will not consider articles dealing with the etiology or descriptive pathology of abnormal behavior.

Therefore, a study that focuses primarily on treatment efficacy should be submitted to the *Journal of Consulting and Clinical Psychology*. However, a longitudinal study focusing on developmental influences or origins of abnormal behavior should be submitted to the *Journal of Abnormal Psychology*.

Articles of five different types will be considered for publication in the Journal: Brief Reports, Regular Articles, Extended Articles, Case Studies, and Commentaries.

- Brief Reports must not exceed 5,000 words in overall length. This limit includes all aspects of the manuscript (title page, abstract, text, references, tables, author notes and footnotes, appendices, figure captions) except figures. Brief Reports also may include a maximum of two figures. For Brief Reports, the length limits are exact and must be strictly followed.
- Regular Articles typically should not exceed 9,000 words in overall length (excluding figures).
- Extended Articles are published within regular issues of the *Journal* (they are not free-standing) and are reserved for manuscripts that require extended exposition beyond the normal length restrictions of a Regular Article. Typically, Extended Articles will report multiple experiments, multifaceted longitudinal studies, cross-disciplinary investigations, or studies that are extraordinarily complex in terms of methodology or analysis. Any submission that exceeds a total of 12,000 words in length automatically will be considered for publication as an Extended Article.
- Case Studies and Commentaries have the same length requirements as Brief Reports.

## Cover Letters

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All cover letters must contain the following:

- the full postal and e-mail address of the corresponding author;
- the complete telephone and fax numbers of the same;
- the proposed category under which the manuscript was submitted;
- a statement that the authors complied with APA ethical standards in the treatment of their participants and that the work was approved by the relevant Institutional Review Board(s);
- that the material is original – if findings from the dataset have been previously published or are in other submitted articles, the distinctiveness of the submitted manuscript needs to be detailed and, if a reanalysis of data, a justification provided;
- whether or not the manuscript has been or is posted on a web site;
- that APA style (*Publication Manual*, 6th edition) has been followed;
- the disclosure of any conflicts of interest with regard to the submitted work;
- a request for masked review, if desired, along with a statement ensuring that the manuscript was prepared in accordance with the guidelines above.

Authors should also specify the overall length of the manuscript (in words) and indicate the number of tables and figures that are included in the manuscript.

## Appendix D

## Adapted Methodological Quality Assessment Checklist

Question	Scoring
Is the hypothesis/aim/objective of the study clearly described?	Y-1, N-0
Are the main outcomes to be measured clearly described in the Introduction or Methods section	Y-1, N-0
Are the characteristics of the patients included in the study clearly described ?	Y-1, N-0
Are the distributions of principal confounders in each group of subjects to be compared clearly described?	Y-1, N-0
Are the main findings of the study clearly described?	Y-1, N-0
Does the study provide estimates of the random variability in the data for the main outcomes?	Y-1, N-0
Have all important adverse events that may be a consequence of the intervention been reported?	Y-1, N-0
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?	Y-1, N-0
Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	Y-1, N-0, Unable-0
Was an attempt made to blind those measuring the main outcomes of the intervention?	Y-1, N-0, Unable-0
Were the statistical tests used to assess the main outcomes appropriate?	Y-1, N-0, Unable-0
Were the main outcome measures used accurate (valid and reliable)?	Y-1, N-0, Unable-0
Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?	Y-1, N-0, Unable-0

Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	Y-1, N-0, Unable-0
Were study subjects randomised to intervention groups?	Y-1, N-0, Unable-0
Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	Y-1, N-0, Unable-0
Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	Y-1, N-0, Unable-0
Were losses of patients to follow-up taken into account?	Y-1, N-0, Unable-0
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%?	Y-1, N-0, Unable-0

