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# The phenomenology of negative and positive imagery in early psychosis

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**D.Clin.Psy. Thesis (Volume 1), 2014**

**University College London**

**UCL Doctorate in Clinical Psychology**

**Thesis declaration form**

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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# Overview

This thesis is presented in three parts and focuses on intrusive cognitions in psychopathology, particularly the phenomenology of mental imagery in early psychosis. Part one is a systematic review which examines the impact of suppression, rumination and worry, hypothesised maintenance factors in cognitive models of PTSD, on trauma-related intrusions. The reviewed experimental studies provide support for increased intrusion frequency following suppression in clinical samples only with limited evidence of an adverse impact on affect. There was evidence of decreased mood following rumination in analogue studies. A number of methodological issues are discussed which warrant consideration in trauma-related experimental research.

Part two is an empirical paper that investigates negative and positive mental imagery in early psychosis. Thirty-one service users from Early Intervention in Psychosis services participated in this study. The phenomenological characteristics, thematic content and appraisals of imagery in addition to participant's ability to intentionally generate positive future-oriented images were investigated in this mixed-methods study. Negative imagery content reflected external threat, traumatic experiences and also depressive and anxious concerns. Positive imagery depicted affiliation and the achievement of personal goals. Idiosyncratic appraisals of imagery varied in terms of their perceived dangerousness, benefit and source. Furthermore, depression and social anxiety were associated with the vividness and perceived likelihood of intentionally generated, positive future-oriented images.

Part three is a critical appraisal of the investigation presented in the empirical paper. It discusses challenges in the examination of cognitive and behavioural responses to intrusive imagery, an issue highlighted in the literature review. It concludes by considering the role of positive imagery in therapeutic interventions for individuals with psychosis.

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## Acknowledgements

First and foremost, this project would not have been possible without its participants. I am extremely grateful for their interest in this study and their vital contribution. I also greatly appreciate the support of the Early Intervention in Psychosis teams who generously assisted me with recruitment.

I would like to thank my academic supervisor, Miriam Fornells-Ambrojo for her excellent guidance and encouragement and Tristan Morland for his interest in collaborating on this study and his support throughout.

I wish to acknowledge the invaluable input and consultation provided by Professors Chris Brewin, Nancy Pistrang and Chris Barker at various points during this thesis. Thanks to Ann Hackmann, Chris Brewin, Caroline Brett, Donald Addington and Ruth Turner for their permission to use and adapt existing schedules and measures in this study.

I wish to acknowledge the support of my placement supervisors and the guidance of my tutor, Tony Roth. I also appreciate the advice and assistance I received from Catherine Huckle, Lucy Adamczyk and Lucy Mersh.

Finally, many thanks to my family and friends for their patience and support and to Adrian for being with me every step of the way.

# Part One: Literature Review

## A systematic review of the impact of suppression, rumination and worry on trauma-related intrusive phenomena

## Abstract

**Background** Naturalistic studies have reported links between suppression, rumination, worry and PTSD symptoms. Cognitive models of PTSD conceptualise these responses as maladaptive, contributing to the maintenance of PTSD symptoms. Modification of these responses is a target in therapeutic interventions for PTSD.

**Aims** This review sought to investigate the impact of suppression, rumination and worry on intrusion frequency, distress and affect in experimental studies with clinical or analogue samples.

**Method** The academic literature was searched via Psychinfo and PubMed prior to December 2013 to identify peer-reviewed journal articles which experimentally investigated the impact of suppression, rumination and worry following (analogue) symptom induction.

**Results** Twenty-nine studies were reviewed, the majority investigated suppression. Intrusions were typically induced using analogue stressors such as distressing films or the provocation of trauma memories in clinical samples. Following suppression, an increase in intrusions was observed in clinical samples only over short-term monitoring windows in the order of minutes. Suppression was not reliably associated with increased negative affect in analogue or clinical samples. Decreased mood was reported following rumination and there was limited evidence of increased intrusion frequency in analogue samples. Only four studies examined worry, with inconclusive findings.

**Conclusions** Further experimental research examining multiple response strategies simultaneously is required, particularly in clinical samples. Methodological challenges associated with experimental investigations of responses to intrusive phenomena are considered. This review provides preliminary support for the contributory role of suppression and rumination in aspects of re-experiencing symptoms. However, further experimental evidence is required to support their prominent role in cognitive models of PTSD.

# Introduction

## Intrusive cognitions

Intrusions of unwanted thoughts, images or impulses are frequent occurrences within individual's streams of consciousness (D. A. Clark & Purdon, 1995). They exist on a continuum ranging from common and every day to distressing, psychopathological intrusions (Holmes, 2003). Intrusive imagery is a core feature of obsessive compulsive disorder (OCD), acute stress disorder (ASD) and posttraumatic stress disorder (PTSD) (APA, 2000). Although not a diagnostic requirement, distressing imagery is a prominent feature in other clinical presentations such as depression, social anxiety and psychosis (Brewin, Gregory, Lipton, & Burgess, 2010). Due to its prevalence, intrusive mental imagery has been proposed as a transdiagnostic process (Birrer, Michael, & Munsch, 2007); with suggestions that similar cognitive information-processing mechanisms are involved in the creation of intrusions across disorders (Steel, Fowler, & Holmes, 2005). Intrusive phenomena are a hallmark symptom of PTSD (APA, 2000) in which aspects of the original trauma are re-experienced or relived through flashbacks, nightmares and intrusions. This review will attempt to further understanding of why trauma-related intrusions reoccur by examining a hypothesised maintenance factor, cognitive responses to intrusions.

## CBT models of PTSD

The manifestation of intrusions has been conceptualised as indicating a failure in emotional processing (Rachman, 1980). According to information processing theory, there is a drive for traumatic experiences, which have remained in active conscious memory, to be processed and incorporated into existing mental representations (Horowitz, 1977; Lang, 1977). Thus, intrusions will reoccur until this information has been fully assimilated in conceptual memory. Maladaptive coping strategies such as attempts to avoid or control intrusions have been argued to impede remittance of re-

experiencing symptoms (Horowitz, 1977; Lang, 1977). There is a range of potential cognitive responses to intrusions, including suppression, rumination, worry, reappraisal, problem-solving, acceptance and distraction amongst others (Berry, May, Andrade, & Kavanagh, 2010). Behavioural responses, which are beyond the scope of the current review, include fight, flight or freezing (LeDoux, 1998) and active avoidance of trauma reminders (Brewin, 2001).

An influential cognitive model of PTSD proposes that negative appraisals of initial PTSD symptoms may encourage the use of maladaptive responses such as suppression and rumination which inadvertently increase the occurrence of symptoms, thereby maintaining a sense of current threat and distress (Ehlers & Clark, 2000). Thought suppression is proposed to directly increase PTSD symptoms by increasing the frequency of unwanted intrusive recollections, whereas rumination about the trauma and/or its consequences may strengthen negative appraisals of the trauma, interfere with adequate processing of the trauma memory, increase negative affect such as hopelessness or dysphoria and provide an internal retrieval cue for intrusive memories (Ehlers & Clark, 2000). In this model, rumination is conceptualised as a cognitive avoidance strategy which focuses on experiences surrounding the trauma rather than the traumatic event itself (Steil & Ehlers, 2000). Decontextualised, fragmented trauma memories are assigned a causal role in persistent re-experiencing symptoms, whereas rumination is viewed as a response to re-experiencing symptoms or as a trigger for further re-experiencing symptoms (Ehlers & Clark, 2000). Accordingly, this model proposes that maladaptive cognitive strategies such as thought suppression and rumination are legitimate treatment targets (Steil and Ehlers, 2000).

The above model is consistent with the Dual Representation Theory (DRT) of PTSD which suggests that behavioural and cognitive avoidance may contribute to incomplete contextual memory of the traumatic event (Brewin et al., 2010). Specifically, avoidant cognitive strategies post-trauma are argued to perpetuate re-

experiencing symptoms by preventing integration of sensory bound memory representations of the trauma (S-REP) with corresponding contextual representations (C-REP). Similarly, dysfunctional responses to intrusions are assigned an important role in the metacognitive model of PTSD (Wells, 2000; Wells et al., 2008). Alongside other thought control strategies and excessive threat monitoring, rumination and worry are thought to impede spontaneous emotional processing following a trauma leading to persistence of PTSD symptoms. Metacognitive therapy for PTSD aims to facilitate a shift away from worry, rumination and threat monitoring towards a detached mindful stance in relation to symptoms (Wells & Matthews, 1996).

Although intrusions are common in the period immediately following a trauma, neither their presence or frequency are good predictors of the persistence of PTSD (Michael, Ehlers, Halligan, & Clark, 2005). Evidence from a number of cross-sectional and prospective studies indicates that suppression of intrusive memories and rumination about the traumatic event has links to persistent PTSD (Clohessy & Ehlers, 1999; Ehlers, Mayou, & Bryant, 1998; Murray, Ehlers, & Mayou, 2002; Steil & Ehlers, 2000), although there have been some contradictory findings (Michael et al, 2005). Trauma-related rumination has been associated with the severity of PTSD symptoms (Ehring, Frank, & Ehlers, 2008; Michael, Halligan, Clark, & Ehlers, 2007) and the prediction of PTSD in prospective studies (Ehlers et al., 1998; Ehring et al., 2008; Michael et al., 2007; Murray et al., 2002).

Rumination has been reported by assault survivors with and without PTSD (Michael et al., 2007). However, certain types of rumination have been specifically linked to PTSD severity, particularly engagement in ‘‘why’’ and ‘‘what if’’ type questions and unproductive circular thinking (Michael et al., 2007). Worry has also been reported to predict PTSD status at follow-up, although its predictive value was lower than other variables such as perceived change in social support (Holeva, Tarrier, & Wells, 2001). These naturalistic studies have highlighted associations

between response strategies, PTSD status and overall symptom severity. Evidence of specific links between response strategies and re-experiencing symptoms such as intrusion frequency or distress is more limited.

## Theoretical models of suppression, rumination and worry

Suppression and rumination have been conceptualised as cognitive emotional regulation strategies linked to the development and maintenance of psychopathology (Aldao & Nolen-Hoeksema, 2010). However, recent meta-analyses have reported mixed findings. In non-clinical samples, thought suppression was reported not to reliability influence emotional outcomes whereas strategies analogous to rumination had a negative impact (Webb, Miles, & Sheeran, 2012). In contrast, in clinical samples (excluding PTSD), both suppression and rumination were associated with psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010). In light of these inconclusive findings, theoretical models of thought suppression and repetitive negative thinking and their proposed role in perpetuating intrusions will now be discussed.

### *Paradoxical effects of thought suppression*

The ironic process theory of mental control (IPT) (Wegner, 1994) is an implicit component of cognitive models of PTSD (such as Ehlers & Clark, 2000). It proposes that thought suppression involves two processes, an intentional state that actively seeks to direct processes away from the to-be suppressed thought and an ironic monitoring process which monitors for the return of the target thought and signals a failure in the intentional process. If the intentional state is interrupted voluntary or by increasing cognitive load, the monitoring state continues its search for the to-be-suppressed thought unimpeded, thereby increasing sensitivity and the likelihood of reoccurrence of the unwanted thought, a phenomenon known as thought rebound. For emotionally relevant rather than neutral thoughts, an emotional rebound (as measured by skin conductance) rather than cognitive rebound (as measured by

intrusion frequency) has been argued to occur once suppression is abandoned (Wegner & Gold, 1995).

A widely adopted experimental design within the thought suppression literature records thought frequency during a three phase procedure which consists of initial baseline monitoring followed by a period of thought suppression and a final monitoring phase in which suppression effort is relinquished (Abramowitz, Tolin, & Street, 2001). A prototypical example requires participants to observe the frequency of a novel target thought, for example, “the white bear” (Wegner, 1994) during these experimental phases (Wegner, Schneider, Carter, & White, 1987). As illustrated in Figure 1 below, in controlled studies, the presence of an initial increase in the to-be suppressed thought, known as an enhancement effect, is established by comparing thought frequency between groups who are suppressing or monitoring (Comparison A below). A rebound effect is examined by comparing thought frequency between groups during the final monitoring period (B below).

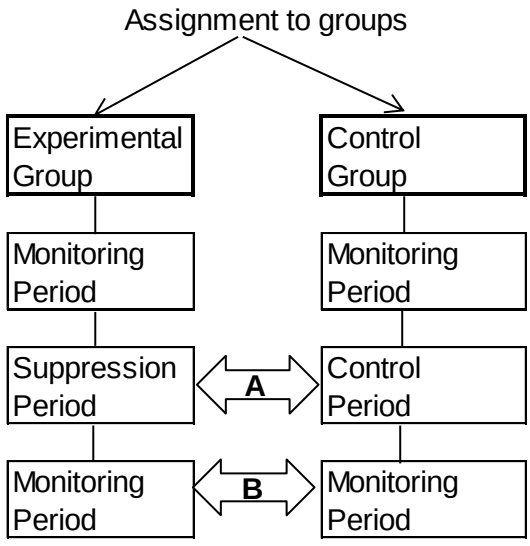


Figure 1**:** *Experimental procedure thought suppression paradigm*

In studies of neutral thought suppression, an immediate enhancement effect (D. M. Clark, Ball, & Pape, 1991; Lavy & Van den Hout, 1990; Wegner et al., 1987) and rebound effect have been reported (D. M. Clark et al., 1991; Wegner et al., 1987). The findings regarding personal intrusive thoughts have been mixed, with

some reporting an immediate enhancement (Marcks & Woods, 2005; Salkovskis & Campbell, 1994; Trinder & Salkovskis, 1994), or a rebound (Koster, Rassin, Crombez, & Naring, 2003; McNally & Ricciardi, 1996), and others finding no evidence of suppression effects (Belloch, Morillo, & Gimenez, 2004; Janeck & Calamari, 1999; Kelly & Kahn, 1994; Marcks & Woods, 2005; Purdon & Clark, 2001; Purdon, Rowa, & Antony, 2005). However, there were indications of increased anxiety (Koster et al., 2003; Marcks & Woods, 2005; Purdon & Clark, 2001; Trinder & Salkovskis, 1994) and decreased mood (Purdon & Clark, 2001). An early meta-analysis of the thought suppression literature reported a rebound effect in clinical and non-clinical samples (Abramowitz et al., 2001), which varied in magnitude depending on various methodological factors such the method used to record thought frequency. In a recent meta-analysis including samples with PTSD, suppression difficulties were similar between groups with PTSD and non-clinical samples during the initial enhancement period and a smaller rebound effect was reported in groups with PTSD relative to non-clinical samples. However, this was based on only five samples using a mixture of neutral and trauma-related tasks (Magee, Harden, & Teachman, 2012). These contradictory findings are noteworthy and suggest that the evidence supporting a post-suppression rebound effect is inconclusive thus far.

### *Repetitive negative thinking*

Repetitive negative thinking (RNT) has been defined as perseverative cognitive activity revolving around negative themes which is subjectively experienced as difficult to control (Ehring & Watkins, 2008). Similar to intrusive imagery, it has been proposed as a transdiagnostic construct due to its manifestation across several of the emotional disorders (A.G. Harvey, 2004). Rumination and worry, both forms of RNT, are similar processes that primarily differ in their temporal orientation. Worry is future-oriented chains of repetitive verbal thought activity about potential negative life events or future feared catastrophes (Borkovec, Ray, & Stober, 1998; Roemer &

Borkovec, 1994), whereas rumination is conceived of as cyclical, self-focused thinking in response to sad mood in which the individual contemplates the causes, meanings and implications of their mood and past negative experiences (Ehring & Watkins, 2008; Nolen-Hoeksema, 1991, 2004).

The level of abstractness or construal adopted during RNT has been proposed as a key variable in determining its impact. It has been argued that dysfunctional rumination is characterised by abstract thinking which is decontextualised, general, aggregated and ambiguous in contrast to functional forms of processing which are more concrete, experiential, specific and unambiguous (Ehring & Watkins, 2008; Watkins, 2008). Furthermore, it has been proposed that trauma-related rumination characterised by reduced levels of concreteness and abstractness of thinking may be crucial in the persistence of PTSD (Ehring et al., 2008). Negative and positive metacognitive beliefs (Wells & Matthews, 1996) and cognitive avoidance (Borkovec, Alcaine, & Behar, 2004) are proposed mechanisms contributing to increased RNT. The avoidance theory of worry suggests that the predominantly verbal-linguistic process of worry may be deployed to distract or avoid more distressing forms of thoughts, particularly images (Borkovec & Inz, 1990). Temporary cessation of worry may be associated with increased negative affect, thus worry becomes negatively reinforced leading to its increasing predominance and subjective loss of control over worry. In relation to traumatic experiences, the discrepancy between the meaning of the trauma for the individual and pre-existing mental structures is thought to produce repetitive thinking which will continue until this discrepancy is resolved (Watkins, 2008). However, the impact of RNT on trauma-related intrusions and associated affect has not been systematically reviewed to date.

## Investigating the impact of response strategies on intrusions

Theoretical models of PTSD and the proposed role of cognitive responses in the maintenance of intrusions have been outlined. Two methods of investigating response strategies, naturalistic and experimental studies are now discussed.

Naturalistic studies with traumatised individuals are challenging given recruitment difficulties (Hardy, Young, & Holmes, 2009) and important ethical considerations regarding recruiting individuals soon after a traumatic experience. The delay between trauma exposure and participation consequently leads to retrospective accounts thereby introducing possible recall and memory biases. Studies have attempted to circumvent these challenges by recruiting participants from accident and emergency departments (Murray et al., 2002) or individuals who are frequently exposed to traumatic stressors, such as healthcare professionals (Alden, Regambal, & Laposa, 2008). However, this may introduce bias limiting the generalizability of findings due to variability in the nature of the traumatic experience or sample characteristics such as the recruitment of less distressed individuals.

As it takes several hours for memories to be encoded and consolidated (McGaugh, 2000), the peri-traumatic period may be a window to investigate intrusion formation and modulate emotional memory processes (Cohen et al., 2006; Pitman et al., 2002; Vaiva et al., 2003). Experimental research of peri-traumatic processes with traumatised samples is also challenging for practical and ethical reasons. However, experimental studies would offer important advantages including controlled stimulus presentation in experimental conditions and precise measurement. Two approaches have been adopted to navigate these challenges, experimental studies with non-clinical samples using analogue stressors and symptom provocation research with traumatised samples.

Prospective analogue designs, such as the trauma film paradigm (Holmes, Brewin, & Hennessy, 2004) induce and monitor analogue trauma symptoms over

extended periods of time, typically up to 7 days following analogue symptom induction (Holmes & Bourne, 2008). As illustrated in Figure 2, studies may adopt a correlational design and examine relationships between pre-existing trait variables and subsequent intrusion characteristics. Others attempt to deliberately manipulate cognitive processes during or following the stressor to investigate the effect on intrusions (Holmes & Bourne, 2008). In these experimental studies, intrusion frequency and affective change may be monitored for minutes to days following the analogue stressor. In this manner, the impact of pre-existing response tendencies such as trait suppression, state variables such as suppression effort, and their relationship to intrusions can be examined prospectively (Engelhard, Huijding, van den Hout, & de Jong, 2007). In studies with clinical samples, the relationship between response strategies and intrusive recollections of personal traumatic experiences are investigated. These studies adopt a symptom provocation approach in which participants attempt to suppress intrusions regarding a previously experienced traumatic event.

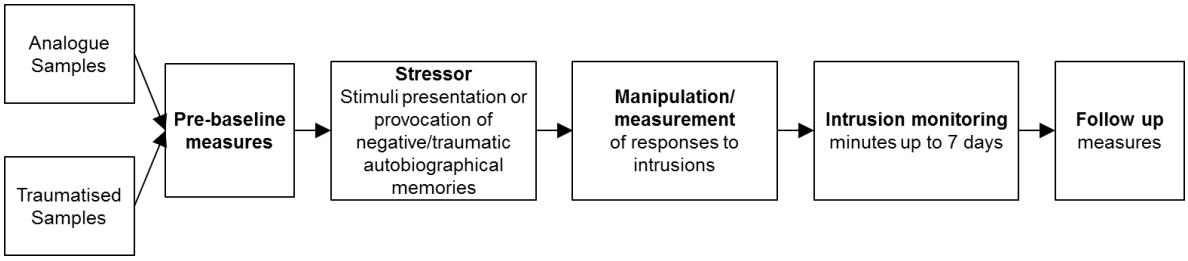


Figure 2**:** *Example of experimental study design*

## Aims of the current review

This review focuses on experimental investigations of the impact of suppression, rumination and worry on intrusion characteristics following symptom provocation or analogue stress. It evaluates studies examining the impact on intrusion frequency, distress and mood when measured immediately following implementation of the response strategy and during follow-up monitoring, generally up to one week

following the stressor. Based on theoretical models and existing research findings, the following hypotheses will be investigated:

1. In analogue samples, a post-suppression rebound in intrusion frequency is predicted to occur with no impact on emotional outcomes. In clinical samples, increased intrusion frequency and distress is predicted following suppression.
2. Rumination will be associated with increased intrusion frequency and negative affect.
3. Worry will be associated with reduced negative affect in the short term and increased negative affect and intrusion frequency over longer term monitoring periods.

# Method

## Literature search and study selection

Experimental studies examining the impact of suppression, rumination or worry on intrusions published prior to December 2013 were identified using three methods.

- Electronic literature searches were conducted in Psychinfo and PubMed using the search terms *"PTSD" "trauma" "intrusi*" "suppress*" "worry" "ruminat*"*. The search terms were not restricted to title, abstract or keywords and could be found anywhere in the article text.
- Reference lists were examined for articles that may be eligible for inclusion (Johnson, 1993).
- Searches of individual journals were conducted (Behaviour Research and Therapy, and Cognitive Therapy and Research).

*Inclusion and exclusion criteria*

There were five inclusion criteria for this review:

1) Experimental design
2) Adult clinical samples meeting diagnostic criteria for PTSD or acute stress disorder or non-clinical (trauma analogue) samples.
3) Response strategy:
    3.1) Studies had to either manipulate or measure a response strategy (suppression, rumination or worry). Studies which examined responses to personally relevant (e.g. previous traumatic experience), novel emotion-inducing stimuli (e.g. trauma film paradigm) and neutral thoughts in traumatised samples (e.g. white bears) were eligible for inclusion.
    3.2) If a particular response strategy was to be initiated by participants it had to be clearly described. Studies in which participants were instructed to commence the response strategy (suppression, rumination or worry) following presentation of an emotion inducing stimulus or symptom provocation were the primary focus of this review. If explicit response initiation instructions were not provided to participants, studies which measured trait or state suppression, rumination or worry were also included.

4) Outcome: At a minimum, each study had to include a measure of intrusion frequency (images and/or thoughts), mood/affect or intrusion-related distress following initiation, or measurement of the response strategy.

5) Studies had to be written in English and published in a peer reviewed journal.

*Search strategy*

**Study selection process**

Figure 3 illustrates the literature search process. From the initial 425 articles, 29 studies met inclusion criteria for this review.

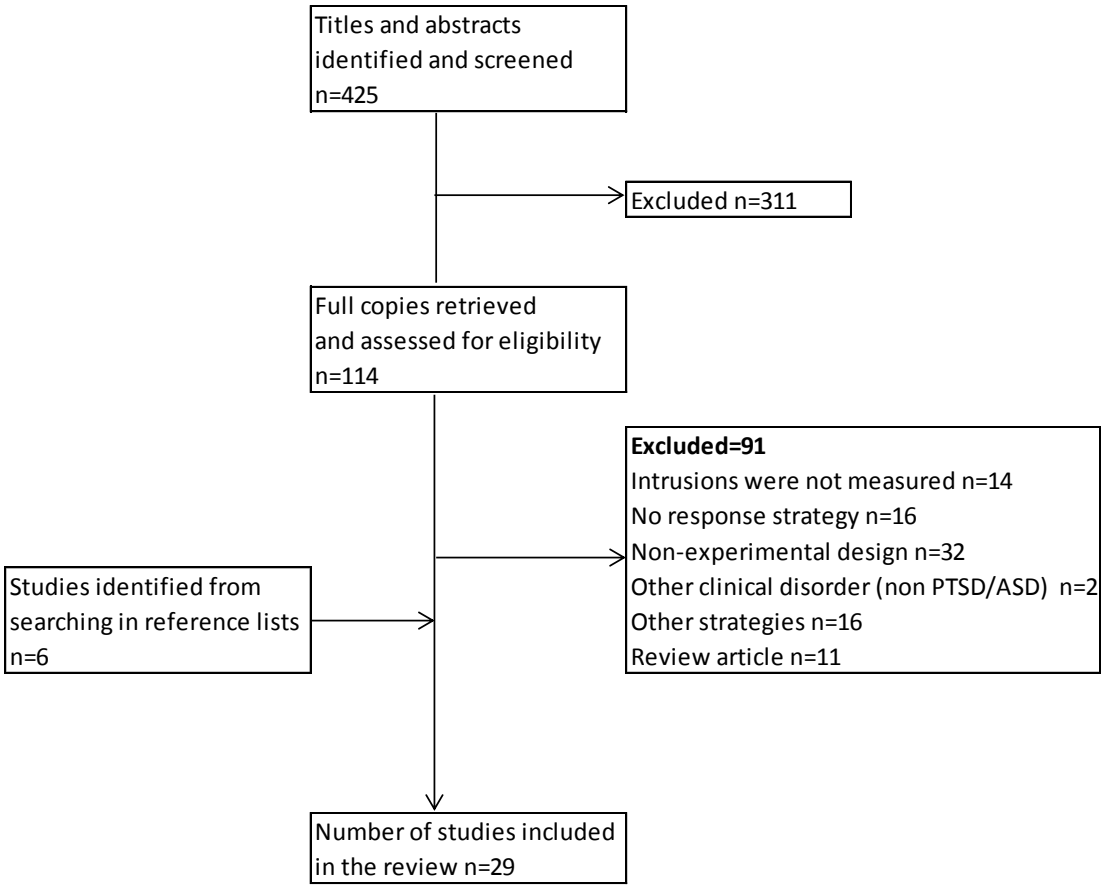


Figure 3: *Flow chart of the study selection procedure*

## Data extraction and synthesis

This systematic review adopted a narrative analysis approach comparing tabulated data with an appraisal of the methodological quality of the studies. It sought to identify common themes, synthesise findings and provide a representative description of the available evidence.

## Quality assessment method

At present, there is no widely accepted 'gold standard' quality appraisal tool for experimental research in the applied sciences (Katrak, Bialocerkowski, Massy-

Westropp, Kumar, & Grimmer, 2004). A search was conducted for an appraisal tool appropriate for experimental research studies with published validity and reliability data. Crowe and colleagues developed an appraisal tool (Crowe Critical Appraisal Tool CCAT) following a systematic review of existing quality appraisal methodologies (Crowe & Sheppard, 2011b). In an investigation of the construct validity of the CCAT (in relation to other existing appraisal measures), moderate to strong correlations were reported for quasi-experimental and experimental studies (Crowe & Sheppard, 2011a). In terms of reliability, high intra-class correlations for consistency were reported for experimental (0.75) and quasi-experimental (0.72) studies (Crowe, Sheppard, & Campbell, 2012).

