The Experience and Role of Dissociation in Subclinical Psychosis Following Developmental Trauma: A Mixed-Methods Study

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Chapter 1
Lay Summary

Background

"Subclinical" psychotic experiences are experiences which can have important negative effects on a person's wellbeing, thinking ability and social relationships, without reaching a level of clinical severity. Psychotic experiences are characterised by losing touch with reality. They include "positive symptoms", such as hearing voices, seeing things or feeling sensations that others don't, experiencing paranoia (feeling highly threatened or targeted by others) and believing things when there is no evidence to support them. Psychotic experiences can become very distressing, and for some people affect their ability to think logically. A lot of people with psychosis find it difficult to ask for help because of mistrusting others. Some people with psychotic experiences will develop a mental health condition known as Schizophrenia, which includes both hallucinations and delusions, but also "negative symptoms", being withdrawn, feeling numb or emotionless, not having motivation and stopping to care for oneself.

In the past decades, researchers have repeatedly found that developmental trauma (psychologically traumatic events in childhood or adolescence) makes people more likely to experience mental health problems later in life, including psychotic experiences. One review found that developmental trauma increases the risk of having psychosis by almost 3 times. We also know that people who have psychosis, both in cases of disorders like Schizophrenia and of subclinical psychosis, are at risk of experiencing worsened functioning, poorer wellbeing and a lower likelihood of substantial improvement when they are survivors of trauma in childhood and

adolescence. Developmental trauma can include emotional, physical and sexual abuse, but also situations of neglect, such as neglect of physical needs but also emotional needs. Understanding how developmental trauma increases the risk of developing psychosis and what areas of life are affected can help us reduce the impact of these events on young people and adults.

This thesis aimed to investigate dissociation, an experience which is associated with both developmental trauma and psychosis, and is proposed to contribute to some of the experiences of psychosis in people who have experienced developmental trauma. During dissociation, one might feel disconnected from themselves, from their body or emotions, and from the world around them. They might also have difficulty remembering certain events or information about themselves, or find that they become absorbed into their thoughts and completely miss what is happening in their surroundings. Dissociation is common among people with developmental trauma and among people with psychosis, and has also been associated with Post-traumatic stress disorder (PTSD) and Complex Post-traumatic stress disorder (Complex PTSD), conditions which are common after exposure to traumatic events.

Aims and Research Questions

Two main pieces of research took place, including a review of previous research and a new empirical piece of research that further included two studies. Through this research we aimed to:

1. Review what previous studies have found about the experience of dissociation in people with psychosis and developmental trauma, including whether dissociation has a role in explaining psychotic experiences in this group of people.

2. Combine, in a new piece of research, approaches to understand different aspects of dissociation among participants with subclinical psychosis and developmental trauma.

Specifically, in the empirical research, we used an online survey to investigate whether the rates of dissociation reported were different between participants with and without a history of developmental trauma. We also wanted to see whether dissociation plays a role in explaining how developmental trauma contributes to "positive" symptoms of psychosis, such as hearing voices or feeling threatened. We tried to see whether there were specific types of dissociation that would explain this relationship. We also tested whether this explanatory role of dissociation depended on meeting criteria for PTSD and Complex PTSD. Adding to this, we used an experiment to see whether participants with developmental trauma were more likely to experience depersonalisation, a form of dissociation characterised by being disconnected from one's experience of themselves, their emotions and their body, compared to participants without developmental trauma.

Design and Method

In the review study, two researchers searched the scientific literature and reviewed 2,215 articles published in scientific journals . A small proportion of relevant papers that studied dissociation in relation to developmental trauma and psychosis, both from clinical populations and the community were further screened. The final 37 papers were examined and assessed for their quality to create a synthesis of how common and severe dissociation is in psychosis following developmental trauma, and on whether it explains part of why people with developmental trauma have such a higher risk for psychosis. The empirical project was part of a larger project conducted with the Translational Psychiatry Research Group at University College London (UCL), the IMPACT study, where 1245 adults form the UK voluntarily participated in an online study

advertised on social media and the UCL campus. They completed questionnaires related to their experiences of developmental trauma, dissociation, PTSD and psychosis. Some of these participants were invited to complete an experiment in London. 64 participants were able to participate in the experiment.

Results

In the review, examining the scientific literature came up with the following conclusions:

1. Having experienced DT among individuals in psychosis is associated with dissociation.
2. A potentially explanatory role of dissociation was found in the relationship between developmental trauma and hallucinations, as well as delusions and paranoia.
3. Negative symptoms were not frequently associated with developmental trauma and dissociation.
4. These findings were from both subclinical and clinical studies, therefore suggesting that dissociative experiences could be targets for the prevention and treatment of psychosis.
5. Research to date was mostly of poor quality and did not study people over time, and only used surveys, thus requiring replication with better controlled research designs.

In the empirical study, the researchers found in the online study that having a history of developmental trauma and subclinical psychosis was associated with higher rates of dissociation, and that people who had both had the highest rates of dissociation. It was found that dissociation explained the relationship between developmental trauma and general positive symptoms, and also with paranoia specifically. The study identified that not all types of dissociation had the same role, and that feeling disconnected from one's body and the world, and becoming highly absorbed with your thoughts and experiences were the forms of dissociation that mostly contributed to subclinical

psychosis in this sample. The study finally found that dissociation seems to play a role in the relationship between developmental trauma and psychosis symptoms irrespective of whether someone has PTSD. In the experimental study, the study found that participants with developmental trauma were more likely to experience a disconnection from their body and sense of self, and to experience experimentally induced illusions that they found uncontrollable, difficult to explain, attributed to someone else and more disturbing.

Conclusions and Future Targets

Overall, these findings indicate that dissociation is an experience associated with both developmental trauma and psychosis, and highly present among individuals with subclinical psychosis and developmental trauma histories. Dissociation may also play a role in explaining positive symptoms and paranoia. The experience and impact of dissociation in individuals with different levels of psychosis severity following trauma needs to be studied further, and it is important to understand whether targeting dissociation in treatment can improve treatment outcomes. In order to disseminate these findings, this research will be presented in conferences focused on trauma and psychosis, and will be written into articles for publication in scientific journals. Findings will also be shared in meetings attended by clinicians working with trauma and psychosis.

Chapter 2

The Experience and Role of Dissociation in Psychosis Following Developmental Trauma: A Systematic Review

Eirini Melegkovits, Rui Tang, Dr Katie Ashcroft, Dr Michael Bloomfield

Abstract

There is an increasing interest in understanding the relationship between developmental trauma (DT), defined as abuse or neglect under the age of 18, and dissociative experiences in the context of psychosis. We aimed to systematically review the evidence on the relationship between DT and the experience of dissociation in the context of psychosis, and to identify studies exploring the mediating role of dissociation in the relationship between DT and psychotic experiences, along the psychosis spectrum. Two authors conducted a systematic search of the literature on the databases Embase, Psychinfo and Medline, as well as searches on Google Scholar and manual searches of reference lists of published studies. Broad inclusion criteria were employed, in order to identify studies using a range of methodologies that could capture the experience of dissociation following DT in individuals with psychosis or psychotic symptoms. A quality assessment of included studies was conducted. The systematic literature review led to the inclusion of 37 studies. First, a significant association of DT and dissociation with a dose-response effect was reported by a number of studies. Studies identified that participants with DT experienced higher levels of dissociation compared to those without. In addition, a mediating role was established for dissociation in the relationship between DT and positive psychotic symptoms, in both clinical and general population samples. Multiple studies identified a mediating role of dissociation specifically for hallucinations following DT, and a novel finding was the identification of a small number of studies that identified a mediating role of dissociation in the relationship between DT and paranoia. No studies using experimental or qualitative methodologies were identified. As most studies were

cross-sectional and did not sufficiently control for potential confounding factors, future research should attempt to replicate these findings using longitudinal and qualitative designs. Clinical implication of the findings are discussed.

Keywords: Dissociation, Trauma, Subclinical Psychosis, Systematic Review

The initial conceptualisation of "schizophrenia" (Bleuler, 1911) was highly influenced by Pierre Janet's ideas that dissociation was a response to psychological trauma, described as involving "loosening of associations" between thoughts, feelings and behaviours. Over 100 years later, the relationship between psychosis and dissociation remains an important area of research. Both represent complex, multifaceted experiences whose phenomenological nuance is challenging to capture in clear and distinguishable constructs. As traumatogenic models of psychosis (Bloomfield, Michael A. P. et al., 2021) and practices of trauma-informed care (Bloomfield, Michael AP et al., 2020; Isobel, 2016) are gaining traction, there has been renewed interest in understanding the relationships between trauma, dissociation, and psychosis.

Psychotic Experiences

Psychosis as a clinical syndrome is comprised by experiences of positive and negative symptoms. Positive symptoms include hallucinations, in auditory, visual, tactile and olfactory modalities, paranoia; and experiences of delusions, in the forms of persecutory, grandiose, referential delusional ideation. In the general population, subclinical positive symptoms can be conceptualised as bizarre ideas, paranoid ideation, or transient hallucinatory experiences with varying levels of frequency and distress. Negative symptoms include experiences such as avolition, emotional and social withdrawal. Other experiences central to psychosis are psychomotor disturbances, formal thought disorder and disorganization, cognitive disturbances and depressive symptoms (Stefanis et al., 2002). There is evidence that psychotic symptoms exist on a continuum, manifesting in the general population, across different diagnoses and with higher severity in clinical samples (Van Os et al., 2009). Subclinical and clinical psychotic experiences have been found to share aetiological factors including childhood adversity (Linscott & Van Os, 2013; Pries et al., 2018).

Developmental Trauma

Psychological trauma has been defined as "actual or threatened death, serious injury, or sexual violence" (American Psychiatric Association, 2013) and as an event that is "extremely threatening or horrific" (World Health Organisation, 2018). Maltreatment and neglect in childhood and adolescence, such as emotional, physical and sexual abuse and bullying and emotional and physical neglect, hereon referred to as developmental trauma (DT) (Bloomfield et al., 2021) are events which can provoke extreme fear and sense of threat and has been repeatedly established as a risk factor for psychosis (Bendall et al., 2008; Read et al., 2005; Varese, Filippo et al., 2012). Specifically, individuals with experiences of DT present with higher odds of psychotic experiences, and DT is associated with greater symptom severity, worse outcomes (Bailey et al., 2018), and higher rates of hospitalisations (Schenkel et al., 2005) among individuals with clinical psychosis. Understanding the mechanisms underlying the relationship between DT and psychotic experiences and the phenomenological experiences of people with psychosis who have experienced DT can therefore have important implications on a prevention, early intervention and clinical management level.

Defining Dissociation

From the earliest theoretical work, Breuer and Freud (1893) emphasized that the main psychological response to trauma is a *"severely paralysing affect… during a modified state of consciousness"* (p. 110). Contemporary accounts describe dissociation as "a disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour," (American Psychiatric Association, 2013, p. 291). According to the bipartite model of dissociation (Holmes et al., 2005), dissociation involves states of "detachment", such as depersonalisation (a sense of disconnection from one's bodily experience) and derealisation (a sense of disconnection from the world or the perception of the world as

strange/unreal), versus a range of anomalous experiences involved in "compartmentalisation" processes, such as dissociative amnesia or other forms of identity loss.

There is evidence that dissociative experiences exist on a continuum, such that individuals in the general population experience non-clinical transient dissociative phenomena (Hunter et al., 2003) but clinically it is an experience which has often been associated with distress and poor outcomes. One example of non-pathological dissociation is absorption, characterised by complete immersion in an internal or external stimulus and ignoring other stimuli in one's environment (Carlson & Putnam, 1993). Depersonalization/ derealisation, absorption and imaginative involvement, and dissociative amnesia make up the most widely used measurement to measure dissociation, the Dissociative Experiences Scale (Carlson & Putnam, 1993). However, the concept of absorption is frequently contested as, in contrast to dissociative amnesia, it does not share a clinical counterpart and is mostly associated with daydreaming (Soffer-Dudek et al., 2015). Clinically, depersonalisation/derealization have been encountered in the context of post-traumatic stress disorder (PTSD), in depersonalisation/derealisation disorder and in dissociative identity disorder, an extreme manifestation of dissociative experiences and a risk factor for multiple suicide attempts (Foote et al., 2008). Pathological dissociation, proposed by Waller, Putnam and Carlson (1996) consists of a "taxon" of phenomena characteristic of a dissociative tendency, which is qualitatively and phenomenologically rather than quantitatively different. It is important to distinguish between peri-traumatic (detachment during trauma), post-traumatic (e.g. in the context of PTSD) and trait dissociation.

Linking Trauma, Dissociation and Psychosis

Dissociation and psychosis were initially conceptualised as similar (e.g. in Schneiderian symptoms), with psychosis often viewed as an extreme form of dissociation, compared to the separate

diagnostic constructs introduced by categorical models and contemporary diagnostic systems. Moskowitz and Corstens (2018) have suggested that auditory hallucinations in fact represent dissociative phenomena, as they are not exclusive to a diagnosis of schizophrenia spectrum disorders, occur across different diagnoses and share vast phenomenological elements. Considering the relationship between trauma, dissociation and psychosis, a trauma-dissociation subgroup of schizophrenia (Ross & Keyes, 2004) has also been proposed.

Most theoretical accounts of how dissociation develops following trauma view it as a protective response to adverse life situations that would otherwise cause unbearable distress (Putnam, 1992; Winnicott 1974). This mechanism allows the protection of the self from emotional or physical pain during a traumatic event through processes of detachment (Spiegel, 1984). This is in line with the defence cascade model proposed by Schauer & Elbert, according to which peri-traumatic dissociative symptoms arise as a "shutdown" of sensorimotor processes, when the intensity of the fear or inescapability of a situation lead to an activation of the parasympathetic system (Brown, 2006).This "fright-flag-faint" response is suggested to be adaptive because "fight or flight" is not an option.

From a cognitive perspective, peri-traumatic dissociation also hinders the dual processing of sensory and contextual information (Holmes et al., 2005) which has been proposed to contribute to the development of involuntary intrusions characteristic of post-traumatic stress reactions (Brewin et al., 2010). The chronic, uncontrollable or automatic, as well as indiscriminate experience of dissociation in response to internal or external traumatic reminders has been identified as becoming maladaptive (Steinberg, 1995; Van der Kolk & Van der Hart, 1991) leading to greater disconnection from external reality and one's own experience of self-cohesion (Allen et al., 1997). One explanation for this is that the repeated use of dissociative processes implicates the integration of somatosensory experiences that may lead to these disturbances of selfhood which are also observed in schizophrenia

(Postmes et al., 2014). This is especially relevant for processes of depersonalization and derealization (detachment), which may be related to a blurred boundary between reality and unreality (Sierra & David, 2011). These disruptions of the experience of the self as the centre of experience have been associated with higher risk of psychosis and an element central to schizophrenia (Parnas, 2000). On the other hand, in compartmentalisation phenomena, as seen in dissociative amnesia, aspects of memory or identity are considered to be compartmentalised (likely following extremely overwhelming situations) to the extent where they are forgotten, in the absence of pathogenetic mechanisms other than dissociation (Staniloiu & Markowitsch, 2014).

From a post-traumatic stress view, dissociative experiences may be triggered as a way of coping with symptoms and distressing experiences (Hardy, K. et al., 2017), which could further duel both detachment and compartmentalisation processes. While dissociation has often been considered a response to trauma and a precursor to schizophrenia (Morgan & Fisher, 2007), the acute or chronic presentation psychosis may in turn elicit the development of coping strategies, including dissociation to the experience, disruptions in identity, detachment, and alternations in the perception of the self and others. Another prominent perspective on the development of dissociation and its relevance to psychosis is the Cognitive Attachment model of Voices (Berry et al., 2017).The fundamental proponent of the model, disorganized attachment, is an internal working model characterised by disoriented and contradictory responses in the separation and reunion of an infant to caregivers. In conditions of unpredictability and dismissing parenting, infants experience the confusion of their source of safety (Liotti, 2004) and care simultaneously becoming a source of threat or distress (Berry et al., 2017)- a condition of "fright without solution" (Liotti, 2004). This attachment pattern, which often characterises individuals with histories of DT, is considered an antecedent of the development of dissociation in the face of adversity later in life (Liotti, 2004). The Cognitive Attachment model

follows other perspectives (Moskowitz & Corstens, 2018)which consider voices to be dissociated parts of the self or "compartmentalized memories", whereby psychotic experiences are conceptualised as internal events perceived as external, and memories perceived as current, likely due to source monitoring deficits.

As such, we see that dissociation in psychosis following DT manifests through different peri-traumatic and post-traumatic mechanisms that involve a suite of sensory, neurobiological, affective and identity processes. There is evidence in support of these theoretical accounts from studies that have described phenomenological differences between individuals with clinical psychosis with and without DT histories. In the context of dissociation, these differences have involved higher levels of dissociative symptoms (Dorahy et al., 2009), higher proportion of severe and potentially clinical dissociative symptoms (Sun et al., 2018) and higher rates of dissociative identity disorder among individuals with psychosis and DT (Ross & Keyes, 2004; Schäfer et al., 2018). Similarly, patients with schizophrenia and high levels of dissociation report higher levels of DT (Ross & Keyes, 2004; Şar & Öztürk, 2018). Recently, meta-analyses (Alameda et al., 2020; Bloomfield et al., 2021; Longden et al., 2020; Pilton et al., 2015) have indeed demonstrated strong relationships between psychotic and dissociative symptoms, with especially robust relationships arising for dissociation and positive symptoms, suggesting a role of trauma in this relationship.

Aims and rationale

Several studies have proposed an explanatory or mediating role of dissociation in the pathway from DT to psychotic experiences (Alameda et al., 2020; Bloomfield, Michael A. P. et al., 2021; Varese, Filippo et al., 2012). In particular, the mediating role of dissociation has been explored as part of other post-traumatic responses (Alameda et al., 2020; Sideli et al., 2020) and amongst psychological mediators with specific psychotic symptoms (Bloomfield et al., 2021). A recent meta-

analysis also considered the relationship between dissociation and DT in severe mental illness (Rafiq et al., 2018). However, as previous studies have employed uniform conceptualisations of dissociation, the contribution of different dissociative phenomena in the relationship between trauma and psychotic experiences remains unclear (Longden et al., 2020).

As this is a rapidly growing field, we considered it important to map research on dissociation in the context of psychotic experiences following DT. We aimed to identify 1) the phenomenological characteristics of dissociative experiences in individuals with experiences of psychosis along the psychosis continuum and DT; 2) evidence comparing the prevalence and experience of dissociative phenomena between individuals with psychosis with and without DT; and 3) on reviewing the potential mediating role of dissociation and subtypes in the relationship between DT and clinical or subclinical psychotic symptoms. Importantly, we elaborated on methodological and study characteristics, such as population (clinical vs general), illness phase, types of DT, and the different dissociative phenomena studied. In order to provide an updated and comprehensive description of the research literature to date, we aimed to include both quantitative and qualitative studies.

Method

Our study protocol was registered with PROSPERO (CRD42022330026). We used the PRISMA framework (Page et al., 2020) in the systematic search, extraction, synthesis and evaluation of data. The search terms are described below and were agreed with a librarian a priori.

Our search was conducted on the 6th of May 2022 and updated on the 12th of January 2023. We conducted a systematic review of the literature on "Embase", "MEDLINE", and "PsychINFO" databases, with no restriction on publication date. Past studies on DT, dissociation and psychosis were examined to identify relevant search-terms. Medical subject headings and keywords associated with a) developmental trauma (DT), b) psychosis or psychotic experiences and c) dissociation were

connected using Boolean operators ("OR"). The above search strings were then attached using the Boolean operator ("and"). The full list of the search terms is provided in Appendix A. Reference lists and Google Scholar were manually searched to identify relevant studies.

Eligibility criteria

Inclusion criteria were studies conducted in English in adult samples (>16), from both in- and out-patient setting, and across the psychosis continuum i.e. first episode psychosis, ultra high-risk or general population groups. An additional requirement was measurement of DT as an exposure, dissociation in clinical samples or along psychosis or psychotic experiences as outcomes. We defined DT as psychological trauma before the age of 18, in the form of emotional, physical, or sexual abuse and emotional or physical neglect, and bullying. Psychotic experiences were defined as clinical and subclinical psychotic experiences through self-report, clinician administered measures or chart review. Dissociation was operationally defined as diagnostic, screening or experimental measures of dissociative experiences, including clinical measures of shutdown dissociation and dissociative identity disorder, measures of anomalous experiences, depersonalisation/derealisation, absorption, and dissociative amnesia, but also through the lens of compartmentalisation/detachment. A chart or psychiatrist diagnosis of psychotic disorder, schizophrenia, schizoaffective disorder, first episode psychosis, diagnostic and screening tools for psychotic experiences were considered eligible.