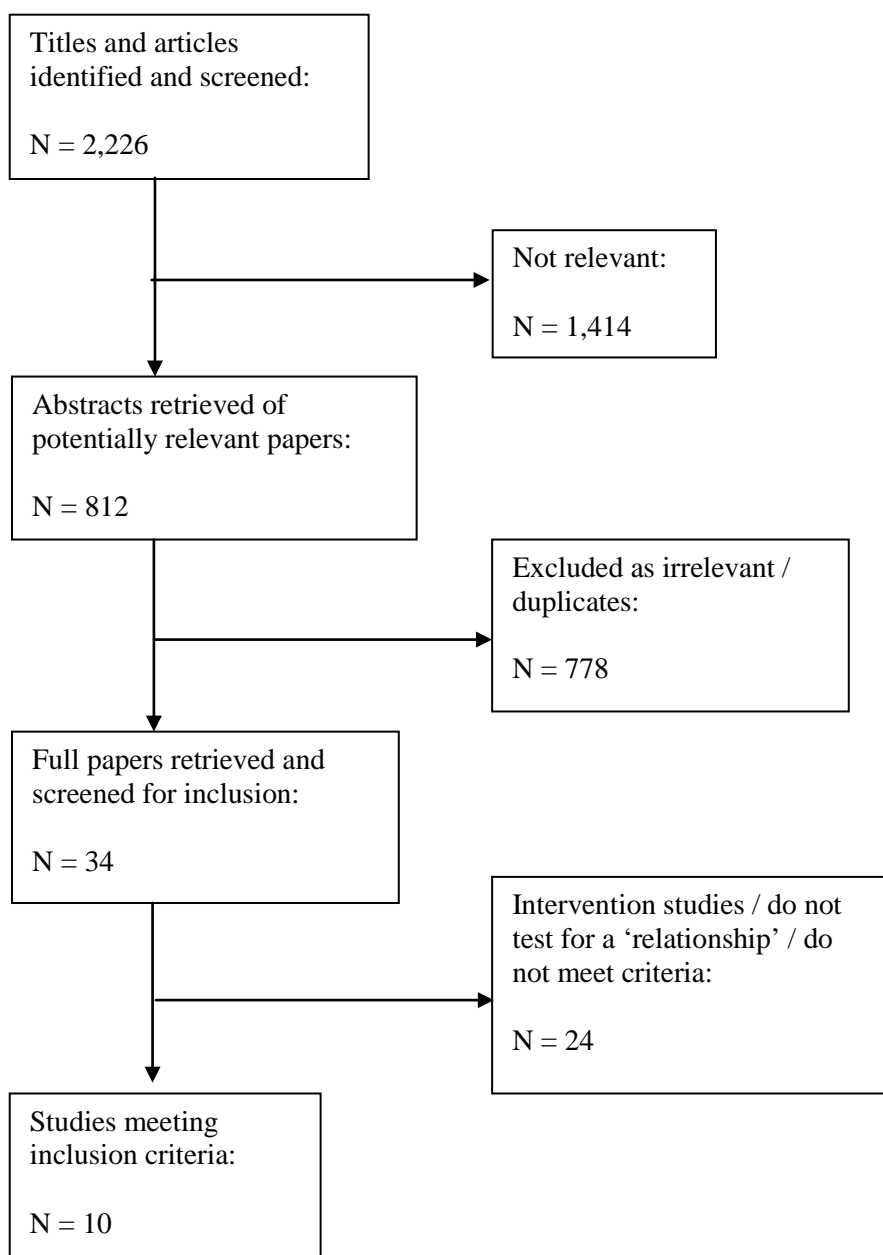
## Appendix E

## Total Score on Quality Assessment Checklist

<b>Empirical Paper</b>		<b>Score</b>
Stanley & Cumming (2010)		12
Holmes, Mathews, et al. (2008)	Experiment 1	6
	Experiment 2	12
Hirsch, et al. (2006)		10
Holmes, Lang, et al. (2009)		10
Ceschi, et al. (2009)		10
Holmes & Mathews (2005)	Experiment 1	14
	Experiment 2	13
Maude-Griffin & Tiffany (1996)		8
Holmes, et al. (2006)		15
Hirsch, et al. (2003)		13
Reyher & Smeltzer (1968)		9

