Phenomenology of Intrusive Trauma Memory in Psychosis and its Relationship with Hallucinations and Persecutory Beliefs

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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 is focused on developing the theoretical understanding of the role of trauma memory in psychosis.

The systematic literature review investigates the relationship between psychosis symptom severity and re-experiencing of traumatic memories. 13 studies published since 1980 were identified as meeting the review criteria. Overall, findings suggest that people with more severe hallucinations and paranoia experiences report more re-experiencing of traumatic memories. However, this relationship was not seen when looking at more global symptoms of psychosis. The role of trauma memory in the development and maintenance of psychosis therefore warrants further investigation.

The empirical paper (a joint project with Carr (2016), "Developing a brief trauma screening tool for use in psychosis") explores the phenomenology of intrusive trauma memory in psychosis and investigates its relationship to hallucinations and persecutory beliefs. In line with theoretical accounts (Steel et al, 2005), it was hypothesised that increased memory fragmentation would be associated with more severe hallucinations. Twenty participants described an intrusive trauma memory and its phenomenological characteristics. Findings indicated that subjective fragmentation of intrusive memories was associated with more severe hallucinations but not persecutory beliefs, although the relationship between the two ratings of objective memory fragmentation and hallucinations were equivocal, with a negative correlation for one rating and no relationship for the other. Participants with psychosis also reported more frequent and vivid intrusions, with an increased sense of reliving, compared to non-clinical sample. The study suggests a potential role for

memory fragmentation in hallucinatory experience, although the complexities of assessing memory characteristics are highlighted.

The critical appraisal focuses on the experience of the research process, which includes reflections on methodological issues in memory assessment, challenges to recruitment in psychosis services and the role of the research process in the author's professional development.

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Part 1: Literature Review

Is the severity of re-experiencing trauma memories associated with psychotic symptom?

Abstract

Background: Research findings increasingly support a causal role for trauma in psychosis (Bentall et al, 2014). Intrusions of traumatic memories have been implicated as a potential mechanism accounting for this relationship (Steel et al, 2005). However, there has been no systematic review of the relationship between re-experiencing of traumatic memories and psychosis symptoms. This review therefore aims to comprehensively examine whether severity of psychosis is associated with the severity of re-experiencing traumatic memories.

Method: Searches of electronic databases PsycINFO, MedLine and Web of Science were conducted and 13 studies were identified that met inclusion criteria. The quality of this evidence was assessed using a quality appraisal tool developed for the purpose of this review. General methodological factors, as well as factors pertaining to the measurement of re-experiencing of traumatic memory and psychosis, were included.

Results: There is initial evidence for a relationship between the severity of hallucinations and paranoia symptoms of psychosis and re-experiencing severity. There is no consistent evidence for a relationship between severity of re-experiencing, negative symptoms and global symptoms of psychosis in relation to both lifetime and psychosis-related traumas.

Discussion: Findings suggest an association between re-experiencing traumatic memories, hallucinations and paranoia. This relationship may indicate a vulnerability relating to impaired contextual integration of sensory-perceptual information in psychosis, or that re-experiencing of trauma memories may give rise to voices and paranoia. Further work is required to explore the nature of this

relationship and the interactions between traumatic memories and psychosis, and to include comprehensive assessments of trauma and related re-experiencing symptoms.

1. Introduction

Evidence increasingly supports a role for trauma in psychosis (Bentall et al, 2014). Intrusive memories of traumatic events have been implicated as a potential causal mechanism in this relationship (Morrison, 2001; Garety, Kuipers, Fowler, Freeman & Bebbington, 2001; Steel, Fowler & Holmes, 2005). To investigate this hypothesis, this systematic review will examine studies investigating the relationship between the severity of psychosis symptom and the severity of re-experiencing traumatic memories. An overview of theoretical accounts of re-experiencing[a] will first be provided. Theoretical frameworks for understanding vulnerabilities in the encoding and retrieval of traumatic events in people with psychosis will then be outlined. Cognitive models for understanding the relationship between re-experiencing of traumatic memories and psychosis symptoms will be presented.

1.1 Trauma and psychosis

It is well established that people with psychosis experience more traumatic events compared to the general population, particularly childhood victimisation (Grubaugh, Zinzow, Paul, Egede & Frueh, 2011). Trauma in psychosis is associated with higher rates of Post-Traumatic Stress Disorder, poorer functional and clinical outcomes, and more severe psychosis (Achim, Maziade, Raymond, Olivier, Mérette, & Roy, 2011; Varese et al, 2012). It is therefore important to develop our understanding of the relationship between traumatic life events and psychotic difficulties.

1.2 Re-experiencing of trauma memories in PTSD

Theoretical models of memory and empirical evidence suggest that encoding and retrieval impairment of autobiographical memory is particularly likely to occur in response to traumatic experiences.

Cognitive-behavioural models suggest increased arousal may lead to disruptions in memory processing, which give rise to impairment in autobiographical memory encoding (Ehlers & Clark, 2000, LeDoux, Iwata, Cicchetti & Reis, 1988, Brewin, 2001; Brewin, Lipton, Gregory & Burgess, 2010). An individual's body and brain are evolved to efficiently manage intense distress. When confronted with a threat, the information is directly processed by the amygdala, resulting in the quick release of stress hormones (LeDoux et al, 1988) and faster, richer processing of sensory-perceptual information (Ehlers & Clark, 2000). Whilst this has an evolutionary advantage, the spatial and temporal context is not as extensively encoded, and the conceptual meaning of the events is not elaborated and integrated with other life events (Brewin, 2001; Brewin et al, 2010; Layton & Krikorian, 2002). This results in the sensory and emotional details of the event being stored in increased detail, with impaired encoding of the corresponding spatial-temporal context.

Due to the lack of contextual information during encoding of traumatic events (Brewin, 2001; Brewin et al, 2010; Layton & Krikorian, 2002), these memories are particularly likely to be triggered by stimuli that represent sensory-perceptual matching cues in the environment, and are therefore easily triggered unwanted into consciousness. Re-experiencing of traumatic memories are therefore held to result from automatic activation of stored sensory memories with a lack of corresponding spatial-temporal representations (Brewin, et al, 2010), and are often fragments of

experience that are comprised of vivid sensations and perceptions (Bewin & Holmes, 2003). Thus, re-experiencing of a traumatic memory can include verbal, non-verbal, and physiological aspects of memory representations.

1.3 Re-experiencing of traumatic memories in psychosis

Theorists have highlighted how, in the context of a vulnerability to psychosis, people may be more likely to re-experience memories of traumatic events. The strength of an individual's ability to encode spatial and temporal information moderates the frequency and nature of intrusions of trauma memory into consciousness. People with psychosis are hypothesised as having a weakened ability to encode this information (Steel et al, 2005; Hemsley, 1993), possibly due to enhanced emotional or stress sensitivity (Fowler et al, 2006; Read, Fosse, Moskowitz & Perry, 2014). This weakened contextual encoding ability is more likely to lead to decontextualized memories, and is theorised as leading to the subsequent intrusion of sensory-perceptual information into consciousness of unintended material from autobiographical memory.

1.4 The impact of re-experiencing trauma memories on psychosis

Cognitive-behavioural models of psychosis suggest that this vulnerability to re-experiencing memories of a trauma, is a proximal route for the development of, and exacerbates, psychotic symptoms (Morrison, 2003). This is because these intrusive memories, which by their nature contain sensory-perceptual information and have limited corresponding contextual information, may not be attributed to prior trauma. Such intrusions are more likely to lend themselves to 'culturally unacceptable appraisals', giving rise to hallucinations and delusional beliefs

(Morrison, 2001). In support of these models, there is evidence suggesting potential specific pathways between childhood trauma, and hallucinations and persecutory beliefs (Bentall et al, 2014; Hardy et al, 2016).

These theoretical accounts propose that people with psychosis may be particularly vulnerable to encoding memories in such a way as to increase the likelihood of more frequent, vivid and fragmented intrusions, which may manifest as hallucinatory experiences or be subject to delusional appraisals. In investigating the relationship between severity of re-experiencing and psychosis, this review will therefore consider both global and more specific symptoms dimensions.

1.4 Summary

Psychosis is associated with increased rates of trauma, particularly childhood victimisation and PTSD. Theoretical models account for how encoding and retrieval of traumatic memories are impaired in PTSD, giving rise to intrusive memories or re-experiencing (Brewin, 2001; Brewin et al, 2010; Layton & Krikorian, 2002; Brewin & Holmes, 2003). It has been argued that people with a vulnerability to developing psychosis may have an impaired ability to contextualise sensory-perceptual information, resulting in them being more likely to experience intrusions following trauma, and that such intrusions may lend themselves to culturally unacceptable intrusions which manifest as hallucinations and delusional beliefs. To further understand the relationship between trauma and psychosis, this review therefore aims to comprehensively evaluate the quality and findings of evidence investigating whether there is an association between the severity of re-experiencing and psychosis.

1.5 Research Question

Is the severity of re-experiencing trauma memories associated with positive, negative or global psychotic symptoms, across the continuum of severity?

2. Method

2.1 Search Procedure

Potential studies were identified via an electronic keyword search of four major databases: Web of Science, MEDLINE and PsychINFO. A comprehensive list of search terms was developed by reviewing MESH terms for 'psychosis' and 'post-traumatic stress disorder'. The following search themes were performed: ("Trauma* memor*": OR "Intrusive image**"; OR "Intrusive mental image**"; OR "Re?experiencing"; OR "Trauma* intrusion*"; OR "PTSD"; OR "Post?Traumatic Stress Disorder") combined with psychosis related search terms ("Schizo*"; OR "Psychotic"; OR "Psychos?s") using the Boolean operator "AND". Search terms were entered for searching in full article text. Where available on the database, the search was limited to peer reviewed journals in the English language in a human population of adults (≥18 years). The databases were searched from 1980 to November 2016. After database extraction, titles and abstracts were manually reviewed to assess whether they met the inclusion criteria. Hand searching for studies potentially overlooked or absent from the databases, was performed by screening the references of all full text retrieved articles.

2.2 Inclusion and Exclusion Criteria

Inclusion criteria for peer-reviewed publication was determined with reference to the PICO criteria (Sackett, Richardson, Rosenburg & Haynes, 1997).

Included studies were required to have an adult population (≥18 years) with an experience of psychosis in both clinical and non-clinical samples, measured with a symptom assessment. Studies were excluded if there was an organic or neurological cause of psychosis, primary diagnosis of PTSD, or primary diagnosis of substance use. Studies were required to have reported a behavioural measure of re-experiencing of traumatic memory. Only studies which looked at the relationship between these symptom measures were included. Studies were only included when published in a peer-review journal in the English language. PTSD was introduced as a diagnostic category in the DSM in 1980, leading to the development of measures reflecting re-experiencing. Therefore, only articles published between 1980 and November 2016 were included. Articles were excluded if poster or conference abstracts were identified without an available corresponding published article, and if they were of a single case study design or reported only qualitative analysis.

2.3 Selection of Studies

See Figure One for a PRISMA flow diagram of the study selection process. The initial search produced a total of 1,462 articles, after duplicates were excluded. The titles and abstracts of the 1,462 papers were manually reviewed to determine which were eligible for inclusion. In cases of uncertainty over the inclusion of a specific article, the methodology and results sections were also reviewed. 68 articles were selected for full text review and screening to assess eligibility. Article reference lists were then reviewed for additional studies; no articles were identified. From the screening, 13 publications were selected for inclusion in the review.

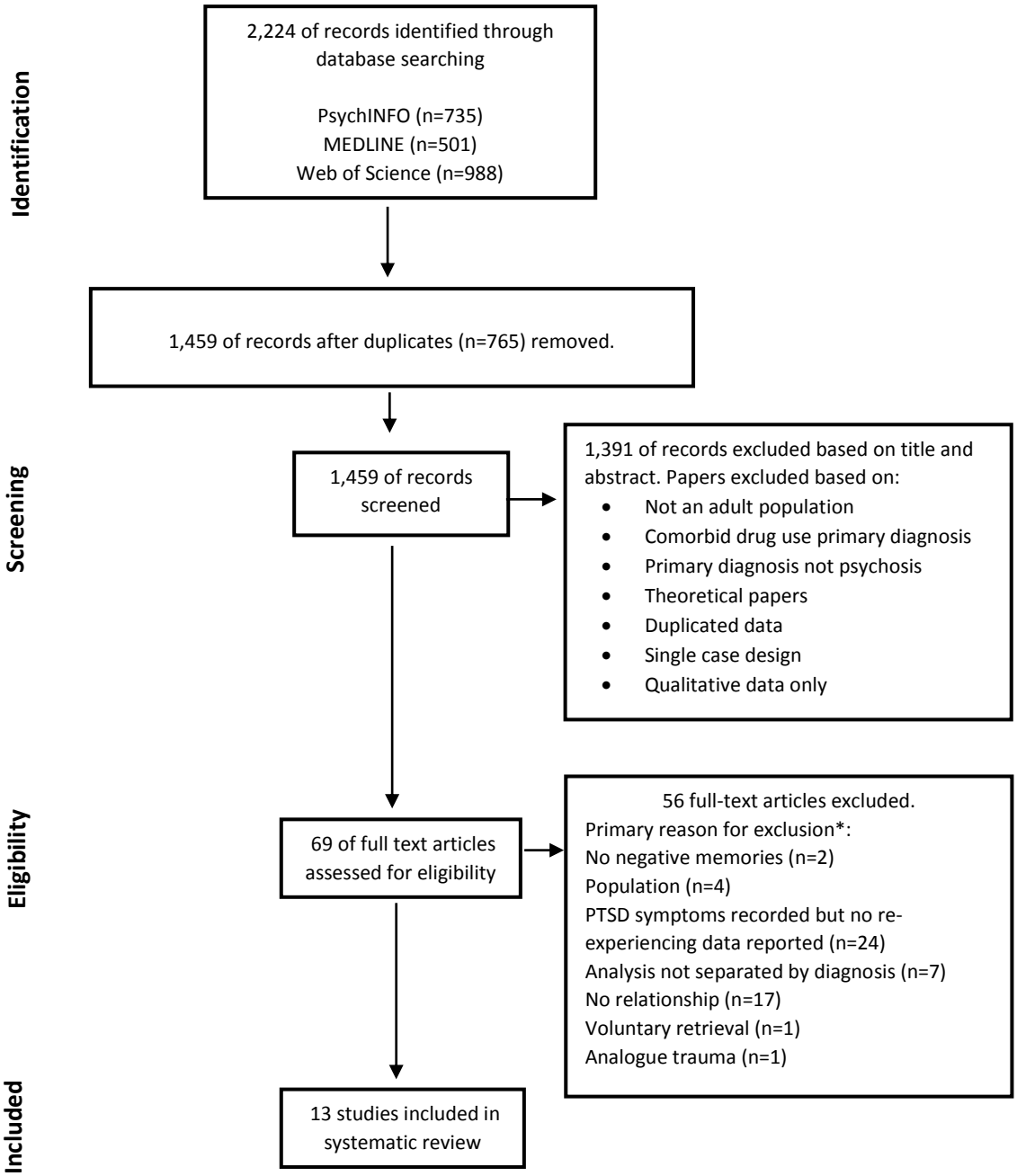

Figure 1. *Flow diagram of electronic search strategy*

2.4 Quality Assessment

There is a lack of consensus in the literature regarding the methodological review of cross-sectional studies (Katrak, Bialocerkowski, Massy-Westropp, Kumar, & Grimmer, 2004). This review therefore developed a quality assessment tool to assess the methodological factors which may have impacted on the reliability and validity of the study findings. These are detailed in Table One.

Table 1. *Quality Assessment Appraisal Tool*

	Selection of subjects	**Trauma Exposure Assessment**	**Analysis**	**Psychosis Measure**	**Measure of Re-experiencing**	**Overall Quality**
-	Poorly described	Only trauma of a specific nature assessed	Analysis of the relationship between re-experiencing and global symptom severity.	Measure developed for use in the study, limited validation	Re-experiencing measured in relation to one index trauma.	Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter
+	Adequately described, however, small sample size.	All trauma comprehensively assessed using an unvalidated measure	Analysis of the relationship between re-experiencing and global, positive and negative symptom severity.	Standardised self-report questionnaire	Comprehensive assessment of re-experiencing, unanchored to one index trauma, using a standardised self-report questionnaire	Some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter
++	Representative of population, indicated % participation sample well described, inclusion criteria made explicit	All trauma comprehensively assessed using a standardised measure	Analysis of the relationship between re-experiencing and specific symptoms of psychosis.	Standardised diagnostic or interview measure	Comprehensive assessment of re-experiencing, unanchored to one index trauma, using clinician administered standardised assessment tools	All or most of the checklist criteria have been fulfilled, where they have not been fulfilled, the conclusions are very unlikely to alter

- Should be reserved for those aspects of the study in which significant sources of bias may persist

+ Indicates that either the answer to the checklist question is not clear from the way the study is reported, or that the study may not have addressed all potential sources of bias for that particular aspect of study design

++ Indicates that for that particular aspect of the study design, the study has been designed or conducted in such a way as to minimise the risk of bias.

Deciding which quality criteria to include in this tool was achieved by drawing on research in the following areas: psychosis assessments; assessment of re-experiencing of traumatic memories, and general methodological assessment quality. Quality factors identified in these areas were discussed and considered for inclusion by the author and supervisors.

As an outcome of this process, five factors were identified. The NICE rating system for methodological quality of studies was employed for rating these factors (NICE, 2007). The NICE rating system rates the studies from good quality (when all or most of the criteria have been fulfilled) (++), to reasonable quality (when some of the criteria have been fulfilled) (+) to poor quality (when few or no criteria are fulfilled (−)). A total quality score was derived from summing the quality assessment variables and a corresponding quality rating of low (3-5), medium (6-7) and high (8-10) were given to the studies. The quality assessment tool was developed in collaboration with the research supervisors, piloted on four of the included articles, and then refined. These factors are listed below:

1. Selection of subjects: contained two separate measures of quality, (i) the richness of the description of the sample and (ii) sample size. Studies with larger samples with more detailed descriptions of the subjects were given higher quality ratings. Poorly described samples were rated lowest.
2. Psychosis measure: Gold standard diagnostic interviews were allocated the highest quality score, while those using an un-validated self-report questionnaire were rated as lowest quality.
3. Trauma Exposure Assessment: Studies in which all traumas were comprehensively assessed using a standardised measure were rated as highest

quality. Those with only trauma of a specific nature assessed were given the lowest rating.

4. Measure of re-experiencing: Those studies which undertook a comprehensive assessment of re-experiencing, which were unanchored to one index trauma using gold standard PTSD diagnosis tools, were given a higher quality rating than a self-report questionnaire investigating the same constructs. Re-experiencing measured in relation to one index trauma was given the lowest rating.
5. Analysis: Studies in which the relationship was measured between re-experiencing of traumatic memories and specific symptoms of psychosis, were set as the highest quality. Studies which only investigated the relationship with global symptoms of psychosis were given a lower quality rating.

3. Results

Thirteen studies investigating the relationship between psychosis symptom severity and re-experiencing of traumatic memories are summarized in Table Two.

3.1 Summary of studies

Nine studies included a clinical sample of people with a diagnosis of schizophrenia or first episode psychosis. Three studies had a general population sample (Kocsis-Bogar, Miklosi, & Perczel-Forintos, 2013; Holmes & Steel, 2004; Gracie et al, 2007; Alsawy, Wood, Taylor, & Morrison, 2015) and one study recruited participants attending a trauma service (Marzillier & Steel, 2007). Studies looked at the relationship between psychosis symptom severity and re-experiencing of different trauma types. Six studies investigated re-experiencing of traumatic memories related to their psychosis illness, five studies investigated this relationship in regards to lifetime traumas and two studies measured re-experiencing in relation to

childhood trauma. All studies included both male and female participants, with a roughly equal weighting by gender. Sample size ranged from n = 13 to n = 7403. Overall n = 8,300 participants were involved in the studies. The mean age ranged between 20 – 44 years.

Table 2. *Detailed overview of the studies included in this review*

Author	Clinical Group	Trauma Type	Study Aims	Measure of Re-experiencing	Measure of Psychosis	Statistical Analysis	Mean re-experiencing and psychosis symptom ratings (SD)	Relevant Findings
Clinical Sample								
Jackson et al, 2004	N=35. FEP Total sample Female N=9, Age M=25.8 (5.09)	PR-PTSD First episode of psychosis	To evaluate the diagnostic status of first episode psychosis as a PTSD-triggering event and to determine the extent to which cognitive factors can mediate the expression of PTSD symptomatology	IES	PANSS KGV	Pearson's correlation	Re-experiencing: M=12.7 (8.8). Psychosis: Not reported	There was not a significant relationship between re-experiencing and residual psychotic symptoms. While psychotic symptoms were in remission for much of the sample, there was no significant relationship between hallucinations and delusions and re-experiencing (hallucinations r=0.23; p=0.18; delusions r=0.20; p=0.25).
Harrison & Fowler, 2004	N=38 Schizophrenia Female=8. Age M=36.5 (11.1)	PR-PTSD Specifically ask people to think about their psychotic symptoms and experience of hospitalisation	To examine the association between negative symptoms, autobiographical memory and traumatic reactions to psychosis and hospitalisation.	IES-R subscale	PANSS	Spearman's Correlation	Re-experiencing: Psychosis M=4.11 (4.42) and Hospitalisation M=1.55 (2.39). Psychosis: Positive M=12.61 (5.58), negative M=13.74 (7.05)	There was a significant positive relationship between re-experiencing of hospitalisation and negative symptom severity (r=0.48, p<0.05). There was no significant relationship between re-experiencing of hospitalisation and positive symptom severity (r=0.20, p=N.S), re-experiencing of psychosis and negative symptom severity (r=0.08, p=N.S) and re-experiencing of psychosis and positive symptom severity (r=0.15, p=N.S).
White & Gumley, 2009	N=27 Schizophrenia Female N=7 Age M = 38.5 (SD 10.7).	PR-PTSD Specifically asked people to think about traumas related to their illness	To investigate if PP-PTSD is associated with fear of recurrence, negative idiosyncratic appraisals of psychotic experiences, and intolerance of	CAPS-S	PANSS	Pearson's Correlation	*No PTSD diagnosis* Re-experiencing: M=4.2 (5.6). Psychosis: Positive M=11.4 (2.5), negative M=10.0 (3.7), total	There was a significant positive relationship between re-experiencing and negative symptom (r=0.42, P<0.05) and total symptom severity (r=0.50, p<0.01). The relationship was not significant with positive symptoms (r=0.27,

			uncertainty.				M=48.0 (6.3) *PTSD diagnosis* Re-experiencing M=19.0 (7.53). Psychosis: Positive M=13.8 (3.7), negative M=14.7 (5.3), total M=62.3 (13.4).	p=NS
Tarrier et al, 2007	N=35 FEP. Female N=10 Age M=24.9 (SD 6.3).	PR-PTSD Specifically asked people to think about traumas related to their hospitalisation or treatment of their illness.	To assess the subjective effect and consequences of suffering a first episode psychosis.	CAPS modified for use with patients with psychotic illness	PANSS	Type of analysis not reported	Re-experiencing: Not reported Psychosis: Not reported	There was no significant relationship between re-experiencing and positive, negative or general psychotic symptoms. Inferential statistics not reported.
Priebe et al, 1998	N=105 schizophrenia Female 44.8% Age M=38.6 (SD 9.4)	PR-PTSD The traumatic events were either an involuntary admission or if not present negative aspect of treatment asked as part of the PTSD standardised interview	To investigate the association between involuntary admissions and PTSD symptoms, and the correlation between PTSD symptoms and psychopathology.	PTSD Interview	BPRS PSE	Pearson's correlations	Re-experiencing of involuntary admission: M=8.1 (5.2) Psychosis: (BPRS) M=32.0 (8.6), (PSE) M=22.2 (14.1)	There was a significant positive relationship between re-experiencing and anxiety / depression on the BPRS (r=.33 p<0.01). There were no significant relationships between experiencing and BPRS Total, BPRS Activation, BPRS Thought disturbance, BPRS Hostility and suspiciousness and PSE Delusions and hallucinations.
Shaw et al, 2002	N = 42 Schizophrenia spectrum Female N=16 Age M =29.8 (SD 10.86)	PR-PTSD IES score was in relation to experience of psychosis and treatment.	To examine the contribution of treatment and illness factors as well as previous trauma in the development of PP/PTSD	IES	CIDI FCRS	Pearson's correlations	Re-experiencing: M=33.91 (17.80) Psychosis: Not reported	There was a positive relationship between re-experiencing and psychosis severity (FCRS r=.31, p<0.05). There was no relationship with total number of schizophrenia symptoms (CIDI) (r=.15, NS)

Resnick et al, 2003	N=47 Schizophrenia Female N=30 Age M=44.1 (SD 9.7)	Lifetime Trauma History Questionnaire-R	To evaluate the hypothesis that trauma and PTSD severity would be positively associated with schizophrenia symptoms	CAPS subscale	PANSS	Pearson's Correlations	Re-experiencing: no criterion A trauma M=1.81 (3.19), adult trauma M=2.19 (3.49), child and adult trauma M=10.44 (7.23) Psychosis: Total M=2.2 (0.5), positive M=2.4 (1.2),negative M=2.1 (0.9)	There was no significant relationship between re-experiencing and total PANSS (r=.06) positive symptoms (r=.18) and negative symptoms (r=-.14).
Bendall et al, 2013	N=13 FEP with CSA. Female N=54%, Age M=20.62 (SD, 3.10)	Lifetime Childhood Trauma Questionnaire	To test theories of the relationship between CSA, hallucinations and delusions, posttraumatic intrusions, and selective attention in FEP.	IES-R	PANSS	Pearson's correlation	Re-experiencing M=1.84 (1.38). Psychosis: positive Symptoms M=21.46 (4.96), negative symptoms M=19.31 (2.21)	There was a positive relationship between re-experiencing and combined delusions items (r=0.47, p=0.05), this relationship was at trend level with hallucinations (r=0.44, p=0.06).
Schafer et al, 2011	N=38 FEP Female=60% female. Age M=31	Lifetime The Childhood experience of Care Abuse Questionnaire	To examine the internal reliability and comparability of the IES in a sample of people with FEP and controls exposed to severe physical/sexual abuse.	IES	SCAN	Spearman's Correlation	Re-experiencing M=6 (8.3). Psychosis: Not reported	There was a significant negative relationship between re-experiencing and reality distortion (r_s=-0.362, p=.046). There was no relationship between re-experiencing and negative symptoms (rs= 0.085, p=0.753)
Non-Clinical Sample								
Kocsis-Bogar et al, 2013	N=198. Age M=20.47 (1.95) Undergraduate students	Lifetime Paykel's Life Events scale (short Version)	Whether schizotypy has a relationship with vulnerability to traumatic intrusions	IES	O-LIFE	Pearson's Correlations	Re-experiencing M=8.02 (5.84). Psychosis: Unusual experiences M=9.21 (5.15), introvertive anhedonia M=5.28 (3.68), total M=31.32 (12.30).	There were positive relationships between intrusions and positive symptoms (r=0.282 p<0.001), intrusions and negative symptoms (r=0.143, p<0.05) and intrusions and total (r=0.348, p<0.001).