Studies not published in peer review journals were excluded, and no limitation on study design was imposed, apart from exclusion of outcomes research, reviews, and case-studies, and studies where it was not possible to separate DT from adult trauma. Studies which looked at inpatient samples overall, including non-psychotic inpatients together or without psychotic inpatients, and did not include a separate measure of psychosis were excluded. Studies reporting dissociative or psychotic

symptoms mainly in the context of substance or alcohol misuse, or organic causes (e.g. neurological conditions, epilepsy) were excluded.

The following methodologies and comparisons were considered eligible: 1) between-groups comparisons of dissociation levels/profiles between individuals with a diagnosis of psychosis with or without DT *or* high and low DT, 2) observational studies looking for an association between DT and dissociative symptoms and psychosis or psychotic symptoms (e.g. in a patient sample with or without a comparator or within a general population sample) and 3) studies looking at the mediating role of dissociation in the relationship between DT and psychosis or psychotic experiences.

Data Extraction and Quality Assessment

Two authors independently screened all titles and abstracts (kappa= 0.80) and full texts (kappa= 0.89) indicating almost perfect agreement. Any inter-rater discrepancies were resolved through discussion and consultation with a third reviewer.
A standardised spreadsheet was used to extract data on study characteristics, including N of sample and groups, diagnostic and medication status of sample; conceptualisation and measurements of DT, dissociation and psychosis symptoms; outcomes.

We evaluated risk of bias using the Newcastle-Ottawa scale for cohort and case-control studies, and the National Heart, Lung and Blood Institute (NHLBI) quality assessment tool for observational and cross-sectional studies (Appendix B). The Newcastle Ottawa scale is recommended for case-control and cohort studies (Zeng et al., 2015), with a rating of 7 and above considered appropriate (Bloomfield et al., 2021). An amendment was made to the Newcastle Ottawa scale to reflect the literature (Alameda et al., 2020), whereby for the purpose of ascertaining exposure we accepted self-report measures of DT. The NHLBI is a tool covering a wide area of research design. This tool was chosen as it comprehensively assesses methodological limitations and sources of bias

(e.g. selection, measurement), considers confounding and power, and was considered more appropriate for cross-sectional studies. Two raters assessed study quality by evaluating risk of bias and discrepancies were discussed. Studies received ratings of low risk of bias, moderate risk of bias and high risk of bias.

Narrative Synthesis of Data

Studies were narratively synthesized based on the outcome investigated and psychotic symptom studied. Information on different types of DT (emotional, physical, sexual abuse, and emotional or physical neglect), dissociation (depersonalisation, derealisation, absorption, detachment vs compartmentalisation etc) and psychotic symptoms (positive and negative symptoms, hallucinations, delusion, paranoia etc) were synthesised where possible. When studies reported findings on subgroups (e.g. FEP vs chronic patients/inpatients vs controls) we report on them separately. Due to the heterogeneity of identified studies in terms of participant groups and outcome measures, and contrary to the original study protocol, a meta-analysis was not conducted for the purpose of this thesis.

Results

As shown in the Prisma flow diagram (Figure 1), 2,894 studies were identified. 2,215 titles and abstracts were screened after duplicate removal, and 78 full texts, resulting in 37 studies for inclusion with a total of 6,357 participants.

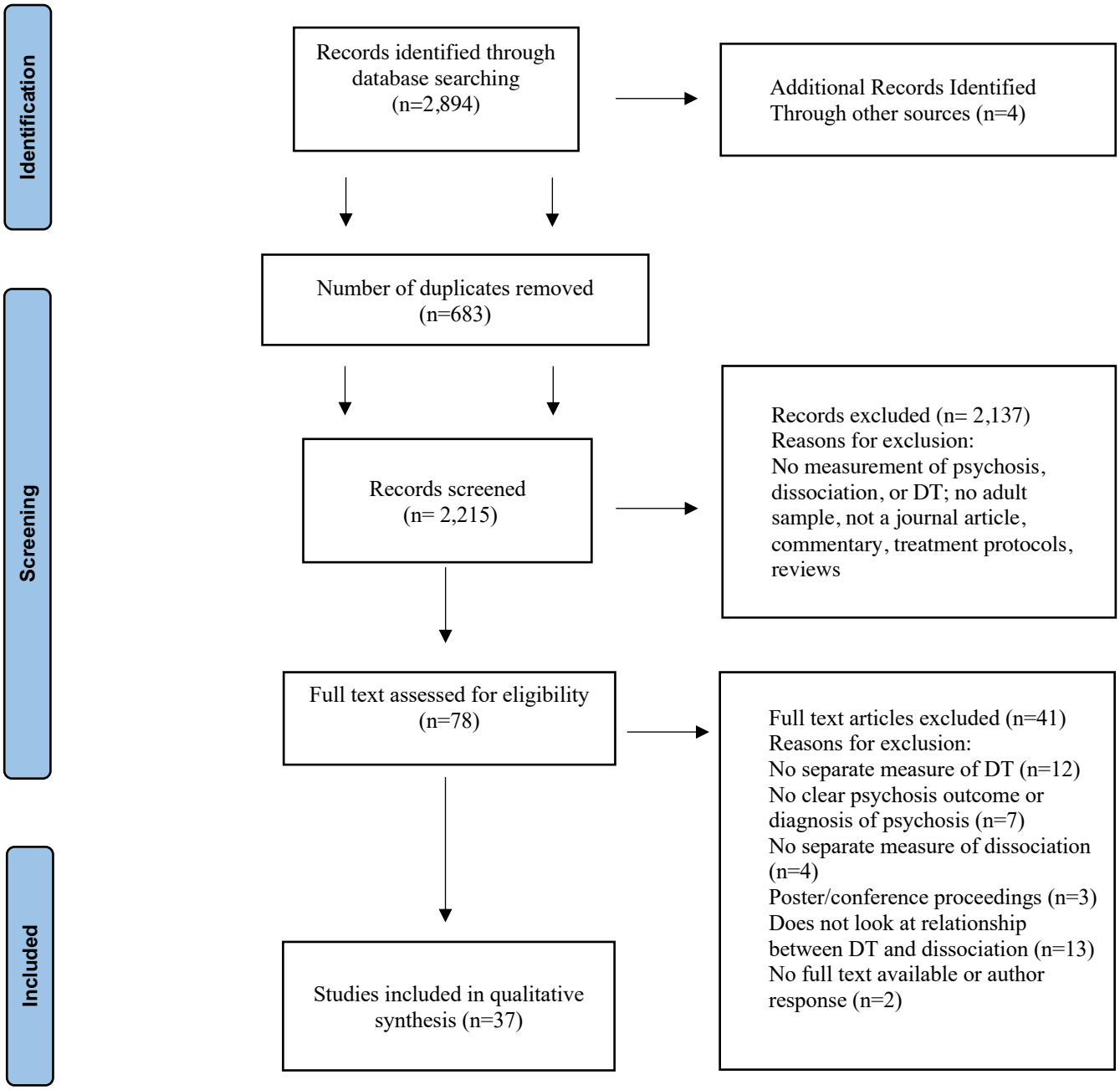

Figure 1. Prisma Flow Diagram of Screening and Inclusion

Description of Included Studies

23 studies were cross-sectional, 10 studies were case-control and 4 were cohort studies. 26 studies included clinical samples, of which 6 were in FEP samples and 8 were inpatient samples. 1 study included an ultra-high risk to psychosis sample and 10 studies looked at general population samples. One study identified the sample as "help seeking". 21 studies explored the mediation or confounding role of dissociation in the relationship between DT and psychotic experiences.

Quality Assessment

16/37 studies were rated as high risk of bias (ROB), 14/37 were rated as moderate ROB, and 6 studies were rated as low ROB(Tables 1-3). 21/37 studies controlled for more than one confounders in their design or analysis. The majority of studies used validated questionnaires for the measurement of DT (29/37), dissociative experiences (37/37) and psychotic experiences (35/37). Random sampling was only employed by (Khosravi et al., 2021; Longden et al., 2016). All other studies employed convenience sampling, with few descriptions about participation rate which could increase selection bias. Multiple studies did not specify inpatient or outpatient participation rates or provide details about participants illness or treatment phase.

Table 1.
Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (The National Heart, Lung, and Blood Institute)

	Research Question	Sample	Participation	Sample selection, time and same exclusion/ inclusion criteria	Power and Sample Size	Exposure before outcome	Sufficient time frame	Multiple levels of exposure	Exposure	Multiple exposures points	Outcome measures	Blinding to exposure	Loss at follow up (<20%)	Confounding	Risk of Bias Rating
Álvarez et al. 2021	Yes	Yes	N/R	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	No	High
Berry et al. 2018	Yes	Yes	N/R	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	Yes	Moderate
Blose et al. 2023	Yes	Yes	N/R	Yes	No	No	No	Yes	Yes	No	Yes	No	No	Yes	Moderate
Bortolon et al. 2017	Yes	Yes	N/R	N/R	No	No	No	Yes	Yes	No	Yes	No	N/A	Yes	Moderate
Bortolon et al. 2018	Yes	Yes	N/R	N/R	No	No	No	Yes	Yes	No	Yes	No	N/A	Yes	Moderate
Chae et al. 2015	Yes	Yes	N/R	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	Yes	Moderate
Cole et al. 2016	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	No	High
Degnan et al. 2022	Yes	Yes	N/R	Yes	Yes	No	No	Yes	Yes	No	Yes	No	N/A	Yes	Low
Gibson et al. 2019	Yes	Yes	N/R	N/R	No	No	No	Yes	Yes	No	Yes	No	N/A	Yes	High
Goff et al. 1990	Yes	Yes	N/R	Yes	No	No	No	No	No	No	No	Yes	N/A	No	High
Gomez& Freyd 2017	Yes	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No	N/A	No	High
Mertens et al. 2021	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	No	Yes	No	N/A	No	High
O'Neil et al. 2021	Yes	Yes	N/R	Yes	No	No	No	Yes	Yes	No	Yes	No	N/R	Yes	Moderate

Offen et al. 2003	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No	N/A	No	High
Pearce et al. 2017	Yes	Yes	N/R	N/R	No	No	No	Yes	No	No	Yes	No	N/A	Yes	High
Perona-Garcelán et al., 2014	Yes	Yes	N/R	Yes	No	No	No	No	No	No	Yes	No	N/A	No	High
Perona-Garcelán et al., 2010	Yes	Yes	N/R	Yes	No	No	No	No	No	No	Yes	No	N/A	No	High
Perona-Garcelán et al., 2012	Yes	Yes	N/R	Yes	No	No	No	No	No	No	Yes	No	N/A	No	High
Sar et al. 2010	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	No	Moderate
Schalinski & Teicher, 2015	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	No	Moderate
Schroeder et al. 2016	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	N/A	Yes	Moderate
Sun et al. 2018	Yes	Yes	N/R	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	No	High
Sun et al. 2019	Yes	Yes	N/R	Yes	No	No	No	Yes	Yes	No	Yes	No	N/A	No	High

Note. N/R= Not reported. N/A= Not applicable.

Table 2

Cohort studies: Quality Assessment Table using the Newcastle Ottawa Scale

	Representativeness of Exposed Cohort	Selection of the Non-Exposed Cohort	Ascertainment of Exposure	Outcomes at start of study	Comparability	Ascertairment of outcome	Follow up	Adequacy of follow-up	/9	Risk of Bias Rating
Muenzenmaier et al. 2015	*	*	*	-	**	No	*	*	7	Low
Schafer et al. 2006	*	*	*	-	*	*	No	*	6	Moderate
Schäfer et al. 2012	*	*	*	-	*	No	No	*	5	Moderate
Thompson et al. 2015	*	*	*	-	No	No	Yes	*	5	Moderate

Table 3

Case-control studies: Quality Assessment Table using the Newcastle Ottawa Scale

Study	Adequate case definition	Representativeness of cases	Selection of controls	Definition of controls	Comparability on the basis of the design or analysis controlled for confounders	Ascertainment of exposure	Same method of ascertainment for cases and controls	Non-response	/9	Risk of Bias Rating
Schalinski et al. 2019	*	Not stated	*	*	**	Yes	*	No	7	Moderate
Uyan et al. 2022	*	Yes	*	*	**	Yes	*	No	8	Low
Álvarez et al. 2015	*	Yes	*	*	**	Yes	*	No	8	Low
Braehler et al. 2013	*	Yes	*	*	**	No	*	No	7	Low
Dorahy et al. 2009	*	Not stated		*		Yes	*	No	4	Low
Varese et al. 2012	*	Not stated	*	*	*	Yes	*	No	6	Moderate
Khosravi et al. 2021	*	Yes	*	*	**	Yes	*	No	8	Low
Evans et al. 2015	*	Not stated	*	*	**	Yes	*	No	7	Low
Longden et al., 2016	*	Not stated	-	*	-	Yes	*	No	4	High
Nesbit et al. 2022	*	Not stated	-	*	*	*	*	No	5	Moderate

Study Characteristics

Clinical studies (*M*=34.54, *SD*=9.29) reported on a higher age group and had fewer females (45% female) than general population studies (*M*=25.80, *SD*=6.6; 73% female). Most studies were conducted in high-income countries of Europe, USA and Australia, with one study from the Middle East and one from Asia.

The vast majority of studies used the Dissociative Experiences Scale as a measure of dissociation. Two studies (Bortolon et al., 2017; Bortolon & Raffard, 2018) distinguished between "automatic pilot" and "shutdown dissociation". Nine studies (Evans et al. 2015; Longden et al., 2016; Nesbit et al., 2022; Pearce et al., 2017; Perona-Garcelán et al., 2012; Perona-Garcelán et al., 2010; Sun et al., 2018; Degnan et al., 2022) removed item 27 from their analysis, in an effort to control the potential confounding role of this item measuring hallucinations. Berry et al. (2018) established that inclusion of item 27 did not impact findings. Finally, several studies used the DES-T, an adapted DES measure capturing pathological dissociation (Dorahy et al., 2009; Muenzenmaier et al., 2015; Schäfer et al., 2012; Varese et al., 2012). Only 5 studies used interview-based measures (e.g. SCID). All studies assessed DT retrospectively and most studies used the Childhood Trauma Questionnaire (Bernstein et al., 1998), as a measure of DT.

Associations between DT and Psychosis

DT levels were higher in clinical vs non-clinical groups in the majority of case-control studies, the majority of which were of low ROB (Álvarez et al., 2015; Braehler et al., 2013; Evans et al., 2015; Khosravi et al., 2021; Schalinski et al., 2019; Uyan et al., 2022; Varese et al., 2012). A dose-response effect between trauma and psychosis emerged in clinical studies (Álvarez et al., 2021; Longden

et al., 2020; Muenzenmaier et al., 2015; Schalinski et al., 2016; Schalinski et al., 2019). Severe polytraumatization in one low ROB study (Álvarez et al., 2015) was associated with a 10 times higher risk of schizophrenia and moderate polytraumatization with 4 times higher risk compared to those without. Nesbit et al. 2022 found no association between DT and AH frequency or distress among patients with psychosis. In general population studies, differentiating between participants high and low in hallucination proneness did not indicate differences in number of DT (Perona-Garcelán et al., 2014), although the authors did not use a validated questionnaire for ascertaining trauma exposure. Berry and colleagues (2018) found an association between most DT types and total DT score, but not physical and sexual abuse, and hallucination proneness.

Associations between DT and dissociation in Clinical Samples

Among samples with patients with clinical psychosis, studies reported moderate (Álvarez et al., 2015; Braehler et al., 2013; Degnan et al., 2022; Nesbit et al., 2022; Pearce et al., 2017; Perona-Garcelán et al., 2012; Sar et al., 2009; Schäfer et al., 2006; Schäfer et al., 2012; Schalinski et al., 2016; Schalinski et al., 2019; Varese et al., 2012) to large (Chae et al., 2015; Khosravi et al., 2021; Sun et al., 2018) correlations between DT and DES. Higher total dissociative scores emerged among patients with DT compared to no DT (Dorahy et al., 2009; Goff et al., 1991; Offen et al., 2003; Perona-Garcelán et al., 2010; Schroeder et al., 2016). Schroeder et al. (2016) found higher dissociative amnesia in participants with histories of physical and sexual abuse and witnessing DV, and higher dissociative absorption in participants who had witnessed DV.

Table 4

Characteristics of Studies Demonstrating Associations Between DT and Dissociation

Study	Design	Sample	Type and measure of DT	Measure of Dissociation	Psychosis diagnosis or measure	Main findings
Álvarez et al., 2015	Case-control	Clinical-outpatient	CTQ	DES-II-total	Schizophrenia or schizoaffective disorder (DSM-IV)	Dose response relationship between polytraumatization 1) risk of schizophrenia and 2) dissociation (stronger among patients) DES scores in high (*M*=20.06, SD= 16.6) vs low DT (*M*=6.64, *SD*=5.92).
Álvarez et al., 2021	Cross-sectional	Clinical	CTQ	DES-II-total	Schizophrenia or schizoaffective disorder (DSM-IV); PANSS	All DT types and intensity of EA, SA, PA associated with higher DES-II ($p < 0.05$) . No correlation between PANSS+ and DT and inverse association between PANSS− and DT, ($\rho = -0.300$, $p = 0.045$. Dose-response relationship between DES-II and number of DTs, ($p < 0.005$).
Berry et al. 2018	Cross-sectional	General Population	CTQ	DES-II	Hallucinations (LSHS-R)	No associations between PA, SA and hallucination proneness, and SA and DES. Total DT associated with hallucination-proneness, *r*=.624* and dissociation, *r*=488* DES (*B*=1.17, 95%*CI*= .075-.160) and avoidant attachment (*B*=2.35, 95%*CI*=.107-.4.44) predicted hallucination proneness.

Study	Design	Sample	Type and measure of DT	Measure of Dissociation	Psychosis diagnosis or measure	Main findings
Braehler et al. 2013	Case-control	Clinical-Chronic patients, FEP, controls	CTQ	DES	Chart diagnosis	Higher DES scores for chronic patients compared to FEP and controls, and FEP and controls, $F=_{(2,168)}17.52$, $p<0.01$). More severe DES associated with more severe DT (r=.30-.48***), EA (r=.22-.65***), SA scores (r=.35-.43***) across groups. PA (r=.35***) and EN (r=.29*) correlated with DES in FEP group. PN correlated with DES in chronic patients (r=.39***) and controls (r=.31**).
Chae et al. 2015	Cross sectional-inpatient	–	CTQ	DES-total	Positive and Negative Symptoms (PANSS)	SA (F=5.16, p=0.03) and dissociation (F=4.34, p=.04) predicted positive symptoms, controlling for sex and age.
Dorahy et al. 2009	Case-control	Clinical-inpatient and outpatient	CTQ	DDIS; DES-T	Auditory hallucinations (Mental Health Research Institute Unusual Perceptions Schedule)	SCZ with DT (M=32.5, SD=21.0) and DID groups (M=65.7, SD=18.0) had higher levels of dissociation and command hallucinations compared to no DT (M=11.8, SD=9.9) , (F $(_{14, 100})$ =8.64; p<.001). DES-T scores increased odds that patients with DT would hear more than 2 voices (B=1.05, p< .001); experience commanding (B=1.05, p=.011); and controlling voices (B=1.04, p< .005); and experience voices related to past memories (B=1.03, p< .001).

Study	Design	Sample	Type and measure of DT	Measure of Dissociation	Psychosis diagnosis or measure	Main findings
Goff et al. 1990	Cross-sectional	Clinical-chronic patients	LEQ: PA or SA before 16	DES	Binary: Voices inside or outside head, presence of voices.	Higher DES in patients with DT vs no DT (*M*=20, *SD*=16.1 vs *M*=12.15, *SD*=12.4, *p*<.05) and amnesia (*M*=11, SD=41 vs *M*=6, *SD*=18, *p*<.05)
Longden et al., 2016	Case-control	Clinical-FEP with non-AH	CSA	DES-II		Dissociation, but not SA predicted hallucinations when entered in a model with SA, cumulative adversity, dissociation, (*OR*=1.05, 95%*CI*=1.01;1.08, *p* = .019).
Offen et al. 2003	Cross sectional	-Clinical-Psychosis	SA (single item)	DES-II	Beliefs, feelings and behaviours around hearing voices	Higher abuse among females, (χ^2 = 4.40, *p* < .04). Higher DES levels among patients with SA histories (*M*= 23.1, *SD*=16.6) vs without (*M*=30.5, *SD*=14.9), Mann–Whitney *z* = 1.77, *p* < .04 DES and beliefs of voices being malevolent correlated with age at first abuse, (ρ = −.68, *p* < .04).
Perona-Garcelán et al., 2010	Cross-sectional		Trauma Questionnaire items	DES-II	Hallucination and delusion (PANSS)	Higher DES in patients with DT (*M*=28.01, *SD*=17.99) vs no DT (*M*=12.85, *SD*=8.98), $t_{(35)}$= 3.395, *p*=.002. Higher DT scores in participants with pathological dissociation, *U* =37.00, p=.001.