The latest version of the CCAT and manual were used in the current review (Crowe, 2013). All 29 papers were rated against the CCAT's eight categories: introduction, design, sampling, data collection, ethical matters, results, discussion and preliminaries (which examines if clear, concise descriptions are provided, the study's title and abstract). Seven additional items were included which assessed methodological features specific to this area of research. These included: the self-relevance of the emotion-inducing stimulus, measurement of state and trait levels of the response strategy, assessment of attention or concentration during the experimental task (if relevant), and monitoring of discomfort induced by the experimental task (see Appendices A & B for definitions and ratings). The ratings process produced a total score for each paper out of 45 (Appendices C and D) and a summary of overall scores is provided in Table 1.

Table 1: *Critical appraisal total scores by response strategy and sample type*

| Response | Sample and monitoring window | Total Quality Score |
|---|---|---|
| **Suppression** | ***Analogue Short Term*** | |
| | Davies & Clark, 1998b | 27 |
| | Nixon et al., 2007 | 23 |
| | Harvey & Bryant, 1999 | 22 |
| | Lin & Wicker, 2007 | 21 |
| | Buck et al., 2009 | 21 |
| | ***Analogue Long Term*** | |
| | Nixon et al., 2011 | 33 |
| | Nixon et al., 2009b | 33 |
| | Regambal & Alden, 2009 | 32 |
| | Davies & Clark, 1998a | 31 |
| | Nixon et al., 2009a | 30 |
| | Wilksch & Nixon, 2010 | 26 |
| | ***Clinical Short Term*** | |
| | Aikins et al., 2009 | 32 |
| | Beck et al., 2006 | 32 |
| | Schonfeld et al., 2007 | 31 |
| | Shipherd & Beck, 1999 | 30 |
| | Shipherd & Beck, 2005 | 27 |
| | Amstadter & Vernon, 2006 | 26 |
| | Nixon et al., 2008 | 24 |
| | ***Clinical Long Term*** | |
| | Zachary Rosenthal & Follette, 2007 | 34 |
| | Guthrie & Bryant, 2000 | 29 |
| **RNT** | ***Analogue*** | |
| **(Rumination)** | Laposa & Rector, 2012 | 37 |
| | Ehring et al., 2009b | 37 |
| | Ehring et al., 2009a | 34 |
| | Ball & Brewin, 2012 | 34 |
| | Zetche et al., 2009 | 33 |
| **RNT** | ***Analogue*** | |
| **(Worry)** | Pruitt & Hazlett-Stevens, 2010 | 32 |
| | Butler et al., 95 | 31 |
| | Wells & Papageorgiou, 1995 | 28 |
| | Behar et al., 2002 | 27 |

# Results

## Overview of studies

The 29 identified studies varied across multiple variables including: response strategy, sample (clinical vs. analogue), symptom provocation method (trauma film paradigm, negative autobiographical event etc.), control conditions and duration of intrusion monitoring.

Regarding the latter, studies which sought to investigate the immediate, short-term impact of responses used monitoring windows up to 15 minutes following the experimental stressor (typically ranged between 2 and 10 minutes) in which to record intrusion related variables and are described as 'short-term' studies for the purposes of this review. In contrast, studies which focused on the impact of responses over longer-term follow-up periods utilised monitoring windows of 1 to 7 days, in which participants typically recorded intrusion frequency data and related variables in a diary, and are labelled as 'long-term' in this review. There were no experimental studies which investigated responses and intrusion-related variables over a period longer than one week.

Studies which adopted short or long term monitoring windows will be reviewed separately to evaluate whether there was a differential impact of responses strategies over these contrasting time frames. It should be noted that some studies included both short term and long term monitoring and are discussed in the long term review sections below. The duration of intrusion monitoring has implications for the research questions that may be addressed in these studies. Short-term windows examine the immediate impact and aftermath of responses on intrusion frequency and affective variables. In non-clinical samples, an experimental stressor is used to induce intrusions; short-term monitoring thereafter represents the analogue peri-traumatic period. In clinical samples, symptom provocation is used to

provoke established intrusions, thus short-term monitoring models the immediate impact of responses on pre-existing trauma-related memories.

In non-clinical samples, longer term monitoring enables prospective investigation of the persistence of analogue intrusions following their formation in the period following memory consolidation. In clinical samples, longer term monitoring investigates the role of responses in the maintenance or exacerbation of existing re-experiencing symptoms.

The majority of the identified studies examined suppression (n=20) in non-clinical (n=11; Table 2) and clinical samples (n=9; Table 3) and will be reviewed initially. Following which, the 9 studies which investigated repetitive negative thinking all conducted in non-clinical samples will be reviewed (Table 4). Please refer to the tables in each section for further information on the experimental and control groups.

## Suppression

It was hypothesised that there would be increased intrusion frequency post-suppression in all groups but that only clinical samples would experience increased distress following suppression. No specific predictions were made regarding potential differences between short or long term monitoring windows.

### *Non-clinical samples*

#### Short term monitoring

Five studies examined intrusion variables during short term monitoring periods (in the order of minutes), three of which used the trauma film paradigm. Overall, there was weak support for a post-suppression rebound effect; the two studies which reported a rebound had important limitations (Davies & Clark, 1998b; A. G. Harvey & Bryant, 1999). In the former study, multiple thought frequency measures were used, however the rebound effect was only observed on one of these measures and

suppression was positively correlated with distraction which creates ambiguity as to the response strategy engaged in (Davies & Clark, 1998b). In the second study, the rebound was only observed among low-anxiety participants. There were difficulties implementing the experimental manipulation in that high anxiety participants continued to suppress when instructed not to do so which may have impacted on these findings (A.G. Harvey & Bryant, 1999).

Three studies did not report a rebound effect. Participants who suppressed or engaged in conceptual processing did not differ in terms of intrusion frequency, duration, vividness or distress (Buck, Kindt, & van den Hout, 2009). Note however that in this study the suppression group completed a distraction task when they experienced film-related intrusions which limit its comparability with other studies. In the other two studies, there were indications of an initial enhancement rather than rebound effect (Lin & Wicker, 2007; Nixon, Flood, & Jackson, 2007).

From the limited number of studies which assessed mood variables, as predicted there was little evidence of a negative impact of suppression. No differences were reported in mood (Davies & Clark, 1998b) or state anxiety (Buck et al., 2009; Lin & Wicker, 2007) in the post-suppression period. Overall, on the basis of this evidence, it appears that suppression is not reliably related to increased intrusion frequency or negative affect immediately following suppression in analogue samples. However, these findings should be interpreted with caution given they attained the lowest scores comparatively during the quality appraisal process. None of these studies measured trait suppression, and attention or engagement during the analogue stressor. There was also variable assessment of trauma history and current mood or anxiety levels. Therefore, the absence of negative effects post-suppression may have been related to methodological factors rather than the absence of an effect per se.

**Long term monitoring**

Six studies employed the trauma film paradigm to investigate the impact of suppression over a one week follow-up period. These studies were more methodologically rigorous and attained higher ratings in the appraisal process compared to those with short-term monitoring windows. Current mood or anxiety levels and trait suppression were assessed. There was also improved assessment of trauma history and PTSD symptomatology; although there was limited screening for other mental health problems and two studies did not assess state suppression levels (Davies & Clark, 1998a; Regambal & Alden, 2009).

Overall, these studies provided some preliminary support for a post-suppression rebound under particular conditions (Nixon, Cain, Nehmy, & Seymour, 2009a; Wilksch & Vandervord Nixon, 2010). As predicted by IPT, suppressing under cognitive load resulted in a higher frequency of intrusions during the follow-up period compared to suppression alone (Nixon et al., 2009a). State suppression effort was reported to mediate the relationship between maladaptive thoughts about film-related intrusions and intrusion frequency (Nixon et al., 2009a). Once again emphasising the importance of appraisals, in participants at high risk for negative interpretations of intrusions, those with a greater general tendency to suppress experienced more intrusions than those with lower trait suppression immediately following suppression (Wilksch & Vandervord Nixon, 2010). Among individuals who endorsed high levels of suppression effort, intrusion related distress and vividness - variables which may be related to appraisals, differentiated between individuals who experienced high and low numbers of intrusions (Nixon, Wilksch, & Hosking, 2011).

A link between trait suppression and emotional reactivity to the stressor was reported in one study in which participants who had a greater general tendency to suppress and responded to an analogue stressor with more dysphoria experienced a greater number of intrusions in the minutes following suppression (Davies & Clark, 1998a). Trait suppression, trait rumination and safety behaviours had the strongest

relationship to intrusion frequency in a structural equation model study (Regambal & Alden, 2009). The importance of measuring state suppression levels in all groups was noted in another study (Nixon, Cain, Nehmy, & Seymour, 2009b) in which the control group reported high levels of suppression effort which may have masked differences between experimental groups (Nixon et al., 2009b).

Few studies measured affect immediately following the film and during follow-up which made it challenging to draw conclusions regarding the impact of suppression on affect. Two studies offered evidence against a negative impact (Nixon et al., 2009a; Regambal & Alden, 2009); the latter study reported links between change in state anxiety during a distressing film, subsequent intrusion frequency, and trait rumination but not suppression (Regambal & Alden, 2009). In addition, two studies emphasised the importance of assessing trauma history in analogue samples. There was a trend for individuals who exerted high levels of suppression effort and experienced more intrusions to have greater PTSD symptom severity and to rate intrusions as significantly more vivid and distressing (Nixon et al., 2011). Participants at high risk for negative interpretations of intrusions endorsed greater intrusion-related distress immediately following a distressing film, which was reduced to non-significance when prior PTSD severity was controlled for (Wilksch & Vandervord Nixon, 2010).

Overall, in analogue studies, there was little evidence of increased negative affect or distress post-suppression in either the minutes or days following suppression. More recent studies demonstrated the importance of assessing PTSD symptomatology in non-clinical samples. There was evidence of a rebound in stressor related intrusions whilst suppressing under cognitive load in the one week following suppression and also amongst participants who appraised intrusions negatively. These findings indicate that extended monitoring in the days following suppression may be warranted in experimental research of this kind.

Table 2: *Suppression Analogue samples study characteristics*

| Author | Sample | Design | Experimental Manipulation | Measures | Initial monitoring | Follow-up |
|---|---|---|---|---|---|---|
| ***Short term monitoring*** | | | | | | |
| Davies & Clark, 98b | 32 undergraduates | Trauma film paradigm<br>3 minute office fire & polar bear films | Suppression disaster film<br>Suppression polar bear film<br>Control disaster film<br>Control polar bear film | VAS, effort to suppress, distraction | 2 minutes | 2 minutes |
| Harvey & Bryant, 99 | 39 Low anxiety<br>39 High anxiety | Distressing film<br>3 minutes of taxi driver vs the lilac bus | Suppression<br>Control (think about anything) | STAI-S/T, VAS | 3 minutes | 3 minutes |
| Nixon et al., 07 | 21 good suppressors<br>14 poor suppressors | Imagine the event for one minute | Negative autobiographical event<br>Novel traumatic event<br>White bear | DASS, PDS | 3 minutes | 3 minutes |
| Lin & Wicker, 07 | 100 students | Read a story about causing a car accident | Suppression<br>Concentration<br>Focused Distraction<br>Control | Retrospective estimate of thought frequency, STAI-S | 6 minutes | 6 minutes |
| Buck et al., 09 | 90 students | Trauma film paradigm<br>29 minute film | Conceptually driven processing<br>Suppression (distraction task)<br>Control (no instructions given) | STAI-S,<br>Intrusions questionnaire | | 4 hours |
| ***Long term monitoring*** | | | | | | |
| Davies & Clark, 98a | 90 volunteers | Trauma film paradigm<br>3 minutes office fire | No instructions | Intrusion diary, STAI<br>General suppression | 4 minutes | 7 days |
| Nixon et al., 09a | 80 students | Trauma film paradigm<br>5 minutes film 'Irreversible' | Verbal Cognitive Load & Suppression<br>Suppression only<br>Verbal Cognitive Load only<br>Control | Intrusion diary<br>Suppression effort, PDS | 5 minutes | 7 days |

| | | | | | | |
|---|---|---|---|---|---|---|
| Nixon et al., 09b | 120 university students | Trauma film paradigm<br>5 minutes film<br>'Irreversible' | Verbal cognitive load & suppression<br>Hyperventilation & suppression<br>Block rehearsal & suppression<br>Control suppression<br>Control (let your mind wander) | Intrusion diary, PDS, WBSI | 5 minutes | 7 days |
| Wilksch & Nixon, 10 | 21 high risk<br>28 low risk<br>(interpretations) | Trauma film paradigm<br>8 minutes film<br>'Irreversible' | Monitor<br>(think of anything you like) | Intrusion diary, PTCI, WBSI, State thought suppression | 5 minutes | 7 days |
| Nixon et al., 2011 | 109 students | Trauma film paradigm<br>8 minutes film<br>'Irreversible' | High Suppression High Intrusions<br>High Suppression Low Intrusions<br>Low Suppression Low Intrusions | Intrusion diary, PDS, WBSI | N/A | 7 days |
| Regambal&Alden, 09 | 148 students | Trauma film paradigm<br>9 minutes<br>emergency medical | No experimental manipulation<br>(SEM) | Intrusion diary,<br>RIQ, STAI | N/A | 7 days |

VAS=visual analogue scale, STAI-S/T=State Trait Anxiety Inventory (State or Trait subscale), DASS= Depression Anxiety Stress Scale, PSD=Posttraumatic Diagnostic Scale
WBSI=White Bear Suppression Inventory, PTCI=Posttraumatic Cognitions Inventory, RIQ=Response to Intrusions Questionnaire

*Clinical samples*

**Short term monitoring**

In clinical samples, there was support for a trauma-specific rebound (Amstadter & Vernon, 2006; Shipherd & Beck, 1999, 2005) or maintenance (Schonfeld, Ehlers, Bollinghaus, & Rief, 2007) of intrusions post-suppression with more limited evidence for an enhancement effect during suppression (Aikins et al., 2009; Nixon et al., 2008). There were indications that the trauma-related rebound may not be specific to participants with PTSD however, as it was also reported in a sample of help-seeking road traffic accident (RTA) survivors regardless of their diagnosis (Beck, Gudmundsdottir, Palyo, Miller, & Grant, 2006). More generalised suppression difficulties were also suggested by a post-suppression rebound of neutral intrusions by military personnel with PTSD (Aikins et al., 2009) and during suppression in a mixed sample of trauma survivors with acute stress disorder (Nixon et al., 2008). There were also indications that metacognitive beliefs may be an important factor with reports of less perceived control over thoughts (Shipherd & Beck, 1999) and less perceived success suppressing trauma-related thoughts in trauma survivors with PTSD relative to trauma survivors without (Beck et al., 2006). Overall, these findings provide support for a rebound effect, although task design and sample characteristics such as diagnostic status appear to impact on whether it is specific to trauma-related or intrusions more generally.

In contrast, there was limited evidence for the hypothesised adverse impact of suppression on affective variables. A rebound of trauma-related or neutral thoughts was not associated with increased negative affect (Shipherd & Beck, 1999), mood (Aikins et al, 2009) or distress (Amstadter & Vernon, 2006; Shipherd & Beck, 2005). In the former study, baseline negative affect may have been elevated as it was assessed directly after a diagnostic interview (Shipherd & Beck, 1999). In another study, participants who suppressed endorsed less anxiety and despondency than other experimental groups (Schonfeld et al., 2007). One study

reported increased negative affect following suppression; however this was across the entire sample and not specific to participants with PTSD (Beck et al., 2006). In terms of methodological quality, these studies had a number of strengths including comprehensive assessment of trauma history and PTSD symptomatology. Limitations included inadequate assessment and control of co-presenting mood difficulties and variable assessment of trait and state suppression. Furthermore, the extent to which participants complied with intrusion monitoring was not assessed in any of these studies which created uncertainty as to the accuracy of the intrusion frequency data obtained. These methodological issues, particularly non-measurement of state suppression, limit the strength of the conclusions which can be drawn from these studies.

**Long term monitoring**

Neither of the two studies which investigated suppression over longer term, 24-hour monitoring periods reported a post-suppression rebound (Guthrie & Bryant, 2000; Zachary Rosenthal & Follette, 2007). Similar to the clinical studies with short-term monitoring windows, the potentially confounding effects of depression and anxiety were not controlled for and compliance with intrusion monitoring was not assessed. There were also indications that participants may have suppressed when requested not to do so, which may have impacted on intrusion frequency data (Guthrie & Bryant, 2000). Furthermore, participants who suppressed had a significantly greater tendency to use cognitive reappraisal and social control in response to unpleasant thoughts than control participants which may have impacted upon frequency of intrusions in the second study (Zachary Rosenthal & Follette, 2007).

In these two studies, there was some tentative support for an adverse impact of suppression on affective variables. In a sample with acute stress disorder, higher anxiety levels were reported immediately following suppression and during follow-up monitoring (Guthrie & Bryant, 2000). In an initial laboratory task; participants who monitored were significantly more distressed than those who suppressed, however,

during follow-up, the suppression group reported a numerical but non-significant increase in distress (Zachary Rosenthal & Follette, 2007).

Similar to the analogue studies discussed above, overall, there was little evidence for an adverse impact of suppression on affective variables in clinical samples. Although in two studies, there were tentative indications of increased anxiety and distress over 24 hour monitoring windows. In clinical samples, there was more consistent evidence for increased intrusions immediately following suppression (up to 9 minutes) rather than long term monitoring (24 hours). The absence of a rebound effect over longer monitoring periods may be attributable to challenges implementing suppression instructions or the use of additional thought control and coping strategies by trauma survivors.

Table 3: *Suppression Clinical samples study characteristics*

| Author | Sample | Design | Experimental Manipulation | Measures | Initial monitoring | Follow-up |
|---|---|---|---|---|---|---|
| ***Short term monitoring*** | | | | | | |
| Shipherd & Beck, 99 | 17 chronic PTSD<br>19 non-PTSD<br>(sexual assault) | Diagnostic interview followed by baseline thought listing | Suppression (trauma)<br>Control (think about anything) | Thought listing, STAI-S/T, controllability of thoughts | 9 minutes | 9 minutes |
| Shipherd & Beck, 05 | 30 PTSD<br>25 no-PTSD<br>(RTA survivors) | RTA interview reviewed | Suppression RTA<br>Suppression neutral<br>Control (following suppression RTA)<br>Control (following suppression neutral) | Thought listing,<br>Degree of suppression | 9 minutes | 9 minutes |
| Amstadter & Vernon, 06 | 31 PTSD<br>34 no-PTSD | Read a written description of trauma | Suppression Neutral<br>Suppression Trauma<br>Control (following suppression neutral)<br>Control (following suppression trauma) | SUDS, PANAS,<br>thought control (0-100) | 5 minutes | 5 minutes |
| Beck et al., 06 | 44 PTSD<br>26 Non-PTSD<br>(RTA survivors) | None<br>Diagnostic interview on a different day | Suppression (RTA)<br>Control (Monitor) | Thought listing, PANAS,<br>Controllability of thoughts,<br>degree of suppression | 9 minutes | 9 minutes |
| Nixon et al., 08 | 34 ASD<br>22 Non-ASD<br>(Accident/assault) | None<br>Diagnostic interview on a different day | White bear suppression<br>Trauma suppression | PTCI, WBSI, BDI | 5 minutes | 5 minutes |
| Aikins et al., 09 | 14 PTSD<br>14 no PTSD<br>15 Pre deployment<br>(Army personnel) | None<br>Length of time since diagnostic interview varied across participants | Suppression (white bear)<br>Monitor | TDQ, BDI | 5 minutes | 5 minutes |
| Schonfeld et al., 07 | 14 PTSD<br>28 No PTSD<br>(assault survivors) | None<br>Trauma interview at beginning | Standard<br>Thought suppression (assault)<br>Mentioned control (think about anything) | RIQ, TCQ,<br>PDS, BAI, | 5 minutes | 5 minutes |

| | | | | | | |
|---|---|---|---|---|---|---|
| ***Long term monitoring*** | | | | | | |
| Guthrie & Bryant, 00 | 20 ASD<br>20 non-ASD<br>(Accidents, assaults) | None<br>Diagnostic interview<br>at beginning | Suppression<br>Control (think about anything) | TCQ, ASDI,<br>IES, BAI | 24 hours | 24 hours |
| Zachary & Follette, 07 | 61 students<br>(Sexual assault) | Written description of<br>trauma-related intrusion | Suppression<br>Monitor (think of anything) | Thought listing, WBSI,<br>PDS, TCQ, | 9 minutes | 24 hours |

STAI-S/T=State Trait Anxiety Inventory (State or Trait subscale), SUDS=Subjective Units of Distress, PANAS=Positive and Negative Affective Schedule
PTCI=Posttraumatic Cognitions Inventory, WBSI=White Bear Suppression Inventory, BDI=Beck Depression Inventory, TDQ=Thought Description Questionnaire,
RIQ=Response to Intrusions Questionnaire, TCQ=Thought Control Questionnaire, PDS=Posttraumatic Diagnostic Scale, BAI=Beck Anxiety Inventory,
ASDI=Acute Stress Disorder Interview, IES=Impact of Events Scale

## Repetitive Negative Thinking

### *Rumination*

Five studies examined rumination in analogue samples (see Table 4); four adopted the trauma film paradigm and one used a script of a previously experienced negative life event to induce intrusions (Ehring, Fuchs, & Klasener, 2009b). All studies utilised long term monitoring windows except Ehring and colleagues (2009b). The rumination studies attained the highest scores in the quality appraisal process, outranking those which investigated worry and suppression. Strengths of the rumination studies included their assessment of trauma history, co-presenting mental health problems and control of mood variables during analysis. All studies assessed trait rumination and attempted to confirm the validity of the stress induction. Limitations included the retrospective assessment of intrusion frequency in some studies, variable assessment of intrusion monitoring compliance and attention during the analogue stressor. However, their overall quality added weight to their findings.

It was hypothesised that following rumination, increased intrusion frequency and negative affect would be reported. Overall, there was limited support for increased intrusion frequency after rumination. Only one study reported higher intrusion levels and a greater number of days in which intrusions were experienced in a sample of moderate ruminators who were requested to ruminate daily during the one week follow-up period (Ball & Brewin, 2012). Support for an association between rumination in response to intrusions (rather than trait anxious rumination) and intrusion frequency was also reported (Laposa & Rector, 2012). There was some indirect evidence for a potential role for rumination in the maintenance of existing symptoms (Ehring et al., 2009b). In two other studies, intrusion frequency did not differ between rumination and other experimental groups (Ehring, Szeimies, & Schaffrick, 2009a; Zetsche, Ehring, & Ehlers, 2009). However, these studies

reported difficulties in the experimental induction of rumination (Ehring et al., 2009a) and a possible gender effect (Zetsche et al., 2009).

There was more consistent evidence for a negative impact of rumination on mood rather than increased intrusion frequency. Rumination was associated with persisting negative mood (Ehring et al., 2009a) and more sadness (Zetche et al., 2009). The impact of rumination on mood varied according to the focus of rumination and possible self-relevance (ruminating about the distressing trauma film or the UK financial crisis) (Ball & Brewin, 2012). Another study highlighted a differential impact of rumination on mood according to experimental task. Participants who engaged in distraction initially endorsed decreased negative mood compared to rumination following the experimental induction. However, distraction was associated with a greater increase in negative mood than rumination when participants were asked to vividly imagine a negative life event in visual form (Ehring et al., 2009b).

### *Worry*

Four studies investigated the impact of worry (see Table 4); three used the trauma film paradigm and one a negative autobiographical event. It was predicted that worry would be associated with decreased intrusion frequency in the short term (as per the cognitive avoidance theory of worry) and greater intrusions over longer term monitoring. Similar methodological limitations were observed in these studies as those that examined suppression in analogue samples. The majority of studies which focused on worry did not screen for co-presenting mental health problems or assess intrusion monitoring compliance. Two studies did not adequately assess trauma history or PTSD symptoms (Butler, Wells, & Dewick, 1995; Wells & Papageorgiou, 1995) and recorded intrusion frequency using retrospective estimates. Most studies, however, measured both trait and state worry and assessed discomfort and engagement during the analogue stressor.

The hypothesis regarding short-term decreased intrusions could not be examined as intrusion frequency was not measured immediately following worry in the majority of studies. Over longer term monitoring, there was weak evidence that worry was associated with increased intrusion frequency in non-clinical samples over 3 day follow-up periods. Two studies which reported increased intrusion frequency over the follow-up period had important methodological issues (Butler et al., 1995; Wells & Papageorgiou, 1995). In the former study, the monitoring window was reduced from 7 to 3 days due to low intrusion levels indicating that the film stressor may not have been valid. In both studies there were difficulties inducing worry, a significant proportion of participants engaged in both imagery and worry during the experimental manipulation which created uncertainty as to the extent of verbal-linguistic worry which occurred. In another study, participants in the worry conditions worried about personally relevant topics whereas an imagery group focused on the distressing film contents which limits its comparability with other studies (Pruitt & Hazlett-Stevens, 2010).

Only one study examined affective variables over the 3 day follow-up period, therefore only the hypothesis regarding short-term decreased anxiety was assessed. There were some indications that worry focused on distressing film content resulted in decreased anxiety (Butler et al., 1995) whereas worry about usual concerns 'usual worry' was associated with increased anxiety compared to the control group (Wells & Papageorgiou, 1995). Similarly, a higher rate of increase in anxious affect was reported by participants who recalled a traumatic experience prior to engaging in a period of usual worry compared to usual worry preceding trauma recall (Behar, Zuellig, & Borkovec, 2005). Worry and imagery about a distressing film resulted in similar levels of state anxiety and affect (negative and positive) (Pruitt & Hazlett-Stevens, 2010). Thus, the findings from this limited number of studies are largely inconclusive and the impact of worry on affect over longer term monitoring periods remains to be investigated.

### *Summary of results*

In analogue samples, there was some support for a post-suppression rebound in intrusion frequency under conditions such as increased cognitive load or amongst those who interpret intrusions negatively over longer term monitoring windows. In non-clinical samples, there was little evidence for increased negative affect or distress either in the minutes or days following suppression. In contrast, in trauma survivors, there was greater support for increased intrusions immediately following suppression. As only two studies adopted extended monitoring windows, the longer term impact of suppression requires further investigation. Overall, in both analogue and clinical samples, there was limited support for an adverse impact of suppression on affective variables.

There were no experimental investigations of repetitive negative thinking in clinical samples. Only one study reported increased intrusion frequency following rumination (Ball & Brewin, 2012), although there was some correlational support and indirect evidence for maintenance of existing symptoms (Ehring et al., 2009b). Similar to studies which investigated worry, challenges were reported in the experimental induction of rumination. There was more consistent evidence for a negative impact of rumination on affective variables such as persistent negative mood and increased sadness. Conflicting findings were reported in the studies which examined worry as well as difficulties inducing verbal-linguistic worry.