Marzillier & Steel, 2007	N=50, female N=27. Age M=38.1. Trauma service waiting list	Lifetime Index trauma taken from referral to service. No routine trauma measure used.	To investigate schizotypy as a vulnerability factor for trauma-related intrusions through the use of a clinical sample.	PDS	STA	Pearson's correlation	Re-experiencing: M=32.76 (12.35) Psychosis: M=20.43 (7.86)	There is a positive relationship between total and re-experiencing ($r=0.34$ $p<0.05$) and magical thinking and re-experiencing ($r=0.50$ $p<0.01$). There was no significant relationship between unusual perceptual experiences and re-experiencing ($r= 0.22$, p=NS) and paranoid suspiciousness and re-experiencing ($r=0.23$, p=NS)
Gracie et al, 2007	N=228 Female N=161. Non-clinical population. Age M=328.9 (8.7)	Lifetime Traumatic Life Events Questionnaire + 2 items from The Childhood Trauma Questionnaire	To investigate the relationship between trauma and predisposition to hallucinations and to paranoia in a non-clinical sample.	SRS-PTSD	PS LSHS	Bivariate Pearson's Correlation	Re-experiencing M=1.7 (1.5) Psychosis: Paranoia scale M=41.7 (14.9). Launay Slade Hallucination Scale M=2.7 (2.2).	There is a positive relationship between re-experiencing and paranoia ($r^2=0.31$ $p<0.001$) and hallucinations ($r^2=0.26$, $p<0.001$). However, while significant, the amount of variability explained by re-experiencing alone was small $sr^2=0.03$ (3%).
Alsawy et al, 2015	N=7403 Female N=4206. Age 16-75+ Adult Psychiatric Morbidity survey	Lifetime One question asked about trauma from SCID. Limited to over 16 years	To examine the relationship between symptoms of PTSD with paranoia and auditory hallucinations	TSQ	PSQ	Pearson's correlation and logistical regression	Re-experiencing: Not reported Psychosis: Not reported	There was a positive relationship between re-experiencing and paranoia and auditory hallucinations ($p<0.005$). The odds of experiencing paranoia and hallucinations increase with greater numbers of re-experiencing symptoms with a dose dependent relationship. Hallucination: 3 reliving symptoms OR=4.98 CI (1.49-16.61) $p<0.05$. 4 reliving symptoms OR 14.05 CI (6.67-29.47). $p<0.05$. Paranoia: 3 reliving symptoms OR=4.33 CI (2.05-9.18) $p<0.05$. 4 reliving symptoms OR 4.36 CI (1.88-10.10). $p<0.05$.

Footnote:

Post-traumatic stress disorder (PTSD); First episode psychosis (FEP); Post-psychotic post-traumatic stress disorder (PP-PTSD); Childhood sexual abuse (CSA)

Psychosis:
Positive and Negative Symptom Scale (PANSS) Kay et al., 1987; Brief Psychiatric Rating Scale (BPRS) Overall & Gorham, 1962; Schizotypal Personality Scale (STA) Claridge & Broks, 1984; Oxford-Liverpool Inventory for Feelings and Experiences (O-LIFE) Mason et al., 1995; The Schedules for Clinical Assessment in Neuropsychiatry (SCAN) World Health Organization, 1992a; Factor Construct Rating Scale (FCRS) Overall, 1986; The Paranoia Scale (PS) Fenigstein A, Vanable PA. 1992; The Launay Slade Hallucination Scale (LSHS) Launay G, Slade P 1981; Psychosis Screening Questionnaire (PSQ) Bebbington & Nayani, 1995; Composite International Diagnostic Interview (CIDI) World Health Organization, 1990; The Psychiatric Assessment Scale (KGV) Krawiecka, Goldberg & Vaughan, 1977.

Re-experiencing:
Impact of Event Scale (IES) Weiss & Marmar, 1997; Impact of Event Scale- Revised (IES-R) Weiss, 2007; Clinician Administered PTSD Scale (CAPS) Blake et al., 1990; Post-traumatic Diagnostic Scale (PDS) Foa, Cashman, Jaycox & Perry, 1997).The Self-Report Scale-Post Traumatic Stress Disorder (SRS-PTSD) Carlier I, Lamberts R, Van Uchelen A 1998; Trauma Screening Questionnaire (TSQ) Brewin et al 2002; Trauma Memory Questionnaire (TMQ) Halligan et al. 2003; Post-traumatic Diagnostic Scale (PDS) Foa, 1995

3.2 Overview of Quality Ratings

The quality assessment of the studies (Table Three) indicated that while there was a range in the quality of the studies, the majority of the studies were rated low quality. For example, only four studies scored a medium quality rating (6 - 7 out of a possible 10). A high quality rating was not achieved by any of the studies. The main weakness across the studies was that they did not systematically assess re-experiencing in relation to the total range of people's traumatic experiences, but rather re-experiencing was anchored to one index trauma. Additionally, studies of lowest quality also did not assess trauma comprehensively. In general, studies of medium quality investigated the relationship between re-experiencing and specific symptoms of psychosis, while those of lower quality looked at this relationship only in relation to global symptoms of psychosis.

Table 3. *Quality Assessment of Included Papers*

Author	Selection of Subjects	Psychosis Measure	Re-experiencing Measure	Analysis	Trauma Assessment	Overall Quality Score	Overall Quality Rating
Resnick et al, 2003	++	++	-	+	++	7	Medium
Jackson et al, 2004	++	++	-	++	-	6	Medium
Gracie et al, 2007	++	+	-	++	++	7	Medium
Kocsis-Bogar et a, 2013	++	+	-	+	++	6	Medium
Harrison & Fowler, 2004	++	++	-	+	-	5	Low
White & Gumley, 2009	+	++	-	+	-	4	Low
Tarrier et al, 2007	++	++	-	+	-	5	Low
Shaw et al, 2002	++	++	-	-	-	4	Low
Bendall et al, 2013	+	++	-	++	-	5	Low
Schafer et al, 2011	+	++	-	+	-	4	Low
Priebe et al, 1998	++	+	-	+	-	4	Low
Alsawy et al, 2015	++	+	-	++	-	5	Low
Marzillier & Steel, 2007	++	+	-	-	-	3	Low

3.2.1 Trauma Assessment

Six studies did not comprehensively assess trauma experience, as people were only asked about traumatic experiences in relation to their psychosis illness (Jackson et al, 2004; Harrison & Fowler, 2004; White & Gumley, 2009; Tarrier et al, 2007; Priebe et al, 1998; Shaw et al, 2002). Three studies more comprehensively assessed lifetime trauma experiences using standardised measures. Resnick et al (2003), assessed trauma with the Trauma History Questionnaire, Kocsis-Bogar et al (2013), assessed trauma with the Paykel's Life Events scale and Gracie et al (2007) used the Traumatic Life Events Questionnaire and two items from The Childhood Trauma Questionnaire, notably those assessing exposure to neglect, bullying and emotional and physical abuse. The Trauma History Questionnaire is a self-report measure of both the frequency and age of a range of potentially traumatic events. The Paykel's Life Events Scale is also a self-report measure which asks about a range of traumatic events. However, in addition, respondents are asked for any further events missing from the list that they experienced and found stressful. While not asking about the frequency and age at which the event occurred, this measure asks for a binary response of experience and the subjective severity of the event. The Traumatic Life Events Questionnaire also asks for a binary response to exposure to a range of potentially traumatic events, and additionally investigates intense fear, helplessness or horror which was experienced if the event occurred.

Two studies assessed trauma experience using standardised measures, restricted to experiences occurring during childhood. Bendall et al, (2013) assessed childhood trauma using the Childhood Trauma Questionnaire and Schafer et al, (2011) used the Childhood Experience of Care Abuse Questionnaire. The Childhood Trauma Questionnaire screens for histories of five types of maltreatment; emotional,

physical and sexual abuse, and emotional and physical neglect in childhood, and it asks for responses to each question on a 5-point Likert Scale, ranging from never true to very often true. The Childhood Experience of Care Abuse Questionnaire assessed lack of parental care (neglect and antipathy), and both sexual and physical abuse, and defines childhood up to the age of 17 years.

Alsawy et al (2015) asked about people's experience of trauma, based on questions constituting the SCID, and limited this to experience over the age of 16, while one study undertook no assessment of trauma, measuring only the index trauma taken from referral to a trauma service (Marzillier & Steel, 2007).

3.2.2. Assessment of re-experiencing of traumatic memory

There was a wide range of measures for assessing re-experiencing of traumatic memories. The most common were self-report questionnaires for PTSD, with clinical interviews for PTSD also being used, and other studies using observational diary methods.

Self-report questionnaires are the most frequently used in the studies, however, their properties vary over the time periods people are asked to report their experience of symptoms, and if the presence, frequency or severity of symptoms are measures. The most frequent assessment was the Impact of Event Scale (IES) used by four studies (Schafer et al, 2011; Shaw et al, 2002; Kocsis-Bogar et al, 2013; Jackson et al, 2009), with two studies using the revised version of the scale (Harrison & Fowler, 2004; Bendall et al, 2013). The Impact of Event Scale (Horowitz, Wilner & Alvarez, 1979) is a self-report questionnaire that assesses frequency of avoidance and intrusion commonly experienced in PTSD after a traumatic event. The revised scale contains seven additional items related to the hyperarousal symptoms of PTSD

(Weiss and Marmar, 1996). Other less commonly used self-report measures was the Posttraumatic Diagnostic Scale (PDS) which was used by one study (Marzillier & Steel, 2007). This scale assessed both the frequency and associated distress of PTSD symptoms over the past month (Foa, Cashman. Jaycox, & Perry, 1997), whereas the IES enquired about symptoms over the past week. The Self-Report Scale-Post Traumatic Stress Disorder (SRS-PTSD) was the measure used by one study (Gracie et al, 2007), which also measured both the presence and severity of PTSD symptoms. The Trauma Screening Questionnaire (TSQ) (Brewin, 2002), used in one study (Alsawy et al, 2015) assessed frequency of symptoms, with the experience having to have occurred twice in the past week to be endorsed.

Clinician-administered clinical interviews were less frequently used by studies included in this review. The gold standard in PTSD assessment, Clinician Administered PTSD Scale (CAPS) was used by one study (Resnick et al, 2003) with two studies (White & Gumley, 2009; Tarrier et al, 2007) using modified versions of the interview for use with people with schizophrenia (Gearson, 2004). The CAPS (Blake et al, 1995) is a structured interview designed to make a PTSD diagnosis, as well as measuring both frequency and intensity of symptoms. The PTSD Interview (PTSD-I) was also used in one study (Priebe et al, 1998). In this interview, the presence and frequency of symptom is measured (Watson, Juba, Manifold, Kucala & Anderson, 1991).

3.2.3 Assessment of psychosis

A wide range of measures of psychosis were employed, both those using clinician interviews, and those using self-report measures. Furthermore, some measures are developed for diagnostic purpose in a psychosis population, while

others look at the continuum of subclinical features of psychosis. This highlights the wide variety in the symptomatology, quality and scope of the measures used in studies included in this review.

A number of clinician administered assessment scales were used. The most commonly used measure was the Positive and Negative Syndrome Scale (PANSS) which was used by five studies (Harrison & Fowler, 2004; White & Gumley, 2009; Resnick et al, 2003; Bendall et al, 2013; Tarrier et al, 2007). The PANSS is used to assess the severity and quality of psychotic symptoms (Kay et al, 1987), and draws on both a clinical interview as well as family member's reports. Less frequently used measures of psychosis were the Composite International Diagnostic Instrument (CIDI) (WHO, 1993) and Factor Construct Rating Scale (FCRS) (Overall, 1968) used in Shaw et al (2002) study. Both are clinician based interviews. The CIDI is based on the World Health Organization's Composite International Diagnostic Interview (WHO, 1990) and measures the prevalence of mental disorders and severity of these disorders, while the FCRS scale focuses only on the severity of psychotic symptomatology. Jackson et al (2004) study used the Psychiatric Assessment Scale (PAS) (Krawiecka, et al, 1977), which is a semi-structured format to elicit information from the patient, and includes observations of their behaviour in the interview about positive, negative and affective symptoms, while limiting this to the preceding month. Priebe et al (1998) asked participants to complete the Brief Psychiatric Rating Scale: (BPRS; Overall & Gorham, 1962). While this scale also assesses the positive, negative, and affective symptoms of individuals using a clinical interview, it takes into account observations of the patients for a longer time-period than the PAS (2-3days). Schafer et al (2011), asked participants to complete the Schedules for Clinical Assessment in Neuropsychiatry (SCAN; Wing et al, 1990).

SCAN is a semi-structured clinical interview measuring and classifying psychopathology and behaviour associated with the major psychiatric disorders in adult life. SCAN was originally called Present State Examination.

Self-report measures were also commonly used and can be differentiated by those looking at symptoms associated with a diagnosis of psychosis, and those measuring the continuum in experiences of psychosis. Gracie et al, (2007) study looked at specific measures of positive symptoms of psychosis: Paranoia Scale (Fenigstein & Vanable, 1992) and Launay Slade Hallucination Scale (Launay & Slade, 1981). The Paranoia Scale looks at the severity of paranoia in a non-clinical population. The Launay Slade Hallucination Scale measures presence of both clinical and subclinical levels of auditory and visual hallucinatory experience. Alsawy et al (2015) study used the Psychosis Screening Questionnaire (PSQ; Bebbington & Nayani, 1995), which assessed the binary presence of symptoms associated with schizophrenia and affective psychosis over the preceding year. Historical psychotic experiences are not measures by this scale.

Three studies used self-report measures of schizotypal traits. Schizotypal personality disorders in the DSM-IV lie at the less extreme end of the schizophrenic disorders. Oxford-Liverpool Inventory for Feelings and Experiences (O-LIFE) (Mason et al., 1995) was used in one study (Kocsis-Bogar et al, 2013). The O-LIFE has four subscales of symptoms: unusual experiences (consistent with positive symptoms), cognitive disorganization, introvertive anhedonia (consistent with negative symptoms) and impulsive nonconformity. The scale measures presence and not severity of these experiences. Marzillier & Steel (2007) used the Schizotypy Personality Scale (STA) (Claridge and Brooks, 1984). This scale uses different constructs of schizotypal experiences. It measures the presence of schizotypal traits,

such as psychotic episodes, irrational beliefs, cognitive disorganization, anxiety, reality distortion, blunted emotions, hostility and asocial behaviour.

3.3. The relationship between re-experiencing and psychosis symptoms

Thirteen studies investigated the association between the severity of re-experiencing trauma memories and global, positive, negative and specific psychotic symptom. The relationships separated into different symptom dimension are summarised in Table Four.

Table 4. *Summary overview of the studies included in this review*

Author	Sample	Trauma Exposure	Re-experiencing measure	Psychotic Symptom measure	Relationship between psychosis and re-experiencing?				
					Hallucinations	Paranoia	Positive	Negative	Global
Gracie et al, 2007	Non-Clinical	Lifetime trauma	SRS-PTSD	PS and LSHS	✓ (+) correlation	✓ (+) correlation	-	-	-
Alsawy et al, 2015	Non-Clinical	Lifetime trauma	TSQ	PSQ	✓ (+) correlation	✓ (+) correlation	-	-	-
Bendall et al, 2013	FEP	Childhood trauma	IES	PANSS	Trend (+) correlation	-	-	-	-
Jackson et al, 2004	FEP	Psychosis related: First episode psychosis	IES	KGV	X	-	X	-	-
Schafer et al, 2011	FEP	Childhood trauma	IES	SCAN	-	-	✓ (-) Correlation	X	-
Harrison & Fowler, 2004	Schizophrenia	Psychosis related: Psychotic symptoms and hospitalisation	IES-R	PANSS	-	-	X	✓ (+) correlation (hospitalisation) X (symptoms)	-
White & Gumley, 2009	Schizophrenia	Psychosis related: Psychosis Illness	CAPS-S	PANSS	-	-	X	✓ (+) correlation	✓ (+) correlation
Tarrier et al, 2007	FEP	Psychosis related: Hospitalisation or treatments of illness	CAPS	PANSS	-	-	X	X	X
Priebe et al, 1998	Schizophrenia	Psychosis related: Involuntary hospital admission	PTSD Interview	BPRS PSE	-	-	X	-	X
Resnick et al, 2003	Schizophrenia	Lifetime trauma	CAPS	PANSS	-	-	X	X	X
Kocsis-Bogar et al, 2013	Non-Clinical	Lifetime trauma	IES	O-LIFE	-	-	✓(+) correlation	✓(+) correlation	✓(+) correlation

Author	Sample	Trauma Exposure	Measure of Re-experiencing	Psychotic Symptom AX	Relationship between schizophrenia and re-experiencing				
					Hallucinations	Paranoia	Positive	Negative	Global
Marzillier and Steel, 2007	Clients on a trauma waiting list	Lifetime trauma	PDS	STA	-	-	-	-	✓ (+) correlation
Shaw et al, 2002	Schizophrenia spectrum	Psychosis related: Psychosis and treatment	IES	CIDI FCRS	-	-	-	-	✓ (+) Correlation (FCRS) X (CIDI)
Relationship Summary					2/3 Some evidence	2/2 Some evidence	2/8 No support/little evidence Potential pattern by trauma type Lifetime trauma: 2/3. Relationships opposite direction PR/Trauma: 0/5	2.5/6 No support /little evidence No pattern by type of trauma	3.5/7 No support/little evidence No pattern by type of trauma

Footnote: "-": relationship not investigated; "✓": the study reported a relationship between psychosis severity and re-experiencing severity; "X": the study reported a relationship between psychosis severity and re-experiencing severity; (+): positive correlation; (-): negative correlation

First episode psychosis (FEP); Positive and Negative Symptom Scale (PANSS) Kay et al., 1987; Brief Psychiatric Rating Scale (BPRS) Overall & Gorham, 1962; Schizotypal Personality Scale (STA) Claridge & Broks, 1984; Oxford-Liverpool Inventory for Feelings and Experiences (O-LIFE) Mason et al., 1995; The Schedules for Clinical Assessment in Neuropsychiatry (SCAN) World Health Organization, 1992a; Factor Construct Rating Scale (FCRS) Overall, 1986; The Paranoia Scale (PS) Fenigstein A, Vanable PA. 1992; The Launay Slade Hallucination Scale (LSHS) Launay G, Slade P 1981; Psychosis Screening Questionnaire (PSQ) Bebbington & Nayani, 1995; Composite International Diagnostic Interview (CIDI) World Health Organization, 1990; The Psychiatric Assessment Scale (KGV) Krawiecka, Goldberg & Vaughan, 1977; Impact of Event Scale (IES) Weiss & Marmar, 1997; Impact of Event Scale- Revised (IES-R) Weiss, 2007; Clinician Administered PTSD Scale (CAPS) Blake et al., 1990; Post-traumatic Diagnostic Scale (PDS) Foa, Cashman, Jaycox & Perry, 1997).The Self-Report Scale-Post Traumatic Stress Disorder (SRS-PTSD) Carlier I, Lamberts R, Van Uchelen A 1998; Trauma Screening Questionnaire (TSQ) Brewin et al 2002; Trauma Memory Questionnaire (TMQ) Halligan et al. 2003; Post-traumatic Diagnostic Scale (PDS) Foa, 1995

3.3.1 Positive symptoms of psychosis

The most frequently investigated relationship was of that between a single construct of positive symptoms of psychosis and severity of re-experiencing of traumatic memories. The majority of studies investigated this relationship (*n* = 8).

The majority of these studies (n = 6) did not find a relationship between positive symptoms of psychosis and severity of re-experiencing of traumatic memories. Of interest, five of these studies were looking at re-experiencing of psychosis-related traumas. Despite finding a relationship between severity of re-experiencing of traumas related to people's psychosis illness and both global and negative symptoms, White & Gumley (2009) did not find a relationship when this was restricted to positive symptoms. The same pattern of findings was reported by Harrison & Fowler (2004). They also did not find a relationship between positive symptoms of psychosis (PANSS) and re-experiencing of experiences linked to their psychosis (IES-R). Using a variety of measures of both re-experiencing related to an experience of psychosis and psychosis severity, Tarrier et al (2007), Priebe et al (1998) and Jackson et al (2004) also did not report a relationship. In addition, one study that looked at re-experiencing in relation to a lifetime trauma, also did not find a relationship between psychosis and re-experiencing (Resnick et al, 2003).

While two studies found a relationship between positive symptoms of psychosis and re-experiencing, the pattern of this relationship was in opposite directions. Kocsis-Bogar et al (2013) found a positive relationship between re-experiencing on the IES in relation to any lifetime trauma and psychosis severity on the O-LIFE in a non-clinical sample. However, Schafer et al, (2011), found a negative relationship in a clinical population: higher frequency of re-experiencing

related to childhood trauma on the IES was associated with lower endorsement of reality distortion (hallucinations, delusions and thought disorder) on the SCAN.