Study	Design	Sample	Type and measure of DT	Measure of Dissociation	Psychosis diagnosis or measure	Main findings
Sar et al. 2010	Cross-sectional	Clinical	CTQ	DES; DDIS	SCID (DSM-IV); Scales for the Assessment of Negative and Positive Symptoms	Positive correlations between DT and DES total scores, r= 0.36, p=.002. Only physical abuse (β=0.28, p=.011) and neglect (β 0.28, p=.013) predicted DES scores. DT not associated with psychotic symptoms.
Schafer et al. 2006	Cohort-prospective	Clinical-inpatient	CTQ	DES	PANSS	Admission: DT, only with amnesia, ρ=.71, p=.003. No correlation between DES, CTQ, and PANSS+ subscales. T1: Amnesia and DT no longer correlated, only correlation with emotional abuse, ρ = .34, p = .032. No other correlations between DES, CTQ and PANSS. DES total score, amnesia and absorption not correlated between timepoints.
Schäfer et al. 2012	Cohort-prospective	Clinical-inpatient	CTQ	German version of the DES; DES-T	PANSS	DES and PANSS scores significantly less over time, ($F_{(1,14)}$=5.1; p= 0.041; η^2 =.265). Admission: PANSS+ scores (β= 2.91, p=.005) predicted dissociation. CTQ did not predict dissociation.

						T1: SA only predictor of dissociation, (β= 2.02, p=.047).
Schalinski & Teicher, 2015	Cross-sectional	Clinical-inpatient-stabilized	MACE: PA, EA, SA, witnessing DV, verbal and physical bullying, EN, PN.	Shutdown Dissociation Scale	PANSS	Severity of DT (r= .30, p = .009 and r= .41, p < .001) but not adult trauma associated with dissociation (r= .08, p = .478 and r = .10, p = .384) Peak vulnerability for shutdown dissociation at 13-14 years of age. EN followed by EA biggest predictors of dissociation.
Schroeder et al. 2016	Cross-sectional	Clinical-inpatient	PA, SA, DV, parental loss, parental dysfunction	DES-German	PANSS (including general psychopathology)	Positive correlation between PANSS + and DES score, (r = .216, p = .039). Significantly different dissociation scores between patients with DT and without DT, (t(18.19) = 2.225, p=.040)

Note. CTQ: Childhood Trauma Questionaire. DES: Dissociative Experiences Scale. DES-T: DES Taxon. DSM-IV: Diagnostic and Statistical Manual, 4th Edition. DT: Developmental Trauma. PA: Physical Abuse. EA: Emotional Abuse. SA: Sexual Abuse. PN: Physical Neglect. EN: Emotional Neglect. DV: Domestic Violence. LSHS-R: Launay-Slade Hallucination Scale-Revised. FEP: First Episode Psychosis. MACE: Maltreatment And Abuse Chronology of Exposure. PANSS: Positive and Negative Symptom Scale. SCZ: Schizophrenia. DID: Dissociative Idenity Disorder. SCID: Structured Clinical Interview. T1: Time 1.

Findings on Types of Abuse

Regarding associations between different forms of abuse, 4/8 clinical studies and 2/4 general population studies reported a positive small to moderate correlation between dissociation and physical abuse (See Appendix D). 7/8 clinical studies and 3/4 general population studies reported a significant small to large positive correlation between dissociation and sexual abuse. In a study of moderate ROB, O'Neil (2021) established that among participants with histories of sexual abuse, abuse in childhood was associated with significantly greater DES total score and greater depersonalization, amnesia, and absorption. In two studies, sexual abuse emerged as the strongest predictor of dissociation (Schafer et al., 2012) and in Goff et al. (1990) more strongly associated with physical abuse, but both studies were of high ROB, with small samples and no control of confounding. 5/7 clinical studies, and 4/4 general population studies, 2 of which were high ROB reported a positive small to large correlation between dissociation and emotional abuse. 3/8 analyses in clinical samples and 2 general population studies demonstrated a small to moderate association between physical neglect and dissociation. Schafer et al. (2012) found a small significant correlation for amnesia and physical neglect and Schafer et al. (2006) found a large correlation for amnesia and physical neglect, but these were not maintained once the sample was stabilized. Sar et al. (2010) in a moderate ROB study found that only physical abuse and neglect predicted dissociation scores, and Braehler et al. (2013) in a low ROB study found a stronger correlation between physical neglect and dissociation in chronic compared to FEP patients. 2/6 clinical samples in low (Braehler et al., 2013) and moderate (Chae et al., 2015) ROB studies found an association between emotional neglect and dissociation, with no association arising between subscales of the DES and emotional neglect.. Sar et al. (2010) classified patients with schizophrenia as high and low on dissociation, and found higher scores across CTQ domains apart from emotional neglect. Alvarez et al. (2015) found differences in the distribution of dissociation

scores between patients with schizophrenia with and without physical, sexual and emotional abuse, but not emotional or physical neglect.

There was evidence of a dose-response effect between DT and dissociation, whereby both severity of trauma (Goff et al., 1990; Braehler et al., 2013; Schalinski et al., 2019) and level of polytraumatisation (Alvarez et al., 2015; Alvarez et al., 2021; Schalinski et al., 2019) were associated with higher levels of dissociation in studies of both moderate and low ROB. Alvarez et al. (2015) in a low ROB study found that when severe DT was present, patients had 3 times higher levels of dissociation whereas controls had 2 times higher levels of dissociation. Perona-Garcelán et al. (2010) only found a dose response effect in those with pathological levels of dissociation, but the study did not use a validated measure of DT. Severity of shutdown dissociation was related to number of childhood but not number of adult traumatic events (Schalinski & Teicher, 2015).

Associations between DES and psychotic symptoms

In case-control studies, dissociation levels were consistently higher in clinical vs non-clinical groups (Braehler et al., 2013; Evans et al., 2015; Uyan et al., 2022; Varese et al., 2012), with some evidence that they were higher in chronic patients compared to FEP (Braehler et al., 2013; Khosravi et al., 2021). An association emerged between measures of dissociation and positive symptoms (Chae et al., 2015; Longden et al., 2016; Perona-Garcelán et al., 2012; Sar et al., 2009; Schalinski et al., 2016; Sun et al., 2018). Studying the stability of the relationship between dissociative and psychotic symptoms in inpatients, Schafer et al., 2006 found no correlation between dissociation and PANSS scores at admission or once patients were stabilised. Two studies found that dissociation predicted positive symptoms independently of DT (Berry et al., 2018; Longden et al., 2016). Similarly, Schafer et al., 2012 found that only PANSS symptoms predicted DES scores in the acute illness phase.

Dissociation as a Mediator Between Trauma and Psychosis

21 studies measured the mediating role of dissociative experiences on psychotic experiences, using a general population (N=8), clinical samples (N=11), ultra-high risk for psychosis samples (N=1) and a self-identified "help-seeking" community sample (N=1). Two studies found a partial mediation of dissociative experiences in the relationship between DT and psychosis group membership, for aggregate DT (Uyan et al., 2022) and for physical neglect (Evans et al., 2015). A prospective cohort study by (Thompson et al., 2016) failed to find a mediation effect of dissociation for transition to psychosis disorder following SA.

16 studies explored a mediating role of dissociation in the DT and positive psychotic symptom relationship. In clinical samples, (Schalinski et al., 2019) found an average partial mediation effect of shutdown dissociation in the relation between DT load and positive symptoms (25.9%), but not for abuse or neglect individually. (O'Neill et al., 2021) found that the effect between sexual abuse and psychotic experiences was partially mediated by depersonalization, but not absorption and amnesia in an online recruited sample seeking support for DT. Khosravi et al. (2021) (Khosravi et al., 2021)on the other hand only found a partial mediation of dissociative amnesia and absorption for sexual abuse and positive symptoms in a patient sample, accounting for 82 and 85% of the effect respectively.

Mixed findings emerged in general population samples. (Gibson et al., 2019) found support of total mediation of aggregate DT and psychotic experiences by dissociation. Blose (2023) established a significant indirect effect of peri-traumatic dissociation on schizotypy, but no

significant indirect effect of dissociation (DES) controlling after peritraumatic dissociation, and no direct effect of DT on schiztotypy.

Table 5
Characteristics of Studies on the Mediating Role of Dissociation in the DT and Psychosis Relationship

Study	Study design	Sample	DT measure	Measure of Dissociation	Psychosis measure	Main findings
Blose et al. 2023	Cross-sectional	General Population	CTQ	DES II	SPQ	Peritraumatic dissociation fully mediated DT→ schizotypy (β=.06, 95% *CI*:0.01;0.12) DES scores did not mediate DT→ schizotypy, controlling for peri-traumatic dissociation (β = .05, 95% *CI*:−0.02;0.12)
Bortolon et al. 2017	Cross - sectional	General Population	CTQ	DES: Defensive dissociation.	Hallucination proneness (LSHS-R)	Defensive dissociation significantly partially mediated DT→AH proneness, f^2 =.325.
Bortolon et al. 2018	Cross-sectional	General Population	CTQ	DES: defensive dissociation	VH and AH proneness	Defensive dissociation partially mediated DT→ VH proneness, f^2=0.085 and mediated DT→ AH proneness, f^2=0.080.
Cole et al. 2016	Cross-sectional		CTQ	CDS; DES -II	Delusions and hallucinations (PDI, LHS-R)	Dissociation mediated DT→ hallucination proneness (β=3.94 95% *CI*=2.15; 6.37) Dissociation mediated DT→ delusional ideation (β=310.75, 95% *CI*=5.87;17.56). Only absorption mediated DT→hallucination proneness Dissociative amnesia negatively and absorption positively mediated DT→delusional ideation.

Study	Study design	Sample	DT measure	Measure of Dissociation	Psychosis measure	Main findings
Varese et al. 2012	Case-control	Clinical-SSD	CATS; severity of DT, SA, EA, PA, neglect.	DES-T	PANSS; LSHS-R	DES (SA), mediated DT→ hallucination proneness in clinical and aggregate samples (β=0.11, 95% *CI*:0.06; 0.17)
Degnan et al. 2022	Cross-sectional	Clinical-self-reported psychosis	SA, PA, EA , witnessing abuse, suicide/death/severe injury of BBTS	DES-II; PSQ	Negative symptoms (SNS)	Compartmentalisation and avoidant attachment were independently associated with negative symptoms but not childhood trauma, r=-.008 and *r*=0.092 respectively. DT was not independently associated with negative symptoms, *r*= 0.109. Disorganized attachment (β=.34, 95% *CI*=0.20;0.47) and dissociation (β=.04, 95% *CI*=0.01; 0.10) mediated DT→ negative symptoms.
Evans et al. 2015	Case-control	FEP and controls	CTQ	DES-II	PANSS; Psychosis Group Membership	EA (*U*=264.00, *p*=0.002), PA (*U*=268.50, *p*=0.001),EN (*U*=372.00, *p*= 0.031) were significantly associated with psychosis group membership. Dissociation significantly mediated PN→psychosis group membership, β =0.10, 95% *CI*= 0.002; 0.37. No direct effect was observed.

Study	Study design	Sample	DT measure	Measure of Dissociation	Psychosis measure	Main findings
Gibson et al. 2019	Cross-sectional	General Population	CTQ	DES-II	Psychotic Like Experiences	Dissociation mediated DT →psychotic experiences (β = .15 ,95% CI=.06;.11)
Gomez & Freyd 2017	Cross-sectional	General Population	SA of BBTS	The Curious Experiences Survey	Hallucinations (Beliefs and Experiences Module)	Dissociation mediated SA→hallucinations, (95% *Cl* = .16;.66).
Khosravi et al. 2021	Case-control	Clinical-chronic psychotic patients, FEP, community controls	CTQ	Persian DES; SCID-D	PANSS	Higher abuse in FEP and chronic patients, p<.001. No group differences in neglect. Higher dissociative scores in chronic patients, p<.001. Amnesia and absorption mediated SA →positive symptoms (β=−0.23, 95%*CI*= −0.497;−0.024 and β=0.24, 95% *CI*=0.02;0.49) respectively
Mertens et al. 2021	Cross-sectional	General Population	EA (ITEC)	DES	Suspiciousness subscale (SPQ); SCID	EA predicted dissociation. Dissociation mediated EA→ paranoid traits (self-report and interview) controlling for insecure attachment (β =0.043, 95% *CI*=.004;.13) Fearful attachment mediated EA→ paranoia (self-report) (β = 0.019; 95% *CI*= 0.003; 0.05)

Study	Study design	Sample	DT measure	Measure of Dissociation	Psychosis measure	Main findings
Muenzenmaier et al. 2015	Cohort-prospective	Clinical-outpatients-psychosis	Childhood SA, PA, EA, witnessing DV, parental MH or substance misuse arrest of family member	DES-T	Delusions and hallucinations (SCID)	1.20 IRR increase (95% *CI*=1.09;1.32) for hallucinations and a 1.19 IRR increase (95% *CI*=1.09;1.29) for delusions with every additional adverse experience. The DES-T related to both delusions, OR=1.03 (95% *CI* 1.01; 1.04) and hallucinations, OR=1.03 (95% *CI* =1.01;1.05). Support for mediation of DES-T in DT→hallucinations over 12 months (from OR1.17 (95% *CI* =0.99;1.38) to 1.09 (95% *CI*=0.92;1.30) after controlling for DES-T.
Nesbit et al. 2022.pdf	Case-control	Clinical-inpatient	CTQ	DES-II	Hallucination frequency, duration and distress of AH and non-AH.	No correlation between DT-AH measures. No correlation between DES subscales and tactile hallucinations. Absorption mediated DT→visual (β = .010, 95% *CI*=.004; .026), olfactory (β = .008, 95% *CI*=.01; .020) and gustatory hallucinations (β = .010, 95%*CI*=.002; .022).

Study	Study design	Sample	DT measure	Measure of Dissociation	Psychosis measure	Main findings
O Neil et al. 2021	Cross-sectional	Help-seeking	SA (SAQ-Part II)	DES-II	PLE (hallucinations & Delusions)	More PLE *t* (-2.51) = 2.57, *p* = < 0.05 and dissociation *t* (-2.75) = 3.98, *p* = < 0.05 among participants with DT than adult trauma. Depersonalisation partially mediated childhood SA→PLEs (*β* = 0.249, 95%*CI*= 0.16; 0.34), and adult SA→ PLEs (*β* = 0.081, 95%*CI*= 0.03; 0.13).
Pearce et al. 2017	Cross-sectional	Clinical and subclinical	BBTS	DES-R	CAPE: paranoia and hallucinations	Dissociation (*β* = 0.09, 95% *CI*=0.03, 0.17), but not fearful attachment (*β* = 0.02, 95% *CI*=−0.001;0.07) mediated DT→voices. Both dissociation (*β* = 17, 95% *CI*=0.07; 0.30) and fearful attachment (*β* = 0.05, 95% *CI*=0.01, 0.12) mediated DT→paranoia.
Perona-Garcelán et al. 2014	Cross-sectional	General Population	childhood trauma on or before 15 years of age (Trauma Questionnaire)	TAS; CDS	Hallucination proneness (LSHS-R)	No significant differences between participants with high and low hallucination proneness in the number of DTs, (*t*(81) = 1.80, *p* = 0.07). Absorption *β*=.38, 95% *CI*=.17-.65 and depersonalization *β*=.16, 95% *CI*=.03;.40 partially mediated DT→ hallucination proneness (51.38% of total effect).

Study	Study design	Sample	DT measure	Measure of Dissociation	Psychosis measure	Main findings
Perona-Garcelán et al., 2012	Cross-sectional	Clinical	SA, PA, death of a relative or friend, near-drowning, assault, accident	DES-II	Hallucination and Delusion items (PANSS)	DT associated with DES-II r=.41**, subscales (r=25* ,r=.34**, r=.37**), hallucinations (r=.36**)and delusions (r=.32**) Dissociation significantly mediated DT→hallucinations (β = 0.21,95% CI=0.09; 0.38) , but not Dt→delusions (β = 0.07، 95% CI=0.00; 0.21) Subsequent mediation models showed that only depersonalization mediated DT→hallucinations.
Schalinski et al., 2019	Case-control	Clinical-inpatient and community controls	MACE: PA, EA, SA, witnessing DV, verbal and physical bullying, EN, PN.	Shutdown Dissociation Scale	PANSS	DT load (r=0.22,p= 0.002) , duration(r=0.28, p = 0.001), severity (r=0.29, p< 0.001) and polytraumatization (0.26, p<0.001) associated with PANSS+. DT load (r=0.37, p< 0.001), duration (r=0.34, p< 0.001) , severity (r=0.44, p<0.001) and polytraumatization (r=0.39, p<0.001) associated with dissociative symptoms. PANSS+ associated with abuse and neglect severity, (r= 0.27, p< 0.001) and (r=0.25,

						p<0.001), but not PANSS- (*r*=0.04, p = 0.5860. Dissociation mediated DT load→positive symptoms, *β* = 0.07, *p* = 0.032, 95% *CI*=0.01; 0.16.
Sun et al. 2018	Cross-sectional	Clinical-psychosis	CTQ	SCID-D-R; DES-II	Hallucinations and delusions (PANSS)	Interview based dissociation mediated the relationship between DT and delusions (*β* = 0.02, 95% *CI*=0.01; 0.04). Self-report dissociation mediated the relationship between DT and hallucinations, *β* = 0.01, 95%*CI*=0.003, 0.03.
Thompson et al. 2016	Cohort-prospective	Ultra-High Risk for Psychosis	SA	Dissociation-CAARMS subscale	Transition to psychotic disorder	No mediation of SA→ transition to psychotic disorder by dissociation, *z*=0.92, *p*=0.358.

Note. BBTS: Brief Betrayal Trauma Survey. CAARMS: Comprehensive Assessment of At-Risk Mental States. CATS: The Child Abuse and Trauma Scale. CDS: Cambridge Depersonalisation Scale. CTQ: Childhood Trauma Questionaire. DES: Dissociative Experiences Scale. DES-T: DES Taxon. DSM-IV: Diagnostic and Statistical Manual, 4th Edition. DT: Developmental Trauma. PA: Physical Abuse. EA: Emotional Abuse. SA: Sexual Abuse. PN: Physical Neglect. EN: Emotional Neglect. DV: Domestic Violence. LSHS-R: Launay-Slade Hallucination Scale-Revised. FEP: First Episode Psychosis. MACE: Maltreatment And Abuse Chronology of Exposure. PANSS: Positive and Negative Symptom Scale. SCZ: Schizophrenia. DID: Dissociative Idenity Disorder. SCID: Structured Clinical Interview TAS: The Tellegen Absorption Scale. T1: Time 1.

Hallucinations

11 studies explored the mediation of dissociation on the effect of DT on hallucinations. Evidence of mediation for the presence of hallucinations emerged in most clinical studies (Muenzenmaier et al., 2015; Pearce et al., 2017; Perona-Garcelán et al., 2012; Sun et al., 2018b; Varese et al., 2012). Muenzenmaier et al. (2015) established a confounding role of dissociation in the trend relationship between DT and hallucinations, measured by the SCID, over 12 months. Sun et al. (2018) established that the mediation was significant only for DES scores, but not clinically measured dissociation (SCID-D-DR) for FEP. In another study, Nesbit et al. (2022) found a small-medium mediating effect of aggregate dissociation on distress from auditory hallucinations, but only in patients with DID, not patients with SSD. This is in contrast to findings by Dorahy et al. (2009) who found that the odds of hearing multiple but also more commanding voices related to memories of DT , based on their DES scores.

Regarding type of DT, Varese et al. (2012) found the mediation effect of pathological dissociation to be especially robust for the experience of sexual abuse. Regarding specific types of dissociation, in an outpatient sample, Perona-Garcelán (2012) found the mediating effect of aggregate dissociation was driven by the depersonalisation subscale in subsequent analyses. In Nesbit et al. (2022) absorption had a mediating role in the SSD group for visual, olfactory and gustatory hallucinations, with no correlation in the DID group. On the contrary, depersonalisation and amnesia, mediated the relationship between DT and visual, tactile and olfactory hallucinations only in the DID group.

Evidence of mediation for hallucinations was also present in general population studies (Bortolon et al., 2017; Bortolon & Raffard, 2018; Cole et al., 2016; Gibson et al., 2019; Gómez & Freyd, 2017; Perona-Garcelán et al., 2014). Regarding subtypes of DT, Gomez & Freyd established dissociation, measured through the curious experiences scale, as a mediator of CSA and hallucinations. Bortolon et al. (2017) found support for a mediation of "defensive"

dissociation, (depersonalisation and dissociative amnesia) between physical abuse and AH proneness, and a partial mediation the association between defensive DT and seeing visions (Bortolon & Raffard, 2018) . While Perona-Garcelán et al. (2014) established a mediating role for depersonalisation between DT and hallucination proneness, this was not replicated by Cole et al., using both the DES and the Cambridge depersonalisation scale, who however found a mediating role of absorption.