Table 4: *Repetitive Negative Thinking study characteristics*

| Author | Sample | Design | Experimental Manipulation | Measures | Initial monitoring | Follow-up |
|---|---|---|---|---|---|---|
| ***Rumination*** | | | | | | |
| Ehring et al, 09a | 83 students | Trauma film paradigm<br>17 minutes<br>8 scenes RTAs | Abstract ruminative thinking<br>Concrete thinking<br>Distraction | Intrusions Questionnaire,<br>PANAS, STAI-T,<br>PTQ, CTQ | 10 minutes | 2.5 minutes<br>& 3 days |
| Zetche et al, 09 | 101 volunteers | Trauma film paradigm<br>17 minutes<br>8 scenes RTAs | Rumination<br>Memory Integration<br>Control (Distraction) | IMQ, Intrusion diary, | 12 minutes | 7 days |
| Laposa & Rector, 12 | 91 students | Trauma film paradigm<br>9 mins emergency medical | No manipulation | Intrusion diary, RIQ,<br>PANAS, STAI-S,<br>IES | N/A | 7 days |
| Ball & Brewin, 12 | 60 students<br>(Moderately high ruminators) | Trauma film paradigm<br>12.5 minutes RTAs | Film related rumination<br>Rumination UK financial crisis<br>Control | Intrusion diary, DASS<br>VAS | 5 minutes | 7 days |
| Ehring et al, 09b | 51 students, negative event in previous 2 years | Imagery symptom provocation<br>Narrative of negative life event | Rumination<br>Distraction | Intrusions Questionnaire,<br>PANAS, RSQ, PSWQ | 10 minutes | 2.5 minutes |
| ***Worry*** | | | | | | |
| Butler et al, 95 | 33 students<br>(health care) | Trauma film paradigm<br>8 minutes<br>industrial accident | Worry (about the film)<br>Imagery (about the film)<br>Control (settle down) | Diary, STAI-T,<br>PSC, PSWQ | 4 minutes | 3 days |
| Wells & Papageorgiou, 95 | 70 students,<br>(trainee nurses,<br>piano makers) | Trauma film paradigm<br>8 minutes<br>workshop accident | Usual worry<br>Film worry<br>Distraction<br>Imagery<br>Control (settle down) | STAI, PSC,<br>PSWQ | 4 minutes | 3 days |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pruitt & Hazlett-Stevens, 10 | 174 students | Trauma film paradigm<br>10 minutes RTAs | Immediate worry (15 minutes)<br>Worry (1 week)<br>Worry (1 year)<br>Usual worry<br>Imagery | Intrusion diary, PANAS, STAI-S/T, TCQ, PSWQ | 14 minutes | 3 days |
| Behar et al, 02<br>Study 2 | 14 PTSD/non-GAD<br>13 PTSD/GAD<br>16 Non-PTSD/non-GAD | Usual worry<br>Recall a personal trauma | Relaxation<br>Trauma Recall<br>Worry | GAD-Q, PCL,<br>% thoughts or images,<br>Affect (Likert scales) | 5 minutes | N/A |

PANAS=Positive and Negative Affective Schedule, STAI-S/T=State Trait Anxiety Inventory (State or Trait subscale), PTQ=Perseverative Thinking Questionnaire, CTQ=Concreteness of Thinking Questionnaire, IMQ=Intrusive Memory Questionnaire, RIQ=Response to Intrusions Questionnaire, IES=Impact of Events Scale DASS= Depression Anxiety Stress Scale, VAS=visual analogue scale, RSQ=Response Style Questionnaire, PSWQ=Penn State Worry Questionnaire, TCQ=Thought Control Questionnaire, GAD-Q=Generalized Anxiety Disorder Questionnaire, PCL=Posttraumatic Stress Disorder Checklist

# Discussion

As previously noted, naturalistic studies in trauma survivors have reported associations between suppression, rumination, worry and PTSD symptoms. Experimental studies enable precise investigation of the impact of these cognitive responses on specific aspects of re-experiencing symptoms such as intrusion frequency, intrusion-related distress and affective change. This review sought to examine what has been learned so far in experimental studies of these response strategies in analogue and clinical samples. The majority of studies conducted to date were found to be with analogue samples in which non-traumatised individuals were exposed to an experimentally-induced stressor. All of the studies with clinical samples examined suppression, nine investigated RNT in non-clinical samples and only one experimental study examined more than one response strategy simultaneously (Regambal & Alden, 2009).

## Suppression

In analogue samples, there was limited support for a post-suppression rebound or increased negative affect immediately or in the days following the experimental induction. This is striking given suppression's hypothesised paradoxical effects and mirrors a recent meta-analysis which challenged the assumed role of suppression in the exacerbation of intrusive phenomena (Magee et al., 2012). The absence of increased intrusions immediately following suppression in the analogue peri-traumatic period may link with dissociation (van den Hout, Merckelbach, & Pool, 1996) or suggest that suppression may not have immediately observable maladaptive consequences for non-clinical participants. Alternatively, it may relate to the use of additional response strategies by participants rather than suppression alone. Greater support was provided by studies which utilized long term monitoring windows which may relate to their superior methodological quality (relative to short-term studies) or that suppression's influence on intrusion frequency manifests in the

post-trauma rather than peri-traumatic period. However, as predicted by IPT, cognitive load appeared to undermine suppression (Nixon et al., 2009a) and negative appraisals of intrusions were found to interact with state suppression effort (Nixon et al., 2011) in contributing to increased intrusion frequency. The latter finding aligns with cognitive models of PTSD in which negative appraisals are thought to encourage a sense of current threat and maintain PTSD symptoms by increasing negative emotions and the use of dysfunctional coping strategies (Ehlers & Clark, 2000). As argued by Magee and colleagues (2012), maladaptive attributions regarding instances of unsuccessful thought suppression may be more important in predicting increased intrusion frequency rather than the experience of intrusions per se. The adverse emotional rebound predicted by IPT was not observed (Wegner & Gold, 1995) in the limited number of studies which examined affective change. In addition to self-report assessment of affect, the inclusion of physiological measures to detect potential changes in arousal may strengthen future research designs.

In contrast, among clinical samples there was evidence of increased intrusions immediately following suppression but limited support for greater distress. There were indications of a trauma-specific rebound among individuals with PTSD and more generalised suppression difficulties in participants with acute stress disorder and help-seeking samples. However, neither of the two studies which examined suppression over longer term (24 hour) periods reported a rebound effect (Guthrie & Bryant, 2000; Zachary Rosenthal & Follette, 2007) which may have been related to confounding factors such as lack of compliance with experimental instructions and pre-existing differences in thought control strategies. Reports that individuals with PTSD endorsed less perceived control over their thoughts and rated their suppression success lower even when suppressing effectively underscore the importance of metacognitive beliefs and appraisals and are reminiscent of Magee and colleagues assertion above. The contrasting findings regarding a rebound effect

between clinical and analogue samples may relate to a number of factors, including the personal relevance of the to-be suppressed cognition and greater motivation to suppress among traumatised individuals, and will be discussed in further detail in the methodology section below.

The limited support for an adverse impact of suppression on affective variables was unexpected given the predictions of IPT and its proposed maintenance role in cognitive models of PTSD. Perhaps the impact of suppression on mood may be indirect via strengthening negative appraisals of symptoms thereby leading to increased distress. Other PTSD symptoms such as emotional numbing or co-morbid depression may also influence state affective changes. Two studies which reported increased negative mood in a help-seeking sample (Beck et al., 2006) and anxiety amongst individuals with acute stress disorder (Guthrie & Bryant, 2000) suggests that chronicity of trauma symptoms may be an important factor influencing affect and intrusion-related distress.

## Repetitive Negative Thinking

In this review, the most consistent evidence was for a negative impact of rumination on mood rather than increased intrusion frequency. The one study which reported increased intrusions following rumination differed from others in that it recruited a sample of moderate ruminators who ruminated daily post stressor which tentatively suggests that duration and/or habitual use of rumination may be important factors (Ball & Brewin, 2012). There were some indications of a role for rumination in the maintenance of existing intrusion levels and distress (Ehring et al., 2009b) which aligns with its hypothesised role in cognitive models (Ehlers & Clark, 2000). There were no differences in intrusion frequency when comparing abstract ruminative thinking to concrete thinking (Ehring et al., 2009a) or rumination and memory integration (Zetsche et al., 2009), findings which are contrary to the proposed role of

reduced concreteness (Stöber, 1998) and abstractness of thought (Watkins, 2008) in theoretical accounts of RNT.

The most consistent evidence was for maintenance of negative affect (Ehring et al., 2009a), increased sadness (Zetche et al., 2009) and higher negative mood (Ball & Brewin, 2012). This is in keeping with the depression literature, in which rumination has repeatedly been linked to low mood (Aldao et al., 2010) and found to predict depressive episodes (Nolen-Hoeksema, 2000). The potential impact of rumination on intrusion-related variables and affect in clinical samples has yet to be experimentally investigated. This appears warranted given the prevalence of depression among individuals with PTSD (Breslau, Davis, Peterson, & Schultz, 2000).

Given the focus of both PTSD and worry on threat (Barlow, 2004), it was surprising that no studies have been conducted on worry with clinical samples thus far. In this review, there was some preliminary support for increased intrusion frequency in the days following the experimental stressor (Butler et al., 1995; Wells & Papageorgiou, 1995) which is qualified by the uncertain induction of worry in these studies. There were also some tentative indications of a potential differential impact of worry anchored to the analogue stressor and worry focused on participant's usual concerns (Wells & Papageorgiou, 1995). It could be hypothesised that worry impedes emotional processing of the analogue stressor, that the future-oriented nature of worry interferes with adequate contextualisation of the analogue trauma memory or that the attentional focus of worry (directed towards usual concerns or a distressing film) may impact upon relative intrusion frequency.
The hypothesis regarding long term increased anxiety following worry could not be examined due to absence of data, whilst the findings regarding short-term affective changes were largely inconclusive. Preliminary indications of differences in anxiety between those who worried about the analogue stressor compared to usual worry may relate to the self-relevance of the worry task, which will be discussed in further

detail in the methodology section. Future research examining worry would be strengthened by the measurement of intrusion frequency and affect both immediately following and in the days after worry induction which was not the case in any of the studies included in this review.

Overall, the findings of this review contrast somewhat with what might be expected given naturalistic studies of suppression, rumination and worry in traumatised samples. As the majority of studies conducted with clinical samples examined suppression over short-term monitoring periods, it is challenging to compare the current findings from analogue studies with naturalistic studies which typically assess PTSD symptomatology over several months. Increased intrusion frequency over long term monitoring windows was reported in some analogue studies. However, the inconsistency of these findings and methodological issues limit the conclusions that can be drawn at present. Further differences between naturalistic and experimental research designs may account for discrepancies in these findings. In naturalistic studies, assessment of trait response strategies and overall PTSD symptom severity may obscure specific relationships between cognitive responses and intrusion-related variables. The associations reported in naturalistic studies may relate to broader PTSD symptom distress (and co-presenting problems such as depression) rather than re-experiencing symptoms specifically. In naturalistic studies, distress associated with the longevity of PTSD symptoms and appraisals of lack of control over their persistence may have a different impact on re-experiencing symptoms and cognitive responses than in an experimental setting, in which these responses are under volitional control.

## Methodological considerations

As highlighted by the critical appraisal process, there was substantial variability in the methodological quality of studies included in this review. The bespoke methodology-related items integrated into the appraisal tool attempted to tailor the

appraisal process to trauma-related experimental studies. However, the large number of existing items in the CCAT may have concealed important methodological variability across studies and thus decreased the utility of the ratings produced by the appraisal process. Moreover, the limited number of studies conducted on each response strategy, (11= suppression analogue, 9=suppression clinical samples, 5=rumination and 4=worry), limits the strength of conclusions that can be drawn from this body of research. There are a number of pertinent methodological issues which should be considered when evaluating the strength of the current review's findings.

***Study design and induction of responses***

The monitoring windows implemented in some of the studies, typically lasting less than 10 minutes, may lack ecological validity. It is known that traumatised individuals typically avoid recollecting their traumatic experience over extended periods of time which may not be mimicked by current research designs. Similarly, responses to intrusions in a laboratory environment may differ substantially from those in naturalistic settings in which trauma survivors typically encounter multiple triggers, cues and distractors. As the impact of cognitive responses was only examined for up to 7 days in analogue samples, it is uncertain whether these studies examine factors related to the generation versus maintenance of intrusions over long term periods in the months and years following a traumatic experience (Nixon et al., 2011). The studies included in this review defined intrusions as images, verbal thoughts or combinations of both. There are indications that image-based memories have differing characteristics to intrusive thoughts and may be manipulated independently during experimental studies (Hagenaars, Brewin, van Minnen, Holmes, & Hoogduin, 2010). Therefore, it would be beneficial in future research for the proportion of intrusive images and verbal thoughts to be reported separately to enable more precise examination of their relationships with response strategies.

The degree of variability in measurement of trait and state responses across studies was striking. This is important as the general tendency to use a particular response may interact with beliefs regarding its efficacy and therefore impact on state response levels. Non-measurement of state responses during experimental inductions is particularly problematic as it creates ambiguity regarding the valid induction of the response of interest. This issue is highlighted by those studies which assessed the extent of worry, suppression and rumination and reported difficulties inducing or manipulating the use of these responses. For example, some studies reported that participants continued to suppress when instructed not to do so which suggests that it may be challenging for individuals who habitually respond in a particular manner to follow experimental instructions to the contrary. The reported problematic induction of rumination indicates it may be a difficult process to simulate for non-habitual ruminators. In addition, the mode of repetitive thinking induced in analogue studies may differ considerably from rumination in clinical samples where it is often focused on the sequelae of trauma such as “why did this happen to me…how can my life ever be the same again”. It is notable that the only study which recruited experienced ruminators and requested daily rumination post analogue stressor reported increased intrusion frequency (Ball & Brewin, 2012). Ruminating for a brief period of time following exposure to an analogue stressor may differ substantially from post-trauma rumination which is likely to be more extensive and persistent.

***Stressor***

The symptom provocation method employed in these studies requires careful consideration. As previously noted, the degree to which participants were able to attend to and concentrate on the stressor was not uniformly assessed in analogue studies. This appears necessary given the graphic and distressing nature of the stressor which often depicted violence, injury and death. In studies with clinical samples, participants are experienced and highly motivated to avoid aversive

recollections of their traumatic experience. Thus, the quality of response may differ between clinical and analogue participants, even when the latter are exerting high levels of response effort.

A related issue in analogue studies is the extent to which the stressor is processed as self-referent, self-relevant and the degree of immersion or involvement in the experience. By design, studies with analogue samples use a low-intensity stressor which can be contrasted with real-life traumatic events in which survivors experience intense emotions such as fear, helplessness and horror. Differences in the level of arousal at encoding during real life trauma events relative to an analogue stressor may lead to qualitatively different types of encoding which may influence characteristics of the trauma memory such as the degree of fragmentation and decontextualisation. Therefore, analogue studies may model the effects of witnessing distressing or traumatic content which may differ substantially from personal, lived experience of trauma involving threat to one's physical or psychological integrity. Similarly, it may be challenging to induce the self-focused mode of thinking that characterises rumination in analogue samples. If participants do not perceive the analogue stressor as relevant and referring to self, then self-focused repetitive thinking may be less likely to occur. It is notable that participants who ruminated about the UK financial crisis experienced higher levels of negative affect than those who ruminated about a distressing film which may not have been viewed as self-relevant to the same extent (Ball & Brewin, 2012).

***Sample characteristics***

The reviewed studies also varied in their assessment of trauma exposure and the presence of other mental health problems in both analogue and clinical samples. It could be hypothesised that co-presenting difficulties such as depression or anxiety may place additional cognitive load on participants, influencing attention, concentration, memory encoding, consolidation and retrieval. Without rigorous assessment of trauma history and PTSD symptomatology in analogue studies,

participants with subclinical symptoms or individuals who have successfully adapted to previous trauma exposure may be inadvertently recruited. The potential role of gender also requires further investigation given a significant gender effect reported in one rumination study (Zetche et al., 2009) which has previously been observed in depression research (Nolen-Hoeksema, 1991). Larger sample sizes with balanced gender distributions may enable possible gender-specific effects to be investigated more thoroughly in future research.

Notwithstanding these limitations, experimental studies of this kind have considerable strengths in their investigation of post-stressor responses within a controlled laboratory environment. This experimental control permits the examination of specific facets of these response strategies, variables they interact with and their impact upon re-experiencing symptoms. Multiple factors such as pre-existing trait variables, peri-traumatic processing, emotional reactivity and post-stressor responses can be examined concurrently.

## Future research

There are a number of potential research questions that could be addressed in future studies with analogue and clinical samples. In terms of analogue samples, the investigation of responses to intrusive recollections of negative life events may provide a useful method for examining how individuals respond and adapt to intrusive memories. Samples recruited on the basis of trait responses, for example those with high general suppression tendencies, may provide useful information regarding the interaction between trait and state responses and trauma-related intrusions. Further research of both rumination and worry in analogue and clinical samples is clearly required particularly the manner in which the temporal focus of RNT impacts on intrusion characteristics.

Although challenging, prospective investigations with participants with acute stress disorder, in which response strategies are contrasted between those who

subsequently fulfil PTSD criteria with those who do not may offer valuable information. The relationship between response strategies, re-experiencing symptoms and other PTSD symptom clusters at varying time points during the course of PTSD and its treatment may be beneficial. It may also be helpful to examine the processes engaged in during cognitive responses in further detail. For example, the manner in which individuals with PTSD attempt to suppress or refocus their attention away from aversive trauma memories and the strategies employed in doing so. Rather than the existing focus in the literature on intrusion rebound effects, this may provide information on the circumstances in which these responses have maladaptive consequences. DRT proposes that deliberate attention must be allocated to the contents of flashbacks for trauma memories to be adequately contextualised, with avoidance preventing integration of the trauma memory (Brewin et al., 2010). Research investigating the attentional focus of these response strategies and the manner in which this interacts with avoidance of intrusions and memory processes appears warranted.

As highlighted by this review, only one experimental study has examined suppression and rumination concurrently thus far (Regambal & Alden, 2009). Research adopting a multifactorial approach investigating the use of multiple strategies simultaneously may be valuable. This may highlight associations between response strategies and indicate whether flexible use of a range of responses rather than the preferential use of a limited number is associated with improved outcomes. The incorporation of novel research approaches such as the experience sampling method (Myin-Germeys et al., 2009) would provide in-vivo information regarding the interaction between pre-existing variables (such as mood and appraisals), responses and re-experiencing symptoms in the natural environment.

## Clinical implications and conclusions

In summary, given the limited quantity of experimental research conducted in this area to date, methodological issues and inconsistency between findings, there remains a lack of clarity regarding the impact of cognitive responses on trauma-related intrusive phenomena. It is unclear as yet under what circumstances these responses are maladaptive and the manner in which they interact with pre-existing vulnerability factors and peri-traumatic processes in the emergence and maintenance of intrusions and other PTSD symptoms. As noted, the processes underlying these responses, their selection and interaction may prove valuable areas for future research. The findings of this review have provided preliminary support for increased intrusions immediately following suppression among traumatised individuals. Further research examining the impact of suppression on affective variables over extended time periods in clinical samples is required. There was preliminary support in this review for a negative impact of rumination on mood, whereas the evidence regarding increased intrusion frequency was limited. The restricted number of studies which investigated worry provided some tentative support for increased intrusion frequency. However, challenges in the induction of worry indicate that further replication is required.

Suppression, rumination and worry have been identified as treatment targets in therapeutic interventions for PTSD (Ehlers & Clark, 2000; Wells, 2000). Future therapy trials which explicitly target response strategies may usefully incorporate monitoring of intrusion frequency, mood and responses using experience sampling methods to examine whether changes in responses are associated with specific PTSD symptomatology. This review indicates that substantial empirical support for the hypothesised maladaptive role of these cognitive responses on intrusive phenomena remains to be conclusively established. Evidence is provided for interventions which seek to support traumatised individuals to relinquish attempts to

suppress intrusive trauma memories. However, this review questions the impact of rumination on intrusions suggesting a primarily affective role which requires further investigation in clinical samples. The findings of this review suggest that addressing fragmented, decontextualised trauma memories and negative appraisals in therapy remains the most appropriate means of alleviating distressing re-experiencing symptoms available at present.

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# Part Two: Empirical Paper

# The phenomenology of negative and positive imagery in early psychosis

## Abstract

**Aims** This study sought to investigate the phenomenological characteristics of intrusive, distressing imagery and positive imagery in early psychosis. The thematic content, appraisals of imagery experiences and the ability to generate positive future-oriented images were also investigated.

**Method** Thirty-one service users recruited from Early Intervention in Psychosis services participated in this mixed-methods, cross-sectional study. The content, characteristics and appraisals of recent imagery experiences were examined using existing interview measures. Participants generated future-oriented images, rated their vividness and perceived likelihood during a positive prospective imagery task. Symptom measures including social anxiety, persecutory ideation, depression and PTSD symptoms amongst others were completed to characterise the sample in relation to imagery experiences. Content analysis was employed to examine imagery themes.

**Results** Approximately three quarters of participants had experienced a distressing, intrusive image in the previous month. Image content related to a range of themes including loss, an inadequate self, external threat and a dangerous self. A higher proportion (84%) experienced a recent positive image, either involuntary or intentionally generated, with themes including loving, intimate relationships, enjoyable times with peers and family, achievement of personal goals and escape from current circumstances. Idiosyncratic appraisals of imagery varied in terms of their perceived dangerousness, benefit or harm and the images' source. Depression and social anxiety were negatively associated with the vividness and perceived likelihood of intentionally generated positive prospective images.

**Conclusions** The content and appraisals of negative and positive imagery highlighted in this study emphasise the importance of mental imagery with implications for therapeutic interventions in early psychosis. The relationship between depression and positive imagery may influence goal directed behaviour and motivation issues in psychosis.

# Introduction

Cognitions are assumed to adopt the form of verbal thoughts or mental images in Cognitive Behavioural Therapy (CBT). Although CBT's predominant focus has been on the former, the importance of mental imagery has been emphasised since CBT's inception (Beck, 1976). Mental images have been defined as "contents of consciousness that possess sensory qualities as opposed to those that are purely verbal or abstract" (Hackmann, 1998) and "the simulation or re-creation of perceptual experiences across sensory modalities" (Kosslyn, Ganis, & Thompson, 2001). Mental imagery has been linked to the retrieval of specific episodes from autobiographical memory (Conway, 2001). This is significant as it has been proposed that autobiographical memory for emotional events may be stored in a form resembling images so that newly generated images are likely to contain elements of these emotional image-like memories (Conway & Pleydell-Pearce, 2000). Furthermore, images have been shown to evoke a more pronounced emotional impact than equivalent verbal representations for both positive and negative events (Holmes & Mathews, 2010).

## Phenomenology

Images may occur in any sensory modality, although visual imagery has been the most extensively investigated (Andrade, May, Deeprose, Baugh, & Ganis, 2013). Images may be deliberately, intentionally generated or result from involuntary recall processes (Pearson, Deeprose, Wallace-Hadrill, Heyes, & Holmes, 2013). Imagery research in psychopathology has largely focused on involuntary intrusive memories (Weßlau & Steil, 2014) although images can also refer to possible future events, imaginative fantasies and daydreams (Hackmann, Bennett-Levy, & Holmes, 2011). Intrusive images often reflect idiosyncratic fears and concerns (Ottaviani & Beck, 1987; Wells & Hackmann, 1993) with suggestions that they link to the core fears driving several of the anxiety disorders (Hirsch & Holmes, 2007). Indeed, idiosyncratic appraisals of intrusive images have been conceptualised as an important pathological factor in anxiety disorders (Hackmann & Holmes, 2004), depression (Newby & Moulds, 2011) and bipolar disorder (Holmes, Geddes, Colom, & Goodwin, 2008b;

Mansell, Morrison, Reid, Lowens, & Tai, 2007). Intrusive imagery experiences are now viewed as a transdiagnostic process due to their occurrence in several of the emotional disorders (Brewin, Gregory, Lipton, & Burgess, 2010; Krans, 2011).

The phenomenological characteristics of intrusive imagery, including content, frequency, emotional response, associated memories and sensory qualities have been investigated in a range of disorders. Research has highlighted associations between distressing imagery and events experienced around the onset of anxiety symptoms in social phobia and agoraphobia (Day, Holmes, & Hackmann, 2004; Hackmann, Clark, & McManus, 2000). Image perspective, that is, whether the image is viewed from one's own or an external point of view, has been investigated in relation to emotional response (Libby, Shaeffer, Eibach, & Slemmer, 2007), social evaluative concerns (Wells & Papageorgiou, 1999) and avoidance of aversive emotions (Holmes, Coughtrey, & Connor, 2008a). Over recent years, imagery has been increasingly integrated within theoretical models and therapeutic interventions. Imaginal exposure to facilitate habituation to anxiety provoking stimuli is a longstanding treatment technique (Abramowitz, Deacon, & Whiteside, 2012). Imagery rescripting which seeks to alter the meaning of memories and images through techniques such as cognitive restructuring, reliving and the introduction of compassionate perspectives amongst others (Pearson et al., 2013) has been applied in a greater range of disorders including PTSD, social phobia, depression and borderline personality disorder (Holmes & Mathews, 2010; Wheatley et al., 2007). Furthermore, responses to intrusive imagery, such as suppression and rumination have been proposed as treatment targets in PTSD (Ehlers & Clark, 2000) and depression (Weblau & Steil, 2014).

## Prospective imagery

Imagery is an important element of mental simulation or time travel, which is the ability to remember past personal events and to project oneself into possible future events (Klein, Robertson, & Delton, 2010; Tulving, 2005). Mental simulation of the future enables individuals to 'preview' possible outcomes and 'pre-experience' potential feelings, rewards

and costs associated with future actions (Gilbert & Wilson, 2007). Crucially, imagining oneself completing a behaviour increases the subjective probability that the outcome will occur (Carroll, 1978) and the likelihood of that behaviour being undertaken (Libby et al, 2007). Accordingly, imagery is thought to influence readiness for action and goal planning more generally (Holmes & Mathews, 2010).