## Appendix F

## Process of Obtaining Included Articles



## Appendix G

## Proforma for Data Collection

*Journal Article Title:* \_\_\_\_\_

*Author(s):* \_\_\_\_\_

*Year:* \_\_\_\_\_

	Questions:	Information:		
General	What is the <b>sample</b> : N, age, population?	<u>N</u>	<u>Age Range</u>	<u>Other relevant demographics</u>
	What was the <b>hypothesis</b> ? (If more than 1 then the relevant one)			
	What was the <b>design</b> of the study and the <b>basic methodology</b> ?			
Measures	How was the presence of <b>mental imagery recorded</b> ?			
	How was <b>emotion measured</b> , was it also measured at baseline?			
Control	Was there a <b>control</b> or group for comparison? (Incl. details)	YES or NO		
Relationship	Was a <b>causal relationship</b> found?	YES or NO	If YES, what was <b>the effect size</b> ? (Incl. pos and neg relationship effect sizes)	
	<b>Statistical tests</b> used?		The statistical <b>significance of the effect size</b> ?	
Limitations	What were the key <b>limitations</b> of the study?			
Other	Additional <b>relevant quantitative</b> results?			
	Additional <b>relevant qualitative</b> results?			



## Appendix H

## Hypomanic Personality Scale (HYP)

**Personality Questionnaire 1**

Below are 46 statements describing how a person feels. **Read each statement carefully and decide whether it applies to you.** If a statement is true or mostly true, as applied to you, please circle "yes". If a statement is false or not usually true, as applied to you, please circle "no".

- |    |   |            |           |
|----|---|------------|-----------|
| 1  | People should try to understand their dreams and be guided by or take warning from them.                              | <b>Yes</b> | <b>No</b> |
| 2  | I work under a great deal of tension.   | <b>Yes</b> | <b>No</b> |
| 3  | At times I have wanted to leave home very much.   | <b>Yes</b> | <b>No</b> |
| 4  | At times I have fits of laughing and crying that I cannot control.  | <b>Yes</b> | <b>No</b> |
| 5  | I have often had to take orders from someone who does not know as much as I do.                                       | <b>Yes</b> | <b>No</b> |
| 6  | I sometimes keep on at something until others lose their patience with me.  | <b>Yes</b> | <b>No</b> |
| 7  | I am an important person.   | <b>Yes</b> | <b>No</b> |
| 8  | At times I have a strong urge to do something harmful or shocking.  | <b>Yes</b> | <b>No</b> |
| 9  | I have met with problems so full of possibilities that I have been unable to make up my mind about them.              | <b>Yes</b> | <b>No</b> |
| 10 | I believe women ought to have as much sexual freedom as men.  | <b>Yes</b> | <b>No</b> |
| 11 | Sometimes when I am not feeling well I am irritable.  | <b>Yes</b> | <b>No</b> |
| 12 | Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right. | <b>Yes</b> | <b>No</b> |
| 13 | I have never done anything dangerous for the thrill of it.  | <b>Yes</b> | <b>No</b> |
| 14 | My speech is the same as always (not faster or slower, no slurring or hoarseness).                                    | <b>Yes</b> | <b>No</b> |
| 15 | My table manners are not quite as good at home as when I am out in company.   | <b>Yes</b> | <b>No</b> |
| 16 | I know who is responsible for most of my troubles.  | <b>Yes</b> | <b>No</b> |

17	At times my thoughts have raced faster than I could say them.	<b>Yes</b>	<b>No</b>
18	When I was a child, I belonged to a group of friends that tried to be loyal through all kinds of trouble.	<b>Yes</b>	<b>No</b>
19	I feel impatient when people ask my advice or otherwise interrupt me when I am working on something important.	<b>Yes</b>	<b>No</b>
20	I feel that I have often been punished without cause.	<b>Yes</b>	<b>No</b>
21	I am afraid when I look down from a high place.	<b>Yes</b>	<b>No</b>
22	It wouldn't make me nervous if any members of my family got into trouble with the law.	<b>Yes</b>	<b>No</b>
23	It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.	<b>Yes</b>	<b>No</b>
24	I find it hard to make conversation when I meet new people.	<b>Yes</b>	<b>No</b>
25	I have had periods where I carried on with activities without later knowing what I had been doing.	<b>Yes</b>	<b>No</b>
26	When I get bored I like to stir up some excitement.	<b>Yes</b>	<b>No</b>
27	I have had attacks in which I could not control my movements or speech but in which I knew what was going on around me.	<b>Yes</b>	<b>No</b>
28	My peers treat me more like a child than a grown-up.	<b>Yes</b>	<b>No</b>
29	It is not hard for me to ask help from my friends even though I cannot return the favour.	<b>Yes</b>	<b>No</b>
30	Some of my family have habits that bother and annoy me very much.	<b>Yes</b>	<b>No</b>
31	At times I feel that I can make up my mind with unusually great ease.	<b>Yes</b>	<b>No</b>
32	I have been inspired to a program of life based on duty which I have since carefully followed.	<b>Yes</b>	<b>No</b>
33	I have at times stood in the way of people who were trying to do something, not because it amounted to much but because of the principle.	<b>Yes</b>	<b>No</b>
34	I have periods of great restlessness where I cannot sit still for long.	<b>Yes</b>	<b>No</b>
35	I never worry about my looks.	<b>Yes</b>	<b>No</b>
36	I don't blame people for trying to grab everything they can get	<b>Yes</b>	<b>No</b>