Delusions and Paranoia

In clinical samples, only 1/3 studies found mediation of dissociation in the relationship between DT and delusions. Specifically, Sun et al. (2018) found that clinically measured (SCID-D-R) dissociation, but not self-report (DES) tools, mediated the relationship between DT and delusions, although the study suffered from potential risk of confounding and selection bias. In a general population sample Cole et al. (2016) found that dissociative amnesia negatively mediated, and total DES and absorption positively mediated the relationship between DT and delusional ideation, with no effect for depersonalization.

Paranoia was mediated by dissociation in 2 studies. Aggregate dissociation and fearful attachment significantly mediated the relationship between DT and paranoia while controlling for voices in an online convenience sample of individuals with subclinical psychosis and schizophrenia (Pearce et al., 2017). Similarly, total dissociation significantly mediated the effect of emotional DT on both interview-based and self-reported paranoid traits, which remained significant even after accounting for insecure attachment (Mertens et al., 2021). However, both studies were of high risk of bias as they did not sufficiently control for confounding and were at risk of selection bias.

Negative symptoms

Only 10/36 studies explored negative symptoms. Seven of these used the PANSS, and one study used the self-report Self-Evaluation for Negative Symptoms. In a well -controlled study, Degnan et al. (2022) found a mediation effect of dissociation on the relationship between DT and self-reported negative symptoms in a convenience online sample of individuals diagnosed with psychosis. 2 studies of low and moderate ROB (Khosravi et al., 2021; Sar et al., 2009) established correlations between DES subscales and negative symptom scores. 5 studies (Chae et al., 2015; Sar et al., 2009; Schäfer et al., 2012; Schalinski et al., 2016; Schalinski et al., 2019) found no significant correlation between DT and negative symptoms, and Álvarez et al., 2021 found a moderate inverse correlation between negative symptoms and DT, but did not control for potential confounders. Among patients with FEP and patients with schizophrenia spectrum disorders in a low ROB **study**, (Khosravi et al., 2021) found that sexual and physical abuse, amnesia and depersonalisation were positively and absorption was negatively associated with negative symptoms, but only physical abuse eventually predicted negative symptoms and no mediation was performed. (Uyan et al., 2022) in a low ROB study found small to moderate associations between passive/apathetic social withdrawal and emotional withdrawal with emotional and physical neglect and total DT, as well as an association between total negative symptom score and emotional neglect.

Discussion

This is the first study to present a comprehensive review of the association between DT and dissociation in psychosis and the potential role of dissociation in explaining psychotic experiences following DT. Our findings are consistent with other reviews, demonstrating a robust association between DT and dissociation (Rafiq et al., 2018). We identified strong evidence for a partial mediating role of dissociation in the relationship between DT and

hallucinations and some preliminary evidence for a partial mediating role in the relationship between DT and delusional ideation and paranoia. Although the majority of findings were cross-sectional, limiting the causal inferences that can be made, they render support for dissociation as a central experience to psychosis and a likely contributor to psychotic symptoms in the aftermath of developmental trauma that will be discussed.

The higher levels of DT identified across most studies in patient samples and in relation to psychotic symptoms is consistent with previous meta-analyses (Varese et al., 2012) and is attributable to a plethora of biopsychosocial mediators and moderators (Gibson et al., 2016). Well-established mechanisms outside of dissociative experiences involve emotional dysregulation, memory deficits, PTSD, and self- and other-schemata, as well as brain changes (Bloomfield et al., 2021; Hardy et al., 2016).

Association between DT and dissociation in the Context of Psychosis

The first aim was to identify studies describing the experience and severity of dissociation in relation to childhood trauma in individuals with psychosis or subclinical psychotic experiences. Surprisingly, the broad search and screening process produced no qualitative or experimental findings, but only quantitative studies. In clinical and general population samples, we found a moderate to large association between DT and dissociation, and higher levels of dissociation among individuals with histories of DT. This suggests that DT may contribute directly or indirectly to the experience of dissociation in psychosis. Dissociation has been long proposed to occur as a way of surviving physically or psychologically unbearable or inescapable circumstances (Putman, 1992). Primarily, post-traumatic accounts of dissociation in psychosis highlight the significance of peritraumatic dissociation, as a protective mechanism that promotes the detachment of bodily and external reality during a traumatic event as a way to minimize distress (van der Hart et al., 2010). Over time, and especially among circumstances of further adversity, complex trauma in childhood

and impaired attachment relationships, detachment may become a habitual way of regulating and coping with emotions (Hardy et al., 2017).This was supported by the finding that polytraumatization is associated with higher levels of dissociation across studies. In terms of dissociative subtypes, a small number of papers found an association between DT and compartmentalisation processes, such as dissociative amnesia, which involves the failure of conscious control over cognitive, sensory or physical process (van der Hart and Horst, 1989). Absorption, a concept not usually associated with psychopathology (Soffer-Dudek et al., 2015), was also associated with DT in several studies, indicating that it might arise as a consequence of DT.

Type of trauma

Regarding the association between different forms of DT and dissociation, consistent significant positive associations emerged for sexual and emotional followed by physical abuse, with less support for physical or emotional neglect. Some studies (Goff et al., 1990;Schafer et al., 2006) failed to report non-significant correlations for individual types of DT and others reported correlations which however were not significant (Braehler et al., 2013; Schafer et al., 2012; Varese et al., 2012). A meta-analysis (Vonderlin et al., 2018) of the association of subtypes of abuse and neglect and dissociation found smaller effect sizes for the difference in dissociation scores between neglected and non-neglected individual, compared to groups of physical, sexual and emotional abuse.

Dissociative experiences following sexual abuse mediated or predicted positive symptoms in both clinical and general population samples (Bortolon et al., 2017; O'Neil et al., 2021; Alvarez et al., 2021). Bortolon et al. (2017) demonstrated the role of early maladaptive schemas in addition to dissociation following sexual and emotional abuse, which also involve feelings of humiliation and subordination (Herman, 1998). Alvarez et al. (2021) found that

dose-response association existed for sexual, and physical abuse and shutdown dissociation, although confounders were not controlled for. The higher physical danger involved in sexual abuse and physical abuse suggest that life-threatening events and the physical pain might give rise to dissociative phenomena, as shutdown dissociation is more likely to occur in situations where escape is not viable. However, this point was contradicted by Schalinski & Teicher (2015), who demonstrated emotional neglect and physical neglect emerging as the strongest predictors of shutdown dissociation with relative consistency across timing of abuse. The authors also demonstrated sensitive periods for physical abuse, parental and peer emotional abuse and bullying in early adolescence, which however was not explored in our study. Nevertheless, different forms of DT exist together rather than in isolation (2.3 different types of DT were reported by Schalinski & Teicher , 2015), thus making it hard to isolate the effects of each trauma type. Furthermore, multiple studies looking at associations between forms of abuse and dissociative experiences had moderate ROB, such as not providing power estimations, criteria for selecting participants and controlling for confounders.

Dissociation Associated with Positive Psychotic Symptoms

The association identified in most studies between the relationship between dissociation and positive symptoms of psychosis, as well as hallucinations and delusions individually, is not a new finding, rendering support for previous meta-analyses (Longden et al., 2020; Pilton et al., 2015) which found associations of moderate strength between dissociative symptoms and positive symptoms, particularly hallucinations. Similarly, a systematic review (Renard et al., 2017) identified high presence of dissociative symptoms in patients with psychosis, as well as psychotic symptoms in patients with DD.

Dissociative experiences mediating DT and positive psychotic symptoms

The finding suggesting a partially mediating role of dissociation in the relationship between DT and positive psychotic symptoms is in line with previous reviews (Alameda et al., 2020; Bloomfield et al., 2021; Williams et al., 2018). Furthermore, dissociation mediated the relationship between DT and psychosis status, which can be accounted for by several theoretical positions. In terms of specific pathways, a mediation for hallucinations emerged consistently in general and clinical population studies. From a cognitive perspective, dual representation theory (Brewin, 2001; Brewin et al., 2010) posits that peritraumatic dissociation can interfere with memory encoding processes, whereby the encoding of decontextualised memories contribute to the intrusive re-experiencing of memories as flashbacks, or in the case of psychosis, hallucinations (Holmes et al., 2005).

The finding that trait dissociation ceased to mediate the relationship between DT and schizotypy when controlling for peri-traumatic dissociation (Blose et al., 2023) rendered support for this theoretical account, although the study risks over-controlling for some of the outcome's variance in the analysis. Peri-traumatic detachment may also be associated with dissociative amnesia (Allen et al., 1997) thus involving compartmentalisation processes (Holmes et al., 2005), as three studies found a role for dissociative amnesia in predicting positive symptoms (Khosravi et al., 2021) and for defensive dissociation in predicting hallucination proneness (Bortolon et al., 2017; Bortolon et al., 2018). Another position, supported by substantial theoretical and empirical evidence (Longden et al., 2020; Brewin et al., 2022), suggests that voices should be conceptualised as dissociative rather than psychotic in nature (Moskowitz & Corstens, 2018) as re-experiencing of de-contextualised memories has an ego-dystonic character, giving rise to their experienced as external (i.e. hallucinations). A recent study on the phenomenology of voice hearing suggested that in some people, voices constitute consciousness alterations with elements of detachment, both in terms of perception and from the experience of the self (Dorahy and Palmer, 2016 as cited in Brewin et al., 2022).

Recently, Wearne et al. (2022), proposed two different pathways: a "stress-mediated" pathway for hallucinations in PTSD, as previously described; and a learned, dissociative, usually auditory form of re-experiencing. In the latter, the experience of intrusive memories as hallucinations rather than flashbacks may depend on additional dissociative processes, in order for them to be appraised as deriving from external sources rather than internal experiences (Steel et al., 2005), which have been chronically overinvolved and reinforced when faced with trauma of stress. A proposal from a predictive coding account is that visual hallucinations are preceded by a dissociative, altered state of consciousness that is elicited from the experience of an unstable, entropic state due to lower inhibition of the default mode network. The default mode network is suggested to be involved in the experience of the self and autobiographical memories (Silverstein & Lai, 2021). This aligns with the notion that trait dissociation may contribute to weakened cognitive inhibition (Giesbrecht et al., 2008; Waters et al., 2006) that allows hallucinations to emerge.

In relation to positive symptoms, we found absorption, detachment and compartmentalization processes to be significant mediators with mixed support from different studies, making the process of untangling these relationships complex and warranting further investigation. Chronic experiences of detachment may have important implications on the processing of sensory and affective information. Multiple traumatic events (i.e. complex trauma) and the resulting heightened anticipation of impending threat may lead to a chronic "disconnect" to minimise risk from a dangerous, threatening world. The integration of sensory information (Blakemore et al., 2000), and experiences of proprioception and interoception that develop across childhood (Postmes et al., 2014) are crucial for the development of the self. As such, continuous detachment could gradually contribute to the self and other recognition deficits and disintegration of sensory information evident in schizophrenia (Parnas et al., 2011), such as during the increased confusion regarding internal versus external experiences (Allen et

al., 1994) which could contribute to attributional errors seen in psychosis. Indeed, disturbances in self-monitoring and source-monitoring have been implicated in hallucinations (Collignon et al., 2005) and thought intrusion experiences (Postmes et al., 2014). The notion of dissociation following co-aggregated trauma as a way of coping and "escaping" contributing to hallucinations is supported by (Schalinski et al., 2019) who found dissociation to mediate the relationship between DT load and hallucinations, but not presence of abuse or neglect itself.

Delusional ideation and paranoia

While it is hard to disentangle the effects on paranoia and delusions in the multiple studies that established a mediation effect for positive psychotic symptoms in general, our study found some preliminary evidence in support of dissociation playing a role in the relationship between DT and delusions and paranoia. Support emerged from 2/4 studies, with Perona Garcelan et al. (2012) and Muenzenmaier et al. (2015), the latter being a longitudinal study, not finding a mediating role for dissociation in the relationship between DT and delusions.

Delusions have been proposed to arise in the effort to explain a "subjectively anomalous internal state" (Freeman, 2016) interpreted in a delusional, "distrustful" or fear-based manner (Jaspers, 1913). A recently conceptualised model by (Treise & Perez, 2021)using the Integrative Cognitive Model (Brown & Reuber, 2016) suggests that compartmentalization phenomena may take place when threat responses to negative affect activates "rogue representations", dissociated from present experience and due to their intuitive perception as correct, are believed to be true. From a Bayesian perspectives, delusions arise by adjustments in top-down predictions to account for predictions errors. Depersonalisation is known to impact interoceptive hierarchies (Seth et al., 2012) and could

incur a sense of threat (Hunter et al., 2017) or an anomalous internal state (Freeman, 2016). Interestingly, Sun et al. (2018) only found this mediating effect when using an interview-based measure of dissociation, which points to a need to carefully assess the use of the DES among patients with delusions. In individuals with high levels of absorption, which was also found as a mediator for delusional ideation in the general population, attention is engrossed in internal or external events, such as in meaning making or worrying (Freeman et al., 2016) or in mentalization deficits, which could be implicated in psychotic experiences. However, more research is warranted, as the evidence of dissociations predicting delusions following DT is weak and inconsistent.

To our knowledge, this is the first systematic review to find a mediating role of dissociation in the relationship between DT and paranoia, which was investigated and identified in 2/2 studies. Although this preliminary finding warrants further investigation, it provides a putative explanation to the moderate associations between dissociative experiences and paranoia identified by Longden and colleagues (2020). It been suggested that disorganized attachment during childhood is likely to lead to dissociative symptoms (van Dam et al., 2014; Bucci et al., 2017). Pearce et al. (2017) established a mediating role of fearful attachment for paranoia but not voices, suggesting that different psychotic experiences may involve different affective, cognitive and neural pathways (Bloomfield et al., 2021). Overall, studies did not specify the age of experienced trauma. Trauma or threatening, dismissive or neglectful parenting at an earlier point in learning may contribute to deeper schematic beliefs and internal working models that will dictate responses to DT, including dissociation.

Psychotic Symptoms Predicting Dissociation

Psychotic symptoms were also found to predict dissociative experiences (Schafer et al., 2012). One study by Longden et al. (2016) demonstrated that the relationship between

dissociation and positive symptoms existed even after controlling for DT. This demonstrates that an independent relationship exists between dissociation and psychosis that is not accounted for by DT. A recent study by Černis et al. (2021) using network analysis found that the direction of the relationship between dissociation and hallucinations was unclear, with some indication that hallucinations also influence dissociation levels.

One potential explanation for psychosis causing dissociative symptoms is that there is a dynamic relationship between perceptual anomalies, dissociation and psychotic experiences. While "the loosening of association" described by Bleuer (1911) may relate to experiences of detachment and underlie some cases or a portion of the *development* of psychotic symptoms, the neurocognitive impact of chronic psychosis may further *feed back* into the incoherence in self-experience (Postmes et al., 2014). As such, experiences such as hallucinations and delusions, which are theorised to provide an explanation for somatosensory, affective or other anomalous internal experiences, may further increase detachment from the world/real bodily experiences and absorption with internal events. This hypothesis might be especially relevant to experience of chronic psychosis, where the neurocognitive burden of psychosis may further contribute to perceptual and cognitive incoherences. In acute phases, the experience of psychosis itself has also been considered a potentially traumatic state, and in accordance with psychoanalytic positions, the passive experience of dissociation might take place to "maintain personhood in the face of breakdown" (Diamond, 2020). Two studies (Schafer et al., 2006; Schafer et al., 2012) found psychotic symptoms to be predictive of dissociative symptoms in the acute illness phase, but not when patients were stabilised, potentially indicating that dissociation could occur as a "shutdown" response to heightened affect (Young, 1988; Cernis et al., 2020).

Negative symptoms

Dissociation did not seem to play a role in the relationship between DT and negative symptoms, and the association between dissociation and negative symptoms was less frequent in our study, with only three studies finding associations between DES, DT and negative symptoms (Degnan et al., 2022; Khosravi et al., 2021; Uyan et al., 2022). Degnan et al. did not find a mediating role for compartmentalisation, but found a mediation of dissociative experiences for the relationship between DT and negative symptoms- although the data had a poor fit, suggestive of unadjusted confounding.

Uyan (2022) found associations only between specific negative symptoms, namely social and emotional withdrawal, and emotional and physical neglect but not with DES symptoms. While these findings are inconclusive, future research would benefit from exploring dissociative experiences in relation to sensory and affective but also social cognitive experiences, which on a neurobiological level have been linked to negative symptoms (Debbané et al., 2016).

Methodological Considerations

Half of the studies in our review were rated as of high risk of bias, which was predominantly attributed to unmeasured confounding, not using validated measures and lack of power calculations. Power calculations are particularly important as smaller samples than necessary can lead to type-II errors. In addition, multiple studies conducted multiple comparisons without applying any post-hoc corrections or sensitivity analyses, increasing the risk of type-I errors. Studies mostly employed cross-sectional designs which limit the capacity for causal inferences. This is especially relevant for mediation studies, where cross-sectional data is only suggestive when temporal factors cannot be accounted for (Chmura Kraemer et al., 2008). Moreover, multiple other unmeasured variables impact the relationship between DT and psychosis (e.g. PTSD symptoms, emotion regulation, depression) which

introduces the risk of unadjusted confounding. The majority of studies failed to adequately report on several sample characteristics, such as differentiating between inpatient and outpatient samples (Nesbit et al., 2022; Dorahy et al., 2009; Varese et al., 2012), including descriptions on medication status or phase of illness, despite the different findings arising between chronic versus FEP, or acute versus stabilised patients. General population studies were likely influenced from selection bias, due to their high proportion of female and younger samples.

All studies measured DT retrospectively. This could introduce a bias to the validity and reliability of reporting, as schizophrenia spectrum disorders are associated with several neurocognitive difficulties which could impact recall. While one meta-analysis found poor agreement between retrospective and prospective measures (Baldwin et al., 2019), with both under-reporting and over-reporting taking place, the stability of retrospective reports has been supported in FEP samples (Fisher et al., 2011; Simpson et al., 2019) independent of psychotic presentation severity. Although multiple clinical studies used interviews, studies were mostly limited to observational designs, with no qualitative, experimental, neurobiological research identified, limiting inferences that can be made for both the phenomenological experiences but also the neurocognitive underpinnings of dissociative experiences and their role in psychosis following DT.

Strengths and Limitations of Present study

This study was the first study to systematically examine the role of dissociation in relation to DT in individuals with psychosis. The broad search terms and no restrictions on publication date, intent to include multiple methodologies and inclusion of individuals along the psychosis continuum paints a holistic picture of the potential different mechanisms of dissociative experiences and the literature to date. Where possible, a differentiation between

types of abuse and types of dissociative experiences took place. The pre-registration and use of two researchers for processes of assessing eligibility, extracting data and assessing risk of bias increases the replicability of this study.

Despite these strengths, the present study had a number of limitations. All included studies were conducted in English and grey literature (e.g. unpublished dissertations) were omitted, which could introduce selection bias. Studies not differentiating childhood from adult trauma, and which did not isolate psychotic symptoms were excluded, which led to the exclusion of three studies exploring psychotic experiences trans-diagnostically.

Future research

Future research would benefit from employing longitudinal designs, novel experimental procedures, such as experience sampling methods, and imaging methods to explore the temporality and causality in the relationship between dissociation, but also other putative mechanisms (e.g. threat processing) involved psychosis in relation to trauma. Considering the widespread lack of adjustment for confounding or exploring important comorbidities (e.g. PTSD symptoms) future research should comprehensively model the relationships between these experiences. In addition, the preliminary finding of the role for dissociation in mediating the relationship between DT and paranoia needs to be investigated further using validated measures.

Dissociation is proposed to be a coping mechanism which initially has a protective function but ultimately becomes maladaptive. The striking absence of qualitative and experimental research in the field highlights the gap in our knowledge of the phenomenology of different dissociative experiences. Research is needed to understand the construct of dissociation and how it manifests in the general population and in psychosis, in order to understand it's complex phenomenology. Using a developmental risk and resilience

framework, we need to further study the neurobiological underpinnings of peri-traumatic dissociation and the structural and functional consequences of long-term detachment on the brain across development by studying individuals along the psychosis continuum. While this may be already explored in clinical settings, using research to understand the dynamic development of these processes and their impact on different domains of wellbeing can shape evidence-based treatments and provide a rationale, a space and the tools for addressing these in the therapy room.

Clinical Implications

The present findings replicate past research and demonstrate an impending need to explore dissociation during assessment, formulation and treatment in individuals along the psychosis continuum and DT.

In terms of prevention, the finding that dissociation mediates positive psychosis symptoms in the general population highlights the need to screen individuals presenting with experiences of subclinical psychotic symptoms or ultra-high risk for psychosis for trauma and dissociation. Furthermore, individuals with histories of DT should be monitored for dissociative experiences that could contribute to psychotic symptoms. In early intervention contexts, screening and if relevant exploring the circumstances under which dissociative symptoms arise using formulaic based approaches and implementing appropriate strategies could be a preventative strategy for the experience of hallucinations, delusional ideation, and paranoia.