Research has begun to highlight the importance of future-oriented (prospective) imagery and positive imagery in psychopathology. A diminished ability to generate positive, prospective imagery has been reported in major depression and anxiety (Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011), as well as reduced frequency and level of detail of positive imagery in individuals with social anxiety (Moscovitch, Gavric, Merrifield, Bielak, & Moscovitch, 2011). In bipolar disorder, depressed mood has been associated with vivid and distressing prospective images, in some cases of death and suicide; whereas positive, enjoyable future-oriented images were related to hypomania (Gregory, Brewin, Mansell, & Donaldson, 2010). Indeed, mental imagery has been proposed as a rapid emotional amplifier in bipolar disorder (Holmes et al., 2008b). In this model, positive imagery contributes to elevated mood by increasing positive emotion, strengthening the conviction that there are positive goals to be achieved which increases the likelihood of behaviour being undertaken to achieve these goals, for example, staying up all night writing after experiencing an image of winning a major writing award (Gregory et al., 2010). Furthermore, it suggests that imagery may contribute to self-injurious behaviour through prospective, 'flash-forward' images of self-harm (Crane, Shah, Barnhofer, & Holmes, 2012), for example, an image of jumping off a bridge (Gregory et al., 2010). These recent findings suggest that both the valence and temporal orientation of imagery are important considerations in mental imagery research.

## Imagery in the context of psychosis

### *Trauma and PTSD in psychosis*

High levels of trauma, including psychosis-related aversive experiences (Berry, Ford, Jellicoe-Jones, & Haddock, 2013; Matheson, Shepherd, Pinchbeck, Laurens, & Carr, 2013; Varese et al., 2012) and PTSD among individuals with psychosis (Neria, Bromet, Sievers, Lavelle, & Fochtmann, 2002; Resnick, Bond, & Mueser, 2003) contribute to the complexity of investigating mental imagery in psychosis. However, commonalities in theoretical accounts of intrusion development in both PTSD and psychosis indicate that similar mechanisms may contribute to intrusion formation in both disorders. Cognitive models of PTSD-related intrusions argue that increases in sensory-perceptual processing and inhibition of contextual processing (during or after a trauma) lead to enhanced involuntary intrusions (sensory-bound representations) and fragmented deliberate recall (contextualised representations) (Brewin et al., 2010). Similarly, weakened contextual integration, that is, a diminished ability to integrate information in a temporal and spatial context, has been proposed as a specific information processing style underlying the increased vulnerability to trauma-related intrusions in psychosis (Glazer, Mason, King, & Brewin, 2013; Jones & Steel, 2012; Steel, Fowler, & Holmes, 2005; Steel & Holmes, 2007; Steel, Mahmood, & Holmes, 2008). Moreover, positive symptoms of psychosis have been conceptualised as intrusions (e.g. auditory hallucinations) or the culturally unacceptable interpretation of these intrusions (e.g. delusional beliefs) with the interpretation of intrusions highlighted as a key contributor to distress (Morrison, 2001). The similarities between intrusive phenomena in PTSD and psychosis have encouraged suggestions that it is the culturally unacceptable interpretation of intrusions, the appraisal of intrusive experiences as external (Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001) and positive beliefs about psychotic experiences (Morrison, 2001) which distinguish intrusions in PTSD and psychosis (Morrison, Frame, & Larkin, 2003).

### *Emotional disorders in psychosis*

In addition to trauma exposure and elevated rates of PTSD, there is an increased prevalence of anxiety and depression in individuals with psychosis relative to the general population (Achim et al., 2011; Buckley, Miller, Lehrer, & Castle, 2009). Persistent anxiety and depression are thought to impede recovery and increase the risk of relapse (Herz & Melville, 1980) and suicide (Roy, 1989). Cognitive models of psychosis have not explicitly incorporated mental imagery related to co-presenting problems, such as depression or anxiety, in their theoretical accounts and there has been limited research in this area to date. However, there are a number of pertinent findings from imagery research in depression and anxiety which may inform imagery research in psychosis. Intrusive imagery content in depression has been related to bereavement or adjustment to life circumstances (Brewin, Hunter, Carroll, & Tata, 1996) and traumatic or critical life events (Birrer, Michael, & Munsch, 2007). Regarding the latter, participants with depression without co-morbid PTSD reported visual intrusive memories of traumatic events such as actual or threatened death, serious injury or threat to the physical integrity of oneself or others as well as non-traumatic events (Reynolds & Brewin, 1998). However, negative appraisals of intrusive memories have been found to predict depression severity over and above imagery characteristics (Starr & Moulds, 2006). Distressing, intrusive imagery has been shown to have an important role in the maintenance of anxiety disorders (Hirsch & Holmes, 2007) with suggestions images may trigger a range of maladaptive responses (Moulds & Holmes, 2011) which contribute to the maintenance of symptomatology and ongoing distress.

### *Imagery research in psychosis*

Mental imagery research in psychosis has investigated its potential relationship with hallucinations. Hallucinations are defined as percept-like experiences in the absence of corresponding sensory stimuli (Bocker, Hijman, Kahn, & De Haan, 2000) which have the impact of actual perception and are not subject to direct and voluntary control (Bentall, 1990). Hallucinations and images are similar in that they both have perceptual qualities,

occur in the absence of appropriate sensory stimuli, are often repetitive, emotive and may be triggered by external or internal cues (Nayani & David, 1996). However, mental images differ in that they can be intentionally generated and controlled (Kosslyn, 1994; Sack, van de Ven, Etschenberg, Schatz, & Linden, 2005). It has been hypothesised that hallucinations may result from enhanced mental imagery vividness and impaired reality or source discrimination in which images are evaluated as arising from external sources (Cahill, Silbersweig, & Frith, 1996; Horowitz, 1975). However, research which examined the relationship between hallucinations and the propensity to experience imagery (Aleman, de Haan, Bocker, Hijman, & Kahn, 2002; Holmes & Mathews, 2010; Mintz & Alpert, 1972; Oertel et al., 2009; Sack et al., 2005), have been inconclusive thus far (Benson & Park, 2013; Lallart, Jouvent, Herrmann, Beauchet, & Allali, 2012).

The content of distressing, intrusive imagery in psychosis has been examined in relation to positive symptoms and social anxiety. The content of images linked to hallucinations and delusions were found to include feared catastrophes associated with paranoia, memories of traumatic life events, and the content of voices or their perceived source (Morrison et al., 2002). Early Intervention in Psychosis (EIP) service users with clinically significant levels of social anxiety described images typically associated with social anxiety but also, in some instances, more psychotic-like paranoid images (Lockett et al., 2012). Another study highlighted links between general anxiety, distressing persecutory delusions and anxiety-provoking images (Schulze, Freeman, Green, & Kuipers, 2013). Appraisals of imagery experiences were not examined in the latter three studies. However, Schulze and colleagues (2013) suggested that beliefs about the origin of intrusive images and their idiosyncratic meaning may maintain distress, threat beliefs and beliefs about one's own vulnerability.

Mental simulation and prospective imagery have been investigated in relation to negative symptoms and cognitive impairments in psychosis. An impaired ability to imagine or project oneself into future events has been reported in schizophrenia (D'Argembeau, Raffard, & Van der Linden, 2008). The negative symptom apathy has been linked to

impairments in imagining future specific events, particularly positive events, even when controlling for depression (Raffard, Esposito, Boulenger, & Van der Linden, 2013). Anhedonia has also been associated with an impaired ability to savour, which is, the anticipation of pleasure in future events, and high estimated difficulty in performing everyday tasks (Cassar, Applegate, & Bentall, 2013). However, impaired mental simulation may not solely relate to negative symptoms as reduced ease of imagination and subjective probability have been reported by individuals with persecutory ideation (Huddy, Brown, Boyd, & Wykes, 2014). More broadly, these findings are of interest because of links between personal goals and ease of imagination of future events (D'Argembeau & Mathy, 2011). However, little is known about involuntary positive imagery experiences in psychosis or the generation of positive, prospective imagery in early psychosis.

## Rationale

The examination of imagery experiences early in the course of psychosis may be valuable given the crucial importance of this period in terms of recovery (Wiersma, Nienhuis, Slooff, & Giel, 1998). In early psychosis, improvements in positive symptoms are often not accompanied by improved functional outcomes (J. Addington, Young, & Addington, 2003; Tohen et al., 2000). This has encouraged suggestions that CBT for individuals with first episode psychosis should focus on emotional dysfunction (Birchwood, 2003; Birchwood & Trower, 2006; Morrison, 2009), due to its prevalence and potential contribution to the development and maintenance of negative as well as positive symptoms. Previous research has indicated that intrusive images are common in people with psychosis but it is unclear which images individuals identify as most distressing and what concerns they may relate to. The high prevalence of depression and anxiety disorders in people with psychosis has led to calls for further imagery research in the context of co-existing difficulties (Morrison et al., 2002). Furthermore, given the central role of emotional processes in cognitive behavioural models of psychosis (Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002; Garety et al., 2001; Morrison, 2001), it appears pertinent to assess co-presenting problems such as

depression, PTSD and social anxiety to examine their potential associations with imagery in early psychosis. Cognitive models propose a central role for appraisals of anomalous experiences and intrusions in contributing to the symptoms of psychosis and changes in mood and physiology (Garety et al., 2001; Morrison, 2001). Appraisals of distressing imagery may have a key maintenance role yet remain unexplored. The ability to generate positive prospective imagery and its relationship to low mood has not been investigated in individuals with early psychosis and may have important treatment implications, for example, in goal setting and behavioural activation for depression or negative symptoms (Staring, ter Huurne, & van der Gaag, 2013). Investigation of the phenomenological characteristics and thematic content of positive imagery experiences in early psychosis may be useful given its importance within other clinical presentations such as bipolar disorder.

## Aims

Four primary research questions will be addressed in this study.

1. Content analysis will be employed to investigate the key themes reflected in the content of distressing imagery experiences in people with early psychosis, who often experience co-morbid difficulties such as PTSD, depression and social anxiety.

2. Regarding deliberate generation of positive prospective imagery, it is hypothesised that increasing depression levels will be negatively associated with imagery vividness and estimates of the likelihood of the scenario's future occurrence.

3. The content of positive imagery experienced by participants in everyday life will be qualitatively analysed to identify emergent themes.

4. Appraisals of negative and positive imagery experiences will be examined, specifically their perceived dangerousness, benefit or harm and source.

# Method

## Participants

### Service setting and ethical approval

This study was conducted in EIP teams in a north London NHS foundation trust. Participants were recruited from three of the trust's four constituent boroughs. The study received ethical approval from Camberwell St Giles Research Ethics Committee (13/LO/0877, Appendix A) and permission to conduct the study was granted by the trust's Research and Development Department (2337, Appendix B).

### Recruitment

Service users aged 18 years and above who had experienced symptoms of a non-organic psychosis (WHO, 1992) and were engaged with EIP services were eligible to participate. Capacity to provide informed consent and sufficient English language proficiency to partake in an interview were required. Exclusion criteria included a primary diagnosis of substance misuse (F10-F19), learning disability (F84, F88, and F89), bipolar disorder (F31), current acute psychotic state and inpatient status. A convenience sampling approach was adopted. The study's aims, procedure, inclusion and exclusion criteria were presented to EIP care co-ordinators who were given a copy of the participant information sheet (Appendix C). Care co-ordinators were requested to examine their case loads for service users who fulfilled inclusion criteria and may be interested in taking part.

Once eligibility was confirmed, care co-ordinators gave service users a participant information sheet and asked for their verbal consent for the researcher to telephone them. During this telephone call, the researcher provided information on the study, answered questions and scheduled an appointment with the service user. This meeting began with a discussion of the information contained in the participant information sheet. If service users had capacity to consent and wished to proceed, they signed a consent form (Appendix D) before the research interview commenced. Participants were reimbursed £10 for travel

expenses and refreshments related to taking part in this study. Research appointments took place in the NHS setting where participants usually met with EIP team members.

## Design and Measures

A mixed-methods, cross-sectional design was employed to gather quantitative and qualitative data.

### *Imagery Interview: development and administration*

This study utilised existing imagery measures which were administered in interview format[1]. Permission was granted to use and adapt these interview schedules by their authors. Service user feedback was sought and incorporated during the interview development phase (see Appendix E).

#### a) Experiences of negative intrusive imagery

Experiences of distressing, intrusive imagery were examined using a semi-structured interview (Appendix F) based on two existing schedules, Hackmann et al.'s (2000) imagery in social anxiety interview, which was subsequently adapted for research with individuals with psychosis (Appendix I; Ison, 2011; Lockett et al., 2012; Morrison et al., 2002; Schulze et al., 2013), and items from Patel and colleagues interview on intrusive images and memories in major depression (Appendix J; Patel et al., 2007). The majority of items were from Hackmann and colleagues interview schedule (Hackmann et al., 2000) which has been used extensively in previous research and has been described as an appropriate method to examine subjective experiences of imagery in clinical populations (Pearson et al., 2013). There are preliminary indications of adequate test-retest reliability for this schedule from a study of imagery in body dysmorphic disorder (Osman, Cooper, Hackmann, & Veale, 2004).

[1] An additional measure, the Thought Control Questionnaire (Wells & Davies, 1994) was also initially included to assess cognitive and behavioural responses to intrusive imagery. It was excluded following reliability checks which will be discussed in the critical appraisal (Appendix H).

At the start of the negative imagery interview, participants were asked if they had experienced an image, picture or impression that regularly spontaneously came to mind. If participants were unable to recall an image, the researcher continued to the next section, outlined in the procedure section below. If participants reported that they had experienced a distressing image in the previous month, they were asked to identify the most distressing image they had experienced rated on a scale from 0-100 (0=not at all distressing to 100 extremely distressing). This was followed by questions regarding the frequency and content of the identified image, its meaning for the individual and ratings of emotions associated with the image, for example, anger and fear. Participants were asked if they could link the image to a previous experience, their age when this event occurred and the similarity of the image and this memory. Participants rated a number of additional items including; threat, perceived likelihood that the event depicted in the image would happen, interference in daily life, controllability, sense of reliving in the 'here and now', vividness and the perspective of the image. Visual aids (laminated print outs) of the rating scales were used to assist participants in providing ratings.

### b) Positive Prospective Imagery Task

Participants' ability to generate positive prospective images was examined using a subjective probability task (MacLeod, Byrne, & Valentine, 1996; Stöber, 2000) which has been used in previous research in depression and anxiety (Holmes, Lang, Moulds, & Steele, 2008c; Morina et al., 2011). Participants were requested to generate images of positive scenarios which may happen to them in the future. Ten scenarios were read aloud to participants, for example, "you will make good and lasting friendships; you will be very fit and healthy". Participants were invited to generate a field perspective image (from their own point of view) of each scenario which they did not have to describe aloud to the interviewer. Participants rated the vividness of each generated image (0=no image to 100=very vivid image) and the likelihood that the event depicted in the image would happen to them in the

future (0=not at all likely to occur to 100=extremely likely to occur). Mean vividness and likelihood scores were calculated for each participant. The internal consistency of the vividness scale was $\alpha$ = 0.761 and $\alpha$ = 0.823 for the measurement of perceived likelihood in this study.

### c) Experiences of positive imagery

The questions in this interview were the same as the negative imagery interview outlined above with additional items. Participants were asked whether they experienced positive images and to describe the most positive image they experienced in the previous month. If participants had not experienced a positive image in the previous month, they were asked whether they experienced positive images in the past and approximately when this last occurred. For participants who experienced a recent, positive image, questions explored the content of the image, its frequency and its meaning. Participants were asked if the image linked with a past experience and their age when this event occurred. They were requested to rate a number of additional characteristics (on 0-100 scales) including vividness, 'here and now' quality, the extent to which the image was spontaneous or deliberately generated and the perceived likelihood that the event would happen to them in the future. Open-ended questions asked participants to identify emotions associated with the image and how they responded to the image when it occurred.

### d) Appraisals of imagery experiences

The appraisals questions from the Appraisals of Anomalous Experiences Interview (AANEX) (Brett et al., 2007) were integrated into the negative and positive interview schedules described above. These items examined whether participants thought the image was beneficial or a bad sign, dangerous or harmless/benign, and if it was caused by somebody in particular or something external to the experiencer. The AANEX has adequate inter-rater reliability and construct validity (Brett et al., 2007).

### *Demographic and clinical information*

At the beginning of the meeting, age, gender, ethnicity, education or employment status, accommodation and number of years of education were collected using a non-standardised form (Appendix K). Participants' clinical diagnosis, length of contact with EIP services and whether they had engaged with individual psychological therapy since referral to EIP was obtained from their electronic case records following the research meeting.

### *Social and Occupational Functioning*

Participant's care co-ordinators were requested to complete the Social and Occupational Functioning Assessment Scale (APA, 1994) after the research meeting. The SOFAS is a single-item scale in which the individual is rated according to their lowest level of functioning over the previous month. It is a measure of social and occupational functioning rated independently of level of psychopathology. Scores range from 0 to 100, with 100 indicating superior functioning across a range of domains and lower scores reflecting higher levels of impairment. There is no published reliability or validity data concerning use of the SOFAS among individuals with psychosis (Burns & Patrick, 2007), although there has been support for its construct validity (Patterson & Lee, 1995). It has been used extensively in research with individuals with psychosis and EIP samples (Killackey, Jackson, & McGorry, 2008).

### *Social Anxiety questionnaire*

Participants completed the 20-item Social Interaction Anxiety Scale (SIAS) self-report measure (Mattick & Clarke, 1998). It assesses social anxiety by asking individuals to rate the extent (on a scale from 0=not at all to 4=extremely) to which they would make particular responses in a variety of situations requiring social interaction. For example, "I have difficulty making eye contact with others". Previous research has demonstrated good reliability and discriminant validity of the SIAS when comparing social anxiety to other anxiety disorders (L.

Peters, 2000). It has been used in previous research with EIP service users (Lockett et al., 2012; Michail & Birchwood, 2009).

### *Persecutory ideation questionnaire*

The 16-item Persecution subscale of the Green Paranoid Thoughts Scale self-report questionnaire (C. Green et al., 2008) was completed. Items are endorsed on Likert scales from 1 (not at all) to 5 (totally), such as “people have intended me harm”. Total scores range from 16 to 80 with higher scores indicating greater levels of persecutory ideation. Good internal consistency and validity have been reported (C. Green et al., 2008) and it has been used in previous research with EIP samples (Fornells-Ambrojo et al., 2008).

### *Screening for traumatic life events*

The trauma history questionnaire (THQ) was completed in interview format to assess participant’s trauma exposure (B. Green, 1996). Acceptable psychometric properties for the THQ have been reported when conducted with individuals with severe mental illness (Mueser et al., 2001). The THQ enables assessment of PTSD diagnostic criterion A1 regarding the severity of the traumatic event (actual or threatened death or severe injury) and criterion A2 relating to feelings of intense fear, helplessness and horror. The categories adopted by Mueser and colleagues (2001) were used in this study which include sexual abuse/assault, physical attack with or without a weapon, witnessing injury or death, and car or work accident amongst others.

### *PTSD Symptoms*

The Posttraumatic Stress Scale-Self Report (PSS-SR) is a 17-item measure assessing the presence and severity of PTSD symptoms. Each item corresponds to DSM-IV diagnostic criteria for PTSD (Foa, Riggs, Dancu, & Rothbaum, 1993). It is a self-report version of the interview based Posttraumatic Stress Scale and a precursor of the Posttraumatic Diagnostic

Scale (Foa, Cashman, Jaycox, & Perry, 1997). Participants rate each of their responses on four point scales (0=not at all to 3=very much) based on experiences in the previous two weeks. For example, “Have you been having bad dreams or nightmares about the traumatic event?” The PSS-SR yields a total PTSD severity score and three subscale scores: re-experiencing, avoidance and arousal symptoms. Endorsement of at least one re-experiencing symptom, three avoidance and two arousal items and a score of 14 and above indicate probable PTSD (Coffey, Gudmundsdottir, Beck, Palyo, & Miller, 2006; Sin, Abdin, & Lee, 2012). The PSS-SR has been reported to have adequate concurrent and convergent validity, test-retest and inter-rater reliability (Foa et al., 1993) and has been described as an appropriate screening measure for PTSD in EIP services (Sin et al., 2012).

### *Depression*

The 9-item Calgary Depression Scale for Schizophrenia (D. Addington, Addington, & Schissel, 1990) interview was conducted. The CDSS is a clinician rated semi-structured interview assessing depressive symptoms over the previous two weeks. Ratings (from 0 to 3) are assigned on the basis of operational criteria defined for each item. A score of 7 and above has 82% specificity and 85% sensitivity for predicting the presence of a major depressive episode (D. Addington, Addington, & Maticka-Tyndale, 1993). The CDSS has good internal and inter-rater reliability (D. Addington, Addington, Maticka-Tyndale, & Joyce, 1992). Its divergent validity, in its assessment of depression rather than the negative symptoms of psychosis or extrapyramidal side effects has been reported (D. Addington, Addington, & Maticka-Tyndale, 1994). The CDSS has been used extensively in previous research and with individuals with early psychosis (Michail & Birchwood, 2009; Upthegrove et al., 2010).

### *Positive symptoms of psychosis*

The seven positive subscale items from the Positive and Negative Syndrome Scale (Kay, Flszbein, & Opfer, 1987) were assessed using the relevant items from its Structured Clinical Interview (Kay, 2006). Each of the subscales (delusions, conceptual disorganisation, hallucinatory behaviour, excitement, grandiosity, suspiciousness/persecution and hostility) were rated (1=absent to 7=extreme) based on participant's SCI-PANSS responses. The SCI-PANSS items regarding hallucinations specifically assess the presence of auditory, visual, olfactory and somatic hallucinations and relevant information was recorded where applicable. The PANSS has good internal consistency, inter-rater and test-retest reliability (Kay, Opler, & Lindenmayer, 1988) and has been widely used in schizophrenia research.

### *Voices (auditory verbal hallucinations)*

The presence and severity of auditory verbal hallucinations was examined using the auditory hallucinations subscale of the clinician administered structured interview, the Psychotic Symptom Ratings Scale (Haddock, McCarron, Tarrier, & Faragher, 1999). These 11 subscale items are rated on five point ordinal scales (0 to 4) and include items assessing frequency, duration, loudness and controllability yielding a total score. Good inter-rater, test retest reliability and validity has been reported in a first episode sample (Drake, Haddock, Tarrier, Bentall, & Lewis, 2007).

## Procedure

A summary of the procedure is provided in Table 1.

Table 1: *Procedure - counterbalancing of imagery interviews*

| Participant Measures | |
|---|---|
| **Order A** | **Order B** |
| **Written, informed consent** | **Written, informed consent** |
| **Demographic information** | **Demographic information** |
| **Self-report measures** | **Self-report measures** |
| SIAS | SIAS |
| GPTS | GPTS |
| ***Audio recording started*** | ***Audio recording started*** |
| **Imagery interview** | **Imagery interview** |
| Distressing, intrusive imagery interview | Positive imagery generation task |
| Responses to identified image (TCQ) | Positive imagery interview |
| **Filler Task** | **Filler Task** |
| Positive imagery generation task | Distressing, intrusive imagery interview |
| Positive imagery interview | Responses to identified image (TCQ) |
| ***Audio recording stopped*** | ***Audio recording stopped*** |
| **Trauma Assessment** | **Trauma Assessment** |
| THQ | THQ |
| PSS-SR if applicable | PSS-SR if applicable |
| **Researcher rated interview measures** | **Researcher rated interview measures** |
| CDSS | CDSS |
| PANSS | PANSS |
| PSYRATS | PSYRATS |
| **Relaxation: Guided visualisation** | **Relaxation: Guided visualisation** |
| **Debrief** | **Debrief** |
| **Participant reimbursement** | **Participant reimbursement** |
| **Other measures** | |
| **SOFAS** | **SOFAS** |
| **Case note information** | **Case note information** |

SIAS=Social Interaction Anxiety Scale, GPTS=Green Paranoid Thoughts Scale, TCQ=Thought Control Questionnaire, THQ=Trauma History Questionnaire, PSS-SR=PTSD Symptom Scale-Self Report, CDSS=Calgary Depression Scale for Schizophrenia, PANSS=Positive and Negative Syndrome Scale, PSYRATS=Psychotic Symptom Rating Scales, SOFAS=Social and Occupational Functioning Scale

Following written, informed consent, the researcher asked participants questions from the demographic form. Participants then completed two pen and paper self-report measures (SIAS and GPTS). A standardised information script was developed drawing from previous research (Appendix L) and was read aloud to each participant prior to commencing the imagery interview. In this script, a commonly utilised definition of mental imagery (Kosslyn et al., 2001) was used to demonstrate the distinction between imagery and other intrusive phenomena such as thoughts and hallucinations. Participants were invited to practice generating a mental image, using a task employed in previous research “Imagine cutting a lemon; describe the characteristics of the image” (Pictet, Coughtrey, Mathews, & Holmes,

2011). Administration of the negative and positive imagery interviews was counterbalanced to minimise potential ordering effects. Thus, half of the sample began with questions regarding negative imagery (Order A above) and the other half started with the positive imagery generation task (Order B above). The positive and negative imagery interviews were separated by a filler task which has been used in previous research (Holmes, Mathews, Dalgleish, & Mackintosh, 2006) and designed to minimise possible carry-over effects. In this filler task, participants were asked to rate the pleasantness of eight 40 second clips of classical music played for approximately 5 minutes in total. Participants rated each music segment on a scale from 1 (extremely unpleasant) to 9 (extremely pleasant). Imagery interviews were recorded in digital audio format with participant consent.

Following the imagery interview, the researcher rated interview measures were completed (THQ, CDSS, PANSS and PSYRATS). In terms of trauma assessment, an approach used in previous research with individuals with psychosis was adopted (Hardy et al., 2005). During the THQ, if participants reported they had experienced one or more traumatic events satisfying PTSD Criteria A1 and A2 they were asked if they were currently affected by these experiences. If participants reported that they were still affected by more than one trauma, they were asked which they found most distressing at present (see Appendix M for script). Participants were then requested to complete the PTSD Symptom Scale Self Report (PSS-SR) in relation to this particular traumatic experience.

To conclude, a guided visualisation relaxation exercise was completed, similar to that used by Day and colleagues (2004). Participants were requested to form an image of a beach or another relaxing scene and to describe details of the image to the researcher (see Appendix N for script). Participants were asked about their feelings in the image and its vividness. The meeting concluded with participant feedback regarding their experience of taking part and debrief. Participants were asked if they wished to receive a summary of the study's findings following its completion. Due to time restrictions, it was not possible to complete all of the symptom measures with each participant (number incomplete: THQ n=6; PSYRATS n=2 and PANSS n=13). The SOFAS was not completed for three participants.

## Sample size and analysis

### *Power calculation*

A power analysis was conducted for the quantitative element of this study using the G* power programme (Faul, Erdfelder, Lang, & Buchner, 2007). Results from a study which used the same prospective imagery task and recruited participants with high or low dysphoria (Holmes et al., 2008c) were used to estimate the required sample size for this study. In Holmes and colleagues' study, among high dysphoria participants there was a significant inverse relationship between BDI-II scores and vividness of prospective positive imagery r(31) = -.42, *p* =.02. Using these values, it was determined that a sample size of N=39 in the present study would provide over 80% power to detect a moderate to large correlation between variables in the sample at a 0.05 level of significance (Faul et al., 2007).