in this world.

- |    |  |            |           |
|----|--|------------|-----------|
| 37 | I have had blank spells in which my activities were interrupted and I did not know what was going on around me.        | <b>Yes</b> | <b>No</b> |
| 38 | I sweat very easily even on cool days.   | <b>Yes</b> | <b>No</b> |
| 39 | Once a week or more I become very excited.   | <b>Yes</b> | <b>No</b> |
| 40 | When in a group of people I have trouble thinking of the right things to talk about.                                   | <b>Yes</b> | <b>No</b> |
| 41 | Something exciting will almost always pull me out of it when I am feeling low.   | <b>Yes</b> | <b>No</b> |
| 42 | I do not blame a person for taking advantage of others who leave themselves open to it.                                | <b>Yes</b> | <b>No</b> |
| 43 | At times I have been so entertained by the cleverness of some criminals that I have hoped they would get away with it. | <b>Yes</b> | <b>No</b> |
| 44 | I drink an unusually large amount of water every day.  | <b>Yes</b> | <b>No</b> |
| 45 | I am always disgusted with the law when a criminal is freed through the arguments of a smart lawyer.                   | <b>Yes</b> | <b>No</b> |
| 46 | If several people find themselves in trouble, the best thing for them to do is to agree upon a story and stick to it.  | <b>Yes</b> | <b>No</b> |

## Appendix I

## Sense of Hyper Positive Self Scale (SHPSS)

**Personality Questionnaire 2**

Please rate how well the following words describe **the way you are most of the time**, by circling the most appropriate number on the scale.

<b>Confident</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Dynamic</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Adorable</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Entertaining</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Outgoing</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Optimistic</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Creative</b>	Not at all							Extremely
	1	2	3	4	5	6	7	

Please rate the following words according to **how you would ideally like to be**, by circling the most appropriate number on the scale.

<b>Confident</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Dynamic</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Adorable</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Entertaining</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Outgoing</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Optimistic</b>	Not at all							Extremely
	1	2	3	4	5	6	7	
<b>Creative</b>	Not at all							Extremely
	1	2	3	4	5	6	7	

## Appendix J

## Hospital Anxiety and Depression Scale (HADS)

**HADS**

We would like to find out a bit about how you are feeling today. For each statement, please circle the response which best applies to you. Try to give your immediate response, rather than thinking about it for too long.

**I feel tense or 'wound up'**

Most of the time	A lot of the time	From time to time, occasionally	Not at all
------------------	-------------------	---------------------------------	------------

**I still enjoy the things I used to enjoy**

Definitely as much	Not quite as much	Only a little	Hardly at all
--------------------	-------------------	---------------	---------------

**I get a sort of frightened feeling as if something awful is about to happen**

Very definitely and quite badly	Yes, but not too badly	A little, but it doesn't worry me	Not at all
---------------------------------	------------------------	-----------------------------------	------------

**I can laugh and see the funny side of things**

As much as I always could	Not quite so much now	Definitely not so much now	Not at all
---------------------------	-----------------------	----------------------------	------------

**Worrying thoughts go through my mind**

A great deal of the time	A lot of the time	From time to time but not that often	Only occasionally
--------------------------	-------------------	--------------------------------------	-------------------