In clinical cases, we found higher levels of psychosis symptoms among individuals with DT, especially following polytraumatization. In relation to hallucinations, using grounding strategies to manage the experience of dissociation and the patients' relationship to hallucinations, addressing unprocessed memories and creating meaning around these

experiences could contribute to a reduction in symptoms in line with trauma-focused treatment models (Bloomfield et al., 2020). Our findings further demonstrate that differences arise in acute vs stable phases of illness. As such, assessment of trauma and dissociative experiences should be a dynamic process with measurement across time using a trauma-informed approach. However, formulation around the role of dissociation following trauma and in the present might be more effective once patients are stabilised.

A novel finding of this review involves the mediating role of dissociation in the relationship between DT and paranoia. Although this relationship was investigated by few studies, thus requiring further replication, it introduces an important parameter in models of paranoia and working with persecutory delusions. While this has been briefly highlighted by existing models, treatment components specifically for dissociation could explore the phenomenological experience of dissociation, the contexts (e.g. affective states or relationships in which it arises) and use techniques to compassionately support individuals in sitting with intolerable and confusing experiences.

Conclusion

The present findings demonstrated an association between DT and dissociative experiences in patients with psychosis, and point to an explanatory role of dissociation in the experience of hallucinations, but also delusional ideation and paranoia. The evidence for an association between trauma, dissociation and negative symptoms was weak and inconsistent. Importantly, the mediating role of dissociation emerged in both clinical and general population studies, with few studies looking specifically at samples with subclinical psychosis. However, most studies lacked phenomenological rigor, and there were no qualitative or experimental studies. Dissociation and psychosis following DT are thus hypothesised to co-occur and dissociation may be involved in the pathogenesis of psychosis. However, future research needs to explore the phenomenology of these experiences, to test the proposed mechanisms through

which dissociation impacts psychotic symptoms following childhood trauma using longitudinal designs or other more robust methodologies, and to investigate whether targeting dissociation in treatment improves clinical outcomes.

Chapter 3

The Experience and Role of Dissociation in Subclinical Psychosis Following Developmental Trauma: A Mixed-Methods Study

Abstract

Developmental trauma (DT), in the form of abuse and neglect in childhood and adolescence, induces vulnerability to psychosis in adulthood. Past clinical and general population studies have suggested that dissociation acts as a mediator in the relationship between DT and psychosis. However, there is a lack of research on the experience of dissociation and its mediating role in individuals with subclinical psychosis and DT. In study 1, 1,2450 individuals who reported not receiving psychiatric medication participated in an online survey. In study 2, 64 individuals participated in an experiment using the Mirror Gazing Task (MGT), with measures of pre- and post- depersonalisation. In study 1, we found higher levels of dissociation, absorption, dissociative amnesia and depersonalisation/derealisation among individuals with subclinical psychosis based on the CAPE-15, and among individuals with DT compared to no DT in both the subclinical psychosis and control groups. We identified a mediating role of dissociation and absorption in the relationship between DT and 1)frequency of positive psychotic symptoms as measured by the CAPE-15 and 2) paranoia. We also explored whether the mediating role of dissociation in the relationship between DT and positive psychotic symptoms as measured by the CAPE-15 is moderated by a diagnosis of post-traumatic stress disorder (PTSD) or complex PTSD, and found that dissociation acts as a mediator regardless of the presence of PTSD. Finally, we identified higher change in depersonalisation among participants with DT compared to no DT. Trait and state dissociation appear to be common among individuals with DT, and among individuals with subclinical psychosis, who present with high rates of DT. It is thus important to screen for dissociation among these groups. Future research is needed to understand the phenomenology and mechanisms underlying the relationship between dissociation and psychosis, and if dissociation is associated with worse prognosis and treatment response in individuals with subclinical psychosis and DT.

Keywords: Dissociation, Developmental Trauma, Subclinical Psychosis, PTSD

Introduction

There is growing evidence that developmental trauma (DT), in the form of abuse and neglect under the age of 18, is a causative risk factor in the development of psychosis. Childhood and adolescence are sensitive periods for brain, emotional and cognitive development. Consequently, traumatic experiences during this period are particularly important for the pathogenesis of psychotic experiences, as they might have significant implications on affective, neurocognitive and interpersonal processes . In addition to the higher risk of psychotic experiences and schizophrenia among individuals with histories of DT (Varese et al., 2012), longitudinal findings also demonstrate that DT is associated with more persistent psychotic symptoms (Bailey et al., 2018), recurrent hospitalisations, and lower remission rates (ten Velden Hegelstad et al., 2021; Trotta et al., 2016). Understanding the factors contributing to the experience of psychotic symptoms in individuals with DT is thus pivotal for the development of effective prevention, early intervention, and clinical management strategies.

Developmental Trauma

Adverse childhood experiences have been associated with poorer adult health and mental health outcomes (Gilbert et al., 2015; Kalmakis & Chandler, 2015; Merrick et al., 2017). In the present study, we define DT as experiences of abuse (physical, emotional, psychological) or neglect (physical or emotional) in childhood or adolescence. In a large meta-analysis of 244 studies, the estimated prevalence of sexual abuse ranged from 4%-22%, physical abuse 14%-24%, emotional abuse 11-47%, physical neglect 7%-19% and emotional neglect 15%-40% (Stoltenborgh et al., 2015). Some studies have found women to be more likely to experience DT compared to men, and in particular child sexual abuse (Barth et al., 2013; Moody et al., 2018; Pereda et al., 2009), although findings are highly influenced by a study's geographical location (Moody et al., 2018)

Psychotic Experiences

Psychosis is a potentially severe and debilitating clinical syndrome that is characterised by a suite of cognitive, emotional, and behavioural changes. These include the well-established presentation of positive psychotic symptoms (hallucinations, delusions); negative symptoms (affective flattening, social withdrawal, avolition) and disorganised thinking and behaviour (e.g. speech), as well as psychomotor disturbances. A central feature of positive psychotic symptoms are hallucinations, i.e. sensory perceptions (auditory, visual, olfactory, tactile, gustatory) happening in the absence of an external event, but phenomenologically and neurologically being experienced as if the stimulus were present. Auditory hallucinations are the most frequent form of hallucinations (Waters *et al.*, 2014), and among patients with DT are experienced as more commanding and persecutory (Dorahy et al., 2009). Delusional ideation, including persecutory delusions, whereby a person can have strong beliefs of persecution independent of available evidence, as well as paranoia, referring to exaggerated beliefs or fear of harm from others (Freeman & Garety, 2014) are another core experience in psychosis.

While historically a categorical approach has been employed to conceptualise psychosis, contemporary approaches opt for a dimensional-continuum approach, which can better capture the complex and heterogeneous experience of the disorder (Van Os et al., 2009). Importantly, these experiences depend on expected cultural or subcultural norms, as "pseudo-hallucinations and overvalued ideas" in the context of suffering may be normative in some cultural contexts, although deemed unusual or odd in others (Larøi et al., 2014). Clinical psychosis includes the "first episode of psychosis" and schizophrenia spectrum disorders, including schizophrenia and schizoaffective disorder, and other psychotic disorders, such as delusional disorder (ICD-11). Psychosis can also occur in the context of other clinical presentations, including mania, severe depression and PTSD (van Rossum et al., 2011).

Research in recent decades has shed light on the high prevalence of subclinical psychotic experiences in the general population (Van Os et al., 2009). Subclinical psychotic experiences include personality characteristics such as schizotypy and mild cognitive, perceptual, and interpersonal difficulties and behaviours with minimal impact (Esterberg & Compton, 2009), which often begin to manifest in the developmental period of adolescence. The "ultra-high risk for psychosis" (UHR) state, also known as the psychosis prodrome in those whose experiences go on to become more severe (Fusar-Poli et al., 2013), involves transient psychotic experiences indicative of higher risk of impending transition to clinical psychosis. Older and more conservative systematic reviews and meta-analyses identified a median prevalence rate of approximately 5-7.2% and a median incidence rate of approximately 2.5%-3.1% for subclinical psychotic symptoms (Linscott & Van Os, 2013; Van Os et al., 2009), whereas a recent meta-analysis among teenagers and adolescents identified a pooled prevalence of psychotic experiences at 23.31% (Fekih-Romdhane et al., 2022). While high variability across studies occurs due to different definitions, thresholds, and measurement Linscott & Van Os, 2013 , they consistently demonstrate that psychotic experiences are widely prevalent in the general population. Subclinical psychotic experiences, apart from increasing risk for clinical psychosis (Thompson et al., 2011), have substantial implications on wellbeing (Fusar-Poli et al., 2015), as they are associated with increased neurocognitive deficits, greater comorbid anxiety and depression (Fusar-Poli et al., 2014), presence of negative symptoms, such as blunted affect, asociality, avolition, anhedonia and alogia (Chan et al., 2022) and worse social functioning (Addington et al., 2008).

Developmental Trauma as a Risk Factor for Psychosis

Evidence from both longitudinal and cross-sectional research demonstrates that DT is an important risk factor for the incidence of psychosis, with 33% of cases suggested to be attributable to trauma (Kelleher et al., 2013; Varese et al., 2012). Support for the causal role of

DT in psychosis comes from the additional presence of a dose-response relationship between DT and psychotic experiences (Kelleher et al., 2013; Trauelsen et al., 2015; Varese et al., 2012). In addition to the higher risk of psychotic experiences and schizophrenia among individuals with histories of DT, longitudinal findings also demonstrate that DT is associated with more persistent psychotic symptoms (Bailey et al., 2018), recurrent hospitalisations, and lower remission rates (ten Velden Hegelstad et al., 2021; Trotta et al., 2016). DT is also associated with increased odds of experiencing substance misuse, PTSD, anxiety and depression, but also subsequent adversity and worse prognostic clinical and psychosocial outcomes in individuals with diagnosed psychosis (Aas et al., 2016; Trotta et al., 2016; Turner et al., 2020). Research using ecological momentary assessments also indicates that on an interpersonal level DT is associated with greater perception of threat, reduced social motivation and poor self-perception, and subsequently social avoidance (Steenkamp et al., 2023).

Several factors have been identified as potential mediators in the relationship between DT and psychosis (Alameda et al., 2020; Bloomfield et al., 2021). One prominent position, the theory of latent vulnerability, suggests that alterations in emotional and neurocognitive processes have an adaptive function in the context of highly threatening or depriving environments, but become maladaptive or increase risk in the long term (McCrory et al., 2017). On a psychological level, evidence exists for affective, post-traumatic and dissociative symptoms (Alameda et al., 2020; Williams et al., 2018), which a recent study found specifically mediate hallucinations (Bloomfield et al., 2021). Self- and other schemata have also been found to have a mediating role in psychotic symptoms (Alameda et al., 2020; Williams et al., 2018), with a differential role in mediating delusions (Bloomfield et al., 2021. Dissociation, which has been identified as a psychological mediator between DT and psychosis, is an experience that has been seen as central to psychosis for over a century and was also recently reviewed in a

comprehensive meta-analysis (Longden et al., 2020) which established a robust association of dissociation to positive psychotic symptoms.

Dissociation as a Trauma Induced Mediator for Psychotic Experience

Historical conceptualisations of dissociation viewed it as "splitting of the different psychic functions" and associated with "a loss of unity" in severe cases of schizophrenia (Bleuler, 1911/1950, p. 8-9, as cited in Moskowitz & Heim, 2018). Dissociation as central to psychosis was also described by perspectives which suggested a permeable "ego boundary" (Koehler, 1979), the "loosening" of the inner and outer reality (Allen et al., 1997), and Schneiderian "passivity phenomena" (e.g. thought insertion, sense of external control) as aspects of schizophrenia, all of which involve a loss of identity and loss of agency today characterised more closely as dissociative experiences. Contemporary accounts of dissociation suggest that dissociative states lie on a continuum, with healthy functioning and dissociative experiences such as absorption and transient states of memory loss or gaps in awareness (Ross et al., 1990) followed by depersonalisation and derealisation (described below), and states such as dissociative amnesia and dissociative identity disorder on the other end (Bernstein, E. M. & Putnam, 1986; Bernstein, I. H. et al., 2001).

From a cognitive perspective, the bipartite model of dissociation describes the states of "detachment" and "compartmentalisation" (Holmes et al., 2005). Detachment refers to the state of disconnection from one's experience: bodily, of the self or the world including depersonalisation, derealisation and other altered states of consciousness (Holmes et al., 2005; Sierra & Berrios, 1998; Brown, 2002). Depersonalisation has been described as a subjective state of separation from the experience of the body and the self (Holmes et al., 2005) and occurs as a deficit in self-awareness experienced at a fundamental, pre-verbal level (Sierra & David, 2011). This sense of disembodiment may be characterised by emotional numbing, an absence of ownership or presence in one's body or a sense of loss of agency over one's actions

(American Psychiatric Association, 2013), which in rare cases manifests as out of body or hallucinatory experiences (Sierra & David, 2011). Derealisation on the other hand has been used to describe a subjective state of detachment from external reality, where the world is experienced as dream-like, strange, unreal, foggy/behind a glass or themselves as not existing anymore. Depersonalisation and derealisation have been described as failures of multisensory integrations (Seth et al., 2012b; Sierra & David, 2011).

Compartmentalization refers to a loss of deliberate control over certain areas of functioning, such as in the context of dissociative amnesia. Dissociative amnesia involves difficulties in the episodic recalling of aspects of a traumatic event, and often involves severe impairments in one's identity or multiple memory gaps impacting narratives of the self (Dell, 2013; Huntjens et al., 2013). Dissociative amnesia is considered a failure of memory retrieval, whereas deficits in memory associated with experiences of detachment (e.g. due to peritraumatic dissociation) are often identified as deficits in information encoding (Allen et al., 1999; Holmes et al., 2005)

The mediating role of dissociation in the relationship between DT and psychosis has been supported by multiple studies in both clinical and general population samples. Previous studies have mostly employed aggregate measures of positive psychotic symptoms, with some differentiating between hallucinations/perceptual abnormalities, delusions, or paranoia (Berry et al., 2018; Bortolon & Raffard, 2018; Cole et al., 2016; Gibson et al., 2019; Mertens et al., 2021; Varese, F. et al., 2012). Robust support from cross-sectional studies exists for the mediating role of dissociation in the relationship between DT and experience of positive psychotic symptoms in general and hallucinations specifically (Bloomfield et al., 2021) Formatting.... Limited early evidence supports a putative mediating role for dissociation in the relationship between DT and paranoia.

Different theoretical models have been put forward to explain the role of dissociation in the experience of hallucinations. The dual representation theory, a neurocognitive model of

PTSD, suggests that failures in encoding during a traumatic event, involving disrupted hippocampal processes and limited contextual representations leads to the formation of autobiographical memories with greater sensory and emotional content, represented in lower-level sensory experiences which are not contextually bound (Brewin, 2001; Brewin et al., 2010; Layton & Krikorian, 2002) Peri-traumatic detachment, which may arise as an attempt to "cope" or "escape" from unbearable threat, further interferes with information processing (Brewin & Holmes, 2003) with decontextualised memories arising as involuntary intrusions following internal or external triggers.

Some authors (Morrison et al., 2003) have pointed to the phenomenological overlap between hallucinations and traumatic intrusions. Specifically, contrary to PTSD, involuntary sensory intrusions in psychosis have been conceptualised as becoming dissociated and experienced or attributed to external agents, manifesting in the form of hallucinations (Moskowitz & Corstens, 2018). A recent study on the multiplicity of voice hearing experiences highlighted that on some occasions, voice hearing may constitute trauma induced experiences which are ego-dystonic and involve perceptual detachment (Brewin et al., 2022). Another account suggests the role of dissociation as a coping strategy in the face of DT (Hardy et al., 2017). Dissociation especially arises in situations of complex trauma, where multiple forms of trauma are experienced simultaneously, and involve interpersonally threatening situations in the context of abuse or the inability to meet certain developmental needs in the context of neglect. Specifically, a dose-response association has been observed between dissociation and experiences of abuse (Schalinski et al., 2019; Schimmenti, 2018).

A history of DT is also associated with higher risk for insecure attachment, particularly disorganised attachment (van Dam et al., 2014; Bucci et al., 2017). A secure attachment relationship fosters the development of mentalization, the ability to interpret the actions of the self and others based on intentional mental state interpretations (Fonagy et al., 2018).

Disorganized attachment and lower mentalizing ability are risk factors for dissociative symptoms (Ensink et al., 2017; Huang et al., 2020), which are suggested to arise as a way to minimize anxiety at the confusing experience of an attachment figure that also causes a sense of threat or distress. Over time, experiences of trauma may trigger the activation of the disorganized attachment system and an inability to respond to danger, contributing to the disintegration of consciousness, memory and the self (Liotti, 2004). In turn, dissociative experiences such as depersonalisation disrupt interoceptive (Seth et al., 2012) and threat processing systems (Hunter, Phillips, Chalder, Sierra & David, 2023), contributing to the gradual fragmentation of the self, ranging from a degree of depersonalisation to more severe fragmentation of parts of the self as external agents. Furthermore, dissociative experiences, particularly in interpersonal contexts, could comprise "anomalous internal states" (Freeman, 2016) that give rise to delusional ideation or paranoia. While a paucity of theoretical explanations supports the role of dissociation in the relationship with paranoia, evidence is preliminary and has not used validated questionnaires to measure paranoia (Pearce et al., 2017; Mertens et al., 2021).

Mirror Gazing Task: An Experimental Measure of Dissociation

Studies exploring dissociative experiences in individuals with psychosis following DT have mostly been cross-sectional and observational in nature. On an experimental level, a novel tool has been used in the past decade to elicit dissociative states, known as the "Mirror Gazing Task (MGT)" (Caputo et al., 2012). This experiment involves one's self-gazing in a mirror under conditions of low illumination (Caputo et al., 2012) resulting in anomalies of subjective experience (ASE), in the form of strange-face illusions in the mirror. This includes perceptual changes (e.g. in lightness, colour), marked deformation of their own face, changes in colour,

the apparition of faces of strangers, faces of relatives or dead individuals, but also archetypical faces and monsters (Caputo et al., 2012; Fonseca-Pedrero et al., 2015). The effects of self-face mirror gazing have also been replicated in dyadic eye-to-eye gazing (Caputo, 2019).The perceived apparition of these faces is usually studied using psychophysical measures (e.g. recordings of the frequency and duration of distortions) as well as phenomenological descriptions.

In patients with schizophrenia, (Caputo et al., 2012) found greater frequency and intensity of apparitions of strange faces, as well as the experience of apparitions as "more real", indicating high self-agency misattribution. (Fonseca-Pedrero et al., 2015) studied a nonclinical sample, and established an association between the disorganisation dimension of schizotypy and the frequency apparitions, and individuals with more depersonalisation like phenomena had higher positive and disorganised schizotypy scores. Past studies have documented increases in dissociative experiences during mirror (Brewin et al., 2013) and eye-to-eye gazing (Caputo, 2019). Anomalous self-experiences have been reported as a risk factor for psychosis (Haug et al., 2015). Recently, Caputo (2023) suggested that the experience of strange faces includes varying levels of misrepresentation of the self, driven by dissociative processes such as derealisation and depersonalisation. Derealisation, through a disruption in in the integration of spatiotemporal representations, is involved in the deformations and higher intensity of strangeness in apparitions. Depersonalisation on the other hand was more closely associated with illusions of others, such as "lifeless" faces, relatives, and immateriality of the strange faces- indicating disruptions in the integration of a representation of the face with the representation of one's body, also as existing to oneself (Brugger & Lenggenhager, 2014; Caputo, 2023). While this experimental protocol has been used among participants with various forms of psychopathology (Caputo et al., 2021; Demartini et al., 2021) as a way of

inducing dissociative states, it has never been explored in participants with DT, in spite of the increased likelihood to experience detachment.

Aims and Hypotheses

This cross-sectional study aimed to investigate dissociation in the experience of psychosis following DT using a mixed-methods approach in a community sample of participants with and without subclinical psychotic experiences.

Study 1

In study 1, we first aimed to compare whether there were differences in the severity of total and different types of dissociative experiences as measured by the Dissociative Experiences Scale (DES), between participants with DT, as measured by the Childhood Trauma Questionnaire (CTQ) and participants with subclinical psychotic symptoms, operationalised as meeting threshold for ultra high-risk (UHR) for psychosis based on the Community Assessment of Psychic Experiences(CAPE)-15. It was hypothesised that DT would be associated with higher rates of dissociation among participants with and without subclinical psychotic symptoms.

Consistent with past studies on the role of dissociation as part of the traumatogenic psychosis pathway to psychotic experiences (Bloomfield et al., 2021), we also aimed to explore the mediating role of dissociative experiences for positive psychotic symptom frequency. We aimed to replicate this finding using a measure of positive psychotic symptoms (CAPE-15) and extend it by including a validated measure of paranoia for the first time. It was hypothesised that dissociation will mediate the relationship between 1) DT and positive psychotic symptom frequency and 2) DT and paranoia. In light of the notion that positive psychotic symptoms (e.g. hallucinations) arise as dissociated and decontextualised memories and may be part of a post-

traumatic stress pathway, we aimed to explore whether the mediating role of dissociation occurs specifically in the presence of PTSD or CPTSD as measured by the ITQ.