The negative correlation was unexpected by the authors. However, they do suggest that the findings may reflect that re-experiencing and hallucinations are qualitatively different phenomenon. Alternatively, they suggest that while PTSD and trauma experience has been associated with hallucinations (Hardy et al., 2005), the composition of the SCAN reality distortion subscale is also made up of thought disorder and delusional components, which have not been implicated in this relationship. In addition, the pattern of findings may reflect that for those with first episode psychosis, intrusions of trauma memories may not be attributed to prior trauma, but rather give rise to hallucinations and delusional beliefs (Morrison, 2001). Finally, they propose that the result may reflect a type I error, due to the multiple correlations calculated between subscales on both the measure of psychosis and measure of PTSD phenomenon.

3.3.2 Hallucinations

Four out of thirteen studies investigated the relationships between re-experiencing of traumatic memories and hallucination severity. In general, the studies found some evidence for a positive relationship. Gracie et al (2007) found a positive relationship between re-experiencing of a range of lifetime traumas on the SRS-PTSD and hallucinations on the LSHS in a non-clinical population $r^2=0.26$, $p<0.001$. Consistently, Alsawy et al (2005) reported a dose dependent relationship. They reported that increased re-experiencing on the THQ, assessing lifetime trauma, was significantly associated with hallucinations on the PSQ. Specifically, if an individual experienced more than four re-experiencing symptoms, they had more

than fourteen times the odds of experiencing hallucinations. While Bendall et al (2013) found a positive relationship between increased re-experiencing of childhood traumatic memories as measured on the IES, and hallucinations as measured on the PANSS at trend level r=.44, p=0.06, this study may have been underpowered to identify a statistically significant relationship (*n* = 13).

However, Jackson et al (2004) found no correlation between hallucinations as measured on the KGV and re-experiencing on the IES, r=0.23, p=0.18. While the mean severity of psychosis experience was not reported, the study notes that the psychotic symptoms were in remission with a low base rate of severity and re-experience was restricted to psychosis-related trauma.

3.3.3 Paranoia

Two out of thirteen studies investigated the relationships between re-experiencing of traumatic memories and paranoia severity. Both of these studies found a positive relationship and, of note, investigated this relationship in a broad range of lifetime traumas, not inclusive of psychosis-related trauma. Gracie et al (2007) found a positive relationship between re-experiencing of a range of lifetime traumas on the SRS-PTSD self-report measure and paranoia on the PS in a non-clinical population $r^2=0.31$, $p<0.001$. Alsawy et al (2005) reported a dose dependent relationship: increased re-experiencing on the THQ was significantly associated with paranoia on the PSQ. Specifically, if an individual experienced more than four re-experiencing symptoms, they had just under five times the odds of experiencing paranoia.

3.3.4 Negative symptoms of psychosis

Half of the studies (n = 6) focused their review of this relationship by looking at the relationship between re-experiencing of traumatic memories and negative symptom severity. Studies investigating this relationship reported little evidence of an association. There was no clear pattern to the findings in relation to trauma type (i.e. lifetime trauma vs. psychosis-related trauma).

Of the three studies investigating the relationship between psychosis and re-experiencing of lifetime trauma, two did not find a relationship. Schafer et al (2011) found no correlation between negative symptoms and re-experiencing of traumas related to childhood abuse on the IES. However, the mean severity of psychosis is not reported in this study. Resnick et al (2003) did not find a relationship using the CAPS and PANSS, and looked at a broader range of traumas, not restricted to childhood, although it is, worth noting that there was a low base rate of psychosis experiences. However, Kocsis-Bogar et al (2013) did find a relationship between re-experiencing on the IES in relation to any lifetime trauma and psychosis severity on the O-LIFE.

Three studies investigating the relationship between psychosis and re-experiencing of psychosis-related trauma. Two studies did not find a relationship. Tarrier et al (2007) did not find a relationship when re-experiencing was based on traumas related to hospitalisation or treatment of symptoms of psychosis when using clinician interview measures of re-experiencing and psychosis. However, the statistical values were not reported in the study. White and Gumley (2009) also did not find a relationship using the CAPS-S, the gold standard measure of re-experiencing developed for people with schizophrenia, based on traumas related to their experience of psychotic illness and the PANSS. However, one study found that

this relationship was dependent on the type of psychosis-related trauma that was the basis of re-experiencing. Using the IES-R and PANSS, Harrison and Fowler (2004), found that there was a positive relationship between re-experiencing of traumatic memories of hospitalisation and negative symptom severity, however this pattern was not seen in relation to traumatic memories of psychotic symptoms.

3.3.5 Global symptoms of psychosis

Seven studies investigated the relationship between global symptoms of psychosis and re-experiencing. As found with negative symptoms, there was no clear pattern to the findings in relation to trauma type (i.e. lifetime trauma vs. psychosis-related trauma).

While two studies found a positive relationship when lifetime trauma was assessed, one study did not. Kocsis-Bogar et al (2013) found a positive relationship between re-experiencing on the IES in relation to any lifetime trauma and psychosis severity on the O-LIFE. In a population of people attending a trauma service, Marzillier and Steel, (2007), found a positive relationship between PDS related to the index trauma, and STA completed by the participant in their home environment. However, using the CAPS and PANSS, Resnick et al, (2003) did not find this relationship.

Four studies investigating the relationship between psychosis and re-experiencing specifically related to psychosis-related traumas. One study reported a positive relationship. White and Gumley (2009) reported a positive relationship using the CAPS-S, the gold standard measure of re-experiencing developed for people with schizophrenia, based on traumas related to their experience of psychotic illness and the PANSS. However, two studies did not report this relationship (Tarrier et al, 2007;

Priebe et al, 1998). Tarrier et al (2007), noted the lack of this relationship between severity scores on the CAPS and PANSS in relation to people's experience of hospitalisation and treatment of psychosis illness. However, it is of note that there was a low base rate of psychosis experience. Priebe et al (1998) also did not report a relationship between re-experiencing as measured by the PTSD interview in relation to the participant's illness, in this case restricted where possible to involuntary admission and psychosis measured on both the BPRS and PSE. However, one study found that this relationship may be more dependent on the severity of psychosis symptoms rather than the global number of symptoms reported. Shaw et al (2002) reported a positive relationship between re-experiencing symptoms related to the experience of psychosis and treatment on the IES and psychosis severity as measures on the FCSR. However, the relationship was not significant with the total number of schizophrenia symptoms as measured by the CIDI. Unfortunately, this difference between frequency and severity was not investigated by other studies in the review.

Given the equivocal nature of the findings, the sample sizes of the studies were reviewed to explore any issues of power in the studies. Despite differing findings, sample size was not identified as a key variable in their interpretation. For example, Kocsis-Bogar et al (2013) reported a positive relationship with a large sample size (n = 198). However, Priebe et al (1998) did not report relationship with a large sample size (n = 105), while White and Gumley reported a positive relationship with a small sample size (n = 27).

3.4 Summary

There appears to be some evidence for a relationship between positive symptoms of psychosis and re-experiencing severity, when investigated in relation to

specific positive symptom types, specifically hallucination and paranoia. However, such findings are based on a limited number of studies. There is currently no consistent evidence for a relationship between negative and global symptoms of psychosis and severity of re-experiencing of both lifetime and psychosis-related traumas.

4. Discussion

In line with evidence implicating a causal role for traumatic life events in psychosis (Bentall et al, 2014), this review systematically investigated whether the severity of re-experiencing trauma memories is associated with psychotic symptom across the continuum.

This review did not find a relationship between global and negative symptoms of psychosis, and severity of re-experiencing of traumatic memories. Negative symptoms of psychosis may be considered within a two-factor model of experiential and expressive symptoms (Horan et al., 2011). It may be, for example, that there is a relationship between experiential symptoms and re-experiencing severity, but that expressive symptoms confound a relationship being reported in the studies.

While the literature is limited, there is some evidence to support a positive relationship between the severity of specific positive symptoms of psychosis, notably hallucinations and paranoia, and increased re-experiencing of traumatic memories. However, this pattern of findings was not supported when investigated in relation to positive symptoms as a whole. It may be that other symptoms, which are part of this construct, confound this relationship. For example, formal thought disorder may not be linked to severity of re-experiencing and may confound the relationship.

Therefore, the findings of this review suggest that this further impairment in the ability to contextual encode information may be specifically associated with people's experience of intrusions and related appraisals, in line with cognitive-behavioural accounts of the mechanisms by which trauma impacts on psychosis (Morrison et al, 2002; Steel et al, 2006). However, due to the limited number of studies, this review calls for more work to conduct a detailed analysis of the relationship between re-experiencing of traumas and specific psychosis symptoms.

The current review provides tentative support to the hypothesis that re-experiencing is a potential mechanism for the specific pathways identified between trauma and hallucinations and persecutory beliefs. The findings of the current review also mirror those of Bentall et al (2014) who reported a relationship between early life trauma and hallucinations and persecutory beliefs. However, this review suggests that the relationship may also be expanded to later life traumas. Cognitive-behavioural models of psychosis can be drawn on to provide an account for why severity of hallucinations may be related to severity of re-experiencing (Morrison et al, 2003). Such models suggest that traumatic memories, which by their nature contain sensory-perceptual information and have limited corresponding contextual information, may not be attributed to prior trauma. Such intrusions, notably those of both visual and auditory nature, are more likely to lend themselves to be interpreted as visual and auditory hallucinations.

However, the relationship between hallucinatory experiences and intrusive re-experiencing may be more complex. McCarthy-Jones and colleagues (McCarthy-Jones et al, 2014) found supporting evidence for five differing subtypes of auditory verbal hallucinations: hypervigilance, autobiographical memory, inner speech, epileptic, deafferentation. Phenomenological differences are reported across these

subtypes. For example, autobiographical memory subtypes of hallucinations are rooted in past memory, (McCarthy-Jones, Trauer, Mackinnon, Sims, Thomas & Copolov, 2014), with the voices being verbatim replays of verbal content in a traumatic situation, or may reflect altered verbal content given the reconstructive aspect of recall (Conway & Pleydell-Pearce, 2000). Alternatively, hypervigilant subtype of auditory verbal hallucinations may be an experience of hearing a threatening voice in the environment as a result of increased hypervigilance following from a stressful life event. Therefore, it may be that different subtypes of hallucinations may have a different relationship with severity of re-experiencing, highlighting the complexity in understanding this relationship.

4.1 Limitations

Only a small number of studies have attempted to investigate the relationship between the severity of psychosis symptoms and severity of re-experiencing of traumatic memories. Within these studies, there is a large variation in the measurement of re-experiencing of traumatic memories and psychosis. This raises concerns whether studies are measuring the same construct. However, research has established the consistency between different measures of re-experiencing. Examining the psychometric properties of the CAPS against the IES, Hovens, Van Der Ploeg, Klaarenbeek, Bramsen, Schreuder & Rivero (1994) reported that they are measuring the same construct ($\geq r=0.66$), suggesting the findings from the different studies of re-experiencing of traumatic memory can be reliably synthesised. Despite such attempts in the literature to allow synthesis of findings using these different measurements, studies included in this review only assessed re-experiencing in relation to an index trauma, and so key intrusions may be missed which are related to

a second trauma event and may be key in understanding this relationship. Therefore, to more fully understand the relationship between trauma memory and psychosis we need to assess more comprehensively these two constructs.

Of interest, non-clinical populations were more likely to find that those with increased experiencing of schizotypal traits and sub-clinical psychosis symptom had an increased severity of re-experiencing memories of traumatic life events. The larger sample sizes in these populations may have enabled them to detect smaller effect sizes, which may have not been identified in the clinical sample due to the smaller sample sizes.

In this review, no studies reported a relationship between positive symptoms of psychosis and re-experiencing related to psychosis-related trauma, however, relationships were identified in relation to lifetime traumas, although different directions of the relationship were reported. This highlights a challenge, and a potential measurement issue, which is posed when looking at the relationship between re-experience of psychosis-related traumatic memories and psychosis symptoms. This is due to the complexity in discriminating psychotic symptoms and such intrusive memories, given the high rates of co-morbid PTSD in this population (Grubaugh et al, 2011) and the current lack of validated psychosis-related trauma assessments (Fornells-Ambrojo, Gracie, Brewin & Hardy, 2016).

While psychotic symptoms can be experienced as an on-going trauma (Bendall et al, 2012) and thus a sense of current threat (Gumley & Schwannauer, 2006), it is possible for current and past threat to be differentiated if the individual with psychosis is adequately orientated, using anchoring questions to the traumatic stressor (Chisholm et al, 2006; Harrison & Fowler, 2004). The CAPS-S (Gearon et al, 2004) has been developed to measure PTSD symptoms in people with psychosis.

By investigating the temporal relationship between when the traumatic experience happened and the first symptoms of psychosis, and by understanding an individual's appraisal of the traumatic event and symptoms commonly associated with PTSD, this enables and supports the differentiation of psychosis related PTSD symptoms from those of current psychosis. This review therefore calls for this relationship to be further investigated using measures like the CAP-S which have been developed to allow differentiation of PTSD symptoms from those of current psychosis.

Further, recommendations have been made for the similarity between the re-experiencing symptoms reported and the content of the traumatic event to be assessed (Fornells-Ambrojo et al, 2016).

Due to the lack of consensus in the literature regarding the methodological review of cross-sectional studies (Katrak et al, 2004), uality rating of these studies were determined by developing a quality assessment tool. However, there were a number of limitations to using this tool. While it has its strengths to being developed specifically to assess the methodological items which are expected to be most relevant in answering the review question, psychometric properties of the validity and reliability of the tool were therefore not established.

4.2 Further research

Given the limitations highlighted in this review, to understand the relationship between trauma memory and psychosis, studies are needed which comprehensively assess an individual's trauma history, measure the severity of re-experiencing in response to a complex number of traumas and investigate this in relation to specific symptoms of psychosis, rather than more globally measured symptoms. Thus, further research looking at these specific relationships is warranted,

to explore re-experiencing as one potential mechanism in understanding the relationship between trauma and psychosis. To comprehensively assess this relationship, continued development of validated psychosis-related trauma assessments and methodology to assess all intrusive experiences in relation to trauma are required. For example, studies which use the experience sampling method as a research procedure for studying re-experiencing would help to explore these relationships.

This review highlights further gaps in the literature. While research into the severity of re-experiencing of traumatic memories in people with psychosis is common, the phenomenology of these memories have not been sufficiently explored. In particular, further research is needed to investigate the coherence of unwanted traumatic memories. This would enable further investigation of theories proposed by Steel and colleagues (2005) who suggest that retrieval of traumatic memory is more incoherent in people with psychosis.

4.3 Clinical implications

The review highlights an emerging literature base which supports the relationship between the severity of a person's experience of hallucinations and paranoia, and increased symptoms associated with re-experiencing of a personal traumatic event. Increased re-experiencing in this specific subset of people vulnerable to experiencing psychosis may form intrusions that shape anomalous experience. It may be more difficult for some individuals to be able to identify the origin of the unwanted memory as connected to a past personal experience (Steel et al, 2005; Larøi, Collignon & Van der Linden, 2005). Within such a situation, individuals are likely to draw upon their existing belief system, to try and make sense

of these experiences and may be prone to appraising re-experiencing of past traumatic events as the product of an external entity or lend themselves to other 'culturally unacceptable appraisals' (Garety et al, 2001; Morrison, 2001).

Clinically it may therefore be important to target re-experiencing of traumatic memories in those experiencing hallucinations and paranoid thoughts using trauma-focused cognitive behavioural methods, such as exposure based techniques, which have been shown to be effective in psychosis (van den Berg et al, 2015). Imagery rescripting has been identified as a brief stand-alone treatment targeting involuntary memories in participants with depression (Brewin et al, 2009) and it may be that similar clinical interventions would be effective in targeting hyper-accessible distressing memories in a subset of the psychosis population.

4.4 Conclusions

This review suggests that individuals experiencing hallucinations and paranoia report increased re-experiencing of traumatic memories. However, this potential vulnerability in contextually encoding information is not a general feature in psychosis. Methodological improvements are required to ascertain if the existing findings are replicable and to examine more comprehensively the role of unwanted traumatic memory in the development and maintenance of psychosis.

References

Achim, A.M., Maziade, M., Raymond, E., Olivier, D., Mérette, C., & Roy, M. A. (2011). How prevalent are anxiety disorders in schizophrenia? A meta-analysis and critical review on a significant association. *Schizophrenia Bulletin, 37(4),* 811–821.

Alsawy, S., Wood, L., Taylor, P. J., & Morrison, A. P. (2015). Psychotic experiences and PTSD: exploring associations in a population survey. *Psychological Medicine, 45*(13), 1-11.

Bebbington, P.E. & Nayani, T. (1995). The Psychosis Screening Questionnaire. *International Journal of Methods in Psychiatric Research, 5,* 11 -19.

Bendall, S., Alvarez-Jimenez, M., Hulbert, C., McGorry, P., & Jackson, H. (2012). Childhood trauma increases the risk of post-traumatic stress disorder in response to first-episode psychosis. Australian & New Zealand Journal of Psychiatry, 46, 35-39.

Bendall, S., Hulbert, C. A., Alvarez-Jimenez, M., Allott, K., McGorry, P. D., & Jackson, H. J. (2013). Testing a model of the relationship between childhood sexual abuse and psychosis in a first-episode psychosis group: The role of hallucinations and delusions, posttraumatic intrusions, and selective attention. *Journal of Nervous and Mental Disease, 201(11),* 941-947.

Bentall, R.P., de Sousa, P, Varese, F., Wickham, S., Sitko, K., Haarmans, M., & Read, J. (2014). From adversity to psychosis: pathways and mechanisms from specific adversities to specific symptoms. *Social Psychiatry and Psychiatric Epidemiology, 49,* 1011–1022.

Blake, D. D., Weathers, F. W., Nagy, L. M., Kaloupek, D. G., Klauminzer, G., Charney, D. S., & Keane, T. M. (1990). A clinician rating scale for assessing current and lifetime PTSD CAPS-1. *Behaviour Therapist, 13,* 187-188.

Brewin, C. R. (2001). A cognitive neuroscience account of posttraumatic stress disorder and its treatment. *Behaviour Research and Therapy, 39,* 373–393.

Brewin, C. R., Rose, S., Andrews, B., Green, J., Tata, P., McEvedy, C., Turner, S., & Foa, E. B. (2002). Brief screening instrument for post-traumatic stress disorder. *The British Journal of Psychiatry, 181,* 158-162.

Brewin, C.R., & Holmes, E.A. (2003). Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review, 23(3*), 339-376.

Brewin, C.R., Lipton, M., Gregory, J.D., & Burgess, N. (2010). Intrusive Images in Psychological Disorders: Characteristics, Neural Mechanisms, and Treatment Implications. *Psychological review, 117(1),* 210–23.

Brewin, C.R., Wheatley, J., Patel, T., Fearon, P., Hackmann, A., Well, A., Fisher, P., & Myers, S., (2009). Imagery rescripting as a brief stand-alone treatment for depressed patients with intrusive memories. *Behaviour Research and Therapy, 47,* 569–576.

Carlier, I.V., Lamberts, R.D., Van Uchelen, A.J., & Gersons, B.P. (1998). Clinical utility of a brief diagnostic test for posttraumatic stress disorder. *Psychosomatic Medicine, 60(1),* 42-7.

Chisholm, B., Freeman, D., & Cooke, A. (2006). Identifying potential predictors of traumatic reactions to psychotic episodes. British Journal of Clinical Psychology, 45, 545-559.

Claridge, G., & Broks, P. (1984). Schizotypy and hemisphere function: I. Theoretical considerations and the measurement of schizotypy. *Personality and Individual Differences, 5(6),* 633-648.

Conway, M.A., & Pleydell-Pearce, C.W. (2000). The construction of autobiographical memories in the self-memory system. Psychological Review, 107, 261–288.

Ehlers, A., & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38,* 319-345.

Fenigstein, A., & Vanable, P.A. (1992). Paranoia and self-consciousness. *Journal of Personality and Social Psychology, 62,* 129-138.

Foa, E., Riggs, D., Dancu, C., & Rothbaum, B. (1995). Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *Journal of Traumatic Stress, 6,* 459-474.

Foa, E., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of PTSD: The Posttraumatic Diagnostic Scale. *Psychological Assessment, 9,* 445-451.

Fornells-Ambrojo, M., Gracie, A., Brewin, C.R., & Hardy, A. (2016). Narrowing the focus on the assessment of psychosis-related PTSD: a methodologically orientated systematic review. European Journal of Psychotraumatology, 7, 32095.

Fowler, D., Freeman, D., Smith, B., Kuipers, E., Bebbington, P., Bashforth, H., Coker, S., Hodgekins, J., Gracie, A., Dunn, G., & Garety, P. (2006). The Brief Core Schema Scales (BCSS): psychometric properties and associations with paranoia and grandiosity in non-clinical and psychosis samples. *Psychological Medicine, 36(6),* 749-59.

Garety, P.A., Kuipers, E., Fowler, D., Freeman, D., & Bebbington, P.E. (2001). A cognitive model of the positive symptoms of psychosis. *Psychological Medicine, 31,* 189-195.

Gearon, J.S., Bellack, A.S., & Tenhula, W. (2004). Preliminary reliability and validity of the clinician-administered PTSD Scale for Schizophrenia. *Journal of Consulting and Clinical Psychology, 72,* 121-125.

Gracie, A., Freeman, D., Green, S., Garety, P. A., Kuipers, E., Hardy, A., . . . Fowler, D. (2007). The association between traumatic experience, paranoia and hallucinations: a test of the predictions of psychological models. *Acta Psychiatrica Scandinavica, 116*(4), 280-289.

Grubaugh, A.L., Zinzow H.M., Paul, L., Egede, L.E. & Frueh, C. (2011). Trauma exposure and posttraumatic stress disorder in adults with severe mental illness: A critical review. *Clinical Psychology Review, 31,* 883-899.

Gumley, A., & Schwannauer, M. (2006). Staying well after psychosis: A cognitive interpersonal treatment manual for relapse prevention. Chichester: Wiley.

Halligan, S.L., Michael, T., Clark, D.M., & Ehlers, A. (2003). Posttraumatic stress disorder following assault: the role of cognitive processing, trauma memory and appraisals. *Journal of Consulting and Clinical Psychology, 71,* 419–438.

Hardy, A., Emsley, R., Freeman, D., Bebbington, P., Garety, P.A., Kuipers, E.E., Dunn, G., & Fowler, D. (2016). Psychological Mechanisms Mediating Effects Between Trauma and Psychotic Symptoms: The Role of Affect Regulation, Intrusive Trauma Memory, Beliefs, and Depression. *Schizophrenia Bulletin.*

Harrison, C. L., & Fowler, D. (2004). Negative Symptoms, Trauma, and Autobiographical Memory: An Investigation of Individuals Recovering from Psychosis. *Journal of Nervous and Mental Disease, 192*(11), 745-753.

Hemsley, D.R. (1993) A simple (or simplistic?) cognitive model for schizophrenia. *Behaviour Research and Therapy*, *31*, 633-646.

Hovens, J. E., Van Der Ploeg, H. M., Klaarenbeek, M. T. A., Bramsen, I., Schreuder, J. N., & Rivero, V. V. (1994). The Assessment of Posttraumatic Stress Disorder: with the Clinician Administered PTSD Scale: Dutch Results. *Journal of Clinical Psychology*, *50,* 325-340.

Jackson, C., Knott, C., Skeate, A., & Birchwood, M. (2004). The trauma of first episode psychosis: The role of cognitive mediation. *Australian and New Zealand Journal of Psychiatry, 38(5),* 327-333.

Katrak, P., Bialocerkowski, A.E., Massy-Westropp, N., Kumar, S., & Grimmer, K.A. (2004). A systematic review of the content of critical appraisal tools. *BMC Medical Research Methodology, 4,* 22.

Kay, S.R., Opler, L.A., & Lindenmayer, J.P. (1989). The positive and negative syndrome scale (PANSS): Rationale and standardisation. *British Journal of Psychiatry, 155,* 59–65.