**I feel cheerful**

Not at all	Not often	Sometimes	Most of the time
------------	-----------	-----------	------------------

**I can sit at ease and feel relaxed**

Definitely	Usually	Not often	Not at all
------------	---------	-----------	------------

**I feel as if I am slowed down**

Nearly all of the time	Very often	Sometimes	Not at all
------------------------	------------	-----------	------------

**I get a sort of frightened feeling like 'butterflies' in the stomach**

Not at all	Occasionally	Quite often	Very often
------------	--------------	-------------	------------

**I have lost interest in my appearance**

Definitely	I don't take as much care as I should	I may not take quite as much care	I take just as much care as ever
------------	---------------------------------------	-----------------------------------	----------------------------------

**I feel restless as I have to be on the move**

Very much indeed	Quite a lot	Not very much	Not at all
------------------	-------------	---------------	------------

**I look forward with enjoyment to things**

As much as I ever did	Rather less than I used to	Definitely less than I used to	Hardly at all
-----------------------	----------------------------	--------------------------------	---------------

**I get sudden feelings of panic**

Very often indeed	Quite often	Not very often	Not at all
-------------------	-------------	----------------	------------

**I can enjoy a good book or radio or TV program**

Often	Sometimes	Not often	Very seldom
-------	-----------	-----------	-------------

## Appendix K

## Adapted Self Defining Memory Task (SDM Task)

**Self-Defining Memory Task**

We are interested in a special kind of personal memory called a self-defining memory. I am going to ask you to tell me about 4 different memories which are 'self-defining' and I will audio-tape them.

There 6 main characteristics about this type of memory:

1. It must be at least **one year old**.
2. It is a memory about your life that you **remember very clearly** and it is still **important** to you when you think about it now.
3. It is about an **enduring theme, issue or conflict in your life**. It helps to explain who you are an individual, and it would be the memory that you would tell someone else if you wanted them to really understand you.
4. It is **linked to other similar memories** that share the same theme or issue.
5. It can be a happy or a sad memory, or be a bit of both. But it must be **associated with strong feelings**.
6. It must be a memory that you have **thought about many times**. It should be familiar to you like a picture or a song you have learned by heart.

This might help:

Imagine you have just met someone you like very much and you are going for a walk together. You are both committed to understanding the real you. You are not trying to play a role or strike a pose.

Inevitably, we say things that present a picture of ourselves that might not be completely accurate, but imagine that you are making every effort to be honest.

In the course of the conversation, you describe a memory that you feel conveys powerfully how you have come to be the person that you are today.

## Appendix L

Follow up to Self-Defining Memory Task

**Self-Defining Memory Follow up**

Memory: (Please circle)                    1      2      3      4

How did you recall the memory? (Please tick)

- Using images in your mind  
 Using descriptive language

How vivid was your memory:

Not at all					Extremely
1	2	3	4	5	6

Please rate how much you felt the following emotions when you were talking and thinking about this memory:

<b>Happy</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Sad</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Angry</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Fearful</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Surprised</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Shameful</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Disgusted</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Guilty</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Interested</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Contempt</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Proud</b>	Not at all					Extremely
	1	2	3	4	5	6
<b>Embarrassed</b>	Not at all					Extremely
	1	2	3	4	5	6



## Appendix M

### Instructions for Coding Self-Defining Memories

#### Memory Coding Instructions

##### *Scoring for Content*

Categories described in The manual for Coding Events in Self-defining Memories (Thorne and McLean, 2001) have been adapted to score the thematic content of self-defining memories in this study. Due to the number of memories that were appeared to have multiple themes it was also decided to adapt the scoring system: rather than code for discrete categories, the rater should code each memory on whether each of the themes listed below is present. Ratings should be done on a six-point scale (1 *not at all present* to 6 *extremely present*).