Study 2

As previous studies have been limited to trait measures of dissociation, in study 2 we used a novel experimental paradigm, the MGT, to explore the influence of DT on anomalies of subjective experience and on experimentally induced depersonalisation in participants with and without DT experiences. Understanding the extent to which DT contributes to illusory self-experiences, operationalised as illusions occurring during self-mirror-gazing, could further our understanding of the processes involved in the experience of psychosis among participants with DT. We hypothesised that individuals with DT would have a higher tendency of experiencing strange face illusions, as measured by the frequency, duration, and cumulative duration of apparitions. Further, we aimed to explore whether experimentally induced depersonalisation would differ between individuals with and without DT, by comparing pre- and post-MGT differences on the Cambridge Depersonalisation Scale between groups. We hypothesised that individuals with DT would experience a higher level of pre- and post-change of depersonalisation.

Method

This study represents part of the Investigating Mechanisms of Psychosis Associated with Childhood Trauma (IMPACT) study. Ethical approval was gained from the UCL Research Ethics Committee (reference 17495/001) (See Appendix E) and the Health Research Authority (Appendix F). Ethical approval was also received from the Royal Holloway Ethics committee (Appendix G). As a doctoral member of the Translational Psychiatry Research Group, I was involved in applying for ethical approval, online recruitment, data management and data collection for both study 1 and study 2.

Service User Representation

Members of the wider research team have personal experience of trauma and psychotic experiences. Additional service user consultation took place through the UCL Division of Psychiatry Service User Forum (SURF).

Participants

Study 1

Participants in the IMPACT study were recruited through paid social media advertisements (see Appendix H) on social media platforms, such as Facebook, Twitter, and Instagram . Inclusion criteria to the study included being 18-40 years old, residing in the UK and being fluent in English. Exclusion criteria included participants currently receiving treatment from a mental health provider, medication for their mental health, and present diagnosis of a psychiatric disorder.

Following completion of the online study, participants were allocated to 4 groups for the purpose of between-group analyses . This included 1) individuals with no psychotic symptoms with (DT+) or 2) without a history of developmental trauma (DT-), and 3) participants with subclinical psychotic symptoms with (SDT+) or 4) without experiences of developmental trauma (SDT-). Participants were assigned to the DT- (no developmental trauma groups) if they scored none to mild on all the childhood trauma questionnaire subscales and did not report trauma before the age of 18. Participants were allocated to the DT+ groups when they scored 'moderate' on a minimum of two CTQ subscales , or 'severe' on one or more CTQ subscales, using the cut-off scores provided by Bernstein and Fink (1998). In line with the IMPACT study protocol, participants with moderate DT in only one domain were excluded from between

group analysis and further study parts, to minimise the risk of over-reporting of DT observed in previous online studies and to maximize the effect of the comparison.

Participants were assigned to the "S" groups of subclinical psychotic symptoms based on their weighted scores on the CAPE-15. A cut-off score of 1.47 was used for CAPE-15 score of frequency and distress, which has been used as a cut-off for identifying UHR for psychosis (Bukenaite et al., 2017). Participants who had above 1.47 on only one of the two CAPE-15 subscales were excluded from between-groups analyses.

Study 2

Participants were invited to later parts of the IMPACT study via email (See Appendix I). Only a small percentage of invited participants completed study 2, due to disruptions in face-to-face recruitment during the Covid-19 pandemic, challenges with travel to London and lack of interest in this next part of the study. A small number of study 1 participants were excluded because they initiated medication subsequent to their online participation. One participant was excluded from the study because of a change in hardware that resulted into data loss during the experiment.

Procedure

Study 1

All participants were provided with information about the questionnaires and signed informed consent (see Appendix J) through the online platform Qualtrics. If they met inclusion criteria, participants completed battery of clinical questionnaires on the online experiments platform Gorilla.sc (Anwyl-Irvine *et al.*, 2020). Considering the sensitive clinical and sociodemographic information about a person's health and wellbeing addressed by this study, all data remained strictly confidential and stored in accordance with the Data Protection Act

using autogenerated alphanumeric codes. Participant information was anonymously recorded on a secure password protected computerised database accessible only by research team staff and only on UCL computers. Consent forms were securely stored. All analyses took place on UCL computers.

Study 2

Study 2 took place in the Wellcome Trust Centre for Human Neuroimaging. Participants completed the MGT as part of two experiments on the day (along another experiment using fMRI, reported elsewhere). Participants provided separate informed consent for this part of the study (Appendix I). Participants completed the Cambridge Depersonalisation Scale-State Version (CDS-S) prior to the MGT.

The MGT took place in a small dimly lit darkened room, where participants sat 40cm away from a large mirror with a white wall and door behind them. The mirror was mounted on a desk in front of participants (see figure 2, adapted by Caputo, 2012). A keyboard was placed in front of participants. The room was lit by a spotlight placed 1.2m behind the subjects pointing in the opposite direction and pointing towards the floor with an approximate 5cm distance between the lamp and floor. The outcome was indirect lighting over the whole room, with participant's whole features visible.

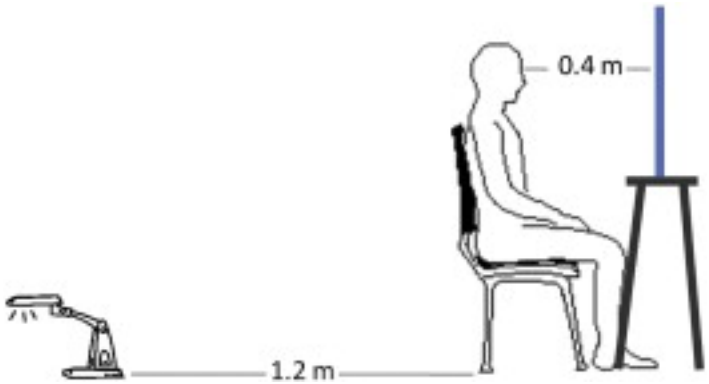

Figure 2. Mirror Gazing Task set-up.

The experimenter instructed participants to press the space on the keyboard in front of them in the experience of an illusion with the following instructions: "*Your task is look at your face in the mirror. You should keep staring into your eyes. The task will last 10 minutes. During the 10 minutes while you are looking at your face in the mirror and staring at your eyes you may or may not notice changes in your face. If you notice a change then press the button and hold it down for as long as the change lasts. If you do not notice any changes then do not press the button".*

Participants were asked if they required any clarification. Considering the higher sensitivity and needs of this group, it was emphasised to participants that if they experienced discomfort and did not wish to continue the experiment they could notify the researcher who was waiting outside the room.

Both quantitative and qualitative responses to the MGT were recorded. Specifically, event-related responses were recorded using Matlab version 9, when participants pressed the button during their apparitional experiences. We recorded timing and duration of apparitions and extracted information on the first apparition, frequency of apparitions, duration of apparitions and cumulative duration of apparitions. Following the MGT task, participants were

asked to re-complete the CDS-S and a series of qualitative and Likert scale questions. Specifically, following previous versions of this experiment (Caputo et al., 2012) participants were asked 5 questions: 'What did you see in the mirror?', 'Did it have a particular colour?', 'Did it move in a particular way?', 'What emotions did it provoke?', and 'Did you see another person in the mirror?'. Questions were manually transcribed. Subsequently, participants responded using 5-point Likert scales of 'never' (=1), to 'very often' (=5) on the following questions: 'How often did you notice anything strange?', 'How often did it influence you emotionally?', 'How often did it seem real?'

Measurements

Study 1

Sociodemographic variables such as age, sex, ethnicity, and family affluence (socioeconomic status) using the Family Affluence Scale. In the Family Affluence Scale (FAS; Currie et al., 1997), participants are required to respond to 4 items assessing whether their family owns a car or computer, whether they had their own bedroom, and number of holidays in the past year. Scores are calculated to give a sum of overall affluence.

Childhood Trauma Questionnaire (CTQ)

The CTQ (Bernstein et al. 2003) (see Appendix K) is a 28-item self-report measurement used to retrospectively captures experiences of DT during childhood or adolescence. The CTQ measures emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect with 5 questions each. A minimisation / denial scale of 3 items is used to measure potential underreporting of maltreatment. Responses are measured on a 5-point Likert scale (1 = never true to 5 = very often true). Scores range from 5 to 25, representing none to low, low to moderate, moderate to severe, and severe to extreme trauma exposure. The cut-off scores used to establish moderate to severe abuse differs between subscales based on a

study by Bernstein & Fink, 1998: 13/16 (moderate/severe) for emotional abuse, 10/13 (moderate/severe) for physical Abuse; 8/13 for sexual Abuse; 15/18 for emotional neglect; and 10/13 for physical neglect. The CTQ has good psychometric properties in past studies (Bernstein et al., 1994; Kim et al., 2013).

Community Assessment of Psychic Experiences (CAPE)

The CAPE (Stefanis et al., 2002)(Appendix L) is a self-report questionnaire measuring the frequency and distress of subclinical psychotic experiences. The 42 items cover three symptom dimensions: positive, negative symptoms and depressive, which has been supported by a plethora of factor analytic studies (Mark & Toulopoulou, 2016). Each individual item (see appendix/supplement) is scored on 4-point Likert scale of "never" to "always" referring to lifelong experiences. Meta-analytic support has been further provided for the tridimensional structure of positive psychotic symptoms, consisting of "Bizarre experiences", "Delusional ideations", and "Perceptual anomalies" (Mark & Toulopoulou, 2016). In the present study, the 15 items comprising the CAPE-15 were employed, due to being factorially robust, having good psychometric properties and its clinical utility (Capra et al., 2013; Sun et al., 2020). As described above, the CAPE-15 was used to assign participants to the subclinical psychosis group, equivalent to meeting criteria for UHR for psychosis, based on scoring > 1.47 on the CAPE-15 (Bukenaite et al., 2017).

Paranoia Scale

The general paranoia scale (Fenigstein & Vanable, 1992) (Appendix M) consists of 20 items using Likert scale responses from 1 (never) to 5 (always). Total scores range between 20 and 100, with higher scores indicative of more frequent paranoid ideation. It has been reported to have good internal consistency (Combs et al., 2002; Fenigstein & Vanable, 1992) and

convergent validity (Green et al., 2008), and has been used in both clinical (Pinkham et al., 2012) and non-clinical samples (Combs & Penn, 2004)

Dissociative Experiences Scale (DES-II)

The DES-II (Carlson & Putnam, 1993)(Appendix N) is 28-item self-report screening questionnaire assessing the frequency of experiences of dissociation in daily life. The DES-II comprises of the factors of dissociative absorption, depersonalisation/derealisation and dissociative amnesia. It is one of the most widely used measures to capture dissociation in clinical (Lyssenko et al., 2018) and non-clinical settings (Stockdale et al., 2002). Responses range from 0% (never) to 100% (always) with 10% increments. Total score is the average of DES answers.

International Trauma Questionnaire

The International Trauma Questionnaire (ITQ) (Cloitre et al., 2018) (Appendix O) is a brief self-report measure reflecting core features of PTSD and CPTSD based on the ICD-11. A diagnosis of PTSD requires one of two symptoms from the symptom clusters of (1) re-experiencing in the here and now, (2) avoidance, and (3) sense of current threat. A diagnosis of CPTSD requires one of two symptoms from each of the three Disturbances in Self-Organization (DSO) clusters: (1) affective dysregulation, (2) negative self-concept, and (3) disturbances in relationships. Functional impairment must be endorsed for PTSD symptoms, and also DSO for CPTSD symptoms. The ITQ has good psychometric properties (Redican et al., 2021) with good sensitivity to clinical change (Cloitre et al., 2021).

Study 2

Cambridge Depersonalisation Questionnaire (State Version)

Depersonalisation was measured using an adapted version of the Cambridge Depersonalisation Scale (CDS-S) (Sierra & Berrios, 2000)(Appendix P). The CDS is a self-

report scale exploring the duration and frequency of depersonalisation in the past 6 months (Sierra & Berrios, 2000). However, as in the present study we explored pre- and post- changes in depersonalisation, we chose a previously adapted "state" version of the CDS (CDSS) (Medford et al., 2016) comprising of 22 items enquiring on depersonalisation through present tense statements (e.g., *Things around me are now looking 'flat' or 'lifeless', as if I were looking at a picture*). Each item is rated on a visual sliding analogue scale of 0 to 100, and the maximum score possible is 2200.

Analysis Plan

Study 1

Visually inspecting the data and z scores for skewness and kurtosis indicated a violation of normality, and thus variables included in univariate analyses were transformed using square root transformations to approximate a more normal distribution. One-way analyses of variance were conducted to explore differences in DT, CAPE-15 positive and paranoia scores between groups based on their trauma and psychosis status (DT-, DT+, SDT-, SDT+) and in DES scores in line with the first hypothesis, that DT would be associated with higher DES scores among participants with and without subclinical psychosis symptoms. Analyses were performed by removing extreme values to ensure that they did not bias findings, however as their influence was minimal and given the large size of our sample these were ultimately included in the analysis.

Subsequently, in order to test the hypothesis that dissociation has a role in the pathway from DT to psychosis, mediation analyses were conducted. Primarily, correlational analyses were conducted between clinical variables. Subsequently, in individual mediation models, we tested:

1) the independent mediation effects of untransformed DES total score between DT and CAPE-15 frequency and paranoia. The Hayes PROCESS macro for SPSS (Hayes, 2018) was employed and mediation effects were calculated using bootstrapping (5000 samples). Specifically, in each model regression paths were modelled for 1) *c*: exposure (DT) and outcome (psychotic experiences); 2) *a:* exposure (DT) and the mediator (DES total score); 3) *b:* the mediator (DES total score/subscale) and outcome (psychotic experiences), controlling for exposure. Indirect paths (*a***b*) were calculated, and mediation was considered significant if 0 was not within the 95% bootstrap confidence interval.
2) Two exploratory separate parallel mediation models were run for the three untransformed DES subscale scores and subscales between DT and the outcomes CAPE-15 frequency and paranoia.
3) To explore the role of CPTSD in accounting for the mediating role of dissociation in the relationship between DT and positive psychotic symptoms, we conducted two moderated mediations with PTSD or CPTSD (both binary variables) as moderators in addition to the initial mediation model used. As above, bootstrapping and 95% confidence effects were used to calculate mediation and moderation effects. In order to see whether the indirect effect of DT on positive psychotic symptoms as measured by the CAPE-15 through dissociation is linearly related to PTSD and CPTSD, the index of moderated mediation was calculated.

Covariates

Independent samples *t*-tests indicated a significant effect of socioeconomic status, and sex on CAPE subscales total CTQ score, aggregate DES scores, DES depersonalisation/derealisation and absorption subscales, and paranoia, all $p < .05$. An effect for socioeconomic status was not observed for dissociative amnesia, $p <$. Small significant

negative correlations emerged between age and total CTQ score, DES total score and all subscales, and CAPE positive and negative frequency, all p <.001. Consequently, these variables were included in the models as covariates to minimise confounding effects.

Study 2

The mean onset of the first apparition (first time pressed), the mean frequency of apparitions, averaged per minute; the mean duration of apparitions and the cumulative duration of apparitions averaged per minute were calculated. The content of *p*henomenological accounts of illusions were qualitatively analysed and classified into strange-face categories using the following typology: deformed traits, change in expression, appearing younger/older, perceptual changes in light/colour, other human face and other non-human face. Emotional reactions were recorded.

Furthermore, independent samples *t*-tests with DT as an IV were run to test the effect of DT on 1) mean duration, 2) frequency of illusions and 3)cumulative duration in line with past studies (Caputo et al., 2012). Descriptive statistics were used to compare responses on single-item questions. Finally, a repeated measures between factors analysis of variance for the DV of depersonalisation was conducted, where DT status was addressed as a between levels IV (DT-/DT+) and depersonalisation (pre-post) was addressed as a within levels IV.

Sample size and Power Calculation

Study 1

Effect sizes from clinical studies comparing differences in dissociative experiences between participants with and without DT ranged between Cohen's *d*=.50-1.26 (Alvarez et al., 2015; Dorahy et al., 2009; Goff et al., 1990; Offen et al., 2003). A meta-analysis (Vonderlin et al., 2018) also estimated significant differences in DES scores of a moderate effect size between participants with and without DT (*d*=.53). We were unable to identify

studies which highlight differences in dissociative scores between participants with and without subclinical psychotic experiences. One study found a significant difference in DES total score between controls and FEP patients, with a moderate effect size, d=0.6 (Braehler et al., 2013).

The same study found significant Group x trauma interactions but did not report effect sizes. Using the aforementioned information, we computed *a priori* power calculations using G*Power. Given the moderate effect sizes identified by previous studies, we calculated a sample size of at least 254 participants required for a medium effect size F, a conservative α=.01 and a desired power of .80. As this study forms part of a larger study, the required sample size was met.

Due to no previous general population studies looking at positive psychotic symptoms in general and variability in the effects reported by previous clinical studies (small to medium) we used a conservative approach at estimating required sample size for mediation based on a desired power of .80, in line with the recommended sample sizes for bootstrapped analysis by Matthew and Mackinnon, 2007.

Study 2

We computed *a priori* power calculations using G*Power. Given the large pre-post differences observed in previous studies of the MGT ((Brewin et al., 2013)), we set an estimated effect size Cohen's d=.60, a minimum sample size of 24 per group were required to achieve 80% power.

Results

Study 1

Demographics and Trauma characteristics

A total of 1,245 participants completed the study. Sociodemographic information is presented in table 6. No significant differences were observed in sex between groups, although the SDT- group had the lowest proportion of females. A Kruskal-Wallis test indicated significant differences between groups in family affluence, $\chi^2(3) = 29.731$, $p<.001$, with the DT+ and SDT+ groups presenting with lower FAS. A one-way ANOVA indicated differences between groups in age, ($F_{3,889}=572.34$, $p=.002$, $\eta^2=.016$). A significant difference was observed between the DT+ and SDT+ group in age. Small difference emerged in the ethnic breakdown of groups (Appendix Q). For the 350 participants excluded from between groups analysis, 248 participants were excluded because they did not meet full criteria for subclinical psychosis (predominantly low frequency but high distress), and 124 had only one childhood trauma rated as moderate. 34 of the above did not meet either criterion.

Table 6.
Sociodemographic Characteristics of Participants

Sociodemographic Variable	*n*	%
Sex (% female)	868	69.70
Age [Mean (SD)]	28.78 (6.30)	
Ethnicity (%)		
White British/Irish	762	61.2%
Black/Mixed Black	32	2.60%
Asian/ Mixed Asian	115	9.20%
Other(White/Mixed/Asian/Black)	336	27.00%
Socioeconomic status (FAS) (median)	5	5

A one-way ANOVA demonstrated an effect for group on CTQ scores, $F_{3,889}$= 558.010, p<.001, η^2= .653 with the SDT+ group having a significantly higher CTQ total scores than the DT+ group (see table 7). An exploratory chi-square test of independence demonstrated that significant differences in the multiplicity of trauma between the DT+ and SDT+ group, $\chi^2_{(6,662)}$=28.210, p <.001. Specifically, in the SDT+ group, 74.60% (n =314) of individuals endorsed having experienced at least 3 traumas experienced as moderate, 47.61% (n=200) at least 4 traumas experienced as moderate and 20.63% (n =89) at least 5 traumas experienced as moderate. In comparison, in the DT+ group, 49.08% (n=94) endorsed having experienced 3 traumas as moderate, 20.85% (n =40.24) at least 4 traumas experienced as moderate and 11.66% (n =22) experienced 5 traumas experienced as moderate.

Table 7

Unstandardised Means and Standard Deviations of Childhood Trauma, Dissociation, CAPE-15 and Paranoia Scores Between Groups.