Kocsis-Bogar, K., Miklosi, M., & Perczel Forintos, D. (2013). Impact of Adverse Life Events on Individuals With Low and High Schizotypy in a Nonpatient Sample. *Journal of Nervous and Mental Disease, 201*(3), 208-215.

Krawiecka, M., Goldberg, D., & Vaughan, M. (1977). A standardized psychiatric assessment scale for rating chronic psychotic patients. *Acta Psychiatrica Scandinavica, 55(4),* 299-308.

Larøi F., Collignon O., & Van der Linden, M. (2005). Source monitoring for actions in hallucination proneness. *Cognitive Neuropsychiatry, 10,* 105–123.

Launary, G., & Slade, P. (1981). The measurement of hallucinatory predisposition in male and female prisoners. *Personality and Individual Differences, 2(3),* 221-234.

Layton, B., & Krikorian, R. (2002). Memory Mechanisms in Posttraumatic Stress Disorder. *The Journal of Neuropsychiatry and Clinical Neurosciences, 14(3),* 254-261.

LeDoux, J. E., Iwata, J., Cicchetti, P., & Reis, D. J. (1988). Different projections of the central amygdaloid nucleus mediate autonomic and behavioral correlates of conditioned fear. *Journal of neuroscience, 8,* 2517–2529.

Marzillier, S.L., & Steel, C. (2007). Positive Schizotype and Trauma-related Intrusions. *Journal of Nervous and Mental Disease, 195(1),* 60–64.

Mason, O., Claridge, G., & Jackson, M., (1995). New scales for the assessment of schizotypy. *Personality and Individual Differences, 18,* 7–13.

McCarthy-Jones, S., Trauer, T., Mackinnon, A., Sims, E., Thomas, N., & Copolov, D.L. (2014). A new phenomenological survey of auditory hallucinations: evidence for subtypes and implications for theory and practice. Schizophrenia Bulletin, 40, 231–235.

McCarthy-Jones, S., Thomas, N., Strauss, C., Dodgson, G., Jones, N., Woods, A., …Sommer, I.E. (2014). Better Than Mermaids and Stray Dogs? Subtyping Auditory Verbal Hallucinations and Its Implications for Research and Practice. Schizophrenia Bulletin, 40(4), 275–284

Morrison, A.P. (2001). The interpretation of intrusions in psychosis: An integrative cognitive approach to hallucinations and delusions. *Behavioural and Cognitive Psychotherapy, 29,* 257–276.

Morrison, A.P., Frame, L., & Larkin, W. (2003). Relationships between trauma and psychosis: A review and integration. *British Journal of Clinical Psychology, 42*, 331–353

Overall, J.E., & Gorham, D.R. (1962). Brief Psychiatric Rating Scale. *Psychological Reports, 10*, 799-812.

Overall, J. E. (1986). Standard psychiatric description: The factor construct rating scale (FCRS). *Triangle, 8,* 178-184.

Priebe, S., Broker, M., & Gunkel, S. (1998). Involuntary admission and posttraumatic stress disorder symptoms in schizophrenia patients. *Comprehensive Psychiatry*, *39*(4), 220-224.

Read, J., Fosse, R., Moskowitz, A., & Perry, B. (2014). The traumagenic neurodevelopmental model of psychosis revisited. *Neuropsychiatry, 4(1),* 65–79

Resnick, S. G., Bond, G. R., & Mueser, K. T. (2003). Trauma and posttraumatic stress disorder in people with schizophrenia. *Journal of Abnormal Psychology*, *112*(3), 415-423.

Sackett, D., Richardson, W.S., Rosenburg, W., & Haynes, R.B. (1997). *How to practice and teach evidence based medicine*. 2nd ed. Churchill Livingstone.

Schafer, I., Morgan, C., Demjaha, A., Morgan, K., Dazzan, P., Fearon, P., & Fisher, H. L. (2011). Assessment of posttraumatic symptoms in patients with first-episode psychosis. *Journal of Nervous and Mental Disease*, *199*(11), 896-898.

Shaw, K., McFarlane, A. C., Bookless, C., & Air, T. (2002). The aetiology of postpsychotic posttraumatic stress disorder following a psychotic episode. *Journal of Traumatic Stress, 15*(1), 39-47.

Steel, C., Fowler, D., & Holmes, E.A. (2005) Trauma-related intrusions and psychosis: An information-processing account. *Behavioural and Cognitive Psychotherapy, 33,* 139 –152.

Tarrier, N., Khan, S., Cater, J., & Picken, A. (2007). The subjective consequences of suffering a first episode psychosis: Trauma and suicide behaviour. *Social Psychiatry and Psychiatric Epidemiology, 42*(1), 29-35.

van den Berg, D., de Bont, P., van der Vleugel, B., de Roos, C., de Jongh, A., van Minnen, A., & van der Gaag, M. (2015). Prolonged Exposure vs Eye Movement Desensitization and Reprocessing vs Waiting List for Posttraumatic Stress Disorder in Patients With a Psychotic Disorder: A Randomized Clinical Trial. *JAMA Psychiatry, 72(3),* 259-67.

Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., van Os, J., & Bentall, R.P. (2012). Childhood Adversities Increase the Risk of Psychosis: A Meta-analysis of Patient-Control, Prospective- and Cross-sectional Cohort Studies. *Schizophrenia Bulletin, 38(4),* 661-71.

Weiss, D., & Marmar, C. (1997). *Assessing psychological trauma and post traumatic stress disorder: a handbook for practitioners.* P. Wilson, T Keane (Eds.), Guilford Press, New York, pp. 399–411.

White, R. G., & Gumley, A. I. (2009). Postpsychotic posttraumatic stress disorder: Associations with fear of recurrence and intolerance of uncertainty. *Journal of Nervous and Mental Disease, 197*(11), 841-849.

World Health Organization, WH0. (1992a). *The Schedules for Clinical Assessment in Neuropsychiatry (SCAN).*

World Health Organization, WHO. (1990) *The Composite International Diagnostic Interview (CIDI),* Authorized Core Version 1.0, WHO, Geneva

Part 2: Empirical Paper

Phenomenology of Intrusive Trauma Memory in Psychosis and its Relationship with Hallucinations and Persecutory Beliefs

Abstract

Aims: Interest in trauma as a causal factor in psychosis has prompted research into how trauma-related processes may account for the development and maintenance of psychosis. The aim of the current study was to investigate one potential cognitive mechanism by examining the phenomenology of intrusive trauma memory in psychosis and its relationship with hallucinations and persecutory beliefs. It was hypothesised that intrusive memory fragmentation would be associated with hallucinatory severity.

Method: Twenty participants described an intrusive trauma memory and its phenomenological characteristics

Results: Intrusive memories were experienced as vivid, distressing and accompanied by physical sensations. Memories were typically not accompanied by an out of body experience, but were accompanied by multi-sensory modalities and fear. Intrusions were viewed from a field perspective and with a low sense of perceived control. Findings indicated that subjective fragmentation of intrusive memories were associated with more severe hallucinations but not persecutory beliefs, although the relationship between the two ratings of objective memory fragmentation and hallucinations was equivocal, with a negative correlation for one rating and no relationship for the other. There was no relationship between reliving and symptom severity. People with an experience of psychosis had more frequent and vivid intrusions, with an increased sense of reliving than the non-clinical sample. However, they reported relatively more coherent intrusive memories.

Conclusions: The study suggests a potential role for memory fragmentation in hallucinatory experience, although the complexities of assessing memory characteristics are highlighted and ideas for future research are discussed.

1. Introduction

Research into Post-Traumatic Stress Disorder (PTSD) has led to the development of cognitive behavioural theories which highlight the role of intrusive trauma memories, maladaptive trauma-related appraisals and affect regulation as key maintenance processes (Ehlers & Clark, 2000; Brewin, Lipton, Gregory & Burgess, 2010; Gumley, Braehler & Laithwaite, 2010; Morrison, Frame & Larkin, 2003; Read, Fosse, Moskowitz & Perry, 2014; Steel, Fowler & Holmes, 2005). Such advances have informed the development of treatments targeting these mechanisms, which are now recommended by National Institute of Health and Social Care Excellence (NICE, 2005). Interest in the causal role of trauma in psychosis, and the higher rates of co-morbid PTSD in this population, has also prompted research in trauma-related processes in psychosis (Bendall, Alvarez-Jimenez, Hulbert, McGorry & Jackson, 2014; Varese et al, 2012; Grubaugh, Zinzow, Paul, Egede, & Frueh, 2011). In addition to events in which 'the person experienced, witnessed or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to physical integrity of self or others' (American Psychiatric Association, 2013), the experience of psychosis and its treatment can also be traumatic, and lead to posttraumatic stress reactions (Morrison et al., 2003; Berry, Ford, Jellico-Jones, & Haddock, 2013; Cusack, Frueh, Hiers, Suffoletta-Maierle, & Bennet, 2003; Mueser, Lu, Rosenberg, & Wolfe, 2010). Evidence suggests potential specific pathways between early life trauma and hallucinations and persecutory beliefs (Bentall et al, 2014). This study will therefore investigate one potential cognitive mechanism by examining the phenomenology of intrusive trauma memory in psychosis, and its relationship to hallucinations and persecutory beliefs.

1.1 Phenomenology of intrusive memory in other disorders

In order to understand how intrusive trauma memories may play a role in psychosis, it is helpful to consider findings from studies investigating trauma memory in other disorders. Intrusive trauma memories can be conceptualised as an experience when a memory is triggered involuntarily, rather than deliberately recalled, by stimuli associated with the event or its consequences (Brewin, Dalgleish & Joseph, 1996, Brewin, 2001, Conway & Pleydell Pearce, 2000, Ehlers & Clark, 2000).

Intrusive memories in PTSD are characterised by vivid, sensory-perceptual content of parts of the traumatic events (Ehlers & Steil, 1995; Hackmann, Ehlers, Speckens, & Clark, 2004; Mellman & Davis, 1985; Van der Kolk & Fisler, 1995; Brewin, et al, 2010). The lack of narrative information regarding when and where the experience occurred, means they are more likely to be experienced as decontextualized fragments occurring in the 'here and now' (Hopper & van der Kolk, 2001; Byrne, Hyman, & Scott, 2001; Foa, Molnar, & Cashman, 1995; Halligan, Michael, Clark, & Ehlers, 2003).

It is now acknowledged that intrusive trauma memories are transdiagnostic experiences present in a range of disorders such as depression and social anxiety (Kuyken & Brewin, 1994). Reynolds and Brewin (1999) compared self-reported characteristics of intrusive memories in people with depression and PTSD (N = 105). They found similar levels of distress and attempts to avoid the intrusive memory. However, the PTSD group's intrusions were characterised by increased dissociation and 'here and now' reliving. This suggests that whilst intrusive memories occur across a range of disorders, the phenomenology of intrusions may vary.

1.2 Theories of intrusive memories

Cognitive-behavioural models outline how disruptions to memory encoding during trauma may contribute to the phenomenology of intrusive memories. When an individual is confronted with intense distress, rather than the information related to this event passing through the hippocampus, it is processed by a more direct route to the amygdala (LeDoux, Iwata, Cicchetti & Reis, 1988). This enables quicker release of stress hormones (LeDoux, et al, 1988) and faster or data-driven processing (Ehlers & Clark, 2000), which allows the individual to rapidly activate threat reduction strategies. However, this processing is done at the expense of the hippocampus's ability to process and integrate information within a spatial and temporal context (contextually bound representations, C-reps) (Brewin, 2001; Brewin et al, 2010; Layton & Krikorian, 2002). Instead, the sensory and emotional details of the event are stored (low-level sensation-based representations, S-reps), with less corresponding C-reps.

Autobiographical memories are hierarchically organised, representing different levels of specificity (Conway & Pleydell-Pearce, 2000). Lifetime periods form the most general level of knowledge and consist of prolonged periods of time. General events are clustered within each lifetime period. Event-specific knowledge forms the greatest level of specificity, containing detailed sensory-perceptual information about the event. Therefore, memories of everyday events contain both contextual information and specific information about what is experienced. However, due to the lack of contextual information during encoding of traumatic events (Brewin, 2001; Brewin et al, 2010; Layton & Krikorian, 2002), these memories are particularly likely to be triggered by stimuli that represent sensory-perceptual matching cues in the environment and are therefore easily triggered involuntarily into

consciousness. Due to the lack of contextual encoding, the traumatic memory is not elaborated and integrated into lifetime and general event themes. Relevant information is not available to be accessed by conscious retrieval processes, this can result in memories which are problematic to intentionally recall (Conway & Pleydell-Pearce, 2000).

Intrusions in PTSD are therefore held to result from automatic activation of stored sensory memories without corresponding spatial-temporal representations, meaning that they are experienced as vivid, and occurring in the 'here and now' (Brewin, et al, 2010). In contrast, however, intrusive memories reported in depression are conceptualised as involving thematic and associative indirect retrieval of the memory, whereby corresponding autobiographical, spatial-temporal and sensory representations of the memory are recalled (Brewin et al, 2010). This difference in the retrieval of contextual information related to the event may account for the increased re-experiencing reported in intrusive memories in people with PTSD compared to those with depression. Thus, the extent to which contextual information is encoded at the time of trauma and subsequently retrieved, could determine the degree to which subsequent intrusions are experienced as fragmented.

1.3 Intrusive trauma memory in psychosis

To date, despite the interest in trauma in psychosis, there has been relatively little investigation of the phenomenology of intrusive memories. However, theories have implicated the possible importance of these memories in psychosis (Steel, Fowler, & Holmes, 2005; Morrison, 2001; Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001).

Morrison (2001) model suggests that intrusive memories are implicated as an important route for the development of, and exacerbating psychotic symptoms, as they may not be attributed to prior trauma. While Morrison's model (2001) normalises the experience of intrusions, the appraisal of these intrusions in a culturally unacceptable way, leads to these being experienced, or conceptualised by others, as hallucinations or delusional beliefs. In support of this model, Morrison et al (2002) identified that the majority of clients with psychosis reported intrusive images (74.3%), with 70.8% being associated with memories. However, this study did not examine the phenomenology of these memories in detail.

However, Garety et al (2001) suggests that these intrusions may be anomalous in people with psychosis due to cognitive processing disturbances, and highlights this as one proximal route to the development of positive symptoms. Garety and colleagues (2001) suggest that one conceptualisation of this disturbance is the `weakening of the influence of stored memories of regularities of previous input on current perception', (Hemsley, 1993), which subsequently leads to ambiguous sensory input, experienced as intrusion of material from an individual's memory.

Steel and colleagues (Fowler et al, 2006; Steel et al, 2005) propose that the strength of an individual's ability to integrate contextual and sensory information moderates the nature and prevalence of intrusions. People high in schizotypal traits and with psychosis are hypothesised to have a weakened ability to encode spatial and temporal information, possibly due to enhanced emotional or stress sensitivity (Fowler et al, 2006; Read, Fosse, Moskowitz, & Perry, 2014). Therefore, people with psychosis may be particularly vulnerable to encoding memories in such a way as to increase the likelihood of more frequent, vivid and fragmented intrusions, which may

manifest as hallucinatory experiences. In support of these hypotheses, Jones and Steel (2014) found that there was an increased vulnerability to intrusive memories following a word association task in a sample (n = 23) of people with schizophrenia and high reported levels of PTSD symptoms. Marks, Steel and Peters (2012), also found that individuals who reported anomalous experiences (n = 23) reported a lower level of trait contextual integration and more intrusions than individuals with low schizotypal traits (n = 26) after watching a trauma film, both immediately and over the subsequent seven days. Their intrusions were also more vivid and associated with emotion. Glazer, Mason, King, and Brewin (2013) also found an association between poor contextual memory, an increased sense of 'nowness' and intrusive images in 55 non-clinical participants, with intrusive images also being associated with psychosis-proneness.

In line with theoretical accounts of psychosis, this study will explore the phenomenology of intrusive memories, with a specific focus on the relationship between fragmentation and hallucinatory experience.

1.4 Conceptual and measurement issues

There are a number of definitions of fragmentation in regards to trauma memory in the literature (see Table One for an overview of subjective and objective ratings of fragmentation employed in the current study). Some researchers define fragmentation as memory confusion (Foa et al, 1995; Halligan et al, 2003), others as abnormal chronology (Byrne et al 2001) and others as an increase of sensory components (Hopper & van der Kolk, 2001). In addition, the terms fragmentation, incoherence and disorganisation are often used interchangeably and operationalised differently across the literature. For example, Murray, Ehlers and Mayou (2002)

rated objective fragmentation on a scale ranging from 'very coherent' to 'very incoherent'. Foa et al. (1995), regarded repetitions in narratives as evidence of fragmentation, and defined disorganisation as 'confused or disjointed thoughts'. Halligan et al. (2003) investigated disorganisation based on two measures of objective ratings. One measure coded repetition, uncertainty and non-consecutive chunks, and the second used a global rating of coherence, from 'not at all disorganised' 'to extremely disorganised'.

To date, fragmentation of memory has only been applied and investigated in memories which have been intentionally recalled. As such, all measures to investigate fragmentation have been developed within this context, either using a narrative coding measure or meta-memory subjective appraisal approach (Bedard-Gilligan & Zoellner, 2012).

In contrast, lack of contextualisation of intrusions has previously been conceptualised in relation to the sense of reliving associated with recall of the memory. However, as reviewed above, theories of psychosis have highlighted contextualisation difficulties in people with psychosis as a mechanism in psychotic intrusions (Steel et al, 2005). Fragmentation may therefore be a relevant characteristic in understanding the relationship between intrusive memories, hallucinations and persecutory beliefs and this study will therefore be the first to examine fragmentation of intrusive memory in people with psychosis.

Table 1. *Operationalisation of the construct of fragmentation*

Construct	Rating	Item	Scale	Previous study
Fragmentation	Subjective	Holding in mind your most frequent intrusive memory, how much does your intrusive memory exist of loosely related pieces or images?	10-point scale. 0 = a coherent image, 10 = lots of loosely related images	Kindt et al (2005)
		Are your intrusive memories in any way unclear or jumbled?	4-point scale. 0 = not at all, 3 = very much	Murray et al (2002)
Fragmentation	Objective	Raters coded intrusive narrative on a four-point scale	(0 = 'very coherent', 1 = 'quite coherent', 2 = 'not very coherent', 3 = 'very incoherent')	Murray et al (2002)
		Raters coded utterance categories which most directly reflected fragmentation, in order of priority	Repetition, (utterance repeated more than once within five lines), unfinished thoughts and speech fillers (e.g. 'um', 'so', 'like')	Foa et al (1995)

1.5 Summary

In summary, the above literature demonstrates that intrusive trauma memories are present in psychosis and may share some similar characteristics to those experienced in other disorders. However, intrusive memories in psychosis could be more fragmented, vivid and associated with an increased sense of reliving than in other disorders, and this may play a role in the development and maintenance of psychotic symptom severity.

1.6 Aims

The study will investigate the phenomenology of intrusive trauma memory in psychosis and its relationship to hallucinations and persecutory beliefs.

1.7 Hypotheses

It is hypothesised:

1. Increased memory fragmentation will be associated with more severe hallucinations and persecutory beliefs.
2. Increased reliving will be associated with more severe hallucinations.
3. Intrusive trauma memories in psychosis will be more frequent, vivid, fragmented and associated with an increased sense of reliving compared to a non-clinical sample.
4. Intrusive trauma memories will be more frequent, vivid, fragmented and associated with an increased sense of reliving, compared to voluntary recall of trauma memories in psychosis.

2. Method

2.1 Study design

The study is a theoretically informed phenomenological study with an observational, cross-sectional design using interview and questionnaire assessments.

2.2 Ethics

Ethical approval was provided by London Queens Square Research Ethics Committee (REC reference: 15/LO/1486) (see Appendix A). Approval was also gained from National Health Service Research and Development Departments for the clinical sample (see Appendices B and C). All participants were provided with written information about the study and gave their informed consent prior to participating (see Appendices D and E).

2.3 Participants

In order to be eligible, clinical participants were required to: 1) Have a current primary diagnosis of affective or non-affective psychosis; 2) No primary diagnosis of intellectual disability, head injury, substance misuse or known organic cause for psychosis; 3) Mental state sufficiently stable to participate in research; 4) A standard of written and spoken English to be able to provide informed consent and complete assessment measures; 5) At least 16 years old. The same inclusion criteria applied to the non-clinical sample, although they were excluded if currently experiencing psychotic symptoms.

2.4 Measures

2.4.1 Trauma Screening Questionnaire (TSQ; Brewin et al, 2002)

The TSQ is a PTSD screening instrument and was adapted from the PTSD Symptom Scale (PSS, Foa et al. 1993). The TSQ is a ten-item instrument consisting of five re-experiencing (e.g. upsetting thoughts or memories about the event that have come into your mind against your will) and five arousal items (e.g. being jumpy or being startled at something unexpected) from the DSM-IV PTSD criteria (American Psychiatric Association, 1994). Participants were asked whether or not they had experienced each symptom at least twice in the past week. When endorsing at least six arousal or re-experiencing symptoms, the TSQ demonstrates excellent sensitivity (0.86), specificity (0.93), and overall efficiency (0.90) (Brewin et al, 2002).

2.4.2 Community Assessment of Psychic Experience (Konings, Bak, Hanssen, Van Os, & Krabbendam, 2006).

The CAPE is a 42-item self-report questionnaire with items covering three symptom dimensions: positive symptoms (e.g. do you ever hear voices when you are alone), depressive symptoms (e.g. do you ever feel sad) and negative symptoms (e.g. do you ever feel that your feelings are lacking in intensity). A 4-point Likert scale (0 to 3) assesses symptom frequency (rated "Never", "Sometimes", "Often" and "Nearly always"), and distress due to the symptom, if present (rated "Not distressed", "A bit distressed", "Quite distressed", and "Very distressed"). The CAPE demonstrated good internal consistency on all symptom dimensions (positive α = 0.82, negative α = 0.81, depression α = 0.83) (Brenner et al, 2007). Since the CAPE has been developed as a three factor model, research has attempted to develop a factor model for the positive dimension. For the purpose of this study, perceptual abnormalities (items 33, 34, 42) and persecutory ideation (items 2, 6, 7, 10, 22) were derived from four factor models (Yung, Nelson, Baker, Buckby, Baksheev, & Cosgrave, 2009; Núñez, Arias, Vogel, & Gómez, 2015; Armando et al, 2010; Capra, Kavanagh, Hides, & Scott, 2013). For clarity, within this study, perceptual abnormalities and persecutory ideation will be referred to as hallucinations and persecutory beliefs respectively.

2.4.3 Phenomenology of intrusive memory interview

Due to the lack of consensus on the assessment of intrusive trauma memories, and different approaches employed, a semi-structured interview was developed to explore the phenomenology of intrusive trauma memories, based on Hackmann, Ehlers, Speckens and Clark (2004), Reynolds and Brewin (1999), Laing, Morland

and Fornells-Ambrojo (2015), Kindt, Van den Hout and Buck (2005) and Murray, Ehlers and Mayou (2002) (see Appendix F). The interview schedule included an open prompt to elicit a narrative of the intrusive memory, with follow-up questions to assess the self-reported phenomenological characteristics of the memory (see Table Two). Self-reported phenomenological characteristics of the intentional recall of the same memory were assessed in those who had intentionally recalled the memory in the past month (see Appendix F). Feasibility and Support to Timely recruitment for Research, a service of individuals with experience of mental health problems and their carers who have been specially trained were consulted in the development of the interview schedule. The interview was then piloted in a clinical sample (n=2) and adapted accordingly.