### *Analysis*

Quantitative data was analysed using SPSS version 22. Missing data was replaced with the series mean for the item or subscale in question and outliers (z score ≥3) were winsorised. Quantitative data was examined for normality using the Kolmogorov-Smirnov test, histograms and scatterplots, which demonstrated that a number of the variables were not normally distributed. Spearman's rank correlation was therefore selected for correlational analyses. All tests were two tailed, $\alpha$ was set at 0.05 and alpha was adjusted for multiple comparisons.

Digital audio interview data was transcribed verbatim and analysed using Nvivo version 10. A content analysis approach (Joffe & Yardley, 2004) was employed to identify the themes of negative and positive imagery. Coding categories were derived from a combination of inductive coding from analysis of the transcripts and deductive coding drawing from previous research in psychosis (Lockett et al., 2012; Michail & Birchwood, 2009; Morrison et al., 2002; Schulze et al., 2013), other disorders such as depression (Birrer et al., 2007) and bipolar disorder (Gregory et al., 2010), and research around recovery in

psychosis (Gumley, Braehler, Laithwaite, MacBeth, & Gilbert, 2010; Romano, McCay, Goering, Boydell, & Zipursky, 2010). Image content was initially analysed by the interviewer and a random subset were independently analysed by the researcher's supervisors who are experienced EIP psychologists and researchers (9 positive and 23 negative image descriptions). The final imagery coding frameworks were agreed by the researcher and supervisors using a consensus approach (Barker & Pistrang, 2005).

# Results

## Demographic and clinical characteristics

Thirty five participants were recruited. Four were excluded due to the following: insufficient English language fluency, a diagnosis of bipolar disorder, difficulties engaging with the interview because of attention problems and risk issues (self-harm and risk to others) which emerged during the interview and were assessed rather than proceeding further (see Appendix O). A final sample of 31 participants who met inclusion criteria consented and completed this study. Demographic and clinical information are detailed in Table 2 below. The majority of participants were not engaged in psychological therapy at the time of participation and had been in contact with EIP services on average for over one year.

Table 2: *Demographic and clinical characteristics*

| | | **N=31 (%)** |
|---|---|---|
| Gender | Male | 17 (55) |
| Ethnicity | Black British, African or Caribbean | 15 (48) |
| | Asian | 11 (36) |
| | Caucasian | 3 (10) |
| | Other | 2 (6) |
| Employment status | Unemployed | 16 (52) |
| | Student | 7 (22) |
| | Part time paid employment | 4 (13) |
| | Full time paid employment | 3 (10) |
| | Part time unpaid employment | 1 (3) |
| Residential status | Lives with family | 24 (77) |
| | Lives alone | 3 (10) |
| | Lives with partner | 1 (3) |
| | Lives with friends | 1 (3) |
| | Other | 2 (7) |
| Diagnosis | Schizophrenia F20 | 4 (13) |
| | Brief psychotic disorder F23 | 15 (48) |
| | Psychotic Disorder NOS F29 | 12 (39) |
| Psychological | None | 15 (48) |
| therapy | On waitlist | 5 (16) |
| | Past | 2 (7) |
| | Ongoing | 9 (29) |
| | | **Mean (SD), range** |
| Years of Education | | 13.8 (1.5), 11-16 |
| Age | | 25.2 (5.0), 18-37 |
| Duration of contact | with EIP services in months | 13.0 (7.8), 4-36 |

As outlined in Table 3 below, around a quarter of participants reported significant levels of social anxiety and depression. Paranoia scores were lower than in previous research with individuals with persecutory delusions (C. Green et al., 2008). Just under 20% of participants were currently hearing voices. Correlations between symptom measures and functioning were examined. Positive symptoms, as assessed by the PANSS, were negatively associated with social and occupational functioning, $r_s(16) = -.60$, $p = .014$ and depression was positively associated with social anxiety, $r_s(29) = .54$, $p = .002$. No other correlations were significant (see Appendix P).

Table 3: *Social and occupational functioning and symptom measures*

| **Measure (n completed)** | **Mean (SD), range** |
|---|---|
| SOFAS (n=28) | 64.9 (14.5), 35-95 |
| SIAS (n=31) | 25.4 (16.1), 0-59 |
| CDSS (n=31) | 4.6 (3.9), 0-15 |
| GPTS (n=31) | 24.5 (13.5), 16-64 |
| | **n (%)** |
| SIAS Score ≥ 36 | 9 (29) |
| CDSS Score ≥ 7 | 8 (26) |
| Currently hearing voices | 6 (19) |
| | **Mean (SD), range** |
| PSYRATS (n=4) | 21.0 (10.0), 6-26 |
| PANSS Positive (n=18) | 10.3 (4.6), 7-17 |

SOFAS= Social and Occupational Functioning Scale, SIAS=Social Interaction Anxiety Scale
CDSS=Calgary Depression Scale for Schizophrenia, GPTS=Green Paranoid Thoughts Scale
PSYRATS=Psychotic Symptoms Rating Scale, PANSS=Positive and Negative Syndrome Scale

As previously noted, there was insufficient time for 6 participants to complete the Trauma History Questionnaire. From the 25 participants who completed this interview, 24 (96%) reported a traumatic experience (outlined in Appendix Q), eight of whom endorsed a trauma which did not fulfil PTSD criteria A1 or A2. These related to a range of negative experiences, including serious injury, sudden illness or death of close family or friends, crime related incidents, being attacked by a family member or friend and bullying at secondary school. Sixteen participants (52% of the whole sample) reported traumatic experiences which fulfilled PTSD diagnostic criteria A1 and A2 and therefore completed the PSS-SR, 10 of whom (32% of the whole sample) endorsed the necessary ratings on each subscale and scored above the clinical cut-off of 14 on the PSS-SR, see Table 4 below (% of total sample). On average, these participants scored 7 on the re-experiencing subscale (*SD* = 2.9, range 3-12), 10.8 on the avoidance subscale (*SD* = 5.3, range 5-20) and 7.3 on the arousal subscale (*SD* = 5.5, range 1-17). For completeness, phenomenological characteristics of negative imagery stratified by probable PTSD status are reported in Appendix R.

Table 4: *Rates of primary traumatic event type*

| Primary event type | N | % of sample | PSS-SR ≥ 14 (n) |
|---|---|---|---|
| Unexpected death of a family member | 7 | 23 | 6 |
| Psychosis: symptoms or acute admission | 5 | 16 | 3 |
| Car accident | 2 | 6 | - |
| Childhood sexual abuse | 1 | 3 | - |
| Physical health problem | 1 | 3 | 1 |

PSS-SR = PTSD Symptom Scale-Self Report

**Filler task and counterbalancing of imagery interview**

On average, participants rated the classical music excerpts as pleasant (*M* = 5.6, *SD* = 1.6, range 2.5-8.1). An order effect was not observed in the frequency of images reported for negative followed by positive image interview questions (*p* = .433, two-tailed Fisher's exact test) or positive followed by negative image interview questions (*p* = .654, two-tailed Fisher's exact test).

## Phenomenology of negative imagery

Approximately three quarters of participants (N=23) experienced a vivid and distressing negative image in the last month, which the majority linked to a previous autobiographical event, see Table 5 below. Three of these participants described the content of their image in more limited detail because of their discomfort discussing it. Participants indicated that the identified image caused some interference in their day to day lives but that they had some degree of control over the image. The likelihood of an event similar to the image happening in the future was rated as somewhat likely to occur. Participants described the image as quite threatening with a 'here and now' quality. On average, feelings of sadness, helplessness and powerlessness were the highest rated emotions associated with the image. There is incomplete data for some of the interview questions as some participants did not answer every item which is reflected in the n values below.

Table 5: *Phenomenological characteristics of negative images*

| | **n (%)** |
|---|---|
| ***Image frequency*** | |
| At least in the last week | 13 (54) |
| At least in the last month | 23 (74) |
| Over one month ago | 6 (19) |
| Never experienced images | 2 (7) |
| ***Linked to a memory*** | 22 (96) |
| ***Images temporal orientation*** | |
| Past | 12 (52) |
| Present | 4 (17) |
| Future | 5 (22) |
| None | 2 (9) |
| ***Perspective*** | |
| Field | 15 (65) |
| Observer | 6 (26) |
| Alternating | 2 (9) |
| | **Mean (SD), range** |
| Distress (n=22) | 79.0 (18.2), 20-100 |
| Threat (n=21) | 43.3 (32.5), 0-100 |
| Perceived likelihood (n=23) | 46.7 (39.0), 0-100 |
| Interference (n=20) | 38.5 (35.0), 0-100 |
| Controllability (n=22) | 48.9 (38.0), 0-100 |
| Vividness (n=21) | 74.0 (20.3), 40-100 |
| Here & now (n=20) | 49.5 (39.5), 0-100 |
| ***Associated emotions*** | |
| Sadness | 65.0 (29.4), 0-100 |
| Helplessness | 64.6 (35.2), 0-100 |
| Powerlessness | 59.8 (41.5), 0-100 |
| Fear | 55.7 (41.1), 0-100 |
| Anxiety | 53.7 (34.0), 0-100 |
| Anger | 45.9 (38.0), 0-100 |
| Humiliation | 43.7 (41.5), 0-100 |

## Negative imagery themes

Descriptions of the 23 negative, intrusive images and associated encapsulated beliefs were examined using Content Analysis. Four themes were derived and interview extracts illustrating each theme are provided below. Please see Appendix S for the coding framework and Appendix T for further examples from interview transcripts. Using the description within the coding framework, the researcher and a second rater assigned each image description to the most relevant thematic category. Inter-rater reliability was calculated using Cohen's

Kappa (Cohen, 1960) as 0.77, indicating a good level of agreement. Images for which the two raters differed were discussed and a final category allocation was jointly made. Table 6 below summarises the image descriptions and frequency of themes.

**Theme 1:** Experiences of loss, bereavement and concerns about being abandoned or left alone without help from others emerged as the most frequent theme (30%) in imagery content.

*"I see a bed, my mums on the bed…She's not alive, she's dead. She's got her arm covering her eyes. The room is silent, it's all quiet. I touch her and she doesn't move…I get goose bumps… It looked like she was asleep and she didn't wake up, there's something wrong with mum. Worst moment: I move her arm and I see her eyes sunken. I've got to do something but I don't know what, I don't know what to do".* Participant 11

**Theme 2:** Feelings of inadequacy including images of failure, a changed, fragile self and fear of negative evaluation by others were also depicted in a large proportion of images (26%).

"*Me and my other friends come back 20 minutes late (from lunch). The tutor calls me in his office, and said "I'm tired of you always coming back late, I'm trying to help you and your not helping yourself…I'm going to have to let you go. You can come back next year if you want to when you get everything sorted out". And I'm trying to reason with him, and he's not reasoning. He's not having any of it. In the image, I see the part in the office when he's talking to me and I'm talking to him. I can see myself sat in the office. I can hear what he's saying. My belly started turning. Worst moment: that it could happen. If I get kicked out of college, I'd have nothing to do; I'd be back at square one*". Participant 20

**Theme 3:** Another theme related to a 'dangerous self' in which images depicted self-harm or a loss of control during the emergence of psychosis. Images content described by 4 participants (17%) was categorized in this theme.

*"I can see my hands, one hand holding a sharp object, a scalpel and it's cutting my wrist and I can see blood flowing out of the cut… I can see my hand moving and the blood flowing. I can feel a little bit of the cut, of the pain. Worst moment: the image has influenced me to self-harm. In the image, there's a lot of blood coming out so I'd say it's deep".* Participant 9

**Theme 4:** Images of external threat including scenes of violence, physical threat and intrusive recollections of traumatic sexual experiences were also described by several participants (26%). Some images in this theme contained elements of delusional beliefs such as persecutory ideation and self-referential ideas.

*"… a war, I remember uniforms, gunshots…Someone's head cut off. Rape…It happened to someone that has a connection to me…I recognise a man in the image, I can picture his face, how he looks like, laying on the street. I feel like I have a connection to him. I don't know him…They didn't believe the story he was telling so they killed him. Worst moment: me not being there".* Participant 31

Table 6: *Distressing imagery: themes, content, related memory and encapsulated beliefs*

| Theme and image content, n (%) | Content of related memory | Encapsulated belief |
|---|---|---|
| ***Loss & feeling alone, 7 (30%)*** | | |
| Girl from school who died | Age 6: last time I saw her | *Horrible things happen, people get hurt, world is unpredictable* |
| Finding mother dead | Finding my mother after she passed away | *I was alone with this loss, the world is an unpredictable place* |
| Father's funeral | Death of father | *He died before I made something of myself* |
| Falling down staircase | Losing family member as a teenager | *I'm responsible for Mum, there's no-one to help* |
| Argument & screams | Conflict 4 years ago | *It didn't work out, I'm alone, people didn't help me* |
| Mother running away | Age 15: similar situation at home | *I'm responsible, I should be doing more to help her, world is hard* |
| Loved one leaving | Age 7: losing a loved one | *I feel abandoned, people can just leave, the world is unpredictable* |
| ***Inadequate self, 6 (26%)*** | | |
| Being arrested & injected | First contact with mental health services | *I'm vulnerable, people misuse their power, the world is unfair* |
| Loveheart sweet: breakup with boyfriend | Being alone after a serious accident | *I wanted love, I was gullible, the world is a cruel place* |
| Vomit, feeling uptight, tense | Being out with friends & feeling unwanted | *I've changed, people will notice and treat me differently* |
| Going into the job centre | 2 years ago: going to the job centre | *I've got doubts about my ability, the world is an unforgiving place* |
| Asked to leave college | N/A | *I might not be responsible enough, I have to work at it* |
| Body part | Becoming fixated on body part in the past | *I'm abnormal, beastly, inadequate. People may judge me* |
| ***Dangerous self, 4 (17%)*** | | |
| Cutting wrist with a scalpel | Previous thoughts of self-harm | *I'm alone and struggling, the world is a hard, cruel place* |
| Kicking oneself in the face | Verbal abuse as a child | *I'm in a whole new dimension which I don't like* |
| Drunk, accidental injury | Previous accident | *I lost control, I went through terrifying experiences after that* |
| Throwing food at father | Being aggressive when unwell | *I was aggressive when I was unwell* |
| ***External threat, 6 (26%)*** | | |
| Physical reliving of trauma | Age 6: memories of childhood sexual abuse | *I'm vulnerable, I need to protect myself* |
| Sexual: naked & exposed | 4 years ago: memory of incident | *I feel guilty, I couldn't defend myself, he tried to deceive me, unfair* |
| Gargoyle in bedroom | Domestic violence towards mother | *I'm vulnerable, I have doubts about my mental health* |
| TV reports of Nairobi attack | Watching TV reports about terrorist attacks | *I need to be alert & observant, world can be a threatening place* |
| Warzone: violence & death | Choosing between saving people | *I'm connected to them, they took the experience for me* |
| Violently attacking police | 4/5 years ago: first contact with police | *I'm helpless, people in authority abuse power for their own gain* |

## Phenomenology of positive imagery

Twenty six participants reported experiencing a positive image in the previous month. One participant was unable to describe the content of her positive image experiences and therefore limited data was available from their interview, see Table 7 below. On average, participants rated the positive image as very vivid, in the 'here and now' and likely to occur in the future. Some participants described positive images which spontaneously came to mind whereas others reported images which were intentionally generated. In response to the open ended question regarding emotions associated with the image, the most frequent emotion was happiness, followed by excitement and optimism. A small number of participants reported some negative emotions including anxiety, frustration, guilt, impatience and sadness. Similar to the negative imagery interview, some participants did not answer all interview items which are detailed in the n values below.

Table 7: *Phenomenological characteristics of positive images*

| | **N=26 (%)** |
|---|---|
| ***Image frequency*** | |
| At least in the last week | 17 (55) |
| At least in the last month | 26 (84) |
| Over one month ago | 2 (6) |
| Never experienced images | 3 (10) |
| ***Linked to memory (n=24)*** | 22 (92) |
| ***Images' temporal orientation*** | |
| Past | 6 (23) |
| Future | 19 (73) |
| Present | 1 (4) |
| ***Involuntary-intentionally generated*** | |
| Involuntary | 8 (32) |
| Intentional | 9 (36) |
| Both | 8 (32) |
| | **Mean (SD), range** |
| Perceived likelihood (n=22) | 72.3 (22.7), 10-100 |
| Vividness (n=25) | 87.4 (14.4), 40-100 |
| Here & now (n=25) | 54.6 (32.2), 0-100 |
| Involuntary or intentional (n=25) | 47.4 (34.6), 0-100 |
| ***Associated emotions*** | |
| Happiness (n=18) | 88.3 (13.5), 60-100 |
| Excitement (n=12) | 81.3 (16.8), 50-100 |
| Optimism (n=5) | 74.0 (15.2), 50-90 |
| Anxiety (n=4) | 75.0 (5.8), 70-80 |
| Relaxation (n=2) | 80.0 (0) |

## Positive imagery themes

The themes of positive images and associated encapsulated beliefs were explored using Content Analysis. As previously noted, one participant was unable to provide a detailed description of a positive image and was therefore excluded from further analysis, leaving 25 descriptions. Four themes were derived, examples of image content related to each theme are provided below. Please see Appendix U for the coding framework and Appendix V for further examples from the interview transcripts. The researcher and a second rater independently assigned each image to the most relevant theme. Inter-rater reliability was calculated using Cohen's Kappa (1960) as 0.84, indicating a very good level of agreement. Images for which the two raters differed were agreed through discussion and a final category allocation was jointly made.

Table 8 below summarises the image descriptions and frequency of themes. In three cases, image content contained elements which related to delusional ideas or beliefs which are highlighted (*) in Table 8.

**Theme 1:** Content analysis indicated that 20% of positive images related to loving, intimate relationships and attractiveness to potential romantic partners. These images depicted spending time with a romantic partner, feeling desirable or meeting a partner and falling in love.

*"I could see the guy chatting me up in the club, the picture was of the guy's face. I just see him; it feels like it's just me and him. I was just happy that he was chatting me up…I felt good when he started chatting to me...I feel free, relaxed. I'm just leaning at the bar and I can see the bartenders behind me. I can recognise the club".* Participant 14

**Theme 2:** A similar proportion (24%) of images portrayed enjoyable, pleasurable times with peers or family members. These images depicted connection with others during enjoyable activities, for example, birthday parties, watching a movie or spending time together.

*“An image of me and my mum having a good time. We are in our garden, it’s full of butterflies. It was a beautiful garden and my mum was swinging me around. It’s an image of the future. It’s going to happen. It’s like a movie, I can’t hear anything”.* Participant 25

**Theme 3:** The majority of images (36%) related to participants aspirations for success and achievement of personal goals. These images frequently depicted achievement in vocational domains, for example, being called for a job interview or returning to university, and proficiency in a hobby or interest, such as dancing or rapping.

*“I’ve got a rucksack, and I’m collecting books and stationary. I then arrive at uni and I’m meeting people. It was the uni I was at before. It’s busy, like Freshers’ Week. I can hear other people chatting. I get excited. It’s something I would like to happen in the future.”* Participant 11

**Theme 4:** A subset of images (20%) portrayed escape from the participants’ current environment into different circumstances or immersion in solitary activities. Some of these images depicted quick solutions, active efforts to escape or engagement in distracting, pleasurable activities such as playing computer games or food.

*“Winning the lottery, going to the cash machine and putting in my card and seeing all the numbers roll up on the screen, not having to worry about whether I’m going to make the rent this week, bills. Walking away from the cash machine, feeling fulfilled, without no pressures, no worries. Basically, being able to do what you want, when you want, without no worries.”* Participant 1

Table 8: *Positive imagery: themes, content, related memory and encapsulated beliefs*

| Theme & image content, n (%) | Content of related memory | Encapsulated belief |
|---|---|---|
| ***Love, intimacy & attractiveness, n=5 (20%)*** | | |
| Having a picnic with boyfriend | Spending time with boyfriend in the past | *I can have love, people can have a nice time sometimes* |
| On holidays with girlfriend | N/A | *We have a special relationship, we are building a life together* |
| Getting chatted up in a club | Meeting a man in a club a few weeks ago | *I'm an attractive person, men would be interested in me* |
| Spending time with the man I'm attracted to | The first time we met | *I feel good, there are some really lovely people in the world* |
| Meeting someone and falling in love | 5 years ago: being asked out | *I'm unhappy with how everything is going at the moment* |
| ***Pleasurable times with peers/family, n=6 (24%)*** | | |
| My birthday party: family and presents | Previous birthday celebrations | *My family really care about me as I do them* |
| Music festival, sunshine and flags flying | Being at music festivals in the past | *I am people's sunshine, I can give positive energy to others* |
| Watching a movie with university friends | Spending time with friends in university | *I'm not alone, I've got friends, they care about me* |
| Birthday celebrations with friends & family | Previous birthday celebrations | *I'm very lucky to have good people around me* |
| Mum and I in a beautiful garden* | 7 months old: being given away by mum | *I'd be way happier with my real mum* |
| Hanging out & having a good time with a friend | Going out with friends in the past | *Friendship is very important to me* |
| ***Success & achievement of goals, n=9 (36%)*** | | |
| Having my own flat with my possessions | Seeing other people get their own places | *I want to have my own space and move out of home* |
| Being able to do a lot of dance moves | Not feeling confident enough to dance | *People would accept me more, appreciate me. I'd feel important* |
| Doing a good job and being praised | Getting GCSE results: relief, happiness | *I really want to be successful and happy in my job* |
| Teaching Art to a classroom of students | Working as a personal tutor | *I'm passionate about wanting to be a teacher, inspiring students* |
| Returning to uni, walking in on first day | N/A | *I know where I want to go and where I want to be* |
| Being interviewed for a job | Being enthusiastic/motivated in the past | *It's just a vision* |
| Rapping into a mic in a recording studio | My older brother and his friends rapping | *I can chase my dreams, people can encourage and help me* |
| Having an office job, sitting at a desk | Being good at accounting in college | *I've got goals, there are things I want to achieve, it's been tough* |
| Giving an abandoned baby to a couple* | N/A | *It's a sign of the things I need to do to help people* |
| ***Escaping everyday life, n=5 (20%)*** | | |
| Winning the lottery, seeing bank balance | My gran and I winning money | *I doubt I'm able to provide for myself or take care of a family* |
| The front cover of a role playing game | When I bought the game for the first time | *It's something to do, it's fun, something I'm looking forward to* |
| Rowing a boat to a tropical island* | Bad trip: fearing the world was dying | *Other people who are detached from reality will find this place* |
| Being away from my life here during a trip away | Trip to visit a lady | *I can be free, I'm not a slave or in prison, I can have control* |
| Having good food from home country | N/A | *There are certain things I really enjoy* |

## Appraisals of imagery experiences

In response to the AANEX appraisals questions, the majority of participants endorsed their images as internally generated cognitive phenomena, see Table 9 below. Two participants attributed their negative image to an external source reporting that the image was put in their mind by somebody or something else. In terms of positive imagery, two participants suggested there may be a spiritual component to this experience; another reported that something other than her own mind created the image. As one participant did not answer appraisal questions regarding their negative image, 22 participant responses are outlined below.

Table 9: *Appraisals of negative and positive imagery experiences*

| | **Negative N=22 (%)** | **Positive N=26 (%)** |
|---|---|---|
| Beneficial | 7 (32) | 20 (77) |
| Bad sign | 9 (41) | 1 (4) |
| Both | 3 (14) | 0 (0) |
| Neither | 3 (14) | 3 (13) |
| Unsure | 0 (0) | 2 (8) |
| | | |
| Harmless | 12 (54) | 25 (96) |
| Dangerous | 6 (27) | 1 (4) |
| Both | 1 (5) | 0 (0) |
| Unsure | 3 (14) | 0 (0) |
| | | |
| Internally generated | 20 (91) | 23 (88) |
| External source | 2 (9) | 3 (12) |

The majority of participants described their negative image as harmless. It was appraised by some as dangerous because of its emotional impact, concern it may encourage unwanted behaviours, or that it may contribute to the re-emergence of psychotic symptoms.

Seven participants described their negative image as beneficial. Reasons included providing a reminder to curtail behaviours such as drug use, a warning that

they had not completely recovered from their psychotic episode, that bad things could happen, or a reminder that they were connected to God. Nine participants appraised the image as a bad sign: because of its emotional impact, that they may act upon its contents, alter their behaviour, or become increasingly unwell. Finally, three participants viewed the image as both beneficial and a bad sign; beneficial because it acted as a warning or something the person could "fight" and a bad sign because of its emotional impact.

The majority of participants described their positive images as beneficial and harmless. A participant who viewed their positive image as a bad sign also described it as dangerous reporting "*If I keep continuing having these images, I'm not going to feel happy with reality*".

## Emotional impact of imagery in relation to symptoms and functioning

Mann-Whitney U tests were performed to examine whether symptom severity differed between participants who experienced a distressing, intrusive image in the previous month and those who had not. The groups only differed on two scales (see Appendix W). In terms of persecutory ideation, participants who experienced a negative image endorsed higher scores (*Mdn*=20) than those who had not (*Mdn*=16.5), $U = 46.5$, $p = .037$. Similarly, participants who reported a negative image were rated higher on the PANSS positive symptom subscale (*Mdn*=10) relative to those who had not experienced a negative image (*Mdn*=8), $U = 11$, $p = .031$.

The emotional intensity of negative and positive images was calculated as the mean rating endorsed across all emotional responses. As a minority of participants reported some negative emotions associated with positive images, these negative emotion ratings were excluded from the positive imagery calculation. As outlined in Table 10 below, for negative images more pronounced negative

emotions were positively associated with increasing PTSD symptomatology and depression levels. For positive imagery, as depression levels increased, positive emotional intensity decreased. However, when alpha was adjusted for multiple comparisons using Holm's Sequential Bonferroni procedure (Holm, 1979) none of these correlations remained significant.

Table 10: *Correlations between symptom severity and emotional intensity of imagery*

| | Mean emotional rating | |
|---|---|---|
| Measure | Negative image (n=23) | Positive image (n=25) |
| SIAS | 0.19 | -0.28 |
| PSS-SR | 0.63*# | 0.05 |
| CDSS | 0.46*# | -0.45*# |
| PANSS | -0.27 | 0.34 |
| PSYRATS | -0.24 | 0.40 |
| GPTS | -0.05 | 0.06 |
| SOFAS | 0.24 | -0.17 |

Note. *p<.05, **p<.01, ***p<.001, # no longer significant after corrections

## Prospective positive image generation and symptom severity

Spearman's rank-order correlations were conducted to examine the relationship between symptom severity and the vividness and perceived likelihood of intentionally generated positive future-oriented images during the positive imagery task. A two-tailed test of significance indicated there was a significant negative correlation between depression and the vividness of prospective positive imagery $r_s(29) = -.468$, $p = .008$ and subjective probability, $r_s(29) = -.612$, $p < .001$, see Table 11 below. Similarly, there was a significant negative correlation between social anxiety and the vividness of prospective positive imagery $r_s(29) = -.555$, $p = .001$ and subjective probability, $r_s(29) = -.622$, $p < .001$. Following adjustment for multiple comparisons using Holm's Sequential Bonferroni procedure, the correlation between persecutory ideation and prospective imagery vividness and subjective probability was no longer significant.