Variable	*DT- (n*=212)	*DT+ (n*=193)	*SDT- (n*=67)	*SDT+ (n*=421)	Other (n=350)
CTQ	31.53 (4.83)	60.26 (14.85)	36.15 (4.99)	68.47 (15.78)	46.94 (15.59)
DES total	15.36 (8.29)	19.56 (9.27)	30.19 (15.03)	38.80 (17.24)	22.48 (12.11)
Absorption	12.65 (11.16)	17.52 (13.38)	32.27 (17.07)	42.85 (20.67)	22.03 (15.77)
Depersonalisation/ derealisation	2.10 (5.00)	4.29 (8.28)	13.20 (17.30)	23.18 (21.08)	6.33 (10.35)
Amnesia	3.08 (5.85)	4.45 (7.19)	13.10 (15.26)	18.47 (17.27)	6.98 (9.07)
CAPE-15	17.91 (1.95)	18.68 (2.32)	25.87 (3.64)	28.73 (5.31)	21.32 (3.31)
Paranoia	33.33 (9.94)	42.55 (12.41)	52.19 (14.73)	64.76 (14.23)	46.59 (13.22)

Note. DT-= Without developmental trauma, DT+= With Developmental Trauma, SDT-= With Subclinical Psychosis and no Developmental Trauma, SDT+= With Subclinical Psychosis and

Developmental Trauma, CAPE-15=Community Assessment of Psychic Experiences (Measure of Positive Psychotic Symptoms)

Differences in Dissociation Scores

In order to test the first hypothesis, that DT and psychotic experiences would be associated with higher rates of dissociation, a one-way ANOVA indicated that there was a significant effect of group on DES total scores, $F_{3,889}$=181.66 p<.001, η^2= .380. A significant effect of group was also observed for depersonalisation/derealisation, $F_{3,889}$= 179.13, p<.001, η^2=.377 , dissociative absorption, $F_{3,889}$= 133.20, p <.001, η^2=.413, and for dissociative amnesia, $F_{3,889}$= 139.85, p<001, η^2=.321. Post-hoc pairwise comparisons using Games–Howell tests, as equal variances were not assumed, demonstrated a significant crescent increase between DT-, DT+, SDT- and SDT+ groups among total dissociation and all subtypes (all p <.001 apart from the difference in DES amnesia between SDT- and SDT+, p=.021). Frequency of positive psychotic symptoms $F_{3,889}$= 575.63, p<.001 and paranoia $F_{3,889}$= 315.36, p<.001 differed between groups with a significant sequential increase between the DT-,DT+, DT- and SDT+ group (all p<.001).

Mediation of DT on Positive Symptom Frequency Through Dissociation

In order to test the second hypothesis, that the relationship between DT and positive psychosis symptoms (CAPE-15) would be mediated by dissociation, we first conducted Pearson correlation analyses which are presented in the Table 8. There was a moderate correlation between DT and DES total scores, DES subscales, and a large correlation between DT and paranoia, all p<.001. There was a large correlation DES total scores, DES subscales and frequency of positive psychotic symptoms and paranoia, all p<.001.

Table 8

Pearson Correlations Between DT, Dissociation Total Score and Subtypes, Positive Psychotic Symptom Frequency and Paranoia Scores

	CTQ	Total DES	DES DD	DES AD	DES AI	Paranoia	Positive Psychotic symptoms
CTQ	-						
Total DES	.42***						
DES DD	.40***	.77***	-				
DES AD	.35***	.81***	.69***	-			
DES AI	.42***	.87***	.72***	.74***	-		
Paranoia	.57***	.58***	.54***	.53***	.60***	-	
Positive Psychotic symptoms	.46***	.62***	.66***	.60***	.62***	.70***	-

Note. ****p<.001, one-tailed.* CTQ= Childhood Trauma Questionnaire, DES= Dissociative Experiences Scale, DD= Depersonalisation/Derealisation, AD=Amnesia, AI=Absorption and Imaginative Involvement

The partial mediation of the association between DT and frequency of positive psychotic symptoms by total dissociation is presented in Figure 3. The indirect effect through dissociation was significant, $\beta = .06$,95%*CI*=.05;.08, indicating a partial mediating role for dissociation in the relationship between DT and positive psychotic symptom frequency.

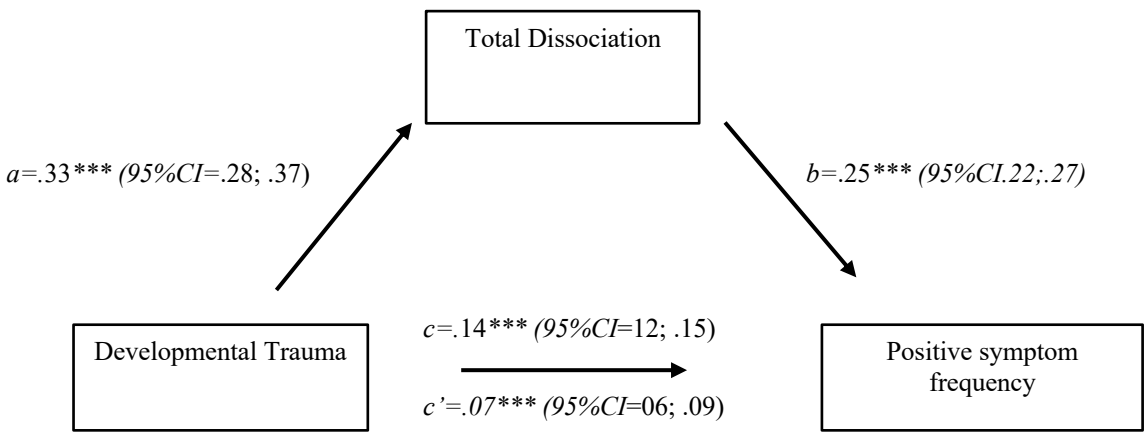

Figure 3. Partial mediation of DT on positive symptom frequency through dissociation. CI = confidence interval. A= effect of Developmental Trauma on Dissociation scores; b = effect of Dissociation on Positive Psychotic Symptom Frequency c' = direct effect; c= total effect.***=p<.001.

Mediation of DT on paranoia Through Dissociation

We conducted a mediation analysis of the association between DT and frequency of paranoia by total dissociation (Figure 4) to test the third hypothesis. As the indirect effect is significant, β'=.130***, *(*95%*CI*=.124; .174), there is evidence of a partial mediation of dissociation in the relationship between DT and paranoia.

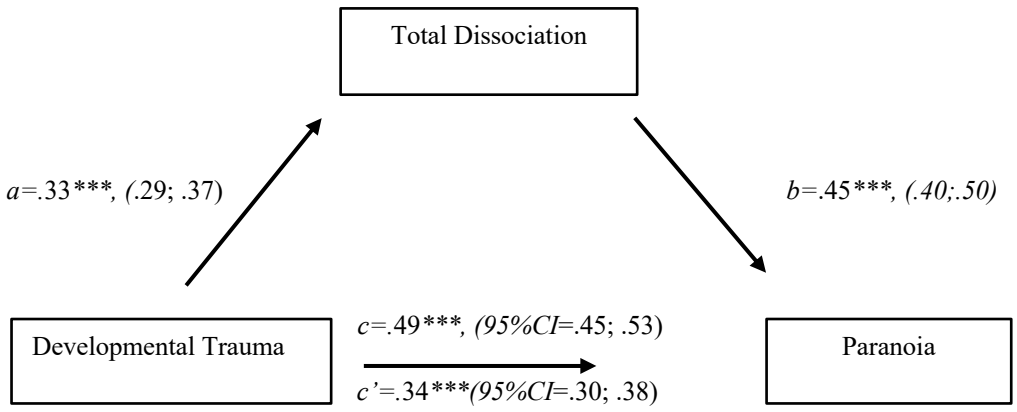

Figure 4. Partial mediation of DT on paranoia through dissociation as measured by total DES. CI = confidence interval. A= effect of Developmental Trauma on Dissociation scores; b = effect of Dissociation on Positive Psychotic Symptom Frequency c' = direct effect; c= total effect.***=p<.001.

The Role of Dissociative Subtypes

A separate parallel mediation model was run with each of the three DES subscales, to check the individual contribution of each dissociation subtype (See Table 9). Results indicated a significant indirect effect for dissociative absorption for both positive symptom scores β =.03, 95% *CI*=.02;.04 and paranoia, β =.13, 95% *CI*= .10;.16. Results indicated a significant indirect effect for depersonalisation/derealisation, in mediating the relationship between DT and positive psychotic symptom frequency β=*.035*, 95% *CI*= .03;.05, and paranoia β=*.03*, 95% *CI*= .01;.05. After applying a Bonferroni correction to account for multiple comparisons the effect of depersonalisation/derealisation for paranoia ceased to be significant. There was no role for dissociative amnesia in either model. Specifically, in both models DT predicted dissociative amnesia (path *a*), dissociative amnesia marginally predicted CAPE-15 scores, *p*=.05, but dissociative amnesia did not predict paranoia, *p*=.639 (path *b*).

Table 9

Summary of Multiple Mediation Model for CAPE-15 and Paranoia

Dependent Variable	Mediator	a	b	c'	a*b	95% CI	c
CAPE-15	DES-AD	.22***	.38	.06***	.01	[.0;.09]	.14***
	DES-DD	.31***	.11***		.04	[.03;.04]	
	DES-AI	.41***	.08***		.03	[.02;.04]	
Paranoia	DES-AD	.22***	.02	.33***	.01	[-.02;.02]	.50***
	DES-DD	.31***	.09*		.03	[.001;.05]	
	DES-AI	.41***	.32***		.13	[.10;.16]	

Note. A= Effect of Developmental Trauma on Dissociation scores, b = Effect of Dissociation on Positive Psychotic Symptom Frequency and Paranoia, a*b=indirect effect, c' = direct effect, c= total effect.***=*p*<.001.

Moderated Mediation of CAPE Positive Frequency by PTSD

In order to test the exploratory hypothesis of the role of PTSD and CPTSD in determining the relationship between DT, dissociation and psychosis, presence of PTSD and presence of CPTSD were added as moderators in two separate moderated mediation models. 292 participants (23.5%) met criteria for PTSD based on the ITQ, and of these, 235 met criteria for CPTSD (18.9%). The index of moderated mediation and conditional direct and indirect effects (Table 10) indicated that neither presence of PTSD (β =.01; 95*CI*= -.03-.03) nor presence of CPTSD (β=-.02, 95*CI*=-.04;.02) moderated the mediating role of dissociation in the relationship between DT and frequency of positive psychotic symptoms as measured by the CAPE-15.

Table 10

Conditional Direct and Indirect effects for PTSD or CPTSD

	PTSD (Direct Effects)		PTSD (Indirect Effects)		CPTSD (Direct Effects)		CPTSD (Indirect Effects)	
	β (SE)	95% *CI*	*β (SE)*	95% *CI*	*β (SE)*	95% *CI*	*β (SE)*	95% *CI*
No PTSD	.06 (.01)	.05;.08	.04 (.01)	.03;.06	.06 (.01)	.4;.08	.05 (.01)	.04;.06
PTSD	.07 (.01)	.04;.09	.04 (.01)	.02;.07	.07 (.02)	.04;.10	.03 (.01)	.01;.06

Study 2

A total of 34 participants with DT and a total of 30 participants without DT completed the study. Characteristics of participants in study 2 are presented in table 11. A chi-square test of independence was performed to assess the relationship between sex and DT status, and

there were no significant differences in gender, $\chi^2(1, 63) = 2.06$, p=.151 or ethnicity, $\chi^2(1, 63) = 2.37$, p=.123 between groups. An independent samples t-test demonstrated no differences in age between groups, p=.219. Standard z scores of skewness and kurtosis were used to explore normality of the distributions separate in the DT+ and DT- groups, and indicated a normal distribution for scores on the CDS. However, as the variables of mean duration and cumulative duration presented highly positively skewed, a square root transformation was applied to measures of duration to approximate a normal distribution.

Table 11

Sociodemographic Characteristics of Study 2 Participants Between Groups

	DT+		DT-	
Sociodemographic Variable	*n*	%	*n*	%
Sex (% female)	22	64.71	24	80%
Age [Mean (SD)]	27.11 (8.91)		28.67	6.61
Ethnicity (%)				
White British/Irish	11	29.41%	6	20%
Black/Mixed Black	1	2.94%	3	10%
Asian/ Mixed Asian	8	23.53%	6	20%
Other(White/Mixed/Asian/Black)	14	41.18%	11	36.67%
Socioeconomic status (FAS) (median)	5		5	

Note. DT+: Participants with Developmental trauma, DT: Participants without Developmental Trauma

Onset, Frequency, and Duration of Apparitions

Independent samples *t*-tests were conducted to investigate the hypotheses that the DT group would have an earlier onset of apparitions, and greater frequency of apparitions, mean duration of apparitions and cumulative duration of apparitions. The DT+ group (*M*=64.7, *SD*=50.63) had a lower first onset than the DT- group (*M*=86.7, *SD*=73.4), but this difference was not statistically significant, $t(61) = 1.127$, $p=.132$. The DT+ (*M*=21.50, *SD*=25.07) group had greater frequency of apparitions compared to the DT- group (*M*=14.00, *SD*=17.66), but this difference was not statistically significant, $t(61) = -1.383$, $p=.086$. The DT+ (*M*=2.25, *SD*=1.79) group had greater mean duration of apparitions (square root transformed) compared to the DT- group (*M*=2.01, *SD*=1.48), but this difference was not statistically significant, $t(61) = -.570$, $p=.285$. The DT+ (*M*=7.65, *SD*= 4.29) group had greater cumulative duration of apparitions compared to the DT- group(*M*=6.04, *SD*=4.63) , and this difference was not statistically significant, $t(61) = -1.422$, $p=.080$.

Single-item Responses

In keeping with previous studies, we explored responses to single-item responses, the DT+ (*M*=3.82, *SD*=1.15) provided higher ratings for frequency of strangeness of apparitions compared to the DT- group, (*M*=3.19, *SD*=1.44), $t(62) = -1.777$, $p=.041$. The DT+ (*M*=3.26, *SD*=1.06) provided significantly higher ratings for emotional impact of apparitions compared to the DT- group, (*M*=2.56, *SD*=1.10), $t(62) = -2.298$, $p=.013$. The DT+ (*M*=3.41, *SD*=1.19)

provided significantly higher ratings for reality of apparitions compared to the DT- group, (M=2.31, SD=1.23), $t(62) = -3.297$, $p<.001$.

Depersonalisation

Pre-MGT CDS-S data and qualitative responses were not recorded for 8 participants during initial piloting of the task, and therefore these were excluded from the analysis, and one was excluded due to missing data, resulting in an n=55. In order to test the hypothesis that participants with histories of DT would experience greater depersonalisation during the MGT, a 2 x2 mixed ANOVA with within (time: pre and post MGT) and between (CTQ group: DT+ and DT-) factors was carried out on scores of the CDS-S. There was a main effect of group, ($F_{(1,54)} = 14.15$, $p <.001$) with the DT+ group significantly higher scores on the CDS-S. In addition, the was a main effect for time ($F_{(1,54)} = 23.68$, $p<.001$) due to higher scores observed post MGT compared to before the MGT. An interaction effect was significant (see figure) whereby the DT+ group experienced a significantly greater change in depersonalisation before and after the MGT compared to the DT- group, ($F_{(1,54)} = 6.95$, p=.011).

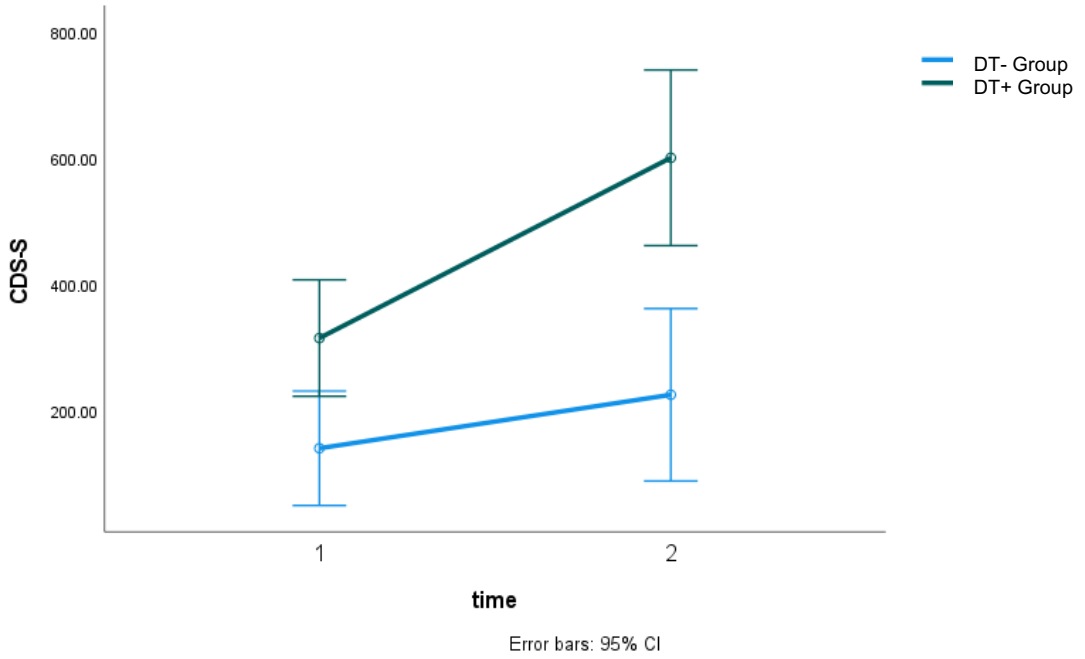

Figure 5. Cambridge Depersonalisation Scale-State (CDS-S) scores before (1) and after (2) the MGT between DT- and DT+ participants.

Qualitative Results

5 DT- participants and 3 DT+ participants did not report any changes in the MGT. These were the same participants who did not press the button. Of the participants who did not press the button, 3 participants did not press the button but described seeing shadows (*n*=1), twitches in their facial expression (*n*=1) and appearing older (*n*=1). 1 DT+ participant and 7 DT- participants provided logical explanations to their experience of illusions such as attributing observed changes to "light" or "lighting conditions", "eyes adapting", "because of eyes fixating".

Table 12 presents the different MGT experiences which were coded from qualitative responses "what did you see" by group. Most participants reported their faces becoming darker. Facial deformation included responses such as faces melting, facial features expanding, eyes changing directions, and features becoming blurred and was observed in

more than half of participants in both groups. Participants also described “fading” and disappearing”. Participants describing strange human faces described the face of a relative, a dead face, or faces they did not recognise. 3 Participants in the DT+ group also noticed non-human figures, such as a mask (*n*=2) and a monster (*n*=1).

Table 12

Differences in Illusory Experiences Between Developmental Trauma Groups

	DT+ group n=27	DT- group n=28
Changes in lightness/darkness	70.37% (n=19)	67.86% (n=19)
Facial deformation	55.56% (n=15)	71.43% (n=20)
Change in expression (angrier, sadder, ironic smile)	33.33% (n= 9)	42.86% (n=12)
Strange human face	37.04% (n=10)	17.86% (n=5)
Strange non-human face	11.11% (n=3)	0
Appearing older	18.51% (n=5)	17.86% (n=5)

Note. DT+: Participants with Developmental trauma, DT: Participants without Developmental Trauma

The MGT provoked a mix of emotional reactions, which differed between groups. Interest and fascination were reported by 2 DT+ participants and 7 DT- participants, of which 3 participants reported feeling reflective and calm. Indifference was reported by 3 DT+ participants and 7 DT- participants. A sense of strangeness and confusion that was not distressing was described by 3 DT+ participants and 6 DT- participants. Regarding negative

reactions, fear and feeling unsettled were reported by 18 DT+ participants and 7 DT- participants.

In relation to the hypothesis that the MGT would provoke greater depersonalisation like experiences in individuals with histories of DT, in the DT+ group 2 participants described feeling numb, 7 participants described a loss of control or agency over their experience, 4 participants described feeling disconnected. 15 participants in the DT+ group described seeing the face of someone they did not recognise, and a "strange feeling", "difficult to explain", and their experience as "someone mimicking them", "taking control", "someone in their place", "someone changing the image" or "external interference" but an ambiguity on who it was or how this experience "makes sense. In the DT- group, these experiences were much more infrequent, with 2 participants described not feeling in control of their experience, and 1 participant described a sense of disconnection from their body.

Discussion

In this mixed method study, we investigated trait and state dissociation in relation to DT and subclinical psychotic experiences. Using a cross-sectional online study, we replicated past findings demonstrating group differences in total dissociation and all dissociative subtypes as measured by the DES between individuals with and without experiences of DT. In line with our first hypothesis, among participants with and without psychotic experiences, DT was associated with higher levels of dissociation. In support of the second hypothesis, we demonstrated a partial mediating effect of dissociation in the relationships between 1) DT and frequency of positive psychotic symptoms as measured by the CAPE-15 and 2) DT and paranoia. We also aimed to address the question of whether the mediating role of dissociation for positive psychotic symptoms occurs mainly in the context of PTSD and Complex PTSD. We found that dissociation partially mediated the relationship between DT and frequency of positive psychotic symptoms in both the presence and absence of PTSD and Complex PTSD.

Finally, we extended past findings by studying state dissociation. Using an experimental protocol to elicit state dissociation in participants with and without DT, we identified experiencing DT is associated with greater experiences of state depersonalisation, measured by the Cambridge Depersonalisation Scale and qualitative responses, during the MGT. Contrary to our hypothesis, individuals with experience of DT did not experience an earlier onset, and greater frequency, duration or cumulative duration of apparitions, but reported greater emotional impact from the apparitions, a higher sense of reality and more experiences of depersonalisation.