1. **'Life-threatening events'**: narratives include death, serious injury or illness (to self or other), physical assault.
2. **'Self being violated/abused'**: this category includes narratives that describe feeling violated, abused or attacked following the actions of another person towards the individual reporting the memory. Narratives may report feeling disgusted in response to the actions of another person that were directed towards them; this may include events such as rape or sexual abuse.
3. **'Disrupted relationships'**: including break-ups, divorce, experiences of separation and interpersonal conflict
4. **'Undisrupted relationships'**: including first love, intimacy, reconciliation
5. **'Achievement, mastery and goal attainment'**: Achievement and mastery events emphasise either individual or group effortful attempts at accomplishment with regard to a goal attainment (physical, material, social or spiritual), skill or direction in life.
6. **'Guilt/ shame'**: These event narratives emphasise doing right or wrong. The narrative may use the word 'guilt', 'shame' or 'ashamed' or clearly convey remorse for one's actions for example, resolve to be a better person.
7. **'Disrupted sense of self'**: emphasis on not being certain of aspects of identity, reporting acting 'out of character', and confusion about identity or contradictory experiences of self. For example, a narrative about acting out of character might refer to being reckless when in a manic state, having affairs, or being uncharacteristically outgoing which may have subsequent negative consequences. Narratives might contain the theme of not being certain of aspects of identity: for example, having homosexual affairs when most of the time seeing oneself as heterosexual or losing one's temper when normally very calm. Additionally, narratives including events such as rape or abuse may refer to how the experiences have disrupted their sense of self or identity. For example, not being able to protect one's self when normally seeing themselves as strong, or feeling differently about one's self following the incident, for example feeling ashamed or dirty or no longer being able to trust others.

8. **'Failure and lack of self-efficacy'**: memory refers to feelings of failure or lack of self-efficacy. This may include the reporter describing feeling as though they are unable to cope or take control over events or aspects of their lives. For example, the participant may describe a loss of control and direction in life because of the illness or having the course of attaining planned life goals disrupted because of illness (this may be in reference to any aspect of life including career, education, relationships, ability to parent).

9. **'Mental illness'**: the memory narrative may emphasise, or make reference to a severe episode of mental illness, hospitalization or stigmatisation. As the control group are screened to ensure no history of psychiatric disorders, this theme will be looked at within the bipolar participants at baseline and across the two mood induction conditions.

## Appendix N

## Participant Information Sheet

**Participant Information Sheet**

We would like to invite you to take part in our research study. We are investigating the relationship between personality and the memories you have about your life. Please read through the following information and feel free to ask any questions.

There are two parts to this study, if you are interested in taking part we will collect your details so we can contact you (if required) to return for the second part.

**Please only complete the first part of the research if you are happy to return to complete the second part, if necessary.**

**Part 1:**

- Gathering some information about you, including contact details.
- Fill in two different personality questionnaires.

*Total Time: Roughly 20 minutes*

**Part 2:**

- This is a meeting with some of the people who completed the first section.
- You will be asked to fill in a questionnaire about how you are feeling.
- You will then be asked to talk in confidence about four memories you have about your life and then rate them on how vivid and happy/sad etc they make you feel.
- This will be audio taped, but you will not be identifiable from these recordings. The tapes will be kept securely within the department and later destroyed.
- For this part we would like you to come and see us at the Hertford Building, (Hull University).

*Total Time: Roughly 45 minutes*

**Risks and Benefits of Completing the Study:**

- You will gain the experience of taking part in a Doctoral research project.
- You might learn something you didn't know about yourself by answering questions you haven't thought about before about your personality.
- You will have the chance to think about some of the memories that are important to you, and have made you the person you are today.
- It will take up a total of over an hour of your time, and you will need to come over to the Hertford building to meet the researcher.

**What are my responsibilities?**

We would just like you to be aware that we may contact you for the second part, and please let us know if you change your mind or your contact details change.

### What are our responsibilities as researchers?

If we notice any cause for concern during the course of the research, we would then suggest that you go and visit your GP to talk about it further. We will give you a chance at the end of the research to talk about how you found the process of taking part in research and explain a bit more about what we are measuring.

### Storage of Data and Confidentiality:

- We will follow all recommended ethical and legal practice and all information about you will be kept in confidence.
- All completed forms and audio tapes will be stored in a locked filing cabinet and any data which is stored electronically will be encrypted. Participant forms and tapes will only include a 'participant identification number'.
- Personal contact information will only be kept until all participants needed for the second part of the research have been contacted. All participant identifiable information will then be destroyed.
- Only the primary researcher and the researcher's supervisor will have access to forms with participant identifiable information on during this time period.