Table 11: *Correlations between symptom measures, image vividness and likelihood*

| | Prospective positive imagery | |
|---|---|---|
| Measure | Vividness | Likelihood |
| CDSS | -0.47** | -0.61*** |
| SIAS | -0.56*** | -0.62*** |
| GPTS | 0.42*[#] | 0.36*[#] |
| PSS-SR | -0.01 | -0.04 |
| PANSS | 0.15 | 0.28 |
| PSYRATS | -0.12 | -0.22 |
| SOFAS | 0.24 | 0.36 |

Note. *p<.05, **p<.01, ***p<.001, [#] no longer significant after corrections

# Discussion

This study sought to investigate the phenomenological characteristics, thematic content and appraisals of distressing, intrusive imagery and positive imagery in early psychosis. The relationship between symptom severity and characteristics of intentionally generated future-oriented images was also explored. The qualitative analysis of imagery content, the investigation of imagery appraisals and examination of positive prospective imagery generation in an early psychosis sample were novel aspects of this study and will be considered in light of existing research findings and theoretical models of psychosis.

## Distressing, intrusive imagery

Replicating previous findings (Ison, 2011; Morrison et al., 2002; Schulze et al., 2013), the majority of participants reported experiencing a recent distressing and vivid intrusive image. For some participants, these images were threatening, uncontrollable, interfered with their daily lives, seemed likely to occur and were associated with intense emotional arousal which underlines the importance of intrusive imagery experiences in psychosis. The present study may have been underpowered to detect possible associations between symptom severity and subjective negative imagery experiences. However, an association between

depression, PTSD symptomatology and the emotional intensity of intrusive imagery was observed at a trend level. Furthermore, there were indications of more pronounced persecutory ideation and positive symptoms in those who experienced a negative image relative to those who had not. These preliminary findings warrant further research in larger samples.

The thematic content of intrusive imagery and associated beliefs revealed striking similarities to imagery research in depression and anxiety disorders. Image content related to loss and bereavement has been reported in depression research (Birrer et al., 2007; Patel et al., 2007) and experiences of loss have been conceptualised as a key variable in post-psychotic depression (Iqbal, Birchwood, Chadwick, & Trower, 2000). Fears of abandonment and being left alone without help from others was reminiscent of imagery research in agoraphobia (Day et al., 2004) in which lack of protection by others emerged as a theme. The depiction of responsibility for others was analogous to imagery research in OCD in which a failure to protect others from harm was reported (Lipton, Brewin, Linke, & Halperin, 2010). Similarly, the theme of 'a dangerous self' was evocative of imagery content in OCD in which 'a dangerous self' increased the possibility of harm coming to others or the experiencer being out of control (Lipton et al., 2010). This finding is also notable given the hypothesised role of appraisals of loss of control over illness and entrapment in post-psychotic depression (Michail & Birchwood, 2009).

Relating the current findings to previous imagery research in psychosis, a subset of images reflected the self as inadequate and mirrored previous imagery research of social anxiety in psychosis in which fear of negative evaluation by others and loss of social status were reported (Lockett et al., 2012). Imagery depicting external threat replicated findings from previous research of imagery associated with positive symptoms (Ison, 2011; Morrison et al., 2002; Schulze et al., 2013). The presence of intrusive imagery and its phenomenological characteristics did not differ between participants according to probable PTSD status. In this study, trauma-

based intrusive memories of sexual abuse and assault were coded in the external threat theme. However, some of the images categorized within the loss theme appeared to contain traumatic elements. Larger samples sizes in future research may enable more detailed examination of imagery associated with PTSD in the context of psychosis.

In sum, it appears that distressing, intrusive imagery in early psychosis relates to a range of themes, including positive symptoms, traumatic experiences and also depressive and anxious concerns. Attachment theory may provide an overarching framework from which to consider the commonality in findings between this study and imagery research in other emotional disorders. Insecure attachment is a non-specific risk factor for psychopathology, with increased rates in psychosis (Berry, Barrowclough, & Wearden, 2007; Dozier, 1990; Gumley, Taylor, Schwannauer, & MacBeth, 2014), depression (Muller, Lemieux, & Sicoli, 2001) and anxiety (Van Buren & Cooley, 2002). It could be hypothesised that parallels in thematic content across disorders, which often reflect interpersonal concerns, may relate to insecure attachment styles and associated schematic beliefs which manifest across disorders.

Cognitive models of psychosis emphasise the crucial importance of idiosyncratic appraisals of anomalous experiences (Garety et al., 2001) and intrusions (Morrison, 2001) in the onset and maintenance of distressing symptoms in psychosis. In the current study, about half of participants reported positive or conflicting (image seen as both beneficial and a 'bad sign') appraisals of negative imagery experiences, with only a third of participants considering negative imagery as potentially dangerous. The S-REF model argues that holding both negative and positive metacognitive beliefs exacerbates distress and prolongs psychological difficulties (Wells & Matthews, 1996) and may contribute to the development of distress in relation to psychotic symptoms (Morrison, French, & Wells, 2007). Appraisals were also related to encapsulated beliefs regarding the self, the world

and/or others (for example "*I'm helpless, people will abuse their power*") and need to be understood in the context of imagery believed to be predominantly internally generated. As has been suggested in other disorders, it could be hypothesised that appraisals contribute to the persistence of negative imagery experiences and associated distress through cognitive and behavioural responses to imagery which are discussed in further detail in the critical appraisal.

## Positive imagery

The majority of positive images experienced in everyday life were vivid, future-oriented, varied in the extent to which they were involuntary or intentionally generated, and were perceived as likely to occur. These images were predominantly associated with positive emotions such as happiness, excitement and optimism. The latter finding regarding optimism is noteworthy given its association with a range of positive psychological outcomes such as increased resilience (Nes, Segerstrom, & Sephton, 2005) and recovery from a range of illnesses, injuries and major life events (Meevissen, Peters, & Alberts, 2011). However, it is striking that positive imagery was also associated with negative emotions which may relate to perceived discrepancies between the actual self and ought or ideal self-representations depicted in the images (Bentall, Kinderman, & Kaney, 1994). As highlighted above in relation to negative imagery, indications of links between symptom severity, in this case depression and intensity of positive emotional arousal requires further research in larger samples.

Images depicting connection and closeness to others were frequently reported in this study. Feeling accepted and cared for, having a sense of belonging, affiliation and being valued by others have been linked to positive affect regulation and feelings of contentment and wellbeing (Baumeister & Leary, 1995; Gumley et al., 2010; Leary & Downs, 1995). Social support or social connectedness has been linked to recovery (Corrigan & Phelan, 2004; Lloyd, King, & Moore, 2010; Roe,

Mashiach-Eizenberg, & Lysaker, 2011) with reports that individuals with higher levels of psychosocial functioning during recovery from psychosis were more likely to have intimate connections to others (Lysaker, Buck, Hammoud, Taylor, & Roe, 2006). Indeed, interpersonal relatedness has been linked to a realistic and stable positive sense of self during recovery from psychosis (Shahar et al., 2004). This finding is also notable given that insecure attachment style has been highlighted as a potential risk factor for problematic recovery from psychosis (Gumley et al., 2014). From an attachment perspective, this may suggest that those with an insecure attachment style may be more likely to inhibit affiliative behaviours and thus experience fewer opportunities for the regulation of emotional distress through close affectional bonds with others (Bowlby, 1982).

The majority of positive images related to the achievement of personal goals in which aspirations, success and competence were described. This theme is similar to the positive imagery used in Competitive Memory Training (Korrelboom, Marissen, & van Assendelft, 2011) in which clients imagine themselves as a competent or successful person. It also resembles another imagery intervention in which individuals envision their future "best possible self" in personal, relational and professional domains which has been associated with increased optimism (Meevissen et al., 2011), mood and wellbeing (King, 2001; M. L. Peters, Flink, Boersma, & Linton, 2010). This theme is also notable given reports that the extent to which an individual perceives themselves as respected by others was the most important aspect of social support predicting recovery from psychosis (Norman, Windell, Lynch, & Manchanda, 2013). More broadly, recognition and respect received from others in one's social network are significant in determining a positive sense of self (Williams & Zadro, 2005), which may be particularly important for individuals with a stigmatised identity. Overall, the themes portraying affiliation and achievement appear to reflect individuals' primary needs for belonging, meaningful existence, agency and self-esteem (Williams & Zadro, 2005).

Images which depicted escape from the concerns of everyday life may be analogous to the spontaneous coping images reported in pain research (Berna et al., 2011). Alternatively, they may more closely align to fantasies, which have been defined as positive images of desirable future events without judgements of their probability (Oettingen & Mayer, 2002), which is discussed further in the critical appraisal.

## Positive prospective imagery generation

This study replicated findings from depression research (Holmes et al., 2008c; Morina et al., 2011; Stöber, 2000), suggesting an inverse relationship between depression levels and the vividness and perceived likelihood of imagined positive future events. In an attempt to examine the specificity of this relationship, we unexpectedly found that there was even a more pronounced relationship between social anxiety and prospective imagery characteristics. This may be related to the moderate correlation between depression and social anxiety in this study, but this novel finding may also be understood in relation to data suggesting diminished specificity and reduced levels of positive imagery in social anxiety (Moscovitch et al., 2011).

As previously noted, prospective imagery is important for initiative (D'Argembeau & Mathy, 2011), decision making (Bechara & Damasio, 2005), planning and goal-directed behaviour (Boyer, 2008). The current findings suggest that depression, social anxiety and self-reported characteristics of intentional future-oriented images are related which may influence the maintenance of low mood, motivation and goal-directed behaviour. It has been argued that depression's impact on everyday functioning in schizophrenia may be motivational in nature, through its influence on anticipatory pleasure (P.D. Harvey, 2011). This suggestion has parallels in the depression literature, where impairments in positive prospective imagery have been linked to reduced perceived likelihood, lower believability and

diminished action in response to positive images (Holmes et al., 2008c). The manner in which emotional problems and positive prospective imagery interact in psychosis requires further investigation and may be informed by ongoing mental imagery research in relation to depression and anxiety. The relationship between persecutory ideation and greater prospective imagery vividness and subjective probability (at a trend level) aligns with earlier reports of increased trait imagery vividness in schizophrenia (Oertel et al., 2009). Further research is required adopting a symptom-based approach given the current findings implicating both depression and persecutory ideation and previous reports linking negative symptoms with impaired mental simulation (Raffard et al., 2013).

## Theoretical implications

Similar to depression, impoverished positive prospective imagery may be an important clinical phenomenon in psychosis influencing mood and behaviour. The design of the present study did not permit examination of potentially differing relationships between depression, social anxiety and spontaneous as opposed to deliberately generated positive images experienced in everyday life.

The thematic content of positive imagery resembled the 'envisioning the future' phase of recovery in which individuals begin to consider their future whilst attempting to meet ongoing life challenges (Romano et al., 2010). These images appeared to reflect hope, self-esteem and social interaction which have been highlighted as important constructs in a model of illness identity and recovery from severe mental illness (Yanos, Roe, & Lysaker, 2010). Just as negative images related to idiosyncratic concerns or fears, positive images may reflect hopes, desires and values which are important considerations in recovery and person-centred care. The finding that a small proportion of positive images contained elements of delusional beliefs requires further investigation. It is conceivable that images of this kind which are associated with positive emotions may be more likely to be attended

to, engaged with or intentionally generated on subsequent occasions. It could be hypothesised that these positive images may reinforce the intensity or conviction of associated beliefs or their perceived likelihood. Similar to the theorised role of positive imagery in bipolar disorder (Holmes et al., 2008b), these images may encourage behaviours in line with strongly held beliefs.

It has been noted that appraisals change over time (Brett et al., 2007) and there were indications of such in this study. Some participants contrasted their previous appraisals of intrusive imagery as externally generated and dangerous with their current relatively benign interpretations. Changes in appraisals of mental imagery and its potential association with positive symptom severity may be a valuable area for future research.

## Limitations

A number of important limitations should be considered when evaluating the findings of this study. Characteristics of the sample may limit its generalisability. This study's convenience sampling approach may have introduced bias as service users with higher levels of distress may have been less likely to participate. Compared to previous research, the current sample endorsed similarly elevated levels of social anxiety and lower levels of paranoia and depression (Michail & Birchwood, 2009), therefore the representativeness of the current sample is uncertain. Due to the small sample size, it was not possible to examine subgroups of participants, for example, imagery associated with PTSD in the context of psychosis. This study may also have been underpowered to detect significant associations thereby increasing the risk of Type II errors. As there was no control group it is unclear whether the present findings relate specifically to experiences of mental imagery in psychosis.

Participation consisted of a single meeting lasting 1.5 to 2 hours in order to minimise the time burden placed on participants. In selecting measures, attention was given to reducing this time burden as much as possible. However, there was

insufficient time for some participants to complete all measures leading to incomplete data. In addition, the manner in which participants recalled and generated images was not examined or verified. Self-report descriptions of imagery may be subject to recall and memory biases, social desirability or demand effects. Furthermore, the validity and reliability of the imagery interviews used in this study (Hackmann et al., 2000; Patel et al., 2007) have not been examined comprehensively. Previous research (Gregory et al., 2010; Patel et al., 2007) has elicited separate descriptions of intrusive memories and images. As they were not differentiated in this study, the current findings represent a composite of intrusive memories and images.

The inclusion of an imagery training component (Morrison et al., 2002) and meeting with participants on more than one occasion may have facilitated the identification of images. In a previous research study, participants described imagery experiences to their therapist rather than a researcher (Morrison et al., 2002) which may have supported the disclosure of distressing or shame-based imagery. The current findings may thus underestimate the frequency of imagery, more detailed or different content may have been disclosed had they been reported to a therapist rather than a researcher.

## Future research

This study has highlighted a number of areas in which future research may be beneficial. The manner in which distressing, intrusive imagery contributes to or maintains low mood or anxiety in the context of psychosis would benefit from further integration in cognitive models and additional research. For example, research examining imagery associated with post-psychotic depression could investigate links to appraisals of illness, diagnosis and the impact of psychosis on social roles and status (Birchwood, Iqbal, Chadwick, & Trower, 2000). Diminished positive prospective imagery and its relationship to maintenance factors in anxiety and

depression such as avoidance and reduced activity levels would also be valuable. Negative symptoms, neuropsychological impairments and low self-efficacy expectations (Bentall et al., 2010; MacCarthy, Benson, & Brewin, 1986; Raffard et al., 2013) may have impacted prospective image generation and were not examined in this study. Challenging social environments such as limited social networks and reduced opportunities for vocational attainment may have also influenced the current findings and could be usefully integrated in future research.

The majority of routine experiences of positive imagery reported in this study were future-oriented. Comparison of the content and temporal orientation of these positive imagery experiences compared to a non-clinical control group would be helpful. Imagining positive scenarios from an observer perspective has been linked to lower mood with suggestions this may relate to unfavourable comparisons with the individual's perceived reality (Holmes et al., 2008a). The relationship between image perspective, associated emotions, including the negative emotions reported in this study, and appraisals may be a valuable area for future research. Positive and negative imagery content were analysed separately in this study which prevented the investigation of shared themes across imagery experiences. It could be hypothesised that shared themes of this kind may reflect schematic beliefs regarding self and others, for example, imagery reflecting the opposing ends of a schema regarding being loveable. The manner in which this relates to attachment styles, particularly in comparison to other disorders may be insightful. Finally, the inclusion of standardised measures of trait imagery such as the Spontaneous Use of Imagery Scale (Nelis, Holmes, Griffith, & Raes, 2014) or the Impact of Future Events scale (Deeprose & Holmes, 2010) which examines the impact of 'pre-experiencing' intrusive prospective imagery may be valuable additions in future research.

## Clinical implications

Clients may not spontaneously speak about their experiences of intrusive distressing images unless it is explicitly enquired about (Hirsch & Holmes, 2007). These findings emphasise the importance of assessing intrusive imagery and the benefit of enabling clients to self-identify their most distressing image rather than anchoring queries to specific symptoms or situations. Positive imagery experiences and the ability to generate positive images are not routinely assessed in clinical practice. Diminished ability to generate positive, prospective images may be an important consideration when discussing therapy goals or utilising imagery based techniques. For example, in compassion focused therapy, clients are guided to create a compassionate image to help combat the impact of derogatory voices (Mayhew & Gilbert, 2008). The current findings suggest that utilising deliberate positive imagery generation with individuals with elevated depression or anxiety may require careful consideration. However, the content of routine experiences of positive imagery may provide a valuable medium for exploring client's values and goals in therapy. For service users with early psychosis, these images may reflect hopes, ambitions for the future or an aspired identity or role (Birchwood et al., 2007) which links with values-based approaches such as acceptance and commitment therapy (Morris, Johns, & Oliver, 2013).

The majority of everyday positive images reported by participants were future-oriented rather than images of past events which may indicate retrieval difficulties or reduced levels of positive memories. Some participants with psychosis who disengaged from a Competitive Memory Training intervention reported that they were unable to imagine and re-live past positive experiences or had no positive experiences to recall (van der Gaag, van Oosterhout, Daalman, Sommer, & Korrelboom, 2012). This suggests that additional preparation may be required to support clients to use positive imagery or to form additional positive autobiographical

memory content (Steel et al., 2010). The tentative links between PTSD symptom severity, depression and intensity of emotional responses to imagery emphasise once more the importance of assessment and treatment of co-presenting difficulties in psychosis. In conclusion, this study indicates that both negative and positive imagery experiences are important processes in early psychosis which warrant consideration in clinical practice and further investigation.

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# Part Three: Critical Appraisal

This critical appraisal will reflect on the process of conducting the research study outlined in the empirical paper. It will discuss a dilemma encountered during this study in its attempt to examine cognitive and behavioural responses to intrusive imagery. It will also consider the incorporation of positive imagery techniques in therapeutic interventions for individuals with psychosis in further detail.

## Personal reflections

My interest in conducting research with individuals with early psychosis was grounded in my experiences pre-training undertaking research with young people with an At Risk Mental State for psychosis (Phillips, Yung, & McGorry, 2000) and as an assistant psychologist in inpatient rehabilitation wards in which service users had long histories of contact with mental health services. These experiences encouraged my interest in affective, social and interpersonal processes in psychosis particularly how emotional problems influence its course and impact on service users' quality of life. My first placement on the doctoral training course was in an acute inpatient psychology service. During this placement, I worked with a number of young service users presenting with a first episode of psychosis. At the time, I remember being quite struck by a client's description of visual images which seemed aligned with the voices he was hearing and some of the beliefs and ideas he expressed to me. Following which, I read a study examining imagery associated with social anxiety and psychosis which fostered my interest in this area further (Lockett et al., 2012).

Overall, I found this experience immensely rewarding and an invaluable learning opportunity. Although I had worked on a number of research projects before training, this was the first occasion I was part of the entire clinical research process from development and design through to analysis and write up. Naturally, there were some challenges, but throughout I felt very well supported by my supervisors and other members of the UCL academic team. There were anxiety provoking moments such as the NHS Research Ethics Committee review and my own anxiety about how

participants would engage with the research interview and experience participation. It was encouraging that so many of the participants appeared interested in the study and requested a summary of its findings (29 from 31). Regarding recruitment, care co-ordinators from the Early Intervention in Psychosis (EIP) teams were helpful and actively facilitated this process although there had recently been significant changes in their team structure and they were under considerable time pressure.

One of the key considerations during this study related to participants' experience of describing imagery during the research meeting. As part of my previous research experience with young people with an At Risk Mental State for psychosis, I interviewed participants regarding their experiences of care and abuse (Bifulco, Brown, & Harris, 1994) and major life events which were often traumatic in nature (Brugha & Cragg, 1990). In planning the current study, containing and managing any emotional distress was of crucial importance. For example, we considered the possibility that participants may present with intrusive trauma memories such as flashbacks and planned for potential negative emotional reactions and dissociation should it arise. This did not emerge as an issue during the research interviews. However, inviting participants to describe a distressing, intrusive image in detail elicited uncomfortable emotions in the room for some participants, mainly anxiety but also embarrassment, shame, fear and some anger. Three participants found it too uncomfortable to describe their intrusive image in depth and elected to provide an overview of the image instead. There was a delicate balance to be struck between ensuring that the participant felt safe enough to discuss their image, respected and valued for sharing what they felt able to disclose, and also managing understandable avoidance of the image in a sensitive and appropriate manner.

This prompted me to consider the differences between working with intrusive imagery in therapy compared to a research context. Therapy affords the opportunity to build a working alliance over time and thoroughly discuss the rationale for

undertaking image-based interventions guided by the clients' formulation and goals. If clients express reluctance to discuss imagery, therapist and client can explore these fears, weigh up the pros and cons of tackling distressing imagery, evaluate associated metacognitive beliefs and devote time to psychoeducation (Hackmann, Bennett-Levy, & Holmes, 2011). As this would not be possible within a research context, the key aim was to ensure that participants felt empowered to disclose what they wished and supported in doing so. I was keenly aware of the potential danger of power imbalances in this context (Kelman, 1972) which was a significant ethical consideration throughout the research process. I actively sought to mitigate this by reminding participants that they could stop at any point, take a break and discuss only what they felt comfortable with. I was also mindful that this was the first occasion that the majority of service users had participated in research, which may have provoked some anxiety, and sought to ensure that participation was the most benign experience possible. It has been noted that inexperienced therapists may demonstrate a reluctance similar to clients in exploring intrusive imagery, (Hackmann et al., 2011) attempting to protect clients from aversive emotions. Avoidance of imagery by some participants during research participation is probably an inevitable part of mental imagery research. However, some of these considerations are equally applicable to positive imagery experiences. Some participants commented on feeling somewhat embarrassed describing the contents of positive imagery, for example romantic relationships, and others appeared to minimise its content such as finding a job or attaining other personal goals.

On the other hand, many participants expressed curiosity about mental imagery and mentioned that they had not been asked about it or spoken about its contents before. The script which introduced the imagery interview (Appendix L) seemed of interest and appeared to allay some participant's anxiety by normalizing imagery experiences. The feedback from participants at the end of the research meeting was largely positive with many participants commenting that they had a

better understanding of their imagery experiences as a result of taking part. This feedback made me consider Day and colleagues study of mental imagery in agoraphobia (Day, Holmes, & Hackmann, 2004) in which there was a significant decrease in agoraphobic avoidance one week after being interviewed about their negative imagery experiences. Although beyond the remit of the current study, it would be interesting to examine the effects of exposure to intrusive imagery during interviews of this kind in future mental imagery research.

## Responses to intrusive imagery

A dilemma encountered during this study concerned the measurement of responses to intrusive imagery. At the outset, it is important to note some varying terminology and definitions in this research field. Responses, thought control strategies and coping techniques are often used interchangeably or to refer to different constructs in research on intrusive phenomena (Marcks & Woods, 2007; Reynolds & Brewin, 1998). As cognitive and behavioural responses are often used in the psychosis literature (Morrison, 2001), this terminology was adopted throughout this thesis. In this manner, responses were conceptualised as discrete processes adopted to manage distressing internal experiences rather than broader ways of coping with stress, for example, disengagement and denial (Carver, Scheier, & Weintraub, 1989).

As outlined in the empirical paper, there has been previous research on the phenomenological characteristics of intrusive imagery in psychosis but not cognitive or behavioural responses to these images (Ison, 2011; Morrison et al., 2002; Schulze, Freeman, Green, & Kuipers, 2013). The literature review examined the proposed maladaptive impact of suppression, rumination and worry on trauma-related intrusive phenomena. More broadly, hypothesised maladaptive responses have been incorporated in theoretical models of OCD (Rachman, 2007), depression (Weßlau & Steil, 2014), health anxiety (Salkovskis & Warwick, 2001) and social

anxiety (Clark et al., 2006) amongst other disorders. Research examining responses to intrusive imagery in psychosis appears warranted given the prominent role assigned to responses to intrusive phenomena in the maintenance of positive symptoms (Morrison, 2001). Alongside mood and physiological factors, it has been suggested that thought control strategies and safety behaviours contribute to the appraisal and maintenance of intrusive experiences (Morrison, 2001). In mindfulness based approaches, experiential avoidance describes the process whereby individuals become lost in their reactions to unpleasant thoughts, images and voices (Chadwick, 2006). In this approach, individuals are supported to develop different relationships with experiences through non-judgemental acceptance and letting go of habitual responses, such as rumination and avoidance (Chadwick, 2006).

Single item ratings scales have been used to examine responses to intrusive imagery in phenomenological studies of health anxiety (Muse, McManus, Hackmann, Williams, & Williams, 2010), OCD (Speckens, Hackmann, Ehlers, & Cuthbert, 2007), depression and PTSD (Reynolds & Brewin, 1998), pain (Berna et al., 2011; Philips, 2011) and imagery experienced by individuals with high levels of body dysmorphic concern (Onden-Lim & Grisham, 2013). The frequency and in some cases, the perceived effectiveness of responses have been reported in these studies. However, the relationship between specific imagery characteristics, such as image frequency or distress or symptom severity more broadly have not been investigated in relation to these responses (except Onden-Lim & Grisham, 2013). At the outset of this study, one of its preliminary aims was to examine cognitive and behavioural responses to distressing imagery. However, whilst developing the research protocol, it became apparent that there are no published measures which specifically assess responses to intrusive imagery rather than responses to intrusions in general.

The thought control questionnaire (TCQ) (Wells & Davies, 1994) is a trait measure of strategies individuals generally employ to control unwanted thoughts and images comprising of 5 subscales; distraction, social control, worry, punishment and reappraisal. In its initial validation study in a student sample, acceptable internal consistency values were reported (distraction=0.72, social control=0.79, worry=0.71, punishment=0.64 and re-appraisal=0.67). There were significant inter-correlations between a number of the subscales, for example, punishment and distraction ($r=0.16$, $p<.05$) and punishment and worry ($r=0.27$, $p<.01$). As these correlation co-efficients were relatively low, the authors concluded that the subscales were measuring distinct constructs (Wells & Davies, 1994). In a further validation study with individuals with depression and/or PTSD, similar alpha co-efficient values were reported. However, higher inter-correlation coefficients and a greater number of significant correlations between subscales were observed in this clinical sample (Reynolds & Wells, 1999).

The TCQ has been used in previous research with individuals with psychosis (Morris, Garety, & Peters, 2014; Morrison & Wells, 2000) and persecutory beliefs (Freeman & Garety, 1999), although its psychometric properties in samples with psychosis has as yet to be formally established. For the purposes of the current study, the TCQ required adaptation so that it referred exclusively to intrusive imagery rather than both thoughts and images. There were indications from previous research that adaptation of the TCQ may be feasible. For example, Freeman & Garety (1999) invited participants to complete the TCQ solely in relation to persecutory beliefs. Furthermore, a scale which measures the impact of intrusive, prospective, personally-relevant imagery (Deeprose & Holmes, 2010) was developed by adapting the Impact of Events Scale-Revised (Horowitz, Wilner, & Alvarez, 1979), rewording its items and instructions to refer to prospective imagery. In the current study, TCQ items related to verbal thoughts were reworded to refer to images and the single item scales used in previous imagery research were also

included. Please see Appendix G for the adapted TCQ and additional items. Participants were requested to answer this questionnaire on the basis of their usual responses to the distressing, intrusive image identified earlier in the interview. Its completion therefore required participants to identify and describe a distressing, intrusive image and recall the strategies employed in response to it.