Table 2. Questions to assess the self-reported phenomenological characteristics of the memory

Phenomenological characteristics	**Question**	**Rating**	**Reference**
Frequency/duration	How long has it been since the event featuring in the intrusive memory?	(1) less than 1 year ago, (2) 1–5 years ago or (3) more than 5 years ago	Reynolds & Brewin, (1999)
	Approximately how often has the intrusive memory that bothers you the most occurred in the past two weeks?	(1) once a week or less, (2) several times a week, (3) once a day, (4) several times a day or more;	Reynolds & Brewin, (1999)
	When you experience this intrusive memory, how long does it last?	(1) seconds, (2) minutes, (3) up to an hour, (4) several hours and (5) constantly preoccupied;	Reynolds & Brewin, (1999)
Distress	How distressing is the intrusive memory?	10-point scale. 0 = no distress, 10 = extreme distress	Reynolds & Brewin, (1999)
Sensory-perceptual	Holding in mind your most frequent intrusive memory, how clear and vivid was the memory?	(1) unclear/hazy, (2) some detail, (3) vivid, (4) very vivid – like it was happening in the here and now	Reynolds & Brewin, (1999)
	When the intrusive memory came into you mind, do you feel as if you are reliving the memory, as if it is happening again now or	5-point scale. 0 = reliving the experience, 5 = looking back at the past	Reynolds & Brewin, (1999)

	experiencing the memory as having happened in the past?		
	Was the intrusive memory accompanied by an out of body experience?	(1) experience absent or (2) experience present	Reynolds & Brewin, (1999)
	Do you have strong physical sensations in the intrusive memory such as heart racing, sweating, trembling, nausea, headache, chills/flushes, and 'butterflies in the stomach?	(1) no physical sensations or (2) physical sensations present	Reynolds & Brewin, (1999)
	In the intrusive memory, what do you see, hear, feel, smell and/or taste?	(1) Visual, (2) Auditory, (3) Taste, (4) Smell, (5) Tactile	Hackmann et al (2004)
	In the intrusive memory, what emotions or feelings do you have?	Initially unprompted, and then asked if the memory was associated with any of the following emotions: (1) Sad, (2) Anger, (3) Humiliation, (4) Guilt, (5) Anxious, (6) Powerless, (7) Ashamed, (8) Helpless, (9) Disgust, (10) Fear	Laing et al (2015)
Control	When this intrusive memory pops into your mind or comes out of the blue, how much do you feel you have control over stopping this memory?	4-point scale. 0 = not at all, 4 = very much.	Laing et al (2015)
Perspective	Thinking about the memory we just discussed, do you mostly view the situation as if you are looking out through your eyes, or one in which you are looking at yourself from outside of yourself? Or does it switch between the two views?	(0) alternating, (1) field, (2) observer.	Laing et al (2015)
Fragmentation	Holding in mind your most frequent intrusive memory, how much does your intrusive memory exist of loosely related pieces or images?	10-point scale. 0 = a coherent image, 10 = lots of loosely related images	Kindt et al (2005)
	Are your intrusive memories in any way unclear or jumbled?	4-point scale. 0 = not at all, 3 = very much	Murray et al (2002)

2.4.4 Objective memory fragmentation measurement

As there is no gold standard way of objectively measuring fragmentation of an intrusive memory, this study analysed fragmentation using a rating scale (Murray et al, 2002) and a coding manual (Foa, Molnar, & Cashman, 1995) developed to rate fragmentation of intentionally recalled trauma memories (see Appendix G). Objective memory fragmentation was first measured using the coding manual developed by Foa et al (1995). Because narratives varied in length across participants, percentage of the narrative which were coded as this utterance were calculated separately for each participant. Narratives were then rated by the first author using methodology outlined by Murray et al (2002), without knowledge of the participant's symptom scores.

2.5 Procedure

Clinical participants were recruited from outpatient clinical teams in two NHS Trusts. Potential clinical participants were approached by their allocated clinician if they met the inclusion criteria. If they expressed interest in the study, potential participants were invited to go through the informed consent process with a member of the research team. Recruitment and data collection were carried out in conjunction with another researcher, as part of a joint project (see Appendix H). Consenting participants completed the questionnaire and interview battery. In addition to the measures reported on in this study (TSQ, CAPE, phenomenology of intrusive memory interview, objective memory fragmentation measurement), participants also completed the Trauma and Life Event Screening Tool (TALE), Trauma History Questionnaire (THQ) (Green, 1996), Childhood Trauma Questionnaire (CTQ) (Bernstein et al, 1994), PTSD Assessment Tool for Schizophrenia (PATS) (Mueser, Lu, Rosenberg & Wolfe, 2010) and Posttraumatic

Cognitions Inventory (PCI) (Foa, Ehlers, Clark, Tolin & Orsillo, 1999), (please see Sarah Carr's thesis). The procedure for clinical participants is outlined in Figure 1. Participants were reimbursed £10 for their time and expenses.

The non-clinical sample was recruited through advertising online via social media and University College London university email circulars. They completed the questionnaires via Limesurvey (Schmitz, 2012) an online open source survey application.

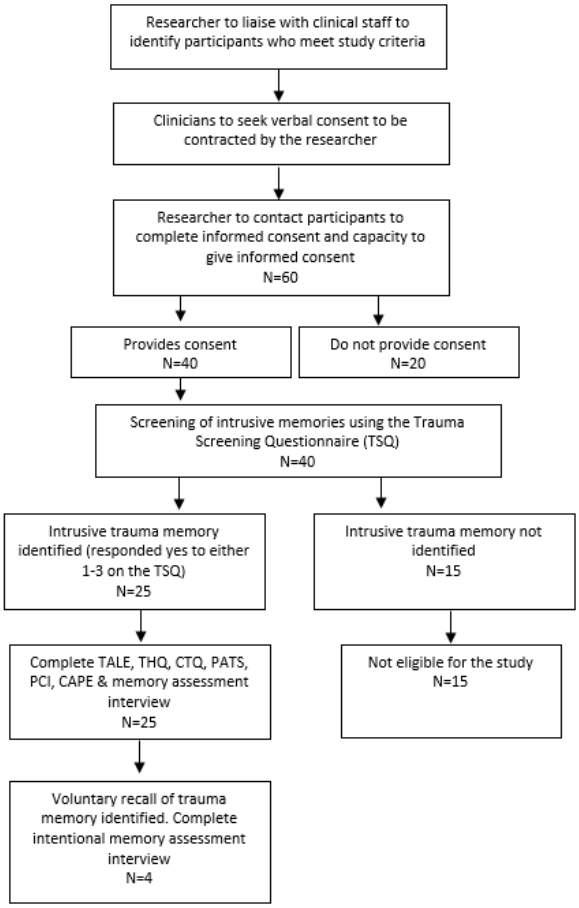

Figure 1. *Systematic recruitment flow diagram for the clinical sample*

All clinical and non-clinical participants completed the Trauma Screening Questionnaire (Brewin et al, 2002) to identify if an individual had experienced intrusive trauma memories at least twice in the past week (i.e. at least one 'yes'

response to items one or three on the TSQ). The phenomenology of these intrusive trauma memories was investigated using the semi-structured interview assessment of traumatic memories. The phenomenology of the intentional recall of the trauma memory was assessed in those who had intentionally recalled the memory in the past month. All participants completed the Community Assessment of Psychic Experience (Konings et al, 2006) to measure frequency and distress of psychosis symptoms. The narratives of the intrusive memories reported were transcribed by the first author. Following transcription, the narratives were objectively rated to measure fragmentation.

2.6 Power calculation

This is a theoretically informed study of the phenomenology of intrusive trauma memories in psychosis, and the relationship between memory fragmentation and psychotic symptoms has not previously been explored. However, the relationship between memory fragmentation and PTSD symptoms has been investigated. Therefore, power analysis of this study was informed by prior work of Murray et al (2002). This study found a medium effect size (r=0.41), of the positive relationship between memory fragmentation and PTSD severity, based on objective rating taken at a single time point. Power calculations were carried out using "G*Power 3" computer program (Faul, Erdfelder, Land & Buchner, 2007), specifying alpha=5%, and desired power=80% (Cohen, 1992). The required sample size was estimated at 35.

2.7 Statistical analysis

Analyses were conducted using the Statistical Package for Social Sciences for Windows (version 21.0). Prior to descriptive and statistical analyses, all data was explored for assumptions of normality and examined for outliers. Categorical data was analysed for independence and expected frequencies. Where expected frequency assumptions were violated, Fisher's exact tests were used. Two variables (Self-reported memory fragmentation (Murray et al, 2002) and hallucination distress) had skewness of >1.96. Square root transformations were performed and were successful in improving the approximation of the variables to normal distributions to allow for parametric tests to be conducted. Age was positively skewed in the non-clinical sample and in the clinical sample who did not report intrusive trauma memories, 2.10 and 4.24, respectively. The distribution of age in the clinical sample who did not report intrusive trauma memories, was also leptokurtic (4.71). It was not possible to correct this distribution using square root transformations and as such non-parametric tests were used. All other variables had skewness and kurtosis values of <1.96 at $p<0.05$, indicating that the variables were sufficiently normally distributed. There was one outlier in the age dataset which fell three SD above the mean ($z = 3.07$) and as such was excluded from the analysis. An α level of 0.05 for statistical significance was used for all tests. Significance test results are quoted as two-tailed probabilities.

3. Results

3.1 Participants

Sixty potential clinical participants were referred by clinical staff. Thirty-nine clinical participants consented to take part in the research and were screened for inclusion, of which 20 experienced intrusive memories of past traumas at least twice

in the past week. Nineteen participants in the non-clinical sample reported intrusive trauma memories. The samples were compared on demographic and clinical characteristics. The findings are shown in Table Three. There were no significant differences in age, gender or ethnicity across the groups. The clinical sample with intrusive memories had significantly higher symptom severity than the non-clinical sample (p = .046). There was no difference between the clinical samples reporting and not reporting intrusive trauma memories (p = .832). While the clinical sample with no intrusive memories reported higher symptom severity than the non-clinical sample, this difference was not significant (p = .514).

Table 3. *Demographic and clinical characteristics*

Variable		Clinical Sample with ITM[a] N=20 (51.3%)	Clinical Sample with no ITM N=19 (48.7%)	Non-clinical Sample with ITM N=19 (15.7%)	Statistics*	P
		Frequency/ M (SD)	Frequency/ M (SD)	Frequency/ M (SD)		
Age		36.70 (13.67)	28.26 (12.28)	31.16 (11.59)	H(2) = 5.79	.055
Sex	Male	8 (40%)	13 (68.4%)	9 (47.4%)	X^2(2) = 3.37	.186
	Female	12 (60%)	6 (31.6%)	10 (52.6%)		
Ethnicity	Black	7 (35%)	3 (15.8%)	1 (5.3%)	-	.067
	White	8 (40%)	10 (52.6%)	16 (84.2%)		
	Asian	3 (15%)	5 (26.3%)	2 (10.5%)		
	Mixed	2 (10%)	1 (5.3%	0 (0%)		
CAPE	Frequency	42.50 (19.62)	35.63 (22.13)	26.84 (16.45)		

* Kruskal-Wallis analysis was conducted for age as the data was positively skewed and could not be corrected using transformations. Fisher's exact test used for ethnicity as two or more cells had an expected cell count of less than 5.

[a] Intrusive Trauma Memory

3.2 Phenomenological characteristics of intrusive trauma memories in psychosis

3.2.1 Type of events experienced as intrusive memories

Eighteen of the clinical participants provided a narrative of an intrusive trauma memory. Thematic analysis was performed to identify the type of events subsequently experienced as intrusive memories (Braun & Clarke, 2006). Five themes were identified: sexual abuse, physical violence, psychological, physical illness and experience of psychosis. The frequency of each event themes is presented in Table Four. An 80% reliability rate is considered acceptable in thematic analysis (Marques & McCall, 2005). 100% reliability rate was achieved by the first author and second rater. Intrusive trauma memories were most frequently related to people's experiences of psychosis, sexual and physical abuse.

Table 4. *Content of intrusive memory*

Type of event	N / %*	Example event
Experience of psychosis	5 / 25%	'Hearing voices of builders when I was at home on the opposite side of the street'
Sexual abuse	5 / 25%	'Taken advantage of sexually by an older man'
Physical violence	5 / 25%	'Partner throwing me down the stairs'
Psychological	3 / 15%	'When I found out my daughter wasn't mine when she was born'
Physical illness	2 / 10%	'Being physically ill for a long time after getting malaria'

* N=1 participant included both sexual and physical abuse and thus is include in both themes. N=1 participant included sexual abuse and experience of psychosis and thus is include in both themes

3.2.2 Frequency/duration

Intrusive memories tended to be associated with more distant events. Sixty-five percent (n = 13) reported it was more than five years since the event related to their intrusive memory. Twenty-five percent (n = 5) said it was one to five years ago and 10% (n = 2), reported more recent events, less than one year ago. There was a

large variation in regards to the frequency of the intrusive memory. Forty percent of the sample (*n* = 8) reported that they experienced the intrusive memory once a week or less, 25% (*n* = 5) reported it occurring several times a week and 35% (*n* = 7) several times a day or more. When investigating the duration of the intrusive memory, the majority of the sample (60%, *n* = 12) reported it lasted minutes, with 20% (*n* = 4) lasting for seconds, 15% (*n* = 3) being constantly preoccupied, and 5% (*n* = 1) reported that the memory lasted several hours.

3.2.3 Distress

In general, the intrusive memories were experienced as distressing (M = 7.40, SD = 2.06, range 3-10).

3.2.4 Sensory-perceptual

The memories were overwhelmingly described as vivid (80%, *n* = 16), with 15% (*n* = 3) described as including some detail and only one memory was described as unclear or hazy (5%). There was a large range in the experience of reliving the memory (0-5) with the mean reliving intensity being 2.80 *(SD* = 1.82). Ten percent (*n* = 2) of the participants reported an out of body experience accompanying the memory. Seventy-five percent (n = 15) of the group reported physical sensations accompanying the memory.

Data on the sensory modalities accompanying the intrusive trauma memory were available for eighteen participants. The most common sensory modality to accompany the intrusive memory was sight (94.4% *(n* = 17). Sixty-one percent *(n* = 11) said it was accompanied by sound and 16.7% (*n* = 3) by smell and tactile sensations. For example, one participant said that they could smell petrol that was

linked to the place in which they were sexually abused. No one reported associated taste. Seventy percent of participants reported multiple sensory modalities accompanying the memory (*n* = 14), with 71.43% of these multiple sensory modalities memories being accompanied by both sight and sound (*n* = 10).

Data on the emotions accompanying the intrusive trauma memory were available for nineteen participants. The emotions most frequently reported as associated with the intrusive memory, were fear (84.2%, *n* = 16), helplessness and anxiety (73.7%, *n* = 14), sadness (68.4%, *n* = 13), anger (63.2%, *n* = 12), powerlessness (57.9%, *n* = 11), humiliation, shame and disgust (42.1%, *n* = 8). The emotion least frequently associated with the intrusive memory was guilt (26.3%, *n* = 5).

3.2.5 Control

Perceived sense of control over the intrusive memory was generally low (M = 0.85, SD = 0.88, range 0-3).

3.2.6 Perspective

The memories were overwhelmingly described as being experienced from a field perspective (60% of the time, *n* = 12), with 15% (*n* = 3) described as from an observer perspective and 25% *(n* = 5) as alternating between these perspectives.

3.2.7 Memory fragmentation

3.2.7.1 Subjective memory fragmentation

On the self-report question measuring memory fragmentation on a 10 point scale, with lower scores indicating a more coherent image and higher scores

reflecting fragmentation (Kindt et al, 2005), intrusive memories were perceived as more coherent than fragmented (*M* = 3.10, *SD* = 3.11). On the self-report question measuring memory fragmentation on a 4 point scale, where 0 = not at all unclear/jumbled, 3 = very much unclear/jumbled (Murray et al, 2002), in general, memories were perceived as reflective of a more clear and unjumbled image (*M* = 0.75, *SD* =1.07).

3.2.7.2 Objective memory fragmentation

Of the twenty intrusive memories reported, two people were not able to provide a narrative to allow for objective coding and two people provided a narrative but did not consent for this to be audio recorded, therefore the exact nature of the narrative could not be accurately transcribed. Results of objective ratings of memory fragmentation will therefore be drawn from sixteen narrations. Based on Foa's (1995) coding manual, the means and standard deviations for each of the utterance representative of fragmentation across the sample are reported in Table Five. All narratives were rated by the first author. Five of the studies were double rated (31.25%) which indicated good inter-rater reliability (ICC .839, CI = .023 - .982).

Table 5. *A table to show the mean percentage of repetition, unfinished thoughts and speech filler utterances and standard deviation and range*

Fragmentation	Mean Percentage	SD	Range
Repetitions	6.00%	4.13	0 - 16.13 %
Unfinished thoughts	17.63%	6.56	6.45 - 26.73 %
Speech fillers	16.30%	10.42	3.23 – 39.06 %
Total Frequency	39.35%	11.65	17.86 – 60.94 %

Descriptive statistics of objective memory fragmentation measured using Murray et al (2002) 4-point scale, found that mean fragmentation was 1.69 (*SD* = .70, range 1-3). This suggests that on average the narratives were rated as between quite coherent to not very coherent, and that no narratives were rated as very coherent. Five of the studies were double rated (31.25%) which indicated good inter-rater reliability (ICC .810, CI = .127 - .978).

3.2.7.3 Summary and relationship between fragmentation measures

Subjective ratings of fragmentation are relatively low indicating that intrusions are experienced as coherent, however objective ratings of fragmentation suggested that intrusions were more fragmented than coherent. Therefore, the relationships between the different measures of fragmentation were explored. There was a significant positive correlation between the different measures of subjective fragmentation ($r = .62$, $p = .004$) suggesting that they may be effective in measuring the same construct. However, there was a non-significant, small negative correlation between objectively measured fragmentation using the Foa et al (1995) coding manual and Murray et al (2002) 4-point scale ($r = -.28$, $p = .290$), suggesting no relationship between the objective fragmentation measures.

There was no relationship between any of the measures of subjective memory fragmentation and objective memory fragmentation, (subjective memory fragmentation (Kindt et al, 2005) and objective memory fragmentation, Foa et al, 1995, $r = -.13$, $p = .622$; Murray et al, 2002, $r = -.09$, $p = .751$), subjective memory fragmentation (Murray et al, 2002) and objective memory fragmentation, Foa et al, 1995, $r = .02$, $p = .930$; Murray et al, 2002, $r = -.05$, $p = .857$).

3.3 Hypothesis one: Increased memory fragmentation will be associated with more severe hallucinations and persecutory beliefs.

A Pearson product-moment correlation coefficient was computed to assess the relationships between intrusive trauma memory fragmentation and hallucinations and persecutory beliefs. The means, standard deviations and Pearson's correlations are presented in Table Six.

3.3.1 Subjective memory fragmentation

As predicted, participants who rated their memories as more fragmented experienced more frequent and distressing hallucinations. This relationship was significant between subjective memory fragmentation (Kindt et al, 2005) and distress associated with hallucinations ($r = .46$, $p = .048$). The relationships between subjective memory fragmentation and frequency of hallucinations did not reach significance. However, moderate to large effect sizes were reported in the hypothesised direction. However, there was no relationship between subjective memory fragmentation and persecutory beliefs.

3.3.2 Objective memory fragmentation

The relationship between objective memory fragmentation and psychosis symptoms were more equivocal. The size and direction of these relationships varied depending on the specific psychosis symptoms under investigation and the methodology used to code for fragmentation of the narratives. Participants whose memories were rated as objectively more fragmented using Foa et al (1995) coding manual were less likely to experience hallucinations with a medium to large effect, at

a statistical trend level ($r = -.49$, $p = .054$). All other correlations were non-significant with weak or small effect sizes.

Table 6. *Correlations between subjective memory fragmentation, objective memory fragmentation and positive symptom severity*

Variable (range)	M	SD		Subjective fragmentation (Kindt et al, 2005) (0-10)	Subjective Fragmentation (Murray et al, 2002) (0-3)	Objective Fragmentation (Foa et al, 1995) (17.86% - 60.94%)	Objective Fragmentation (Murray et al, 2002) (1-3)
Persecutory Ideation Frequency	5.45 (N = 20)	3.49	*r*	-.23	.06	-.17	.21
(0-14)	5.88 (N = 16)	3.70	*p*	.324	.816	.541	.426
Persecution Ideation Distress	5.63 (N = 19)	3.52	*r*	-.29	.12	-.08	.17
(0-11)	5.67 (N = 15)	3.31	*p*	.231	.620	.776	.536
Persecution Ideation Total	11.11 (N = 19)	6.60	*r*	-.28	.10	-.13	.201
(0-23)	11.6 (N = 15)	6.78	*p*	.244	.690	.655	.473
Hallucinations Frequency	2.20 (N = 20)	2.51	*r*	.36	.39	-.49	.02
(0-8)	2.69 (N = 16)	2.56	*p*	.117	.092	0.054	.953
Hallucination Distress	2.26 (N=19)	2.79	*r*	.46*	.40	-.30	-.01
(0-9)	2.80 (N=15)	2.91	*p*	.048	.092	.286	.986
Hallucinations Total	4.53 (N=19)	5.17	*r*	.45	.46*	-.35	-.13
(0-15)	5.60 (N=15)	5.32	*p*	.051	.047	.204	.654

* $p < .05$ significance, ** $p < .01$

M and *SD* are reported twice to be inclusive of the different participant's data used in the different correlational analysis

3.4 Hypothesis two: Increased reliving will be associated with more severe hallucinations.

A Pearson product-moment correlation coefficient assessed the relationships between reliving associated with intrusive trauma memories, hallucinations and persecutory beliefs. All correlations were non-significant (see Table Seven).

Table 7. *Correlations between reliving and positive symptom severity*

Variable (range)		Reliving (0-5)
Persecutory Ideation Frequency (0-14)	*r*	-.184
	p	.438
Persecution Ideation Distress (0-11)	*r*	-.195
	p	.423
Persecution Ideation Total (0-23)	*r*	-.203
	p	.404
Hallucinations Frequency (0-8)	*r*	-.014
	p	.954
Hallucination Distress (0-9)	*r*	.087
	p	.724
Hallucinations Total (0-15)	*r*	.055
	p	.824

3.5 Hypothesis three: Intrusive trauma memories in psychosis will be more frequent, vivid, fragmented and with an increased sense of reliving compared to a non-clinical sample

There was a significant difference in frequency of the intrusive memories, using a Fisher's Exact Test on people in the clinical and non-clinical sample (p = .02). As predicted, in the clinical sample the memories were described as occurring more frequently. As described previously, the clinical sample most frequently reported that they experienced intrusive memories, once a week or less, followed by several times a day or more. 68.4% of the non-clinical sample (n = 13) reported that they experienced the intrusive memory once a week or less, 26.3% (n = 5) reported it occurring several times a week, one person (5.3%) reported that they experienced the

intrusive memory once a day. No one reported that they experienced the intrusive memory several times a day or more.

There was a significant difference in vividness of intrusive memories, using a Fisher's Exact Test on people in the clinical and non-clinical sample (p = .048). As predicted, the clinical sample described their memories as more vivid. As described previously, in the clinical sample the memories were overwhelmingly described as vivid, with only one participant reporting that the memory was unclear or hazy. In the non-clinical sample, the memories were described as less vivid with five people reporting that the memory was unclear or hazy (26.3%), 31.6% (n = 6) described as including some detail, and 42.1% described the intrusive memory as vivid (n = 8). An independent samples t-test found no evidence of a significant difference between people with psychosis (M = 2.8, SD = 1.82) and the non-clinical sample (M = 3.79, SD = 1.18) on degree of reliving associated with the intrusive memories t(32.76) = -2.02, p = .052, d = 0.84. However, people with psychosis tended to report the memory was associated with a higher degree of reliving.

There was increased self-reported fragmentation in the non-clinical sample than the clinical sample. When asked how much the memory existed of loosely related pieces or images, intrusive memories were rated as significantly more fragmented in the non-clinical sample (M = 5.58, SD = 3.25) than the psychosis sample (M = 3.10, SD = 3.11), t(37) = -2.43), p = 0.02, d = .76, 95% CI of the difference = -4.54 to -.52. However, a significant difference was not seen between the clinical (M = .54, SD = .70) and non-clinical sample (M = .95, SD = .62 when asked if the intrusive memory was in any way unclear or jumbled, t(37) = -1.95, p = 0.06, CI [-.84, .01].