### Right to withdrawal:

This study is voluntary and you have the right to withdraw from the study at any time, and upon request we can destroy all of your data.

### What will happen to my results?

The results gathered will be used to form part of the researchers' Doctoral Dissertation, it is intended that it will be published, if this is the case, all of the data will be made anonymous and you will not be identified in any report or publication.

**Do you have any questions?**

## Appendix O

## Consent Form

**Participant Consent Form**

**Title of Project:** Research into the relationship between different personalities and self-defining memories.

**Name of Researcher:** Jocelyn Hall, Trainee Clinical Psychologist.  
Supervised by Professor Dominic Lam,  
Clinical Psychologist.

1. I confirm that <b>I have read and understand the information sheet</b> for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	<input type="checkbox"/>
2. I understand that my <b>participation is voluntary</b> and that I am free to withdrawal at any time without giving reason.	<input type="checkbox"/>
3. I understand that data collected during the study will contain a patient identification number which can be linked to my personal details. I understand that <b>the researcher will keep my information securely</b> and it will be destroyed when no longer necessary. I give permission for my information to be kept for this time period.	<input type="checkbox"/>
4. I give the researcher <b>permission to contact me by the email or telephone</b> using the details I have provided to offer me to take part in the secondary section of the research if necessary.	<input type="checkbox"/>
5. <b>If I am asked to participate in the second part of the study, I understand that I will audio taped</b> whilst taking about some of the memories I have about my life. The recordings are confidential and will be kept securely and destroyed when no longer required.	<input type="checkbox"/>
6. <b>I agree to take part in the above study</b>	<input type="checkbox"/>

**Name of Participant:**

---

**Signed:**

**Date:**

**Signature of Researcher:**

**Date:**

## Appendix P

## Demographic Form

**Participant Demographic Form**

Name: \_\_\_\_\_

Age: \_\_\_\_\_

Gender: Male / Female

Ethnicity: \_\_\_\_\_

Marital Status: Single / Cohabiting / Married (Civil Partnership) /  
Divorced

Student: Yes / No

If 'Yes'; Course: \_\_\_\_\_

Year: \_\_\_\_\_ of \_\_\_\_\_

If not currently a student, Occupation:  
\_\_\_\_\_

Any history of psychiatric diagnosis or psychological disorders: Yes / No

If yes, please give details:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_**Contact Details**

Best Time for Contact: Daytime / Evening Weekdays / Weekends

Other: \_\_\_\_\_

Mobile Telephone Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

I would prefer to be contacted by: Phone / Email / Both

Signed:

Date:

## Appendix Q

## Debrief 1

**Thank you for completing the first part of my study**

As previously mentioned, we will ask some people to return to complete the second section of the research. The contact details you have given me will be kept until everyone required has been contacted.

If we do not ask you to return, and you are interested in learning more about the study you have taken part in, please contact the researcher on the email address below. You will be emailed this information when both sections of the study are fully completed.

If you have any questions in the mean time you can contact me at:

[Jocelyn.Hall@2005.hull.ac.uk](mailto:Jocelyn.Hall@2005.hull.ac.uk)

**Jocelyn Hall, Trainee Clinical Psychologist**

**Department of Clinical Psychology and Psychological Therapies**

## Appendix R

## Debrief 2

**Thank you for completing my study**

The study you have completed involved looking at personality type called 'Hypomanic Personality'. There is some evidence (mainly from overseas) that a hypomanic personality can be linked to a later diagnosis of Bipolar Affective Disorder.

The individuals that were asked to return for the second part of this study were **either more likely OR less likely to have this personality type**, and those that were not asked to return were somewhere in the middle.

**At this time, we would suggest that you do not worry about this information** as there is a reasonable chance of a false positive depending on how you were feeling when you completed the questionnaire and the measure is not proven as 100% accurate.

**If you are interested in finding out more about your results, i.e. if you are more likely OR less likely to have this personality type we suggest you have a think about it and contact the researcher on the email address below, alternatively you can ask the researcher now.**

If you have any immediate worries or concerns about this information please ask the researcher about confidential places to talk, such as the university counselling service.