The 23 participants who experienced a distressing, intrusive image in the previous month completed this adapted questionnaire. Cronbach's alpha is the standard method of assessing the internal consistency of questionnaire subscales (Barker, Pistrang, & Elliott, 2003). There are numerous guidelines as to the minimum sample size required for its calculation, with recommended ratios of participants to items ranging from 3 to 10 participants (Rouquette & Falissard, 2011). Given there are only 6 items in each TCQ subscale and the small sample size in this study, alpha co-efficients were unlikely to be a robust measure of internal consistency. For completeness, they are detailed in Appendix H. An important consideration was the significant correlations between several of the subscales (see Appendix H) which were greater than those reported in the TCQ validation studies (Reynolds & Wells, 1999; Wells & Davies, 1994). There were also significant correlations between the single item ratings scales, including rumination, avoidance of places/situations and withdrawal from people. Due to these significant correlations, it was uncertain whether this adapted questionnaire measured distinct responses in this sample. It was therefore excluded from further analysis due to its questionable reliability and validity.

This dilemma underlined the challenges inherent in the investigation of responses to intrusive imagery. The development of a measure specifically examining responses to imagery may be timely given recent research interest in mental imagery in clinical disorders. Development of such a measure would require substantial research in terms of item generation and validation of its psychometric properties in non-clinical and clinical samples. It would also require careful

consideration in terms of its scope and format, for example, whether multiple strategies would be assessed concurrently, as discussed in the literature review, and whether both cognitive and behavioural responses would be examined. Regarding the former, a measure which assesses putatively maladaptive and adaptive responses simultaneously may provide valuable information and potentially could be employed transdiagnostically. In this manner, responses such as suppression or repetitive negative thinking could be contrasted with the use of mindfulness, re-appraisal and other proposed adaptive strategies. Such a measure would enable investigation of potentially differing responses to negative and positive imagery, or the examination of changes in responses over time, for example, as a function of symptom severity or during therapy. Furthermore, the inclusion of both cognitive and behavioural responses within a measure of this kind may highlight relationships between responses and imagery characteristics. Potential associations between specific cognitive responses such as rumination and behavioural avoidance could be explored. A semi-structured interview schedule which assesses the use of safety behaviours in relation to persecutory delusions (Freeman, Garety, & Kuipers, 2001) may provide a useful framework for the development of such a behavioural measure. The findings of the current study indicate the importance of appraisals of imagery experiences. Therefore, future research of responses to imagery would be usefully incorporated within more extensive imagery research investigating meta-cognitive beliefs, appraisals, associated emotions and links to symptom severity.

## Positive imagery in psychosis

The investigation of positive imagery in early psychosis was a novel aspect of this study and appeared to yield some clinically relevant findings. The relationship between positive imagery and fantasy, and the integration of positive imagery in

therapeutic interventions for individuals with psychosis will now be discussed in further detail.

## Fantasy

As early as the 1960's, Beck highlighted the potential utility of guided mental imagery and positive imagery in simulating new behaviours and reducing negative affect (Beck, 1970). As noted in the empirical paper, fantasy is a term used to describe positive images of desirable future events in the absence of estimates of likelihood or expectancies regarding their occurrence (Oettingen & Mayer, 2002). Frequent fantasizing has been related to psychopathology with suggestions that reliance on fantasy may make the use of alternative, more helpful coping strategies less likely during times of distress (Greenwald & Harder, 1994). Conversely, individuals with psychological difficulties may be more likely to fantasise because of a greater need to manage distress. From a developmental perspective, fantasizing and engagement in imaginative activity has been proposed as a means of coping with isolation, loneliness or a form of escape from early aversive environments (Hilgard, 1974; Wilson & Barber, 1983) and may serve an adaptive, defensive function for some children (Tower, 1983). Similarly, fantasizing has been linked to early experiences of abuse, abandonment and family stress which has encouraged suggestions that fantasy may serve as "an emotional haven" in harsh environments (Lynn & Rhue, 1988).

These findings are of relevance given the association between childhood trauma and psychosis (Read, van Os, Morrison, & Ross, 2005) and links between schizotypy, fantasy proneness and hallucinatory experiences (van de Ven & Merckelbach, 2003). This issue is pertinent for the current study as the propensity to fantasise or the duration of fantasizing was not assessed. Participants reported that when their positive image was in mind they believed its contents were highly likely to occur (mean=72.3 out of 100). However, this did not constitute a comprehensive

assessment of the objective likelihood of the occurrence of the image's content. Investigation of the function of positive imagery, its perceived benefits and its impact were beyond the scope of this study. Although the majority of participants endorsed feelings of happiness, excitement and optimism related to their positive image, it is unclear whether these positive emotional effects persisted. The influence, if any, of positive imagery on behavioural outcomes, self-efficacy beliefs or other related variables remains to be determined. In some circumstances, positive imagery may represent a means of simulating future, goal-directed behaviours, modulating distressing emotions or the avoidance of aversive external or internal experiences. As outlined in the empirical paper, some participants described images containing elements of delusional beliefs. The role and impact of these images is unclear but appears to align with the notion of fantasy and conceptualisations of psychosis as (partial) detachment from aspects of the external world with subsequent reduced opportunities for reality testing (Colombi & Atkinson, 2010). Further research is clearly required; however, at this point the possibility cannot be excluded that for some, positive imagery may represent a double edged sword.

## Therapeutic interventions

Although there is limited evidence as yet, positive imagery techniques have been proposed as a potentially beneficial element in therapeutic interventions (Hackmann et al., 2011). Informed by research on the use of mental simulation in sports psychology (Cumming & Ramsay, 2008), these interventions seek to harness mental imagery's influence on emotion, behaviour and self-efficacy. The use of positive imagery has been highlighted in goal-setting, skills-training and problem-solving (Hackmann et al., 2011). For example, clients may be invited to construct images of their preferred goals and simulate the steps necessary in achieving them. There are indications that imagery may be most useful in goal setting when it focuses on both outcomes and the strategies needed to realise them (Taylor, Pham,

Rivkin, & Armor, 1998). This is notable given the content of achievement-based imagery in this study which often portrayed the process of working towards goals, for example, being interviewed for a job. Structured mental simulation and imaginal practice of the successful application of skills has been suggested as an effective means of enhancing new skills (Korrelboom, van der Weele, Gjaltema, & Hoogstraten, 2009). In this manner, regular imaginal rehearsal of skills between therapy sessions is recommended in Competitive Memory Training (COMET; Korrelboom et al., 2009). In addition to COMET, positive imagery has been integrated into other therapeutic interventions for individuals with long standing difficulties including Compassionate Mind Training (CMT) (Gilbert, 2005) and the old system/new system approach (Mooney & Padesky, 2000).

As noted in the empirical paper, there have been initial studies regarding the use of COMET and CMT with individuals with psychosis (Laithwaite et al., 2009; Mayhew & Gilbert, 2008; van der Gaag, van Oosterhout, Daalman, Sommer, & Korrelboom, 2012). All three studies described difficulties generating or maintaining positive imagery and accessing positive memories. In a case series of CMT with clients who were hearing voices, the authors suggested that clients found it difficult to rely on compassionate feelings associated with the image without fearing judgement or threat of some kind (Mayhew & Gilbert, 2008). In a CMT group in a high security setting, it was reported that clients found it difficult to relate to personal experiences of compassion, with the authors suggesting that perhaps clients may not have had an internal working model for it (Laithwaite et al., 2009). In spite of these challenges, promising outcomes were reported and there has been further interest in developing positive imagery interventions for depression in individuals with schizophrenia (Steel, 2014). The factors which contributed to difficulties in positive memory recall, and the generation or maintenance of positive imagery are unclear at this point; however, as previously noted, depression, impairments in mental simulation and neuropsychological deficits are candidates for further

investigation (D'Argembeau, Raffard, & Van der Linden, 2008; Huddy, Brown, Boyd, & Wykes, 2014; Raffard, Esposito, Boulenger, & Van der Linden, 2013).

Attachment Theory and Social Mentality Theory which inform CMT may offer some potentially useful insights in this respect. Social Mentality Theory proposes that people develop the ability to be compassionate towards themselves and others through secure attachment relationships. In terms of psychosis, childhood trauma and early disrupted attachment relationships may impact upon the ability to reflect upon emotional states and memories (Mayhew & Gilbert, 2008). For individuals with early adverse experiences, attachment relationships may have become associated with fear, punishment and threat. If the person experiences kindness or care in the form of a compassionate image or otherwise, aversive attachment-based memories may be triggered leading to feelings of fear. This is an interesting suggestion given Brewin's competition retrieval hypothesis (Brewin, 2006), which could suggest that positive imagery may inadvertently invoke negative information in memory thus continuing the cycle of negative memories outweighing potentially more positive representations. Further investigations of possible links between memory, positive imagery and attachment styles may represent a valuable area of future research.

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# Appendices: Literature Review

**Appendix A: Definitions of bespoke quality appraisal items**

The quality of studies was rated according to the following variables:

**1. Screening for PTSD, depression and other anxiety disorders**

- Analogue: Screening measure for current mental health problems including PTSD (or current symptom levels satisfactory e.g. depression) Clinical: comprehensive screening of other anxiety disorders and depression = good
- Analogue: no self-reported current/history of MH problems or treatment reported (unclear whether a measure/checklist was used) Clinical: basic screen (e.g. BDI or BAI) used to detect/establish extent of other disorders=fair
- Analogue: no screening for MH problems or no description of diagnostic process. Clinical: no screening or measures for other MH problems=poor

**2. Trauma history and existing PTSD levels**

- Comprehensive assessment of trauma history and current PTSD levels if relevant=good
- Clinical: assessment of specific, index trauma (e.g. assault rather than entire trauma history) or PTSD diagnosis confirmed by self-report/case records and current PTSD levels. Analogue: isolated measurement of PTSD symptoms or trauma checklist or no personal experience of stressor depicted (e.g. never been in an RTA, worked in a medical environment etc.) or no self-reported trauma history=fair
- Sparse/inadequate description of trauma history assessment, diagnostic process or current symptom levels=poor

**3. Confounding mood variables:**

Depression or anxiety assessed, controlled for or groups evenly matched=yes
Depression or anxiety not assessed or controlled for inadequately = no

**4. Self-relevance of emotion inducing stimulus**

- High: Negative autobiographical life event or trauma = yes
- Moderate: viewing real life or fictional footage (movie) or narrative in which they are asked to immerse themselves = no

**5. Intrusion frequency measurement during experimental phases**

- Real time frequency recording in vivo: yes
- Retrospective assessment: no

**6. Overt/covert measurement of intrusions during experimental phases**

- Covert (button press, written thought listing/form, verbalising thoughts with experimenter outside the room) = yes
- Overt (listing thoughts aloud with experimenter in the room, ringing a buzzer, raising a finger etc.) = no

**7. Experimental manipulation and compliance checks**

a) State levels of suppression/rumination/worry includes effort or time spent worrying etc.: yes/no
b) Attention/concentration on the film/narrative (if relevant): yes/no
c) Extent of intrusion recording compliance (diary, thought listing etc.): yes/no
d) Trait measure of suppression/rumination/worry completed: yes/no
e) Pre-post manipulation increase in negative affect/anxiety/discomfort or task subjectively rated as unpleasant/distressing = yes/no

## Appendix B: Bespoke appraisal item ratings

Raw ratings data removed

## Appendix C: Appraisal quality ratings for suppression studies

Raw ratings data removed

## Appendix D: Appraisal quality ratings for RNT studies

Raw ratings data removed

# Appendices: Empirical Paper

## Appendix A: NHS ethical approval

Health Research Authority

**NRES Committee London - Camberwell St Giles**
Bristol Research Ethics Centre
Level 3, Block B
Whitefriars
Lewins Mead
Bristol
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19 July 2013

Dr Miriam Fornells-Ambrojo
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Dear Dr Fornells-Ambrojo

| | |
|---|---|
| **Study title:** | **Responses to negative intrusive imagery and positive image generation in early psychosis** |
| **REC reference:** | **13/LO/0877** |
| **Protocol number:** | **13/0048** |
| **IRAS project ID:** | **125119** |

Thank you for your letter of 12th July 2013. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 05 July 2013

**Documents received**

The documents received were as follows:

| *Document* | *Version* | *Date* |
|---|---|---|
| Covering Letter | | 12 July 2013 |
| Participant Consent Form | 3 | 12 July 2013 |
| Participant Information Sheet | 3 | 12 July 2013 |
| Protocol | 2 | 12 July 2013 |

**Approved documents**

The final list of approved documentation for the study is therefore as follows:

| *Document* | *Version* | *Date* |
|---|---|---|
| Covering Letter | | 20 May 2013 |

| | | |
|---|---|---|
| Covering Letter | | 12 July 2013 |
| Evidence of insurance or indemnity | | 20 May 2013 |
| Interview Schedules/Topic Guides | Semi-Structured Interview Schedule, v1 | 15 May 2013 |
| Investigator CV | Miriam Fornells-Ambrojo | 05 September 2012 |
| Investigator CV | Jennifer Laing | 15 May 2013 |
| Letter from Sponsor | UCL Insurance Confirmation | 20 May 2013 |
| Other: UCL Data Protection Registration | | 15 May 2013 |
| Participant Consent Form | 3 | 12 July 2013 |
| Participant Information Sheet | 3 | 12 July 2013 |
| Protocol | 2 | 12 July 2013 |
| Questionnaire: Self-Report Questionnaires - SIAS, GPTS, PSS, SR | 1 | 15 May 2013 |
| Questionnaire: Demographic Information Form | 1 | 15 May 2013 |
| Questionnaire: Trauma History Questionnaire (THQ) | | |
| Questionnaire: Calgary Depression Scale for Schizophrenia (CDSS) | | |
| Questionnaire: PANSS Positive Symptom Subscale | | |
| Questionnaire: PSYRATS Auditory Hallucinations Subscale | | |
| REC application | 125119 | 22 May 2013 |
| Referees or other scientific critique report | Peer Review | 17 October 2012 |

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor's responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

**13/LO/0877** **Please quote this number on all correspondence**

Yours sincerely

[redacted]

**Mr Thomas Fairman**
**Committee Co-ordinator**

E-mail: NRESCommittee.London-CamberwellStGiles@nhs.net

*Copy to:* *Dr Clara Kalu,*
*Ms Sandeep Toot, North East London NHS Foundation Trust*

## Appendix B: Trust Research & Development Department Approval

North East London NHS
NHS Foundation Trust

Research and Development Office
North East London NHS Foundation Trust,
1st Floor Maggie Lilley Suite,
Goodmayes Hospital,
Barley Lane,
Goodmayes,
Essex, IG3 8XJ

Date: 30th July 2013

Dear Dr Miriam Fornells-Ambrojo

**Re: R&D #2337 Responses to negative intrusive imagery and positive image generation in early psychosis**

I am pleased to inform you that the above named study has been granted approval and indemnity by Professor Martin Orrell, Director of Research and Development North East London NHS Foundation Trust. You must act in accordance with the North East London NHS Foundation Trust's policies and procedures, which are available to you upon request, and the Research Governance Framework. Should any untoward events occur, it is **essential** that you contact your Trust supervisor and the Research and Development Office immediately. If patients or staff are involved in an incident, you should also contact the Governance and Assurance department, in Goodmayes Hospital, and complete the Incident and Reporting Form, namely the IR1 form.

You must inform the Research and Development Office if your project is amended and you need to re-submit it to the ethics committee or if your project terminates. This is necessary to ensure that your indemnity cover is valid and also helps the office to maintain up to date records.

You are also required to inform the Research and Development Office of any changes to the research team membership, or any changes in the circumstances of investigators that may have an impact on their suitability to conduct research.

Yours sincerely,

Sandeep Toot

Research and Development Manager, North East London NHS Foundation Trust

## Appendix C: Participant Information Sheet

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### Participant Information Sheet

We would like you to take part in a research study. The reason you are being asked to take part is because you are in contact with an Early Intervention in Psychosis team and your care team thought that you might be interested in taking part. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

**Title of Project**

Responses to negative intrusive imagery and positive image generation in early psychosis.

**Why is this study being done?**

This study looks at imagery experiences among people in contact with Early Intervention in Psychosis services. Images are pictures (as if seeing a snapshot or watching a movie clip) or impressions that can either spring into our minds without the person wanting them to or they can be created intentionally. Images can be related to events that have happened to a person or to things they may be expecting or hoping to happen. We are interested in interviewing you to explore the kinds of images you may experience, and the beliefs, feelings and memories associated with these images.

**Do I have to take part?**

No, you do not have to take part in the study. If you decide to take part and then later change your mind, either before you start the study, during it or afterwards, you can withdraw without giving your reasons, and, if you wish, your data will be destroyed.

Taking part, or otherwise, in the study will not affect the treatment that you are currently receiving or likely to receive in the future.

**What will I be asked to do if I take part?**

Participants are only required to attend one session, which is expected to last between one and half and two hours. The session is in two parts:

**Part 1**

If you agree to take part in the study you will be asked to complete three questionnaires and the researcher will also ask you questions about some experiences you may have had. The questionnaires ask about how you see yourself and other people and the possible impact of stressful experiences. You will also be asked questions about your mood, if you have experienced traumatic events and anomalous or unusual experiences. This part of the study will take between 30 and 60 minutes.

**Part 2**

The researcher will also interview you about whether you experience negative distressing images and about your experiences of positive imagery. The researcher will ask you whether you have recently experienced a distressing image and how you respond when you experience this image. You will also be asked to try to create positive images of events that may happen in the future and finally whether you experience positive images in day to day life. This interview will take between 45 minutes and one hour.

An example of the sort of question that you will be asked is given below:

*Does this positive image pop into your mind without you meaning it to or do you find that you create it or try to call it to mind?*

At the end, there will be an opportunity to participate in a short guided visualisation relaxation exercise for 5 to 10 minutes as a pleasant way of ending the session. Hand outs describing relaxation techniques will be available to take with you. You will be asked what you thought of taking part in the study and whether you would like to receive a summary of the research findings when the study is completed. The researcher will confirm that you have the contact details of the Early Intervention team, your allocated case worker and will telephone you one week after taking part to follow up on any feedback you gave.

You will be paid £10 as a 'thank-you' for participating in the study.

**Where will this study take place?**

If you decide to participate in the study, then you can choose to meet with the researcher at the Early Intervention team's offices such as Thorpe Coombe Hospital or Goodmayes Hospital.

**Will my experiences and reports be kept confidential?**

Yes. All information which is collected about you during the course of the research will be kept confidential and will conform to the Data Protection Act of 1998 with respect to data collection, storage and destruction. This means that all paper-based and electronic information will be locked and password protected with access restricted to study personnel and any information about you will have your name and address removed so that you cannot be identified from it. The research governance sponsor of this study, University College London (UCL) may monitor or audit this study to ensure that it is being conducted appropriately but your identity will not be revealed.

To ensure that all the valuable information that you provide will be captured, the study will use a digital audio recorder. Participants will have the opportunity to opt-out of having their experiences audio recorded. The recordings will be destroyed on completion of the study.

We hope to report our findings in academic/health related journals and present them to relevant health professionals at meetings and conferences. This study is part of an educational project and its findings will contribute to Jennifer Laing's Doctorate in Clinical Psychology. You will not be identified in any reports or publications arising from the study. You will be asked if you would like to receive a summary of the findings after this research is complete. If concerns emerge while taking part regarding risk of harm to yourself or others, the researcher is obliged to disclose this information to your clinical team and will discuss this with you in advance.

**Are there any advantages/benefits from taking part?**

We cannot promise the study will help you directly but the information collected from you and other participants may help to improve our understanding of psychosis and specifically how people experience mental imagery. A further benefit of this type of research will be to inform the application and development of psychological therapies.

**Are there any disadvantages/risks from taking part?**

We consider there to be minimal disadvantages, e.g., the inconvenience of attending an interview session and completing the questionnaires. However, the sessions will be arranged so that they cause the least disruption and inconvenience to you.

If at any time you feel upset please raise it with the interviewer immediately. If you feel distressed, the researcher will use their clinical skills to help you feel calm and re-orient you to the present. You can ask the interviewer to move on to another subject or terminate the interview altogether. It is important for you to understand that you are not required to discuss anything that you do not want to and you should discuss only the things which you feel are relevant. In the event that any distress is experienced at the end of the interview, the researcher will remain with you until you feel better or ensure that you are not left alone and will ask whether they can highlight this to your allocated case worker. The researcher will call to check you are safe and well one week later.

**What if there is a problem?**

If you have any concerns or wish to complain about any aspect of the way you have been approached or treated as part of this study, you should initially contact the researchers, Jennifer Laing or Dr Tristan Morland, who will do their best to answer your questions. Their contact details are provided at the end of this information sheet. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure (Details can be obtained from your Primary Care/NHS Trust) or you can contact the Research Governance Sponsor of this study, UCL. Please write to UCLH/UCL/Royal Free Joint Research Office, UCL, Gower Street, London, WC1E 6BT quoting reference 13/0048.

Every care will be taken to ensure your safety during the course of the study. This study has been reviewed by Camberwell and St. Giles Research Ethics Committee. UCL the Research Governance Sponsor of the study has indemnity (insurance) arrangements in place for negligent harm, in the event that something does go wrong and you are harmed as a result of taking part in the research study. If you are harmed due to someone's negligence, then you may have grounds for legal action but you may have to pay for it.

**What do I do next if I'm interested?**

If you would like to participate or wish to discuss the study further you can contact:
Jennifer Laing, Trainee Clinical Psychologist, or Dr Tristan Morland, Clinical Psychologist, using the details below.

Jennifer Laing
Trainee Clinical Psychologist, Research Department of Clinical, Education and Health Psychology,
University College London, Gower Street, London, WC1E 6BT
Telephone: [redacted]
Email: [redacted]

Dr Tristan Morland,
Clinical Psychologist, [Trust contact details]

## Appendix D: Consent Form

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Site: Study Number: 13/0048 Participant Number:

**Participant consent form – Responses to negative intrusive imagery and positive image generation in early psychosis**

Jennifer Laing, the researcher is a trainee clinical psychologist. She is based in the NHS and also registered with University College London (UCL), undertaking a Doctorate in Clinical Psychology. Her work in this study is being conducted under the supervision of Dr Miriam Fornells-Ambrojo (UCL) and Dr Tristan Morland [Trust name]. These will be the people who will have access to the information produced by this study. Participants will not be able to be identified from this information. By completing and returning this form, you are giving us your consent that the personal information you provide will only be used for the purposes of this project and not transferred to an organisation outside of UCL. The information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.The researcher will have explained the following to you:

- The nature and purpose of the study;
- Why you have been asked to participate in this study;
- What will be required of you as part of the study;
- That the interview will be audio recorded and the reasons for this.
- That the information you provide will be made anonymous and kept confidential, except in circumstances where information is provided that may place you or others at risk. If this issue emerges, the researcher is obliged to inform your clinical team and will discuss this with you.
- That you have the right to withdraw from the study at any point you wish and that you may request for any information that you have provided to be withdrawn from the study and destroyed;
- Participation or not in the study will not affect your access to treatment
- That some information collected during the study *may* be looked at by responsible individuals from the sponsor (UCL) for the purpose of monitoring or auditing, to ensure that the study is being conducted appropriately.

Please initial all boxes

1. I confirm that I have read and understand the information sheet dated 12/7/2013(version 3) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐
3. I agree for Jennifer Laing and her supervisors to have access to the information produced from my responses for the purposes of this study. ☐
4. I understand that relevant sections of my medical notes may be looked at by Jennifer Laing or her supervisors where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records. ☐
5. I agree for the interview to be digitally audio recorded. ☐
6. I agree to take part in the above study. ☐

| Name of participant (Print) | Date | Signature |
|---|---|---|
| Name of researcher (Print) | Date | Signature |

## Appendix E: Service user feedback

Provided by FAST-R on 21/5/2013

**Positive Aspects of the Semi-Structured Interview Schedule, Participant Information Sheet and Participant Consent Form**

- Overall, we felt that all of the forms (Semi Structured Interview Schedule, Participant Information Sheet and Participant Consent Form) were very well written and carefully thought through for the ease and consideration of the service user.
- We felt that the language you used throughout all of the forms was clear and accessible.
- We also felt that your description of the concept of an image was extremely effective; as we understand the potential difficulty in explaining this abstract concept. In our opinion, it was particularly helpful that you ask participants to describe their images to you 'so that a film director might be able to recreate the scene'. We felt this helped the service user to understand more clearly what was being asked of them, and make the task accessible.
- We felt it was a particularly good strategy to show the participants photographs of both the 'Image perspective' and 'Observer perspective' types of images, as we were a little unsure as to what this meant until reading the image descriptions.
- The Semi-Structured Interview Schedule in particular is very clear, systematic and easy to follow.
- The debrief at the end of the interview schedule was very thorough, well thought out and substantial, which is necessary given the potentially upsetting nature of the tasks.
- On the Patient Information Sheet, we felt it was particularly good that you included an example of the type of question the participants would be asked; ensuring transparency and fully preparing the participant before they make their decision. On this sheet we also felt it was good that you have stated the option for participants to opt out of their interview being recorded.
- On a more general note, we all agreed that the study seems very interesting and worthwhile.

**Semi-Structured Interview Schedule**

***Questions & points for the research team to consider***

- We commend that you have clearly addressed the potential for the imagery exercises to cause emotional distress to the participant (through the deliberate conjuring of images that may be upsetting) by offering relaxation activities (and the offer of further relaxation activities at the end of the interview), clearly stating the opportunity to stop the interview at any stage and providing a follow up telephone call a week later. However we thought that if an individual appeared particularly upset by the interview process, or disclosed anything that made you concerned for their welfare, it would be good to additionally contact their care team to notify them that the participant has taken part and was upset to ensure any distress caused is managed appropriately after the interview. Should you choose to implement this, this would then need to be stated on the patient information sheet.
- We felt that it would be extremely hard for people to talk about images they experience, particularly negative ones, as these are likely to have an incredibly personal basis. It may be useful to introduce into the Semi-Structured Interview Schedule a sentence acknowledging this and reassuring them. Perhaps you

could take this opportunity to explain you are a Trainee Clinical Psychologist again for credibility and reassurance.
- One of our reviewers raised the issue of memory training, and wondered if it would be worth checking if any of the participants have undergone memory training, as this may affect their performance.