3.6 Hypothesis four: Intrusive trauma memories will be more frequent, vivid, fragmented and associated with an increased sense of reliving compared to voluntary recall of trauma memories in psychosis.

Four participants reported that they had intentionally recalled their trauma memory in the past month. Therefore, there was not enough data to carry out statistical hypothesis testing. Descriptive statistics are presented in Table Eight. Where small differences were seen, these were in the hypothesised direction.

Table 8. *Descriptive statistics of intrusive and voluntary recall of trauma memories*

Variable		Intrusive memory Frequency / M (range)	Voluntary memory Frequency/ M (SD)
Sense of reliving		2.50 (0-4)	3.50 (2-5)
Fragmentation Kindt et al (2005)		5 (0-8)	4.25 (0-9)
Fragmentation Murray et al (2002)		1.50 (0-2)	1 (0-2)
Vividness	unclear	0	1
	vivid	1	1
	very vivid	3	2
Frequency	once a week	2	3
	several times a day	2	1

4. Discussion

To our knowledge this is the first study to report on the phenomenology of intrusive trauma memory in psychosis and its relationship to hallucinations and persecutory beliefs.

4.1 Summary

Intrusive memories in this sample tended to be related to distant events, were experienced as overwhelmingly vivid, distressing and accompanied by physical sensations. Memories were typically not accompanied by an out of body experience, but were accompanied by multi-sensory modalities and fear. Memories generally

lasted minutes, were viewed from a field perspective and with a low sense of perceived control. Intrusive memory frequency and reliving intensity varied within the sample.

Consistent with other studies, this study found that intrusions were sometimes related to the experience of psychosis (Berry et al, 2013) and supports the suggestion that such experience would meet the relevant criteria within the ICD-10 diagnosis of PTSD (World Health Organisation, 1992).

The phenomenological investigation was largely based on the work of Reynolds and Brewin (1999), who reported qualities of intrusive memories in people with PTSD and depression. Whilst the sample in the current study was not matched to the characteristics of the previous work, the phenomenology of the memory qualities was similar across the diagnostic groups in regards to physical sensations (PTSD, 74%; Psychosis, 75%; Depression, 62%), level of distress (PTSD & Depression, M = 7.9; Psychosis, M = 7.4) and vividness (PTSD & Depression, 88%; Psychosis, 80%). As the present study used a continuous scale to assess reliving, findings cannot be compared to that of Reynolds and Brewin (1999) as they used a dichotomous response. However, fewer people with psychosis reported an out-of-body experience (PTSD, 42%; Depression, 20%; Psychosis, 10%). This suggests that the presence of an out-of-body experience may be a quality of the memory that differentiates intrusive memories in PTSD from those in other disorders.

As predicted, further findings of interest indicated that subjective fragmentation of intrusive memories was associated with more severe hallucinations. It is of note that the relationship between fragmentation and persecutory beliefs was not observed, suggesting the effect was specific to hallucinations. Such findings are consistent with Steel and colleagues (2005) theoretical accounts that people with

psychosis have a weakened ability to contextually integrate information. The relationship between objective memory fragmentation and hallucinations was equivocal, with a negative correlation for one rating and no relationship for the other.

When interpreting these findings, it is important to consider explanations within the context of the methodology employed and the conceptual construct of fragmentation. Measurement of fragmentation of intrusive memories was adapted from the intentional recall literature. The methodologies used in this study may not be adequately developed to measure fragmentation for this purpose, as the retrieval processes involved in these experiences are different than those involved in intentional recall. Consequently, it may be that measures of fragmentation of these two different types of memory recall are tapping into overlapping, or differing constructs. It may be more theoretically applicable for measures of fragmentation of intrusions to look more explicitly, for example, at the degree of temporal and contextual information, nature of sensory memory, coherence of images linked in a narrative, as opposed to repetition (Foa et al, 1995) or a general sense of coherence (Murray et al, 2002).

Nonetheless, the significant and predicted relationship between subjective fragmentation and hallucination severity, suggests that the items used to measure fragmentation were reflective of memory contextualisation. In the PTSD literature, contextualisation has been primarily defined in relation to the sense of reliving. This is the index of lack of contextualisation more commonly associated with memory intrusions, and which may be a more valid construct given the strong sensory impressions associated with the memory (Brewin et al, 1996; Ehlers, Hackmann, & Michael, 2004). However, reliving in this study was not associated with hallucinatory severity. It may be that when intrusions are sufficiently contextualised

to be associated with a 'here and now' experience of a past trauma, they are less likely to play a role in hallucinatory experience, whereas when contextualisation is more severe and memory fragmentation inhibits an awareness of the relationship between intrusions and prior trauma experience, hallucinations are more likely to occur. However, given the small sample size and identified conceptual and measurement issues, caution is required when interpreting this patterns of findings.

As hypothesised, people with an experience of psychosis had more frequent and vivid intrusions, with an increased sense of reliving, than the non-clinical sample. These findings are in line with previous studies by Marks and colleagues (2012) and Glazer and colleagues (2013) who reported that people with proneness to psychotic experiences have a predisposition to experience greater levels of intrusions, due to a relatively weakened ability to integrate information within a spatial-temporal context (Steel et al, 2005). Increased stress may further weaken this ability, (Fowler et al, 2006; Read et al, 2014), with traumatic memories being particularly vulnerable to intruding. These theories are consistent with our current data, which extend previous studies findings by specifically investigating traumatic intrusions in a clinical sample with psychosis, and comparing to a non-clinical group.

However, it is of note that people with psychosis reported more coherent intrusive memories than the non-clinical sample. It is similarly importance to consider the methodological and theoretical validity of measurements of fragmentation and the impact this may have on these findings.

While initial findings are consistent with the PTSD models of intrusions being more frequent, vivid, and associated with an increased sense of reliving than voluntary recall of trauma memories (Brewin et al, 2010), such differences observed were small. There was insufficient data in the current study to investigate these

relationships with inferential statistics, and further research is needed to see if the findings replicate.

4.2 Limitations

While the semi-structured interview was able to explore the phenomenology of intrusive memories, retrospective judgments are often viewed as having limited reliability (Priebe et al., 2013). Constraints could be further implicated in a psychosis sample where meta-memory bias is more pronounced, i.e. knowledge and awareness of your own memory (Eisenacher et al, 2015). Alternative methodologies could therefore also be considered to investigate the phenomenology of memory and its relationship to psychosis. Previous studies have found that diaries are an effective and reliable way of recording the occurrence of intrusions (Marks et al, 2012; Holmes & Steel, 2004). This would allow for more contextual information to be gathered and 'real-time' responses.

Due to a delay in starting recruitment, the desired sample size of 35 was not reached. A power analysis was carried out to determine the effect size that the achieved sample of $N = 20$ was powered to detect. Using G-Power (Faul, et al. 2007) and specifying alpha=5%, desired power=80% (Cohen, 1992), the sample provided sufficient power to detect large effect size, greater or equal to r = .53. Therefore, while the study was underpowered to detect small and medium effects, large effects were identified. While further research is needed in a larger sample to observe if the identified relationships replicate, this study was the first phenomenological study of the nature of intrusive memories in psychosis and so offers valuable initial insights.

4.3 Clinical implications

The current recommended treatments for psychosis are cognitive behavioural therapy (CBT) and family interventions (NICE, 2014). Individual CBT has effect sizes in the small to medium range (Jauhar, McKenna, Radua, Fung, Salvador & Laws, 2014; Burns, Erickson & Brenner, 2014; van der Gaag, Valmaggia & Smit, 2014; Turner, van der Gaag, Karyotaki & Cuijpers, 2014). Whilst the development of talking treatments for psychosis is promising, there have been calls to further improve effectiveness by targeting the underlying mechanisms (Freeman & Garety, 2013). This study starts to elucidate how cognitive processes may contribute to the development and maintenance of psychosis occurring in the context of trauma, and potentially emphasises the importance of contextualising trauma memories, consistent with a recent trial and best-practice guidance supporting the efficacy of trauma-focused exposure treatments in psychosis (NICE, 2014; van den Berg et al, 2015)

4.4 Further research

Morrison et al (2002) highlights important links between memories of traumatic events and the content of images associated with psychotic symptoms. It would have been of additional scientific value for this study to further this investigation by considering the relationships between the trauma events, the content of intrusive memories and the content of hallucinations and persecutory beliefs. In addition, while aiming to investigate the similar and differing natures of voluntary recall of traumatic memories, and intrusive trauma memories, asking participants to report on intrusions and voluntary recall of neutral memories, would have allowed a clearer insight into what phenomenological aspects of the memory are unique to

traumatic events in this population. However, such avenues were beyond the scope of the present study, due to the further demands this would place on the participants, although future research investigating these relationships would be valuable.

4.5 Conclusions

The study suggests a potential role for memory fragmentation in hallucinatory experience, although given the small sample size and identified conceptual and measurement considerations, caution is required when interpreting this finding. While our study is only a starting point for this line of enquiry, it may form the basis of further research within this pioneering area.

Reference

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders (4th ed.).* Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.).* Washington, DC: Author.

Armando, M., Nelson, B., Yung, A., Ross, M., Birchwood, M., Girardi, P., & Nastro, P.F. 2010. Psychotic---like experiences and correlation with distress and depressive symptoms in a community sample of adolescents and young adults. *Schizophrenia Research, 119,* 258-265.

Bedard-Gilligan, M., & Zoellner, L.A. (2012). Dissociation and memory fragmentation in post-traumatic stress disorder: an evaluation of the dissociative encoding hypothesis. *Memory, 20(3),* 277-299.

Bendall, S., Alvarez-Jimenez, M., Hulbert, C.A., McGorry, P.D., & Jackson, H.J. (2014). Childhood trauma increases the risk of post-traumatic stress disorder in response to first-episode psychosis. *Australian and New Zealand journal of psychiatry, 46(1),* 35-39.

Bentall, R.P., de Sousa, P, Varese, F., Wickham, S., Sitko, K., Haarmans, M., & Read, J. (2014). From adversity to psychosis: pathways and mechanisms from specific adversities to specific symptoms. *Social Psychiatry and Psychiatric Epidemiology, 49,* 1011–1022.

Berry, K., Ford, S., Jellico-Jones, L. & Haddock, G. (2013). PTSD symptoms associated with the experiences of psychosis and hospitalisation: A review of the literature. *Clinical Psychology Review, 33,* 526-538.

Brenner. K., Schmitz, N., Pawliuk, N., Fathalli, F., Joober, R., Ciampi, A., & King. S. (2007). Validation of the English and French versions of the Community

Assessment of Psychic Experiences (CAPE) with a Montreal community sample. *Schizophrenia Research, 95(1-3),* 86-95.

Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J.Handelsman, L., Medrano, M., Desmond, D., & Zule, W. (2003). Development and validation of a brief screening version of the childhood trauma questionnaire. *Child Abuse & Neglect, 27,* 169–190.

Braun, V., & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology, 3 (2),* 77-101.

Brewin, C. R. (2001). A cognitive neuroscience account of posttraumatic stress disorder and its treatment. *Behaviour Research and Therapy, 39,* 373–393.

Brewin, C. R., Rose, S., Andrews, B., Green, J., Tata, P., McEvedy, C., Turner, S., & Foa, E.B. (2002). Brief screening instrument for post-traumatic stress disorder. *British Journal of Psychiatry, 181,* 158 – 162.

Brewin, C.R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological review, 103(4*), 670-686.

Brewin, C.R., Lipton, M., Gregory, J.D., & Burgess, N. (2010). Intrusive Images in Psychological Disorders: Characteristics, Neural Mechanisms, and Treatment Implications. *Psychological review, 117(1),* 210–23.

Burns, A.M.N., Erickson, D.H., & Brenner, C.A. (2014). Cognitive-Behavioral Therapy for Medication-Resistant Psychosis: A Meta-Analytic Review. *Psychiatric Services, 65(7).*

Byrne, C.A., Hyman, I.E., & Scott, K.L. (2001). Comparisons of memories for traumatic events and other experiences. *Applied Cognitive Psychology, 15(7),* 119-133.

Capra, C., Kavanagh, D.J., Hides, L., & Scott, J. (2013). Brief screening for psychosis-like experiences. *Schizophrenia Research, 149(1-3),* 104-107.

Carr, S.C. (2006). Developing a brief trauma screening tool for use in psychosis. Unpublished clinical psychology doctoral thesis, Department of Clinical, Educational, and Health Psychology. University College London.

Cohen, J. (1992). A power primer. *Psychological bulletin, 112*, 155-159.

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*(2), 261-288.

Cusack, K. J., Frueh, B. C., Hiers, T. G., Suffoletta-Maierle, S., & Bennet, S. (2003). Trauma within the psychiatric setting: A preliminary empirical report. *Administration and Policy in Mental Health, 30,* 453-460.

Ehlers, A., & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38,* 319-345.

Ehlers, A., Hackmann, A., & Michael, T. (2004). Intrusive re-experiencing in post-traumatic stress disorder: phenomenology, theory, and therapy. *Memory, 12(4),* 403-415.

Ehlers, A., & Steil, R. (1995). Maintenance of intrusive memories in posttraumatic stress disorder: A cognitive approach. *Behavioural and Cognitive Psychotherapy, 23,* 217–249.

Eisenacher, S., Rausch, F., Ainser, F., Mier, D., Veckenstedt, R., Schirmbeck, F….& Zink, M. (2015). Investigation of metamemory functioning in the at-risk mental state for psychosis. *Psychological Medicine, 45(15),* 3329-3340.

Faul, F., Erdfelder, E., Land, A., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavioral Research Methods, 39(2),* 175-191.

Foa, E.B., Ehlers, A., Clark, D.M., Tolin, D.F. & Orsillo, S.M. (1999). The Posttraumatic Cognitions Inventory (PTCI): Development and validation. *Psychological Assessment, 11*, 303-314.

Foa, E.B., Molnar, C., & Cashman, L. (1995). Change in rape narrative during exposure therapy for posttraumatic stress disorder. *Journal of traumatic stress, 8(4*), 675-690.

Fowler, D., Freeman., Steel, C., Hardy, A., Smith, B., & Hackman, C. (2006). The catastrophic interaction hypothesis: how do stress, trauma, emotion and information processing abnormalities lead to psychosis. In: Morrison, A and Larkin, W and Morrison, T, (eds.) *Trauma and Psychosis.* (101 - 124). John Wiley and Sons.

Freeman, D., & Garety, P. (2013). Advances in understanding and treating persecutory delusions: a review. *Social psychiatry and psychiatric epidemiology, 49(8),* 1179–1189.

Garety, P.A., Kuipers, E., Fowler, D., Freeman, D., & Bebbington, P.E. (2001). A cognitive model of the positive symptoms of psychosis. *Psychological Medicine, 31,* 189 – 195.

Glazer, D.A., Mason, O., King, J.A., & Brewin, C.R. (2013). Contextual memory, psychosis-proneness, and the experience of intrusive imagery. *Cognition and Emotion, 27(*1), 150-157.

Green, B. L. (1996). Trauma History Questionnaire. In B. H. Stamm (Ed.), *Measurement of stress, trauma, and adaptation* (pp. 366-369). Lutherville, MD: Sidran Press.

Grubaugh, A.L., Zinzow H.M., Paul, L., Egede, L.E. & Frueh, C. (2011). Trauma exposure and posttraumatic stress disorder in adults with severe mental illness: A critical review. *Clinical Psychology Review, 31,* 883-899.

Gumley, A., Braehler, C., Laithwaite, H. et al. (2010). A compassion focussed model of recovery after psychosis. *International Journal of Cognitive Psychotherapy, 3(2),* 186-201.

Hackmann, A., Ehlers, A., Speckens, A., & Clark, D.M. (2004). Characteristics and content of intrusive memories in PTSD and their change with treatment. *Journal of traumatic stress, 17(3*), 231-240.

Halligan, S.L., Michael, T., Clark, D.M., & Ehlers, A. (2003). Posttraumatic stress disorder following assault: The role of cognitive processing, trauma memory, and appraisals. *Journal of counselling and clinical psychology, 71(3),* 419-431.

Hemsley, D.R. (1993) A simple (or simplistic?) cognitive model for schizophrenia. *Behaviour Research and Therapy*, *31*, 633-646.

Hopper, J.W., & van der Kolk, B.A. (2001). Retrieving, assessing, and classifying traumatic memories: A preliminary report on three case studies of a new standardized method. *Journal of Aggression, Maltreatment and Trauma, 4(2),* 33–71.

IBM Corp Released (2013). *IBM SPSS Statistics for Windows, Version 22.0.* Armonk, NY: IBM Corp.

Jauhar, S., McKenna, P.J., Radua, J., Fung, E., Salvador., & Laws, K.R. (2014). Cognitive-behavioural therapy for the symptoms of schizophrenia: systematic review and meta-analysis with examination of potential bias. *The British Journal of Psychiatry, 204*, 20-29.

Jones, V., & Steel, C. (2014.) *Examining vulnerability to involuntary memories in schizophrenia comorbid with post-traumatic stress disorder. Schizophrenia Research, 152(2),* 487-489.

Kindt, M., Van den Hout, M., & Buck, N. (2005). Dissociation related to subjective memory fragmentation and intrusions but not to objective memory disturbances. *Journal of behavioral therapy and experimental psychiatry, 36*, 43-59.

Konings, M., Bak, M., Hanssen, M., Van Os, J., & Krabbendam, L. (2006). Validity and reliability of the CAPE: A self-report instrument for the measurement of psychotic experiences in the general population. *Acta Psychiatrica Scandinavica, 114(1),* 55-61.

Kuyken, W. & Brewin, C.R. (1994). Intrusive memories of childhood abuse during depressive episodes. *Behaviour Research and Therapy, 32*, 525-528.

Laing, J., Morland, T., & Fornells-Ambrojo, M. (2015). The Phenomenology and Generation of Positive Mental Imagery in Early Psychosis. *Clinical Psychology & Psychotherapy.*

Layton, B., & Krikorian, R. (2002). Memory Mechanisms in Posttraumatic Stress Disorder. *The Journal of Neuropsychiatry and Clinical Neurosciences, 14(3),* 254-261.

LeDoux, J. E., Iwata, J., Cicchetti, P., & Reis, D. J. (1988). Different projections of the central amygdaloid nucleus mediate autonomic and behavioral correlates of conditioned fear. *Journal of neuroscience, 8,* 2517–2529.

LimeSurvey Project Team / Carsten Schmitz (2015). LimeSurvey: An Open Source survey tool /LimeSurvey Project Hamburg, Germany. Retrieved from http://www.limesurvey.org/.

Marks, E. M., Steel, C., & Peters, E. R. (2012). Intrusions in trauma and psychosis: information processing and phenomenology. *Psychological Medicine, 42*(11), 2313-2323.

Marques, J. F., & McCall, C. (2005). The application of interrater reliability as a solidification instrument in a phenomenological study. *The Qualitative Report, 10,* 439–462.

Mellman, T.A., & Davis, G.C. (1985), Combat-related flashbacks in posttraumatic stress disorder: Phenomenology and similarity to panic attacks. *Journal of clinical psychiatry, 46(9),* 379-382.

Morrison, A.P. (2001). The interpretation of intrusions in psychosis: An integrative cognitive approach to hallucinations and delusions. *Behavioural and Cognitive Psychotherapy, 29,* 257–276.

Morrison, A.P., Beck, A.T., Glentworth, D., Dunn, H., Reid, G.S., Larkin, W., & Williams, S. (2002). Imagery and psychotic symptoms: a preliminary investigation. *Behavioural research and Therapy, 40,* 1053-1062.

Morrison, A.P., Frame, L. & Larkin, W. (2003). Relationships between trauma and psychosis: A review and integration. *British Journal of Clinical Psychology, 42,* 331-353.

Mueser, K. T., Lu, W., Rosenberg, S. D., & Wolfe, R. (2010). The trauma of psychosis: Posttraumatic stress disorder and recent onset psychosis. *Schizophrenia Research, 116,* 217-227.

Murray, J., Ehlers, A., & Mayou, R.A. (2002). Dissociation and post-traumatic stress disorder: Two prospective studies of road traffic accident survivors. *The British Journal of Psychiatry, 180,* 363-368.

National Institute for Health and Care Excellence. (2005). *Post-traumatic stress disorder (PTSD): The management of PTSD in adults and children in primary and secondary care. CG26.* London: National Institute for Health and Clinical Excellence.

NICE. (2014). Psychosis and schizophrenia in adults: treatment and management. Retrieved from http://www.nice.org.uk/guidance/cg178.

Núñez, D., Arias, V., Vogel, E., & Gómez, L. (2015). Internal structure of the Community Assessment of Psychic Experiences-Positive (CAPE-P15) scale: Evidence for a general factor. *Schizophrenia Research, 165(2-3),* 236-242.

Priebe, S., Broker, M., & Gunkel, S. (1998). Involuntary admission and posttraumatic stress disorder symptoms in schizophrenia patients. *Comprehensive Psychiatry, 39*(4), 220-224.

Read, J., Fosse, R., Moskowitz, A., & Perry, B. (2014). The traumagenic neurodevelopmental model of psychosis revisited. *Neuropsychiatry, 4(1),* 65–79.

Reynolds, M., & Brewin, C.R. (1999). Intrusive memories in depression and posttraumatic stress disorder. *Behavioural research therapy, 37(3),* 201-15.

Steel, C., Fowler, D., & Holmes, E.A. (2005). Trauma-related intrusions and psychosis: An information processing account. *Behavioural and cognitive psychotherapy, 33,* 139-152.

Turner, D.T., van der Gaag, M., Karyotaki, E., & Cuijpers, P. (2014). Psychological Interventions for Psychosis: A Meta-Analysis of Comparative Outcome Studies. *American journal of psychiatry, 171,* 523-538.

van den Berg, D.P., de Bont, P.A., van der Vleugel, B.M., de Roos, C., de Jongh, A., van Minnen, A., & van der Gaag, M. (2015). Prolonged exposure vs eye movement desensitization and reprocessing vs waiting list for posttraumatic stress disorder in patients with a psychosis disorder: a randomized clinical trail. *JAMA Psychiatry, 71(3),* 259-267.

van der Gaag, M., Valmaggia, L.R., & Smit, F. (2014). The effects of individually tailored formulation-based cognitive behavioural therapy in auditory hallucinations and delusions: A meta-analysis. *Schizophrenia Research Volume, 156(1),* 30–37.

van der Kolk, B. A., & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress, 8,* 505–525.

Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., van Os, J., & Bentall, R.P. (2012). Childhood Adversities Increase the Risk of Psychosis: A Meta-analysis of Patient-Control, Prospective- and Cross-sectional Cohort Studies. *Schizophrenia Bulletin, 38(4),* 661-71.

World Health Organisation. (1992). International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10). Geneva: WHO.

Yung, A.R., Nelson, B., Baker, K., Buckby, J.A., Baksheev, G., & Cosgrave, E.M. (2009). Psychotic-like experiences in a community sample of adolescents: implications for the continuum model of psychosis and prediction of schizophrenia. *Australian and New Zealand Journal of Psychiatry, 43(2),* 118-128.

Part 3: Critical Appraisal

Critical appraisal

When the opportunity first arose to study intrusive trauma memories and their relationship with psychosis, I was attracted to doing a study which considered this cognitive process in an applied setting. It seemed striking to me that given the high rates of trauma in psychosis (Grubaugh, Zinzow, Paul, Egede & Frueh, 2011; Varese et al, 2012), the understanding about what trauma memories are like for people with psychosis, and the evidence to support therapeutic input directly around these underlying mechanism, were limited. However, the research process highlighted to me some of the barriers to extending research within the area of trauma and psychosis, and the importance of difficult methodological choices when conducting research.

This critical appraisal will firstly reflect on the complexities of the methodological choices in measuring the phenomenology of intrusive memories; and relationship with psychosis severity. I will then focus on the practicalities of this as a research area, given the difficulties with recruitment in this field. Finally, I will explore how the research process shaped my clinical work and future career interests.

1. Methodological choices

There were several difficult choices to make in the course of conducting this study, all of which had implications for the study as a whole.