If you have any questions or comments about the study then feel free to contact me:

[Jocelyn.Hall@2005.hull.ac.uk](mailto:Jocelyn.Hall@2005.hull.ac.uk)

**Jocelyn Hall, Trainee Clinical Psychologist**

**Department of Clinical Psychology and Psychological Therapies**



## Appendix S

## Information on Student Counselling Service

**Student Counselling Service**

We are here to help students at the university to cope and come to terms with any issues or difficulties they face during their time as a student.

**Drop in:**

On the Hull Campus we operate a "**Drop-In**" every weekday during semesters between 12 noon and 1pm when you can see a counsellor for a brief consultation without making an appointment (just turn up). Drop-In does not operate during the vacations.

**Find us:** 138 Cottingham Road  
**Tel:** 01482 465166 (with answer phone)  
**Email:** studentcounselling@hull.ac.uk

or call in to make an appointment.

**Opening Times:**

Student counselling is open on Mondays, Tuesdays, Wednesdays and Thursdays 9am - 5pm (closed between 1-1.45 for lunch) and on Fridays 9am - 4pm (closed between 1-1.45 for lunch).

**During Vacation:**

Counselling is available on the Hull campus at a reduced level of service during vacations, by appointment only. There are some days in each vacation when the service will not be available due to staff holidays. Appointments can be arranged by calling:

**Student Support Services Office:** (3rd of Students' Union building)  
 Tel: 01482 465297  
 Email: studenthelp@hull.ac.uk  
 Web: <http://student.hull.ac.uk/support>

**Disability Services:** (on third floor of Students' Union building)  
 Tel: 01482 466833  
 Email: disability-services@hull.ac.uk  
 Web: [www.hull.ac.uk/disability](http://www.hull.ac.uk/disability)

**OTHER SUPPORT** during times Student Counselling is closed:

**Samaritans:**

Tel: 01482 343456 (Local) or 08457 909090 (National)  
 Email: Jo@samaritans.org

**HOPE line UK:** Tel: 0870 170 4000

If you do have any particular worries or concerns, then you can always make an appointment to see your GP.

## Appendix T

## Letter from PGMI Ethics Committee



SRK/JBK

30 March 2010

Ms J Hall  
19 Kings Court  
71-76 Wright Street  
HULL  
HU2 8JR

Dear Jocelyn

Thank you for attending the Faculty Ethics Committee meeting today and explaining so coherently your research proposal to the committee. Before the committee is able to formally approve your research proposal they would like you to address the following issues;

1. The patient information sheet to be rewritten, consolidating it into one form and using the correct format.
2. That you review with your supervisor the concerns expressed by the committee regarding the amount of support that would be offered to individuals taking part in your study, particularly with regard to their probable chance of developing bipolar disorder in the future.
3. As you know the committee had concerns about the deception inherent in the study and that individuals would not know that they were being assessed for their probability of developing a bipolar disorder later in life, nor are they told the result of this assessment. Please think about this and either (preferably) alter the information leaflet to exclude the deception or at least justify unequivocally that such a deception is absolutely necessary so as not to bias the results.

I look forward to receiving your revised paperwork.

Yours sincerely

A handwritten signature in black ink, appearing to read "S. Killick".

STEPHEN R KILLICK  
Chair – PGMI Ethics Committee

Professor Nicholas D Stafford MB FRCS  
Director - Postgraduate Medical Institute  
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N.D.Stafford@hull.ac.uk

## Appendix U

## PGMI Ethics Approval Letter



SRK/GBK

3 June 2010

Ms J Hall  
19 Kings Court  
71-76 Wright Street  
HULL  
HU2 8JR

Dear Jocelyn

**Re: Self defining memories and mental imagery in individuals likely to develop bipolar disorder**

Thank you for sending me the revised documentation for your research project. I can confirm that these changes are appropriate and I am now able to fully approve your research proposal.

May I once again take this opportunity of wishing you every success with your research.

Yours sincerely

A handwritten signature in blue ink, appearing to read "S. Killick".

STEPHEN R KILLICK  
Chair – PGMI Ethics Committee

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