**Participant Consent Form**

***Questions & points for the research team to consider***

- You mention in the first paragraph that their information will be handled in accordance with the Data Protection Act 1998, however we felt it would be more useful to additionally state the length of time that their data will be stored before it is destroyed.
- It may also be useful to explain the abbreviation 'NELFT' on this form.

**Participant Information Sheet**

***Questions & points for the research team to consider***

- There is no mention here that the study has had ethical approval, and which ethics board has approved this.

## Appendix F: Imagery Interview

Removed due to copyright, please request from author.

## Appendix G: Adapted Thought Control Questionnaire

Removed due to copyright.

## Appendix H: Responses to distressing, intrusive imagery

The adapted Thought Control Questionnaire (TCQ, Appendix G; Wells & Davies, 1994) was completed by participants who reported that they experienced a negative image in the previous month. Cronbach's alpha coefficients were calculated for each of the five TCQ subscales and the Total TCQ Score in this subgroup of participants (n=23). Alpha values were as follows: Punishment = .441, Reappraisal = .573, Worry=.67, Distraction=.688, Social Control=.726 and Total TCQ Score=.677. Please see the inter-correlations of the TCQ subscales and additional single item rating scales in Table H1 below.

Table H1: *Correlations between TCQ subscales and single item rating scales*

| | **TCQ items** | | | | | | **Single item scales** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** |
| 1. Distraction | 1 | | | | | | | | | | | | |
| 2. Worry | 0.52***** | 1 | | | | | | | | | | | |
| 3. Punishment | 0.36 | .47***** | 1 | | | | | | | | | | |
| 4. Reappraisal | 0.27 | -0.01 | 0.17 | 1 | | | | | | | | | |
| 5. Social | -0.05 | -0.44 | -0.50 | 0.12 | 1 | | | | | | | | |
| 6. Suppression | 0.24 | -0.03 | 0.43***** | 0.39 | -0.23 | 1 | | | | | | | |
| 7. Rumination | 0.23 | 0.31 | 0.24 | 0.31 | -0.18 | 0.24 | 1 | | | | | | |
| 8. Checking | 0.27 | 0.33 | -0.08 | -0.08 | 0.00 | -0.18 | 0.10 | 1 | | | | | |
| 9. Reassurance | -0.38 | -0.33 | -0.43 | 0.06 | 0.29 | -0.06 | 0.02 | 0.16 | 1 | | | | |
| 10. Withdrawal | -0.17 | -0.19 | -0.23 | 0.28 | 0.27 | -0.04 | 0.44***** | 0.02 | 0.47***** | 1 | | | |
| 11. Avoidance | 0.14 | 0.35 | 0.18 | 0.18 | -0.28 | -0.07 | 0.68***** | 0.08 | -0.2 | 0.42***** | 1 | | |
| 12. Acceptance | 0.33 | 0.13 | 0.14 | 0.15 | -0.23 | -0.08 | 0.27 | 0.10 | -0.31 | -0.04 | 0.36 | 1 | |
| 13. Substances | 0.04 | 0.05 | -0.2 | 0.04 | 0.10 | -0.1 | 0.09 | -0.07 | 0.32 | 0.33 | 0.05 | 0.26 | 1 |

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

## Appendix I: Imagery Interview

Removed due to copyright.

## Appendix J: Intrusions Interview

Removed due to copyright.

## Appendix K: Demographic information

| |
|---|
| From electronic case records:<br>Diagnosis:<br>Therapy: Current/waiting list/previous/none<br>Approximate length of contact with EIP:<br>SOFAS: |

Gender: Male/Female

1. What is your date of birth? _____

2. What would you describe as your ethnicity? _____

3. How many years have you spent in education? *When did you finish in school/college/uni?*

_____

4. What is your employment status? *(student, p/t paid employment, f/t paid employment, p/t unpaid employment, f/t unpaid employment, unemployed)*

_____

_____

5. Where do you live? [Live alone, live with children, live with partner, live with parents, live with friends, live in supported house, other]

_____

_____

***If participant withdraws from study:***

- Reason for withdrawal

- Follow up actions required and agreed with participant

## Appendix L: Script introducing the imagery interview

Now, we are going to start the interview. I'm going to turn on the audio recorder; I will tell you when I am turning it on and off. No-one will have access to this recording except me, you won't be identifiable, the recorder will be stored safely and the recording will be deleted after I finish this study.
We are going to talk about different kinds of experiences and feelings that people may have. Are you ready to start?

### Explanation of imagery:

For the next part of this study, I will be asking you about mental images or "images in the mind's eye". First, I want to explain what I mean by mental images.

When we think, we can do so in different ways. Often we think in words, but at other times we can think in images or pictures, which are like photos, a brief snapshot or a movie clip.

Imagery is the experience of seeing with the mind's eye. It can also include other senses: sound, smell, taste and touch (which are feelings or sensations in your body). For example, if I say "cup of coffee" to you, a picture may pop into your mind of what a cup of coffee looks like, but also an impression of its smell, its taste, the sensation as you drink it and so on.

When we experience images, we know they are created in our own minds; we are not perceiving something in our external environment. You would usually be quite certain that the image is in your minds' eye, rather than something that is actually happening outside of yourself at that time.

I would like us to talk about images that people experience when they are **not** under the influence of drugs or alcohol.

### Image generation practice task:

It's possible to create an image of anything, even if it does not seem believable, for example, a flying elephant. Can you imagine that in your mind's eye? You just experienced what is known as an image.

Now let's try to make another image. I would like you to try to imagine cutting a lemon. You can close your eyes if you like. (Pause) Describe the image to me, talk me through it. Tell me about its colour, shape, what else can you see? Can you hear anything as the lemon is cut? Can you smell the lemon juice? Can you feel its texture? Can you taste the zest?

- *Does the participant describe an image? Yes/No*
- Do you think you understand what a mental image is? Yes/No
- *Use participants' language if possible.* What do you call images? Do you have your own name for them? Is it ok if I call them images?
- Any questions?

I am interested in finding out about images that come into a persons' mind, without them wanting them to. They are known as intrusive images and are very common in the general population. Sometimes they can be pleasant, such as images of a special day that we remember well or something exciting that may happen in the future.

Sometimes these images can be unpleasant. For example, when bad things happen, we may be left with distressing images and memories that haunt us, they may colour our experience of the present. When these images are very vivid or real, it can feel almost as if the past is happening all over again. At other times, intrusive images may be related to things that we are afraid of or worried about. When we experience these unpleasant images, it is common to also feel emotions or even physical sensations.

To summarise, intrusive images are common, they come to a persons' mind without the person wanting them to. They can be pleasant or unpleasant. Often these images are very brief or fleeting; they can affect how we feel or experience things.

## Appendix M: Trauma history script

*Trauma History Questionnaire:*
I'm going to be asking you about some difficult or stressful things that sometimes happen to people. Some examples of this are being in some type of serious accident; being in a fire, a hurricane, or an earthquake; being mugged or beaten up or attacked with a weapon; or being forced to have sex when you didn't want to. I'll start by checking whether any of these experiences apply to you. Then, if any of them do, I'll ask you to briefly describe what happened and how you felt at the time.

Some of these experiences may be hard to remember or may bring back uncomfortable memories or feelings. People often find that talking about them can be helpful, but it's up to you to decide how much you want to tell me. As we go along, if you find yourself becoming upset, let me know and we can slow down and talk about it. Also if you have any questions or you don't understand something, please let me know. Do you have any questions before we start?

- Did you believe you were at risk of serious injury or death or there was a threat to the physical integrity of yourself or others?
- Did you experience extreme fear, helplessness or horror?

Posttraumatic Stress Scale-Self Report*:*

- If participant ***reports one*** traumatic life event:

Can you please complete this questionnaire in relation to the (researcher writes index trauma on questionnaire)?

- If participant reports ***more than one*** traumatic life event:

Do you think that you are currently affected by any of these events that happened to you? Can you please pick the event which you find most distressing at the moment? Or the event that you found most upsetting? I want you to keep (THAT EVENT) in mind as you answer these questions about how it may have affected you.

## Appendix N: Guided Visualisation, participant feedback and debrief

# Relaxation task

Now, I'm going to ask you to create a final image in your mind and to describe it to me. I'd like you to create an image of a relaxing beach but if you would prefer to create an image of a different relaxing scene, please let me know and we can imagine that instead. *(Participant describes details)*

Close your eyes if you feel comfortable doing so, try to relax. I would like you to think about a beach, either one you have been to or one in your mind. Can you try to imagine the sand, the look of the sea, the sun on your skin? *Pause*

1. Have you got the image? Yes/No

2. Now I would like you to imagine a dog running across the beach. Can you see that? Yes/No

3. Can you see anything in the image? Can you describe it to me, so that a film director might be able to recreate the scene?

4. Can you hear anything? Apart from your own voice? (Waves, seagulls etc.)

5. What about taste or smell? (Salty seawater, sun cream etc.)

6. What physical sensations do you have in your body? (Hot sun, smooth sand etc.)

7. Is there anything else that you notice?

8. On a scale from 0 to 100, how **vivid** is the image? With 0 being hazy and 100, most vivid and clear? _____

9. How do you feel in the image? Rate emotions (relaxed, happy etc.) on a scale from 0 to 100 with 0 being not at all and 100 very much so.

# Debrief

I would like to ask you a few final questions to finish. How did you find taking part in this study? *(Distressing, difficult/hard, enjoyable, interesting?)*

Was there anything positive or good about taking part? Was there anything negative or bad about taking part?

Is there anything that could be changed that would make taking part a better experience? Is there anything I could do differently?

How are you feeling now?

Would you like to do another brief relaxation exercise?

Any final comments or questions? Would you like to be sent the final results of this study? Yes/No

(If applicable) I will telephone you in one week. **Thanks for participating today.**

## Appendix O: Flow Chart of participants through the research study

4 potential participants were excluded due to the following: 1 had insufficient English language fluency to participate, 1 had a diagnosis of bipolar disorder, another participant found it difficult to engage with the interview process because of attention difficulties. Risk issues (self-harm and risk to children) emerged during another interview. The research interview was abandoned so these issues could be assessed.

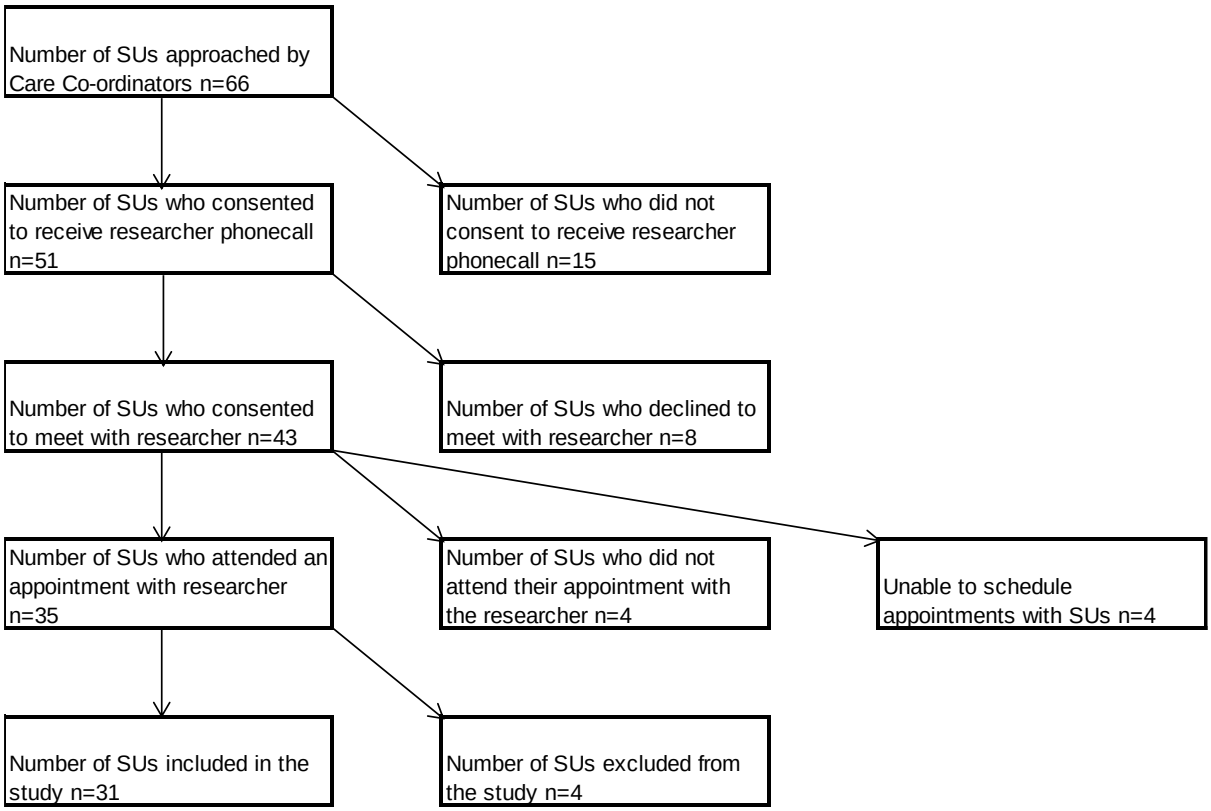


*Figure O1.* Flow of Service Users through the research study

## Appendix P: Correlations between symptom measures

Table P1

*Spearman's rank correlations between symptom measures and SOFAS*

| | Measure | | | | | | |
|---|---|---|---|---|---|---|---|
| | SIAS | GPTS | PSS-SR | CDSS | PANSS | PSYRATS | SOFAS |
| SIAS | 1 | | | | | | |
| GPTS | -0.00 | 1 | | | | | |
| PSS-SR | 0.43 | 0.30 | 1 | | | | |
| CDSS | 0.54** | 0.19 | 0.30 | 1 | | | |
| PANSS | 0.01 | 0.38 | 0.58† | 0.13 | 1 | | |
| PSYRATS | 0.26 | -0.02 | 0.31 | -0.10 | 0.38 | 1 | |
| SOFAS | -0.37† | -0.22 | -0.01 | -0.21 | -0.60* | -0.36† | 1 |

Note. † p<.1, *p<.05, **p<.01, SIAS=Social Interaction Anxiety Scale, GPTS=Green Paranoid Thoughts Scale, PSS-SR=PTSD Symptom Scale-Self Report, CDSS=Calgary Depression Scale for Schizophrenia, PANSS=Positive and Negative Syndrome Scale, PSYRATS=Psychotic Symptoms Rating Scale, SOFAS= Social and Occupational Functioning Scale

## Appendix Q: Exposure to traumatic events

Table Q1
*Trauma History Questionnaire: trauma experiences*

| Event type | N |
|---|---|
| ***Crime-related*** | |
| Mugging | 8 |
| Robbery | 4 |
| Break in not at home | 4 |
| Serious accident | 10 |
| ***Disasters*** | |
| Natural disaster | 2 |
| Bank robbery | 1 |
| Exposed to dangerous chemicals | 2 |
| ***Injuries and death*** | |
| Other situation: serious injury | 4 |
| Other situation: feared death or injury | 9 |
| Seen someone seriously injured/killed | 6 |
| Seen or handled dead bodies | 2 |
| Friend or family murdered or killed | 8 |
| Spouse, partner or child died | 2 |
| Serious or life threatening illness | 4 |
| Serious injury, illness or death of someone | 14 |
| ***Unwanted sexual experiences*** | |
| Intercourse against your will | 1 |
| Touching under force or threat | 2 |
| Other unwanted sexual contact | 2 |
| ***Violence by family or friends*** | |
| Family, friends attacked with a weapon | 2 |
| Family, friends attacked without a weapon | 2 |
| Family beat, spanked or pushed | 5 |
| Other stressful situation or event | 6 |

## Appendix R: Negative imagery characteristics and PTSD status

Table R1: *Phenomenological characteristics of negative imagery and probable PTSD status*

| | Probable PTSD | Unlikely PTSD | | |
|---|---|---|---|---|
| **Experienced image** | **n** | **n** | $\chi$ | p |
| Yes | 8 | 15 | 0.26 | 0.61 |
| No | 2 | 6 | | |
| Total | 10 | 21 | | |
| | | | | |
| **Phenomenological characteristics** | | | | |
| | **Mean (SD)** | | | |
| Distress | 81.3 (15.5) | 80.54 (12.6) | | |
| Emotional impact | 56.9 (18.1) | 44.9 (17.4) | | |
| Threat | 40.0 (38.6) | 45.38 (29.6) | | |
| Subjective probability | 48.8 (30.8) | 45.67 (43.6) | | |
| Interference | 33.1 (32.2) | 42.08 (37.6) | | |
| Controllability | 47.5 (41.7) | 49.64 (37.3) | | |
| Here and now | 47.9 (37.6) | 50.38 (42.1) | | |
| Vividness | 75.6 (18.4) | 73.1 (22.1) | | |

## Appendix S: Distressing, intrusive imagery coding framework

| Theme | Description and definition | Examples: Images of |
|---|---|---|
| **1. Loss & feeling alone** | ***Abandonment***<br>Losing loved ones through abandonment.<br>Sense of personal responsibility,<br>Feeling alone, no help from others. | Violent harm to oneself<br>without help from others<br>Being responsible for self<br>or vulnerable others<br>Being abandoned by loved ones |
| | ***Bereavement***<br>Sudden, shocking death of loved one<br>or close other | Seeing the dead body<br>or funeral of loved one<br>Last time they were alive. |
| **2. Inadequate self** | ***Failure***<br>Fear of being stuck or not attaining | Going to the job centre<br>Being asked to leave college |
| | ***Changed or unrecognisable self***<br>Changes in self<br>& associated sense of vulnerability | Being arrested<br>End of romantic relationship<br>Friends noticing changes |
| | ***Fear of negative evaluation by others***<br>Anxiety about views of others<br>or being judged critically | Body parts |
| **3. Dangerous self** | ***Self-harm***<br>Physical, deliberate self-harm | Violent self-harm<br>cutting or kicking oneself |
| | ***Losing control***<br>During the emergence of psychosis | Aggressive towards others<br>Being drunk and getting hurt |
| **4. External threat** | ***Physical or psychological threat***<br>Sinister threat of being attacked<br>or manipulated, need to defend self | Physical attack<br>by a sinister figure or terrorists<br>Violent scenes from a war zone<br>Attacking persecutors |
| | ***Sexual abuse or assault***<br>Intrusive recollections<br>of unwanted sexual experiences | Re-experiencing<br>of sexual abuse or assault |

## Appendix T: Negative imagery themes - extracts from interviews

**1. Loss & feeling alone** (Participant 16)

Image content:
"*It's about midday. It's a sunny day. As I'm walking out of my bedroom, I've got one arm reaching out. I'm already in the free fall motion. It's a still image (not like a movie) but I can just see myself moving ever so slightly in slow motion. There's no one else in the house. It's a silent image, I can feel the carpet underneath my feet, I'm barefoot, I feel the sensation of falling. There was a sense of tumbling down the stairs. Thoughts in the image: if I fall and break something that nobody's here to help me. Worst thing: There's nobody to help me.*"

Encapsulated belief:
"*I need to be alert and aware because if something happened to me what would that mean for Mum? I'm shouldering all that responsibility and there's no-one to help?*" (belief=100%)

Associated memory:
"*I've experienced the sensation a couple of times of falling down the stairs. You gain more responsibility as you go through life but even as a kid I remember, I'd fallen down the stairs, it was the exact same stairs; my uncle was around when I fell (age 7). He was the first in the family that I lived with to die (age 15, found his body at home)*".

**2. Inadequate self** (Participant 12)

Image content:
*"the image is of me having to keep going to the job centre. I see the job centre sign up in (local high street). I can see myself walking into the building. It seems like in the image that it's going to reoccur. After the image, I have a cigarette to calm myself after".*

Encapsulated belief:
*"I've got doubts about my ability to succeed. Sometimes the world is a hard, unforgiving place"* (belief=90%).

Associated memory:
*"2 years ago, memories of me going into the job centre. I'm not going in there at the moment".*

**3. Dangerous self** (Participant 6)

Image content:
"*I start eating and I pick up a piece of yam, and I throw it and it hits my dad's head and then it drops to the floor. The image is of me picking it up and throwing it, seeing the yam flying across the room. Dad doesn't look happy and that's what makes it distressing, seeing his reaction in the image. Dad looks shocked; he speaks to me in (first) language, the words he is saying like "wow, what happened!" The yam hits him on the forehead. For some reason it hurts him, that makes me feel a bit bad. After the image happened, I felt a strong emotion, I feel bad, kind of guilty. Worst thing: it seems to hurt Dad. It's so vivid it feels like it's in the present*".

Encapsulated belief:
"*The image reminds me of when I was unwell and I was aggressive*." (belief=75/80%).

Associated memory:

"*Age 19, skating with my friend, I became aggressive towards a driver (shouting at him) who nearly hit us, looking back now it was when I was starting to become unwell*".

**4. External threat** (Participant 34)

Image content:
"*I'm being troubled by the police basically. The images I have are basically, the police being troubled in return. So it's violence towards the police. It's a hold load of different things, seeing a police man suffer, seeing him being murdered, seeing him being electrocuted, it could be booby traps where they've walked into something and had their face smashed in. they're all of that nature. I can't see anyone else in the image other than the police officer. It would be myself doing it but not directly, it's something I've set up. A form of defence, hence booby traps or flame throwers, whatever, just to keep them away from me. One particular image that comes to my mind a lot, the image of a massive log or something heavy that is set on a pivot that basically releases and then hits them. It's like a big heavy sledge hammer thing that's connected to my ceiling. They come into my home, they trigger something, and it basically pushes them back out. Because I physically can't do it myself, ok fine this is how I can get them away. Worst part: I don't usually have violent thoughts, but I don't really focus on the violence itself because if they hadn't done what they've done, this wouldn't be happening. They're abusing their power, and lying and deceiving and forcing their way into my home, they're not abiding by the same rules and laws as they're claiming that I have to follow*".

Encapsulated belief:
"*I feel helpless to do anything about abuses of power in my life, I'm trying to protect and defend myself but that people in authority often abuse their power often for their own gain*" (belief=100%)

Associated memory:
"*4/5 years ago: Ex made false allegations against me to the police. They then turned up and that's when the journey downhill started for me. They twisted the whole situation*".

## Appendix U: Positive imagery coding framework

| Theme | Description and definition | Examples: Images of |
|---|---|---|
| **1. Love, intimacy & attractiveness** | Romantic or sexual relationships, being in love/loved, physically attractive or desirable to others | pleasurable time with a partner<br>getting chatted up or asked out<br>falling in love |
| **2. Pleasurable times with peers/family** | Close relationships with family or friends in which the person feels valued, cared for, included or significant. | birthday celebrations<br>having a good time or fun together<br>spending time together |
| **3. Success & achievement of goals** | Attainment of personal goals often in vocational domain, being competent, respected or successful. | Talented at job/interests<br>having a job or preferred job<br>being called for a job interview<br>going back to uni |
| **4. Escaping everyday life** | Desire for quick solutions or immersion in a different world or possessions in which the person experiences freedom, pleasure or comfort | winning the lottery,<br>travelling to a tropical island<br>time away from current troubles |

## Appendix V: Positive imagery themes - extracts from interviews

**1. Love, intimacy and attractiveness** (Participant 2)

Image content:
*"An image of me and my boyfriend. I can see us together, just hanging out, having fun. I can hear people talking. So there's me and my boyfriend, we're in the park, and we're having a picnic and we're talking with each other, and we're laughing, joking about, and we can see the field and other people. You can hear the children playing in the background"*

Encapsulated belief:
*"Being close to someone, loving someone and being loved back is really important. It is possible to have a relationship like that. People can have a nice time sometimes".*

Associated memory:
*"A few months ago, we went to play pool so that was kind of linked to the image. Going to play pool with my boyfriend and friends".*

**2. Pleasurable times with peers and/or family** (Participant 21)

Image content:
*"me and some friends (male & female) from university, sitting in my room, watching a horror movie. This is a memory of when I was in uni. It was in halls. It was scary watching the movie but fun having my friends around. It's like a movie clip rather than a photograph. It's in colour. I can hear laughing but nothing else. The movie was called 1408."*

Encapsulated belief:
*"I've got friends, I'm not alone, they care about me. It's important to have a network of friends."*

Associated memory:
*"Age 18: the memory of us hanging out together in uni."*

**3. Success and achievement of goals** (Participant 7)

Image content:
*"I do a make-up course, at the end of the course you have to do a photo shoot with models. I can see me doing up their faces and getting the photos done. There are a few people there, about 3 models; we're in a field doing an outdoor shoot. I can see different groups of people, different make-up artists and people are really praising me saying "I like the way you did that". I feel really elated, really happy, proud of myself. I see myself beaming"*

Encapsulated belief:
*"I really want to be successful and happy in my job in the future. It would be nice to help other people and make them feel good. If people go for it, they can get what they really want"*

Associated memory:
*"Age 16: when I got my GCSEs. I'll never forget because I put so much hard work into it. It's got that same kind of feeling – relief, happiness and achievement."*

**4. Escaping everyday life** (Participant 32)

Image content:
*"I can see a little rowboat, I'm rowing by myself, it's quite choppy water, and it's very blue. It feels quite breezy; the island looks really warm and tropical. It's kind of like the South Pacific, and the island is massively verdant. The island is teaming with creatures and people. It's like a secret place that people find out about. It's like all sorts of people. I can hear the waves and the boat hitting the water. I always imagine lights shooting up from the island and hitting the earth's atmosphere and it makes me feel tingly".*

Encapsulated belief:
*"Other people who are similarly detached from reality will find this place as well. It seems like a place that's not in this world".*

Associated memory:
*"the bad trip (before my first episode) when it became apparent that I thought the world was dying and I wanted something to be done about it".*

## Appendix W: Symptom severity according to recent imagery experience

Table W1
*Symptom severity: Median values and Mann Whitney U results according to imagery experience*

| | Negative image | | | Positive image | | |
|---|---|---|---|---|---|---|
| **Measure** | Yes | No | *U* | Yes | No | *U* |
| SIAS | 21 | 17 | 71 | 20 | 24 | 43 |
| GPTS | 20 | 16.5 | 46.5* | 19 | 16 | 32.5† |
| PSS-SR | 17 | 12 | 19.5 | 17 | 6 | 15 |
| CDSS | 4 | 1 | 64.5 | 4 | 7 | 42 |
| PANSS | 10 | 8 | 11* | 9 | 8 | 19.5 |
| PSYRATS | 0 | 0 | 81 | 0 | 0 | 40† |
| SOFAS | 65 | 71 | 55.5 | 65 | 65 | 50 |

Note. *p<.05, † trend, SOFAS= Social and Occupational Functioning Scale, SIAS=Social Interaction Anxiety Scale, CDSS=Calgary Depression Scale for Schizophrenia, GPTS=Green Paranoid Thoughts Scale, PSYRATS=Psychotic Symptoms Rating Scale, PANSS=Positive and Negative Syndrome Scale, PSS-SR=PTSD Symptom Scale-Self Report