1.1 Semi-structured interview

A detailed description of intrusive memories in psychosis had not yet been investigated. I was particularly interested in developing an initial understanding of an individual's experience of these memories, given the new area of research. I wanted

to get a clearer insight into the nature of people's subjective appraisal of the experience. However, given the novelty of the research area, I thought it was important to build on previous methodology to explore the phenomenon.

One strength of this approach was that it allowed for a comparison between this area and other psychopathologies, to help determine the uniqueness of the experience in people with psychosis. It was therefore decided to use a semi-structured interview, which required participants to retrospectively report previous experienced intrusive memories, adapted from Reynolds and Brewin (1996). Participants were asked if they had noticed 'memories of any of these deaths, life events, or childhood experiences, or of any other negative event spontaneously coming into their minds during the past week'. A qualifying statement was made to ensure participants were reporting on a memory which consisted of a visual image of an event which had taken place. Participants were asked to identify two intrusive memories and to report on the associated emotions of each one. This was followed by a series of questions which gathered descriptive information about characteristics of this memory. For this, participants were asked to respond using binary or multiple choice responses (Reynolds & Brewin, 1996). This method was used to study the characteristics of intrusive memories in people with post-traumatic stress disorder and depression, with similar self-report approaches used in the field. This approach therefore allowed me to compare across diagnostic categories and to start to identify the similarities and differences in the phenomenology of memories of traumatic experiences in psychosis.

However, using this methodology to investigate intrusive memories, raised some challenges in the specific context of psychosis. I will go on to explore this in

relation to specific memory problems in people with psychosis and general critique of retrospective reports of experiences.

While psychosis has been implicated as associated with a wide range of cognitive impairments (Fioravanti, Carlone, Vitale, Cinti, & Clare, 2005), memory is perhaps the most severely impaired (Heinrichs & Zakzanis, 1998; Aleman, Hijman, de Haan, & Kahn, 1999). This finding has been seen in both first episode psychosis (Albus et al., 2006) and chronic populations (Paulsen et al., 1995). A recent meta-analysis examined impairment specifically in voluntary autobiographical memory recall in schizophrenia-spectrum disorders (Berna et al, 2016) and reported impaired recall of past personal memories, with recollection being less vivid and specific. Meta-memory bias is more pronounced in people with psychosis, i.e. knowledge and awareness of your own memory (Eisenacher et al, 2015). A number of studies have specifically implicated that people with psychosis are less confident in their responses, whilst also demonstrating overconfidence in errors (Moritz, Woodward, & Ruff, 2003; Moritz, Woodward, & Hausmann, 2006a). Subsequently, this makes the investigation of the subjective nature of memory constructs difficult in this population.

In addition to the difficulties which individuals presenting with schizophrenia face when asked to report on aspects of their own memory, retrospective memory judgments are often viewed as having limited reliability (Priebe, Kleindienst, Zimmer, Koudela, Ebner-Priemer, Bohus, 2013) as they can be based on biased storage and recollection of personal memories (Ebner-Priemer & Trull, 2009). For example, rather than being based on the overall experience, there is a tendency to be biased by the most prominent and recent experience, (peak-end rule) (Kahneman, Fredrickson, Schreiber, & Redelmeier, 1993).

This therefore raises the questions of whether intrusive memories are currently assessed in the most appropriate way in the literature, and extends this question to the specific context of assessment in people with psychosis. As intrusive memories are commonly triggered in response to both internal and external cues, retrospective questionnaire items about the frequency of intrusive memories, may not be the most valid and reliable assessment method (Brewin, 2015).

Electronic diaries have been used when conducting research in a number of psychiatric populations, which aim to address recall biases by enabling real-time assessment. Priebe and colleagues (2013), used such an approach to investigate intrusions and flashbacks related to childhood sexual abuse in female participants. While this study did not ask for detailed descriptions of these intrusions, they found that when electronic diaries were used to record intrusions and flashbacks, there was a 50% increase, compared to retrospective assessment.

While such a methodology could be considered to gather the information relevant to this research topic, this would have financially been outside the scope of a DClinPsy research study. However, attempts to do 'real time' assessment with paper diaries have been identified as an effective and reliable way of recording the occurrence of intrusions in psychosis (Marks, Steel, & Peters, 2012; Holmes & Steel, 2004). This would allow for more contextual information to be gathered and 'real-time' responses. However, this approach may have raised ethical considerations with regards to people being asked, not just to record frequency of intrusions, but also to record the subjective experience, and provide a narrative of these experiences, in situations which may not be containing and with appropriate support afterwards if needed. Such alternative approaches were therefore not considered to be appropriate

in order to gather the data to answer the current research question in a safe and containing way.

1.2. *Measures of psychosis*

Due to the data for this study being collected as part of a joint research project, the methodological choices relevant to my study required consideration in relation to those needed for the Carr (2016) study. It was important to be mindful of the length of the assessment session to allow us to pool together our recruitment resources and ensure that data for both projects could be collected without becoming burdensome for participants. Subsequently, research team discussions were held to consider appropriate methodological choices. I will reflect on one such example.

Standardised clinician administered measures are considered to be the gold standard for measurement of psychosis symptoms. The Brief Psychiatric Rating Scale (Lukoff, Liberman, Nuechterlein, 1986a) is one example of an interviewer-based measure which is often used as a measure of symptom severity in psychiatric populations and allows evaluation of a wide range of symptoms (Burlingame et al, 2005). However, due to the number of other questionnaires and interviews needed to be included in the assessment battery of this study, the research team met to discuss what would be a valid way of measuring symptoms of psychosis, given the time restraints of the research session.

We started to consider shorter measures and focused on self-report measures. While self-report measures are less routinely used in research to examine symptom outcomes than clinician-administered measures (Burlingame et al., 2005), the advantages are that they are often less time intensive to administer and to score and interpret. However, self-report questionnaire are widely recognised as being

vulnerable to bias in responding, particularly social desirability bias. Social desirability is the tendency of respondent to answer questions in a way to be viewed in a positive light by others. In reference to these questions, it may be under-reporting 'undesirable' symptoms, particular those associated with positive symptoms of psychosis, as the participants may already have experience of others not believing their reports. Evidence has been found in a non-clinical sample where, with the exception of hallucinations, reporting of psychosis symptoms were subject to social desirability biases (DeVylder & Hilimire, 2015).

Therefore, the decision was made, after weighing up all of these considerations, to use the Community Assessment of Psychic Experiences as a measure of psychosis symptoms (Konings, Bak, Hanssen, Van Os, & Krabbendam, 2006). The experience made me reflect on the difficult considerations in research when all options have their associated weaknesses, and practical considerations need to be given as much importance as conceptual issues. It highlighted the further methodological considerations when working as part of a joint research team.

2. Recruitment challenges

Recruitment is viewed as the conversations which take place between a researcher and potential participants. Therefore, the recruitment process is reflected from the initial process of starting dialogues with NHS sites, then on to generating interest for the study with potential participants and obtaining informed consent, based on the sharing of appropriate information.

In view of the challenges in recruiting participants for this study, considerations need to be given to the barriers at an organisational level. Initially, barriers arose in this study in relation to recruiting trusts allowing us to conduct the

research in specific parts of their service. The trust which we first approached had a strong research base, especially in the areas of early intervention, psychological therapies and treatment resistant psychosis and my supervisors held posts in both a clinical and research capacity. The services provided in this trust are organised into Clinical Academic Groups (CAGs), one of which is the psychosis CAG. This CAG covers 74 teams and upwards of 7000 service users. Prior permission must be sought from the CAG before initial services can be approached about hosting the research. Unfortunately, due to the large number of granted research projects planning to take place in the early intervention services, a two-way correspondence between our research team and the CAG about the feasibility of the research, led to a final decision being made that they could not host the research. This provided a useful insight into the demands placed on early intervention services, and a need to protect both the clinicians and potential participants. This reflects a national pattern, with early intervention services being asking more frequently to host research than those services specialising in promoting recovery and complex care. However, given my interest in exploring the phenomenology of intrusive trauma memories in a psychosis population, I was keen to ensure I captured participant's diverse experiences from across a spectrum of presentations. Unfortunately, this process lasted a number of months and therefore delayed the granting of ethical approval, and subsequently delayed established links with other NHS Trust.

When choosing this research topic, I was mindful of the potential barrier of recruiting people with psychosis into research, when asking them to reflect on previous trauma memories. I was aware, from my discussions with researchers in this area, that both positive and negative symptoms associated with psychosis can have an impact on people's ability to engage with the research process. People with

predominantly positive symptoms may be paranoid and suspicious of the intentions of the research. Those with negative symptoms are often more unmotivated to take part in research. Such findings are common across the literature (Lester & Wilson, 1999; Woodall et al, 2011). However, in our research 65% of potential participants who gave their initial consent to their clinician to be contacted by the research team, then gave informed consent to take part in the study.

What I had not been mindful of at the beginning of the research process was that a main barrier to participant recruitment was clinicians discussing the research project with their clients. My previous research experience of recruiting nursing staff to implement clinical interventions on a psychiatric ward, had shown me the importance of developing strong working relationships with clinicians. I was therefore aware of the importance of the research project being a collaboration with clinicians (Patel, Doku, Tennakoon, 2003) and paid particular attention to the attitude of clinical staff. After initially meetings with different teams, I was optimistic about their warm reception and interest in the research, and I therefore expected that clinicians would start discussing the research with their clients. However, only a small number of potential participants' information was passed on to the research team.

Spending time exploring the motivational needs of clinical staff can lead to a more helpful understanding of how to achieve successful collaboration (Young & Dombrowski, 1989). I therefore started to consider the motivational needs of the clinicians and the additional pressures. I initially considered it from the context of the high volume of pressure experienced by the staff and on the service. Demands of mental health services are rising. An increase of 4.9% was seen in people in contact with mental health services from 2013/2014 to 2014/2015 (Health and Social Care

Information Centre, 2015b). Over this same time period, around 40% of mental health trusts experienced reductions in income. While over the past three years most trusts have been in financial surplus, there appears to be decreased spending on community mental health teams (The King's Fund, 2015). There has also been a reduction in staffing levels with 8% of early intervention psychosis services having lost staff in the previous year (Rethink Mental Illness, 2014), and no service able to deliver NICE-concordant services to more than 50% of new clients with first episode psychosis (Khan & Brabham, 2015). Taken together, this reflects an increased pressure on clinicians in the services in which we were aiming to carry out our research.

While being an important variable in understanding the challenges to clinicians referring potential participants; a pattern started to emerge as to the services and clinicians within these services, who more commonly discussed the research with their clients. After establishing more trusting relationships with some of the staff team, this allowed me to try to understand further constraints, and a common theme was the clinician's worries about the psychological impact the research would have on their clients. Specifically, that asking clients about traumatic past event experiences would cause overwhelming distress.

Such worries are not uncommon when conducting trauma-related research and are sometimes shared by Institutional Review Bodies (Jaffe, DiLillo, Hoffman, Haikalis & Dykstra, 2015). I hoped to reduce this anxiety by sharing with the teams the precautions I would put in place, in order to limit the impact of taking part in the research for clients, and to ensure clinicians were aware of the value of the research, which has also been cited as an important part of the collaboration process (Bell, 1993; Miller, Rosenstein, & DeRenzo, 1998). I particularly found it helpful to share

with clinicians the findings of Jaffe and colleagues (2015) who reported that while there is evidence for some immediate distress following trauma-related research, this is not extreme. Additionally, in general, participants found the research a positive experience and did not regret taking part.

While such conversations started to lead to increased referrals to the study, some clinicians continued to express reservations. While understandably driven by their care for their client's wellbeing, their views were heavily guided by their intuitive understanding and own clinical practice, rather than being guided by the developing evidence base. Such reluctance to be guided in clinical practice by the evidence base, has been highlighted as one mechanism which accounts for the difficulties with translating research into clinical practice (Baker, McFall, & Shoham, 2008). This may be one hypothesis for understanding why the research base in the area of psychosis and intrusive trauma memories has not advanced to the same degree as in other disorders, where individuals may not be viewed as 'vulnerable' and 'risky' to the same degree. In particular, it may highlight the emotiveness of the issues of trauma in psychosis in society.

3. Professional development

Prior to starting my doctorate in clinical psychology, my clinical and research experience had been working on psychiatric intensive care units and in inpatient services. I was initially drawn towards these posts, due to my interest in supporting people with severe and enduring mental health difficulties, with a specific interest in psychosis. At the beginning of my career in these posts, I was struck by the high rates of trauma, and I continued to see this pattern of complex trauma histories emerge across a range of psychological presentations throughout my varied clinical

placements. Upon embarking on the process of this research, my reading highlighted for me the spectrum of responses to traumatic events. Such new understandings and knowledge fuelled my interest in working more specifically within a specialist post-traumatic stress disorder service, in order to develop my clinical skills in the evidence base for working with intrusive trauma memories, given my increased awareness of the prevalence of symptoms associated with trauma.

The research process continues to shape my thinking in all stages of my direct clinical work, from highlighting the importance of exploring trauma experiences in assessment, the phenomenology of related symptoms and the predominant place in psychological formulations. As I advanced along my training course, I started to be more mindful of considering the organisation and service structures in which I was working, and to consider the impact of these on my clients. Holding in mind the spectrum of responses to trauma, I became interested in service structuring. There is a move for some services to divide their service lines by diagnosis, creating a split between the teams supporting people with a psychosis presentation and those with a post-traumatic stress disorder presentation. Whilst this allows for the specialist provisions of skilled clinicians into the different services, it causes a separation in the understanding of a presentation which may be more helpfully viewed on a spectrum (Morrison, Frame, & Larkin, 2003). My more in-depth conceptual understanding of trauma responses, as a consequence of the research process, has allowed me to take part in discussion around these challenges with the clinical team I am working with.

Conducting this research study has allowed me to have a clearer understanding about the clinical field I hope to work in upon completing my doctoral in clinical psychology, pursuing my interest to specialise in working with complex trauma.

4. Conclusions

In conclusion, the research process demonstrated the complexities of the methodological choices to be considered when conducting research in a novel area, and the different organisational barriers when conducting research investigating trauma memories in psychosis. The research process also offered an opportunity to develop my clinical interests and shape my clinical practice.

References

Albus, M., Hubmann, W., Mohr, F., Hecht, S., Hinterberger-Weber, P., Seitz, N.N., & Küchenhoff, H. (2006). Neurocognitive functioning in patients with first-episode schizophrenia: Results of a prospective 5-year follow-up study. *European Archives of Psychiatry and Clinical Neuroscience, 256,* 442.

Aleman, A., Hijman, R., de Haan, E.H.F., & Kahn, R.S. (1999). Memory Impairment in Schizophrenia: A Meta-Analysis. *American Journal of Psychiatry, 156,* 1358–1366.

Baker, T.B., McFall, R.M., & Shoham, V. (2008). Current Status and Future Prospects of Clinical Psychology: Toward a Scientifically Principled Approach to Mental and Behavioral Health Care. *Psychological Science Public Interest, 9(2),* 67-103.

Bell, J. (1993). *Doing your research project. A guide to first time researchers in education and social sciences* (2nd Ed.). Buckingham: Open University Press.

Berna, F., Potheegadoo, J., Aouadi, I., Ricarte, J.J., Allé, M.C., Coutelle, R., Boyer, L., Cuervo-Lombard, C.V., & Danion, J.M. (2016). A Meta-Analysis of Autobiographical Memory Studies in Schizophrenia Spectrum Disorder. *Schizophrenia Bulletin, 42(1),* 56-66.

Brewin, C.R. (2015). Re-experiencing traumatic events in PTSD: new avenues in research on intrusive memories and flashbacks. *European Journal of Psychotraumatology, 6,* 27180.

Burlingame, G.M., Seaman, S., Johnson, J.E., Whipple, J., Richardson, E., Rees, F., Earnshaw, D., Spencer, R., Payne, M., & O'Neil, B. (2006). Sensitivity to change of the Brief Psychiatric Rating Scale-Extended (BPRS-E): An item and subscale analysis. *Psychological Services, 3(2),* 77-87.

Carr, S.C. (2006). Developing a brief trauma screening tool for use in psychosis. Unpublished clinical psychology doctoral thesis, Department of Clinical, Educational, and Health Psychology. University College London.

DeVylder, J.E., & Hilimire, M.R. (2015). Screening for psychotic experiences: social desirability biases in a non-clinical sample. *Early Intervention Psychiatry, 9(4),* 331–334.

Ebner-Priemer, U. W., & Trull, T. J. (2009). Ambulatory assessment—An innovative and promising approach for clinical psychology. *European Psychologist, 14,* 109 –119.

Eisenacher, S., Rausch, F., Ainser, F., Mier, D., Veckenstedt, R., Schirmbeck, F., Lewien, A., Englisch, S., Andreou, C., Moritz, S., Meyer-Lindenberg, A., Kirsch, P., & Zink, M. (2015). Investigation of metamemory functioning in the at-risk mental state for psychosis. *Psychological Medicine, 45(15),* 3329-3340.

Fioravanti, M., Carlone, O., Vitale, B., Cinti, M.E., & Clare, L. (2005). A meta-analysis of cognitive deficits in adults with a diagnosis of schizophrenia. *Neuropsychological Review, 15,* 73– 95.

Grubaugh, A.L., Zinzow H.M., Paul, L., Egede, L.E. & Frueh, C. (2011). Trauma exposure and posttraumatic stress disorder in adults with severe mental illness: A critical review. *Clinical Psychology Review, 31,* 883-899.

Health and Social Care Information Centre (2015b). Mental health bulletin. Annual report from MHMDS Returns 2013-14. Available at: www.hscic.gov.uk/catalogue/PUB18808 (accessed on 12th May 2016).

Heinrichs, R. W., & Zarkanis, K.K. (1998). Neurocognitive deficit in schizophrenia: A quantitative review of the evidence. *Neuropsychology, 12,* 426–445.

Holmes, E. A., & Steel, C. (2004). Schizotypy: A Vulnerability Factor for Traumatic Intrusions. *Journal of Nervous and Mental Disease, 192*(1), 28-34.

Jaffe, A.E., DiLillo, D., Hoffman, L., Haikalis, M., Dykstra, R.E. (2015) Does it hurt to ask? A meta-analysis of participant reactions to trauma research. *Clinical Psychology Review, 40,* 40-56.

Kahneman, D., Fredrickson, B., Schreiber, C.A., Redelmeier, D.A. (1993). When More Pain Is Preferred to Less: Adding a Better End. *Psychological Science, 4(6),* 401–405.

Khan, S., & Brabham, A. (2015). 'Preparing to implement the new access and waiting time standards for early intervention in psychosis'. Presentation at the North East and Cumbria and Yorkshire and Humber EIP and IAPT Workshop, Leeds, 7 May. Available at: http://www.nescn.nhs.uk/wp-content/uploads/2015/04/Joint-North-Regional-Mental-Health-Event-Presentation-Final.pdf (accessed on 12th May 2016).

Konings, M., Bak, M., Hanssen, M., Van Os, J., & Krabbendam, L. (2006). Validity and reliability of the CAPE: A self-report instrument for the measurement of psychotic experiences in the general population. *Acta Psychiatrica Scandinavica, 114(1),* 55-61.

Lester, H., & Wilson, S. (1999). Practical problems in recruiting patients with schizophrenia into randomised controlled trials. *British Medical Journal, 318,* 1075.

Lukoff, D., Liberman, R.P., & Nuechterlein, K.H. (1986a). Symptom monitoring in the rehabilitation of schizophrenic patients. *Schizophrenia Bulletin, 12,* 578–593.

Marks, E. M., Steel, C., & Peters, E. R. (2012). Intrusions in trauma and psychosis: information processing and phenomenology. *Psychological Medicine, 42*(11), 2313-2323.

Miller, F.G., Rosenstein, D.L., & DeRenzo, E.G. (1998). Professional integrity in clinical research. *JAMA, 280*, 1449-1454.

Moritz, S., Woodward, T.S., & Hausmann, D. (2006a). Incautious reasoning as a pathogenetic factor for the development of psychotic symptoms in schizophrenia. *Schizophrenia Bulletin, 32*, 327–331.

Moritz, S., Woodward, T.S., & Ruff, C. (2003). Source monitoring and memory confidence in schizophrenia. *Psychological Medicine, 33*, 131–139.

Morrison, A.P., Frame, L., & Larkin, W., (2003). Relationships between trauma and psychosis: A review and integration. *British Journal of Clinical Psychology, 42*, 331–353.

Patel, M.X., Doku, V., & Tennakoon, L. (2003), Challenges in recruitment of research participants. *Journal of Continuing Professional Development, 9,* 229-238.

Paulsen, J.S., Heaton, R.K., Sadek, J.R., Perry, W., Delis, D.C., Braff, D., Kuck, J., Zisook, S., & Jeste, D.V. (1995). The nature of learning and memory impairments in schizophrenia. *Journal of the International Neuropsychological Society, 1(1),* 88-99.

Priebe, K., Kleindienst, N., Zimmer, J., Koudela, S., Ebner-Priemer, U., & Bohus, M. (2013). Frequency of intrusions and flashbacks in patients with posttraumatic stress disorder related to childhood sexual abuse: an electronic diary study. *Psychological Assessment, 25(4),* 1370-1376 .

Rethink Mental Illness (2014). *Lost generation: why young people with psychosis are being left behind, and what needs to change*. London: Rethink Mental Illness. Available at: www.rethink.org/living-with-mental-illness/early-intervention (accessed on 25th May 2016).

Reynolds, M., & Brewin, C.R. (1999). Intrusive memories in depression and posttraumatic stress disorder. *Behavioural research therapy, 37(3),* 201-15.

The King's Fund, The Health Foundation (2015). Mental Health Under Pressure. London: The Health Foundation. Available at: www.kingsfund.org.uk/sites/files/kf/.../mental-health-under-pressure-nov15_0.pdf (accessed on 25th May 2016).

Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., van Os, J., & Bentall, R.P. (2012). Childhood Adversities Increase the Risk of Psychosis: A Meta-analysis of Patient-Control, Prospective- and Cross-sectional Cohort Studies. *Schizophrenia Bulletin, 38(4),* 661-671.

Woodall, A., Howard L., & Morgan C. (2011). Barriers to participation in mental health research: findings from the Genetics and Psychosis (GAP) Study. *International Review of Psychiatry, 23(1),* 31-40.

Young, C. L., & Dombrowski, M. (1989) Psychosocial influences on research subject recruitment, enrolment and retention. *Social Work in Health Care, 14,* 43–57.

Appendices
Appendix A
Ethical approval by London Queens Square Research Ethics Committee

NHS
Health Research Authority
National Research Ethics Service

London - Queen Square Research Ethics Committee
HRA NRES Centre Manchester
Barlow House
3rd Floor
4 Minshull Street
Manchester
M1 3DZ

09 October 2015

Dr Miriam Fornells-Ambrojo
University College London
1-19 Torrington Place
London
WC1E 7HB

Dear Dr Fornells-Ambrojo

Study title:	**Development of a brief clinical screening tool for trauma and post traumatic reactions in people with psychosis**
REC reference:	**15/LO/1486**
IRAS project ID:	**187370**

Thank you for your letter of 30 September 2015, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact the REC Manager, Rachel Heron, [redacted]

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

A Research Ethics Committee established by the Health Research Authority

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact Catherine Blewett [redacted] the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Copies of advertisement materials for research participants [Recruitment Poster]		12 June 2015
Copies of advertisement materials for research participants [Recruitment Poster]	1.2	25 September 2015
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Sponsor Insurance]		28 July 2015
GP/consultant information sheets or letters [Clinician Information Sheet]	1.0	13 March 2015

Interview schedules or topic guides for participants [Intrusive Trauma Memory Interview]	1.0	12 June 2015
IRAS Checklist XML [Checklist_07082015]		07 August 2015
IRAS Checklist XML [Checklist_30092015]		30 September 2015
Letter from sponsor [Sponsor Letter]		28 July 2015
Letters of invitation to participant [Recruitment Poster]	1.1	12 June 2015
Non-validated questionnaire [Trauma and Life Events Checklist]	9	12 June 2015
Other [Sophie M-P CV]	1.0	17 July 2015
Other [Debrief Sheet]	1.1	12 June 2015
Other [Non-Clinical warning notice]	1.0	26 September 2015
Other [Ethics Covering Letter]		30 September 2015
Other [NELFT Lone Worker Policy]		
Other [NELFT Lone Working Procedures]		
Participant consent form [Clinical Participant Consent Form]	1.1	12 June 2015
Participant consent form [Non-Clinical Consent Form]	1.0	12 June 2015
Participant information sheet (PIS) [Clinical Participant Information Sheet]	1.1	12 June 2015
Participant information sheet (PIS) [Non-Clinical Participant Information Sheet]	1.1	12 June 2015
REC Application Form [REC_Form_07082015]		07 August 2015
Referee's report or other scientific critique report [UCL Peer Review - Sarah Carr]		08 January 2015
Referee's report or other scientific critique report [UCL Peer Review - Sophie Marsh-Picksley]		20 October 2014
Research protocol or project proposal [Research Protocol]	1.0	12 June 2015
Summary CV for Chief Investigator (CI) [Chief Investigator CV]	1.0	17 July 2015
Summary CV for student [Sarah Carr CV]	1.0	17 July 2015
Summary CV for supervisor (student research) [Supervisor CV]	1.0	17 July 2015
Summary, synopsis or diagram (flowchart) of protocol in non technical language [Protocol Flowchart]	1.0	12 June 2015
Validated questionnaire [Questionnaire Battery]		

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

Appendix B

Approval from NELFT Research and Development Office

NELFT 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

16th November 2015

Dear Sophie Marsh-Picksley and Sarah Carr,

RE: Development of a brief clinical screening tool for trauma and post traumatic reactions in people with psychosis

R&D Ref: 2376

I am pleased to inform you that the above named study has been granted approval and indemnity by 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.

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,

[redacted]

Fiona Horton

Acting Research and Development Manager, North East London NHS Foundation Trust

Document	Version	Date
NELFT Project Registration Form		
Research Protocol	1	12 June 2015
Clinical Participant Information sheet	1.1	12 June 2015
Participant Information sheet – non clinical	1.1	12 June 2015
Information sheet for clinicians	1	13 March 2015
Follow-on support and information sheet	1.1	12 June 2015
Clinical Consent Form	1.1	12 June 2015
Consent Form – non clinical	1	12 June 2015
Intrusive Trauma Memory Interview	1	12 June 2015
Trauma Screening Questionnaire (TSQ)		11 July 2015
TALE Checklist	9	12 July 2015
Recruitment poster	1.2	25 September 2015
NHS REC Approval Letter	15/LO/1486	09 October 2015
NHS R&D Form		
REC Form		07 August 2015
NHS SSI	187370/868072/6/701/297254/334459	
UCL Trainee Indemnity		
Verification of Insurance		14 July 2014
Letter of Insurance		28 July 2015
Peer Review	Sarah Carr	08 January 2015
Peer Review	Sophie Marsh-Picksley	20 October 2014
Researcher CVs	Sophie Marsh-Picksley, Sarah Carr	
Academic Supervisor/LC CV	Dr Miriam Fornells-Ambrojo, Dr Amy Hardy, Dr Sara Tresilian	
GCP Certificates	Sophie Marsh-Picksley, Sarah Carr, Dr Sara Tresilian	

Appendix C

Approval from NOCLOR Research Support of behalf of ELFT

1st Floor, Bloomsbury Building
St Pancras Hospital
4 St Pancras Way
NW1 0PE

[redacted]

www.noclor.nhs.uk

23 March 2016

Dr Miriam Fornells-Ambrojo
University College London
Department of Clinical, Educational and Health Psychology
1-19 Torrington Place
London
WC1E 7HB

Dear Dr Miriam Fornells-Ambrojo,

This NHS Permission is based on the REC favourable opinion given on **09 October 2015**.

I am pleased to confirm that the following study has now received R&D approval, and you may now start your research in **the trust(s) identified below**:

Study Title: Development of a brief clinical screening tool for trauma and post traumatic reactions in people with psychosis
R&D reference: 187370
REC reference: 15/LO/1486

Name of the trust	Name of current PI/LC	Date of permission issue(d)
East London NHS Foundation Trust	Dr Elena Alexandrou	23 March 2016

If any information on this document is altered after the date of issue, this document will be deemed INVALID

Specific Conditions of Permission (if applicable)
N/A

If any information on this document is altered after the date of issue, this document will be deemed INVALID

Yours sincerely,

[redacted]

Pushpsen Joshi
Research Operations Manager

Cc: Principle Investigator(s)/Local Collaborator(s), Sponsor Contact

1st Floor, Bloomsbury Building
St Pancras Hospital
4 St Pancras Way
NW1 0PE

[redacted]

www.noclor.nhs.uk

May I take this opportunity to remind you that during the course of your research you will be expected to ensure the following:

- **Patient contact:** only trained or supervised researchers who hold the appropriate Trust/NHS contract (honorary or full) with each Trust are allowed contact with that Trust's patients. If any researcher on the study does not hold a contract please contact the R&D office as soon as possible.

- **Informed consent:** original signed consent forms must be kept on file. A copy of the consent form must also be placed in the patient's notes. Research projects are subject to random audit by a member of the R&D office who will ask to see all original signed consent forms.

- **Data protection:** measures must be taken to ensure that patient data is kept confidential in accordance with the Data Protection Act 1998.

- **Health & safety:** all local health & safety regulations where the research is being conducted must be adhered to.

- **Serious Adverse events:** adverse events or suspected misconduct should be reported to the R&D office and the Research Ethics Committee.

- **Project update:** you will be sent a project update form at regular intervals. Please complete the form and return it to the R&D office.

- **Publications:** it is essential that you inform the R&D office about any publications which result from your research.

- **Ethics:** R&D approval is based on the conditions set out in the favourable opinion letter from the Research Ethics Committee. If during the lifetime of your research project, you wish to make a revision or amendment to your original submission, please contact both the Research Ethics Committee and R&D Office as soon as possible.

- **Monthly / Annually Progress report:** you are required to provide us and the Research Ethics Committee with a progress report and end of project report as part of the research governance guidance.

- **Recruitment data:** if your study is a portfolio study, you are required to upload the recruitment data on a monthly basis in the website: http://www.crn.nihr.ac.uk/can-help/funders-academics/nihrcrn-portfolio/recruitment-data/

- **Amendments:** if your study requires an amendment, you will need to contact the Research Ethics Committee. Once they have responded, and confirmed what kind of amendment it will be defined as, please contact the R&D office and we will arrange R&D approval for the amendment. If your study is Portfolio Adopted, amendments must be submitted for R&D review via the NIHR CRN (CSP), please refer to the Amendments Guidance for Researchers: http://www.crn.nihr.ac.uk/can-help/funders-academics/gaining-nhs-permissions/amendments/

- **Audits:** each year, noclor select 10% of the studies from each service we have approved to be audited. You will be contacted by the R&D office if your study is selected for audit. A member of the governance team will request you complete an audit monitoring form before arranging a meeting to discuss your study.

Appendix D

Clinical Participant Information Sheet

Developing a brief clinical screening tool for trauma and its impact

Clinical Participant Information sheet

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

Thank you for reading this information.

Part 1

Why is the study being done?

We know that many people have experienced difficult or upsetting things during their lifetime. We want to develop a brief questionnaire that helps clinicians routinely assess these experiences in mental health services. We hope the questionnaire will help people to report these experiences more easily and access support if needed. In addition to this, we would also like to find out about any ways in which events have impacted on people and their memories. This will contribute to improving the care provided to people experiencing trauma-related difficulties.

Why have I been invited?

We are inviting you to participate because a member of your care team has checked with you that it would be okay for us to approach you to provide information about this project. Alternatively you may have seen an advert for this research and contacted us, or previously indicated you are willing to be contacted about research. At this point we have no other information about you unless you have consented for this to be accessed. We will not access any further information without your consent.

Do I have to take part?

No, it is up to you whether or not you decide to take part and you can take your time to consider this. If you decide to take part we will describe the study and go through information sheet which we will then give to you to keep. We will also ask you to sign a consent form. If you decide to take part you can leave the study at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, **will not** affect any other aspect of your current or future care. If you withdraw from the study, all your personally identifiable information will be destroyed.

What will happen to me if I take part?

If you are interested in taking part you will meet with a researcher to complete some questionnaires about traumatic and difficult experiences you may have had in your life, and other common difficulties and problems. If you experience memories of traumatic events that pop into your mind when you do not want them to, we will also ask you questions about this using a short interview. We expect that this meeting will take between 1 hour 30 minutes and 2 hours in total. You can take breaks as needed throughout the meeting. This can be completed in one session, or spread over more sessions if you prefer.

We will also invite you to come back two weeks later to complete one of the brief questionnaires about difficult experiences again. This will last for approximately 15 minutes and it will be an optional part of the study.

Will I be reimbursed for any expenses?
Yes. You will receive £10 for completing the first part of the research assessment, to cover any time and expenses, and £5 if you return for the second part.

What are the disadvantages and risks of taking part?
As described above, you will be required to answer questions about difficult life experiences and memories. However, you will not be required to describe in detail any difficult past experiences. For some people talking about the past and their memories might bring up some thoughts or feelings which are distressing. You will be free to withdraw from the project at any time. In the event that you do become upset, we will help you to manage these feelings by using relaxation strategies commonly used to reduce distress (e.g. controlled breathing or muscle relaxation) at the end of the meeting. If necessary the researcher will seek further support for you through healthcare services. You will be provided with contact details for the research team and other support services, should you need support after you have taken part.

What are the possible benefits of taking part?
Some people have said that they have found it helpful to be able to talk about experiences which they find upsetting and be listened to in a caring way. If you feel that it would be helpful, we can provide a summary of the information you share with the researchers to the mental health professionals involved in your care so that you do not need to repeat information to them. We will not do this if you do not want us to. Also, the information we get from this project may help us to better understand how to help people with similar problems and develop better treatments.

What if there is a problem?
Any complaint about the way you have been dealt with during the study or any possible difficulties you might experience will be addressed. The detailed information on this is given in Part 2.

Will my taking part in the project be confidential?
If you are under the care of a team, we will inform them that you are taking part in the study. Otherwise, all the information about your participation in this study will be kept confidential. One exception to this is if you give information that suggests you or someone else is at risk of harm. If this occurs we will need to share the information with your health care team. The details to this are included in Part 2.

This completes Part 1 of the Information Sheet. If the information in Part 1 has interested you and you are considering participating, please continue to read the additional information Part 2 before making any decision

Part 2
What if there is a problem?
If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated by members of staff due to your participation in the research, UCL mechanisms are available to you. Please ask your researcher if you would like more information on this.

In the unlikely event that you are harmed by taking part in this study, compensation may be available. If you

suspect that the harm is the result of the Sponsor's (University College London) or the hospital's negligence then you may be able to claim compensation. After discussing with your researcher, please make the claim in writing to Dr Miriam Fornells-Ambrojo who is the Chief Investigator for the research and is based at University College London. The Chief Investigator will then pass the claim to the Sponsor's Insurers, via the Sponsor's office. You may have to bear the costs of the legal action initially, and you should consult a lawyer about this. You of course would be supported throughout this process.

Will my taking part in the project be confidential?

Yes. All information collected about you will be kept strictly confidential and will conform to the Data Protection Act of 1998 with respect to data collection, storage and destruction. After you have completed the questionnaires and interview your name will be removed from all the information collected so that it is anonymous and you cannot be recognised from it. Paper copies of questionnaires and electronic recordings will be kept securely by the researchers in a locked filing cabinet in a locked office.

One exception to this is if you give information that suggests you or someone else is at risk of harm. If this occurs we will need to share the information with your health care team.

What will happen to the results of the study?

We will aim to publish the results in a scientific journal as part of Doctorate in Clinical Psychology educational projects. We will make the results available to all participants in a non-scientific format. You will not be identifiable in any of these reports. If you would like to receive a summary of the results you will be asked to indicate this in the consent form.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study have been reviewed and given a favorable opinion by London Queens Square Research Ethics Committee (REC reference: 15/LO/1486).

Contact for further information

If you require further information about the study you may contact one of the following people:

Name and title	Role in the project	Contact details
Dr Amy Hardy	Investigator	[redacted]
Dr Miriam Fornells-Ambrojo	Chief Investigator	[redacted]
Sophie Marsh-Picksley	Researcher	[redacted]
Sarah Carr	Researcher	[redacted]

Thank you for taking the time to read this information and for agreeing to take part in the study.

You will be given a copy of this information sheet and a copy of the signed consent form to keep.

Appendix E

Clinical Participant Consent Form

Study Number:
Patient Identification Number:

CLINICAL CONSENT FORM

Title of Project: Developing a brief clinical screening tool for trauma and its impact
This study has been given favourable opinion by London Queens Square Research Ethics Committee (REC reference: 15/LO/1486).
Name of Researchers: Sarah Carr and Sophie Marsh-Picksley

Thank you for your interest in taking part in the research study. Once you have read the information sheet and discussed the study with the researcher please read through and complete the form below. You will be given a copy of the consent form to keep and refer to at any time. A copy will also be kept by the research team. This will be kept securely and separately from the responses you provide as part of the study.

Please initial all boxes:

1. I confirm that I have read and understand the information sheet dated 12/06/2015 (version 1.1) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I consent to the processing of my personal information for the purposes of this study only and that it will not be used for any other purpose. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998. ☐
3. 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. ☐
4. I understand that sections of my medical notes may be looked at by the researchers, only if it is relevant to my taking part in this research (for example, to get an address, or confirm clinical information). I give permission for these individuals to have access to my records for this purpose. ☐
5. I give consent for the research interview to be audio recorded for the purpose of ensuring that we are presenting the interview and questionnaires in the same way for each person taking part. Declining to do so at any time will not affect my participation in the research in any way. ☐
6. I give additional consent for quotations to be extracted from the audio recordings for use in future publications. I understand that these quotations will be anonymous. Declining to do so at any time will not affect my participation in the research in any way. ☐
7. I agree that a member of the research team can contact me about coming in for a second, brief assessment session in approximately 2 weeks' time. ☐
6. I understand that information relating to me taking part in this study will be stored on an anonymised electronic database for up to 7 years by the research team ☐
7. I would like to receive a summary of the research results ☐
8. I agree to take part in the above study ☐

Name of Participant	Date	Signature

I .....confirm that I have carefully explained the purpose of the study to the participant and outlined any reasonably foreseeable risks or benefits.

Name of Person taking consent	Date	Signature

Appendix F

Semi-structured Interview of Intrusive Trauma Memories

Memory Assessment Interview

"In your answers to the questionnaires you said that memories of (a trauma – or use participants own words) pop into your mind or come out of the blue, when you do not want them. I would like to ask you some questions about what these memories are like for you. Knowing more about these experiences will help us to improve future treatment.

Please let me know if you feel upset at any point, you would like to take a break or stop at any time, or you have any questions. If you are unsure about what I am asking, please let me know so I can explain things better. Do you have any questions?"

Part A - Narrative of an intrusive trauma memory

A1. *"You have told us that memories of (_____)* (specify participants trauma reported in the questionnaire*) pop into your mind or come out of the blue when you do not want them to. Please select the intrusive memory that bothers you the most.* (If a participant experiences more than one intrusion, then ask them to select the most distressing.)

_____
_____
_____

A2. *"It would be helpful if you had a clear picture of this intrusive memory while we talk about it. Could you try to bring an image of* _____ (specify) *into your mind now? If you feel comfortable, it may be easier to close your eyes to do this. I'll give you some time to try to remember it. (*Pause for 30 seconds). *"Have you got it now? Can you describe the intrusive memory to me from beginning to end in detail for me? Please describe it in as much detail as possible so that a film director might be able to recreate the scene.* (Follow up prompts if needed)
Can you tell me a bit more about how you experience this memory?
What is it like?

_____
_____
_____
_____
_____
_____
_____
_____
_____

A3. *"In the intrusive memory, what do you see, hear, feel, smell and/or taste"?"* (If participant reports sensory experiences, explore all the sensory modalities, taste, smell, visual, auditory, tactile, bodily sensations)

_____
_____
_____
_____
_____

A4. "*Do you have strong physical sensations in the intrusive memory such as heart racing, sweating, trembling, nausea, headache, chills/flushes, and 'butterflies in the stomach?"*

No physical sensations ☐

Physical sensations present ☐

A5. *"In the intrusive memory, what emotions or feelings do you have?"*

_____
_____
_____
_____
_____

Tick emotions reported in box below. Prompt for additional emotions using checklist.

Sad ☐	Guilty ☐	Ashamed ☐	Disgust ☐
Angry ☐	Anxious ☐	Helpless ☐	Fear ☐
Humiliated ☐	Powerless ☐		

A6. *"In the intrusive memory, what are you thinking?" Further prompt: "What are you thinking about yourself, other people, and the situation?"*

_____
_____
_____
_____
_____

If the participant's eyes are close, direct them to open their eyes and bring their attention back to the room, using grounding if needed. Summarise their description in detail, including emotions experiences, adding *"Is that right?"* Thank participant for sharing their description, validate emotional response, and check if they are o.k. to proceed.

Part B - Characteristics of memory intrusions

"I'd now like to ask you some more questions about this intrusive memory"

B1. "*Approximately how often has the intrusive memory that bothers you the most occurred in the past two weeks?"*

Once a week or less ☐

Several times a week ☐

Once a day ☐

Several times a day or more ☐

B2. "*When you experience this intrusive memory, how long does it last?"*

Seconds ☐

Minutes ☐

Up to an hour ☐

Several hours ☐

Constantly preoccupied ☐

B3. "*How long has it been since the event featuring in the intrusive memory?"*

Less than 1 year ago ☐

1–5 years ago ☐

More than 5 years ago ☐

B4. "*How distressing is the intrusive memory on a scale from 0 to 10 where 0 means not distressing at all and 10 extremely distressing?"*

No distress — Extreme distress

0 1 2 3 4 5 6 7 8 9 10

B5. "*Vividness means how clear and distinct the image appears; how similar it is to seeing something in the environment. When something is not vivid it may appear hazy or unclear. Holding in mind your most frequent intrusive memory, how clear and vivid was the memory?"*

Unclear/hazy ☐

Some detail ☐

Vivid ☐

Very vivid – like it was happening in the here and now ☐

B6. *"When the intrusive memory came into you mind, do you feel as if you are reliving the memory, as if it is happening again now or experiencing the memory as having happened in the past?"*

Reliving the experience — Looking back at the past

0 1 2 3 4 5

B7. *"Holding in mind your most frequent intrusive memory, how much does your intrusive memory exist of loosely related pieces or images, where 0= a coherent image and 10=lots of loosely related images?"*

A coherent Image — Lots of loosely related images

0 1 2 3 4 5 6 7 8 9 10

B8. *"Are your intrusive memories in any way unclear or jumbled? On a 4 point scale where 0 is not at all and 3 is a lot/very much, how unclear or jumbled are your intrusive memories?"*

Not at all — Very much

0 1 2 3

B9. *"An out of body experience typically involves a sensation of floating outside your own body and, in some cases, perceiving your body from a place outside one's body. Was the intrusive memory accompanied by an out of body experience?"*

Experience absent ☐

Experience present ☐

B10. "*Memories can differ in how they appear to us, in what view they are from."*

"Field perspective is when you are able to see memories as if looking out from your own eyes, observing what is going on around you." The researcher shows a photograph to demonstrate.

"Observer perspective is when the memory appears as if you can see an image of yourself in the scene being observed from someone else's point of view". The researcher shows a photograph to demonstrate.

"Memories can also switch between these two perspectives." "Thinking about the memory we just discussed, do you mostly view the situation as if you are looking out through your eyes, or one in which you are looking at yourself from outside of yourself? Or does it switch between the two views?"

-3 = Field 0 = Alternating +3 = Observer

B11. "*When this intrusive memory pops into your mind or comes out of the blue, how much do you feel you have control over stopping this memory?*

Not at all			Very much
0	1	2	3

Part C – Intentional Recall of Memory

*Thank you for telling me about your intrusions of (*trauma/event*). I would now like to ask you about what the memory of (*trauma/event*) is like if you deliberately, or intentionally, remember about what happened.*

C1. *"Have you intentionally/deliberately remembered or thought what happened in the past month?"*

No ☐ (Discontinue part C)

Yes ☐

C2. If yes, "*When you intentionally or deliberately approximately how often have you thought about it in the past week?"*

Once a week or less ☐

Several times a week ☐

Once a day ☐

Several times a day or more ☐

C3. "*When you intentionally or deliberately think about what happened, how long does it last?"*

Seconds ☐

Minutes ☐

Up to an hour ☐

Several hours ☐

Constantly preoccupied ☐

C4. "*How distressing was the memory on a scale from 0 to 10 where 0 means not distressing at all and 10 extremely distressing?"*

No distress — Extreme distress

0 1 2 3 4 5 6 7 8 9 10

C5. "*Vividness means how clear and distinct the memory appears; how similar it is to seeing something in the environment. When something is not vivid it may appear hazy or unclear. Holding in mind what the memory is like when you try to remember it, how clear and vivid is the memory?"*

Unclear/hazy ☐

Some detail ☐

Vivid ☐

Very vivid – like it was happening in the here and now ☐

C6. "*Did strong physical sensations accompany the memory such as heart racing, sweating, trembling, nausea, headache, chills/flushes, and 'butterflies in the stomach?"*

No physical sensations ☐

Physical sensations present ☐

C7. *"When you deliberately remember what happened, do you feel as if you are reliving the memory, as if it is happening again now or experiencing the memory as having happened in the past?"*

Reliving the experience — Looking back at the past

0 1 2 3 4 5

C8. *"Holding in mind what it's like when you deliberately/intentionally remember what happened, how much does your memory exist of loosely related pieces or images, where 0= a coherent image and 10=lots of loosely related images?"*

A coherent Image — Lots of loosely related images

0 1 2 3 4 5 6 7 8 9 10

C9. *"Are your memories in any way unclear or jumbled? On a 4 point scale where 0 is not at all and 3 is a lot/very much, how unclear or jumbled are your memories?"*

Not at all — Very much

0 1 2 3

C10. "*Memories can differ in how they appear to us, in what view they are from."*

"Field perspective is when you are able to see memories as if looking out from your own eyes, observing what is going on around you." The researcher shows a photograph to demonstrate.

"Observer perspective is when the memory appears as if you can see an image of yourself in the scene being observed from someone else's point of view". The researcher shows a photograph to demonstrate.

"Memories can also switch between these two perspectives." "Thinking about the memory we just discussed, do you mostly view the situation as if you are looking out through your eyes, or one in which you are looking at yourself from outside of yourself? Or does it switch between the two views?"

-3 = Field 0 = Alternating +3 = Observer

C11. *"Sometimes memories can change over time. Do you think this may have happened with your memory? On a 4 point scale where 0 is not at all and 3 is a lot/very much, how much, it at all, do you think your memory may have changed?"*

Not at all Very much
0 1 2 3

C12. "*How much control do you think you have when you think about* (trauma/event)?

Not at all Very much
0 1 2 3

"Is there anything important about the intrusive memory or the memories you intentionally/deliberate think about that you haven't had the opportunity to talk about?"

_____
_____
_____
_____
_____
_____

Appendix G

Objective Fragmentation Coding Frame

Objective ratings of memory fragmentation was measured by using the coding manual developed by Foa et al (1995) to analyse the voluntary narrative of a trauma memory narrated by a person with PTSD.

Appendix H

Joint Project Declaration

This thesis is part of a joint trainee project with Sarah Carr. This thesis investigated the phenomenology of intrusive trauma memories in psychosis, and Sarah's study focused on developing a trauma screening questionnaire for use within the psychosis population. Ethical approval, recruitment and data collection was shared between myself and Sarah, but individual project research questions and hypotheses were developed. Data analysis and interpretation were also conducted independently.

Carr, S.C. (2006). Developing a brief trauma screening tool for use in psychosis. Unpublished clinical psychology doctoral thesis, Department of Clinical, Educational, and Health Psychology. University College London.