Differences in Dissociative Symptoms Between Groups

The higher levels of dissociation among individuals with experiences of DT among participants with and without subclinical psychosis is consistent with previous studies in community and patient samples (Dorahy et al., 2009; Goff et al., 1991; Offen et al., 2003; Perona-Garcelán et al., 2010; Schroeder et al., 2016). The average dissociation score in the group with DT and no subclinical psychosis is similar to that established in previous meta-analyses (M=22.7) (Vonderlin et al., 2018) which however had not differentiated participants based on their diagnosis or clinical status.

This pattern was similar in the subclinical psychosis groups: individuals who met threshold for UHR status and had experienced DT had the highest levels of dissociative experiences**.** On explanation for this is the higher levels of polytraumatisation in this group, reflecting the dose-response effect reported in past clinical studies between DT and dissociation (Schalinski et al., 2019; Schimmenti, 2018). In repeated experiences of maltreatment, as observed in the higher multiplicity of trauma in the group with subclinical psychosis in our sample and in previous studies (Fusar-Poli et al., 2017; Kraan et al., 2015), dissociation may become a learned response to abuse or neglect through operant learning. Although the neural processes underlying dissociation are unclear, responding through dissociation for extended

time periods could have an impact on brain development, as evidenced in functional and structural alterations between groups with and without DT. To our knowledge, no previous study has compared levels of dissociation in individuals meeting threshold for subclinical psychosis with and without developmental trauma so comparison with previous studies is limited.

The higher levels of dissociation in the groups meeting threshold for UHR based on the CAPE is also consistent with past studies which found an association between dissociation and psychosis (Humpston et al., 2016). Case-control clinical studies have also found higher levels of dissociation in clinical groups (Braehler et al., 2013; Evans et al., 2015; Uyan et al., 2022; Varese et al., 2012), with a dose-response association observed between severity and chronicity of psychotic experiences and dissociative experiences (Braehler et al. 2013; Khosravi et al., 2021). Our findings indicate that dissociative experiences likely constitute a common experience in the subclinical point of the psychosis continuum. A meta-analysis by Longden et al., 2020 identified that the association between dissociation and positive symptoms was stronger in non-clinical studies, suggesting the possibility of high conceptual and phenomenological overlap between psychotic and dissociative symptoms (Moskowitz & Corstens, 2018) during the psychosis prodrome.

Our findings also indicated that dissociative experiences are higher among participants with subclinical psychosis in the absence of DT compared to controls with or without DT. While a plethora of studies suggest a role for dissociation in predicting psychotic experiences, it is also possible that dissociative experiences arise subsequent or parallel to psychosis symptoms (Schäfer et al., 2012). Specifically, psychotic experiences can constitute states which are affectively challenging (Yung et al., 1998), as reflected in the requirement for endorsement of both frequency and distress from positive symptoms to meet the threshold for

UHR status based on the CAPE-15 (Capra et al., 2013). For some people, psychotic experiences represent a breakdown of psychic processes that is intolerable and traumatic in itself, contributing to dissociation. As we didn't control for adult trauma, we cannot exclude that dissociative experiences in this group are also influenced by adult traumatic events or other forms of adversity. Similarly, we did not look at individual types of trauma and dissociative experiences, so we cannot preclude that the higher levels of dissociation in the DT+ and SDT+ groups are accounted for by higher prevalence of specific types of abuse.

Dissociation as a Mediator Between DT and Psychotic Experiences

We found that dissociation partially mediated the relationship between DT and frequency of positive psychotic symptoms in a community sample, where over one third of individuals met criteria for UHR for psychosis. Past studies have found a mediating role of dissociation in general population samples using measures of psychotic experiences (Gibson et al., 2019) and schizotypy (Blose, 2023). Focusing on specific symptoms, evidence has also previously emerged for the mediation by dissociation of DT on hallucination proneness in previous general population (Bortolon et al., 2017; Bortolon & Raffard, 2018; Cole et al., 2016; Gibson et al., 2019; Gómez & Freyd, 2017; Perona-Garcelán et al., 2014). Dissociative experiences may also contribute to an internal state of confusion that weakens cognitive inhibition (Giesbrecht et al., 2008; Waters et al., 2006) increasing the likelihood of self- and source-monitoring errors (Collignon et al., 2005) and erroneous appraisals to account for the "sense of anomaly" (Černis et al., 2020).

As traumatogenic models of psychosis have often suggested that experiences of psychosis, and in particular dissociative experiences and hallucinations, occur in the context of undiagnosed PTSD or through underlying post-traumatic mechanisms, we investigated this by including PTSD/CPTSD as moderators in our model. We found that regardless of the presence of absence of both PTSD and Complex PTSD, dissociation partially mediates the relationship

between DT and frequency of positive psychotic symptoms. From a cognitive-behavioural perspective, peri-traumatic detachment contributes to a disruption of encoding of memories, which has been also documented experimentally (Brewin et al., 2013). Decontextualised autobiographical memories are believed to play a role in perceptual abnormalities or hallucinations among individuals with PTSD, which might explain part of our findings. In the context of avoidance, it is possible that dissociation manifests in the unconscious avoidance of traumatic content or distressing affect, as a process of emotion regulation which could induce suppressed intrusions to arise as dissociated components, through hallucinations. However, the lack of a moderation supports the notion that dissociative experiences play a role in predicting psychotic symptoms through additional processes. This is in line with Wearne et al. (2022) who proposed the existence of a "stress" mediated pathway contributing to hallucinations and another pathway that likely involves additional dissociative processes, potentially through a learned response to traumatic experiences or distress that is reinforced over time. It is also possible that individuals may not meet threshold for PTSD or complex PTSD but still experience post-traumatic intrusions that in states of dissociation, arise as bizarre perceptual experiences and hallucinations.

Dissociation as a mediator between DT and paranoia

Paranoia, the exaggerated tendency to perceive ones' experiences, or others' behaviours as indicative of malevolence or threat in the absence of supporting evidence (Fenigstein & Vanable,1992) is a characteristic experience of psychosis which initially may hold an adaptive value (Freeman et al., 2005) but becomes maladaptive in its clinical manifestation. Our finding that dissociation partially mediated the relationship between DT and paranoia adds to a small number of studies that have highlighted the role of dissociation in predicting paranoia and delusional ideation (Humpston et al. 2016; Mertens et al., 2021; Pearce et al., 2017) and supports recent meta-analytic findings (Longden et al., 2020) and findings from network

analyses (Černis et al., 2021) on the relationship between dissociation and paranoia. Previous studies have employed subscales of suspiciousness and structured clinical interviews (Mertens et al., 2021) as well as individual items from the CAPE (Pearce et al., 2017), but we replicated this relationship using a validated measure of paranoia designed for the general population (Fenigstein & Vanable,1992), in a sample with a broader range of dissociative, subclinical psychotic and childhood traumatic experiences compared to previous studies.

The Role of Subtypes of Dissociation

In support of the first hypothesis, differences in depersonalisation/derealisation, dissociative amnesia and absorption and imaginative involvement were also evidenced between groups, which followed the pattern of aggregate dissociation. In our study, using two parallel mediation model, we found that depersonalisation/derealisation and absorption, but not dissociative amnesia, partially mediated the relationship between DT and frequency of positive psychotic symptoms and DT and paranoia.

Depersonalisation/Derealisation (Detachment)

In the context of trauma, detachment is hypothesised to occur as a defensive process to protect the self from conditions of inescapable threat (Putnam, 1992) or even subordination and humiliation (Herman, 1998) through the detachment from bodily experience of external reality (Spiegel, 1984). Similar to most previous studies, we established a mediating role for depersonalisation/derealisation in the relationship between DT and frequency of positive psychotic symptoms (Bortolon et al., 2017). In the long run, and as DT is an experience frequently characterised by complex, severe or chronic trauma, uncontrollable or indiscriminate detachment which develops as a learned way of coping (Hardy, 2017) may contribute to a disconnection from external reality and one's experience of selfhood (Steinberg, 1995; Van der Kolk & Van der Hart, 1991). In cases of detachment paired with the well-established processes of errors in threat processing, source-monitoring deficits and erroneous

appraisals, paranoia might arise in an attempt to explain this sense of anomaly (Freeman et al., 2005). However, paranoia was not significant in our sample after applying Bonferroni corrections, and thus only a trend relationship was evidenced, and this finding requires further study. Adding to this trend were the findings from the MGT, participants with DT experienced and described, with a difficulty to put it into words or "make sense", their visual experiences as controlled or belonging to someone else. This finding, which is described in more detail below, further points to the possible role of depersonalisation in predicting positive symptoms through "disowned components of the self" (Longden et al., 2012), p.61).

Absorption

We established higher levels of dissociative absorption in relation to DT. This finding is in contrast with previous findings by (Irwin, 1999) who found no association between absorption and DT, but aligned with (Allen et al., 2002) who found an association between absorption and DT even after accounting for "pathological dissociation", as measured by the DES-T. Absorption also had a large association with voices in a meta-analysis by Pilton and colleagues (2015). The finding that the partially mediating process of dissociation in the relationship between DT and paranoia was driven by absorption in our sample is consistent with findings by Cole et al. (2016), who found a mediating role for the DES when measuring DT and delusional ideation, and Humpston et al (2016) who found that absorption measured through the Tellegan Absorption scale predicted subclinical delusional ideation, without however measuring DT. In spite of the criticisms of the absorption factor, converging evidence using different scales supports the theoretically parsimonious idea that absorption as a process of "tuning in" (Holmes et al., 2005), becoming engrossed with internal events, could be contributing to self-referential thinking, and the misinterpretation of behaviours as threatening encountered in paranoia.

Dissociative amnesia (Compartmentalisation)

We found higher levels of dissociative amnesia, characterised by failures of memory retrieval, in groups with experiences of DT, which may indicate the effects of repeated or chronic trauma on memory systems (Allen et al., 1997; Holmes et al., 2005). It is suggested that compartmentalisation processes involve a disruption in the frontal executive system (Kopelman, 2000; Wolf, 2009), or fronto-temporal brain regions through the impact of stress-related hormones (Markowitsch & Staniloiu, 2013) that disrupts episodic memory retrieval. In our study, dissociative amnesia did not mediate the relationship between DT and psychotic experiences when entered in a parallel mediation model with absorption and detachment, in contrast to a clinical study by Khosravi and colleagues (2021). One possibility is that the DES as a scale lacks items addressing that extent of conversion phenomena characteristic of some dissociative experiences (Holmes et al., 2005). While this is a preliminary finding in a sample that requires replication, one arising question is whether compartmentalisation processes play less of a role in subclinical experiences of psychosis, as also demonstrated by Humpston and colleagues (2016). Further research is needed to elucidate the role of DT on dissociative amnesia, its underlying neurobiology and potential role in positive psychotic symptoms.

Study 2

In study 2, we used the experimental protocol of the MGT to elicit dissociative states and compare these between individuals with and without DT. We did not identify a difference in frequency, onset, or mean duration of apparitions between groups. In our study, anomalous self-experiences were frequent, with perceptual changes and deformation of facial features reported in both groups, but higher levels of strange faces in the DT+ group. Responses on single items demonstrated higher levels of perceived frequency, emotional impact and especially the sense of "realness" of apparitions in the DT+ group, which presented as the statistically strongest difference, replicating previous studies (Caputo et al., 2012). While the emotional impact of apparitions was corroborated by open-ended questions, this was not the

case for the question on perception of "realness" which was not explicitly mentioned by participants, and thus this needs to be interpreted with caution. No previous studies have conducted this experiment in individuals with DT, but previous case control studies established higher cumulative duration of apparitions among patients with schizophrenia (Caputo et al., 2012) and anorexia nervosa (Demartini et al., 2014) and lower among patients with depression (Caputo et al., 2014).

According to Caputo (2023) the MGT implicates multiple stages of face perception and corresponding visual neural networks, including the processing of basic visual information by the primary visual cortices, reflected in the anomalous self-experiences frequently observed in this study, in particularly the "fading" and change or darkening of colours and features engage (also referred to as the Troxler and Brewster effect) (Brewster, 1818; Troxler, 1804)which have been associated with a process of derealisation. The observed disappearance of features and whole face deformations are considered to involve failures in the engagement of the core face network in the binding of individual facial features into "the whole face Gestalt". The experience of illusions of other identity, which were less frequent in our sample but more than twice as many times in the DT+ group compared to the DT- group, involve engagement of the "extended face network", implicating the temporal lobe and the integration of sensory information that allows the construction of the identities of the self and others (Wang et al., Jun 2018).

The MGT produced dissociative experiences, namely depersonalisation, in accordance with past experimental research that found it is a valid tool to induce state dissociation (Brewin et al., 2013). Participants with DT endorsed higher levels of baseline depersonalisation (Briere, 2006), adding to our findings from study 1. Importantly, we found that depersonalisation changes as measured by the CDS-S were significantly greater in individuals with DT compared to without experiences of DT. This also reflects the phenomenological descriptions of

participants, who described a sense of "felt it wasn't mine" and "didn't look like me" "someone else had taken over", indicating that in line with the theory proposed by Caputo (2023), depersonalisation in the MGT involves detachment from the body experienced proprioceptively but also in the mirror, and a failure of integration of one or both as existing to oneself (Brugger & Lenggenhager, 2014). There was a profound difference in the sense of loss of control and emotional distress reported by the DT+ group compared to the DT- group. This may reflect a greater quantity of depersonalisation, but also alterations in the permanence vs. transience and emotional effect of these experiences, as seen in the difference in endorsement of single item questions of "perceived realness" and "emotional impact".

An interesting finding is the rational attributing of experiences to the lighting conditions and experimental manipulations among participants in the DT- group, which was not observed in the DT+ group. This may reflect how cognitive appraisals can be a source of risk and resilience in how a state of depersonalisation and perceptual abnormalities give rise to paranoia or external attribution. On the other hand, participants in the DT+ group experienced a sense of "external interference", " someone mimicking them", or "someone taking over"-experiences which might be indicative of a less stable sense of self in survivors of DT. This hypothesis would benefit from further qualitative exploration. As Longden et al. (2012) suggests, while an emphasis has been placed traditionally on the characteristics of hallucinations, reactions and relationship with these experiences may be more relevant. In a comparison between clinical and non-clinical samples, Andrew, Gray, and Snowden (2008) (as cited in Longden, 2012) found a sense of uncontrollability, an inability to resist voices and high rates of distress among patients with hallucinations, which were not experienced by the non-clinical group.

Overall, these findings support the notion that anomalous self-experiences are associated with depersonalisation processes, and that DT may impact not only trait, but also

state depersonalisation. From a framework of psychotic experiences involving "ego-dystonic" states characterised by dissociation and "disowned aspects of the self" (Longden et al., 2012, p.61), these findings highlight the disintegration of the experience of the self, similar to the sensory and psychological disintegration which might occur in the context of trauma (Dorahy & van der Hart, 2007). They also point to the likely reciprocal relationship between dissociative and perceptual anomalies, frequently encountered in psychosis, and how these may arise in the context of DT.

Strengths and Limitations

The present study has a number of strengths. Primarily, we used a large community sample which included participants with and without DT, with enough statistical power to find associations and draw a comparison between study groups with higher generalisability. Another strength is this study's novelty in comparing dissociative experiences between individuals with and without subclinical psychosis using the threshold from a validated screening tool that is frequently used in real world settings. Furthermore, previous similar studies have been limited to smaller samples with low rates of trauma and lower levels of psychotic experiences. The implementation of inclusion criteria surrounding medication status of participants and the inclusion of covariates in analysis models limits the risk of confounding. The study's novelty is also found in our inclusion of PTSD and Complex PTSD as moderators. Importantly, this is the first study to explore differences in state dissociation between groups, using a task that has been used extensively and which has been previously used to induce dissociation.

The cross-sectional nature of this study is an important limitation, as it limits causal inferences and does not exclude the possibility of reverse causality. This is particularly relevant to our use of mediation analysis, which has been criticised when applied for cross-sectional data (Maxwell, Cole & Mitchell, 2011). Nevertheless, the present study's finding on the

relationship between DT and dissociation, using two different methodologies replicates previous studies and is in line with the theoretical and empirical literature, satisfying the Bradford Hill criteria of coherence, consistency and experimental evidence.

The retrospective nature of our measurement of DT increases risk of measurement bias, although previous studies in FEP samples indicated stability of retrospective and prospective reports of DT (Fisher et al., 2011; Simpson et al., 2019). We tried to mitigate over-reporting by implementing stringent criteria for belonging in a DT+ group. Our categorising of participants in a DT+ and DT- group meant that a substantial number of participants with less severe DT scores were excluded from between groups analyses and the experimental component of study 2, and statistical power was reduced. Furthermore, this dichotomy limits the comparison with previous studies which mostly required only one trauma category to be endorsed as moderate on the CTQ for someone to meet criteria of having experienced DT.

We also need to acknowledge the risk of unmeasured confounding. We did not control for the influence of other forms of adversity or adult trauma, which is known to be higher among individuals with experience of DT and psychosis . However, past studies have found that dissociative (Schalinski & Teicher, 2015) and psychotic (O Neil et al. 2021) experiences were associated with DT more than adult traumatic experiences. Regarding measurement bias, although we used well-established and validated questionnaires, we did not perform a factor analysis. The DES used in study 1 has received substantial criticism about the conceptual overlap of some of its items, in particular the items relevant to dissociative absorption and amnesia (Soffer-Dudek et al., 2015). In addition, some of the measurements used in study 1, such as the CAPE-15 and the DES, have been criticised for having high conceptual overlap, which needs to be taken into consideration when interpreting correlations and mediations. In study 2, measurement issues may arise with the robustness of single-item questions following

the MGT when these were not aligned with the open-ended questions or psychometric data, such as rating how "real" illusions appeared.

We also need to consider how our findings may have been impacted by selection bias. Primarily, we used an online recruitment strategy , and our study 1 sample was predominantly white and female, which is common in social media samples, but is not ethnically representative of the UK population. Furthermore, our online recruitment strategy could have excluded participants who may not use social media, may be more withdrawn or socially isolated, or experience higher levels of paranoia. In study 2, selection bias could have been introduced as participants volunteering to participate could have had less work or caring responsibilities and better circumstances of accessibility, in spite of participation and all travel being reimbursed.

Finally, there are broad variations in what is considered normative across cultures, and although this is an understudied area, likely differences in the phenomenology and meaning of dissociative and psychotic experiences, and the contexts that these arise in (Krüger, 2020; Seligman & Kirmayer, 2008). Consequently, these findings should be interpreted in light of the Western context they emerged from and more research, especially of qualitative nature, should be conducted elucidate their generalisability and relevance across cultural contexts.

Future Directions

Future research should replicate the present findings on the mediating role of dissociation in positive psychotic symptoms following DT in samples with subclinical and clinical psychosis using longitudinal designs. Our findings suggest that dissociation may impact psychotic experiences both in individuals with and without PTSD. Further research, using qualitative methodologies and experience sampling methods is needed to gain a precise

understanding of how DT contributes to psychosis through post-traumatic processes and dissociation. Although we demonstrated differences in experimentally induced depersonalisation between individuals with and without DT histories, it is important to consider the role of other forms of dissociation and how these contribute to in vivo perception abnormalities and anomalous self-experiences, such as derealisation but also dissociated identity.

Understanding the phenomenology of different dissociative experiences, and their role in the development and experience of the self and identity, which has been a relatively neglected area in contemporary conceptualisations of mental illness and distress, could inform psychological formulation. We need to understand if dissociation is a factor associated with poor prognosis, worse functional outcomes and lower treatment response in individuals with subclinical psychosis and DT. Adding to this, future interventional research is needed to test whether adding components targeting dissociative experiences in the treatment of individuals with experience of psychosis and DT histories improves outcomes. The finding of more depersonalisation, more uncontrollability and higher distress during anomalous self-experiences in the MGT may point to an important research and clinical target for prevention and early intervention. Specifically, further research should explore reactions and meanings constructed around anomalous self-experiences and whether these predict distress and the development of psychotic symptoms.

Clinical Implications

The present study has important clinical implications. Primarily, our findings add to a large body of evidence that suggests that dissociation is a highly prevalent experience in the aftermath of DT, both in the form of trait and state dissociation. Dissociative experiences should be screened for when assessing individuals with histories of DT, as these have been shown to contribute to experiences of distress. Higher levels of dissociation were also found in

individuals with subclinical psychotic symptoms, who met threshold for UHR for psychosis based on the CAPE-15. As dissociative experiences are rarely screened for outside of the context of PTSD, and given the difficulty in describing this experience which was documented in the present and past studies (Černis et al., 2020) it is important for clinicians to be aware and know how to identify experiences of both compartmentalisation and detachment to minimise underreporting.

Our novel finding of dissociation having a mediating role in the relationship between DT and positive psychotic symptom frequency independent of PTSD and complex PTSD suggests that screening for dissociation should be emphasised when people present with psychotic experiences and DT. Understanding and managing dissociation, in addition to PTSD symptoms when present, may be a valuable target for treatment. For example, time should be dedicated to collaboratively formulating about the context in which dissociative symptoms arise and implementing emotion regulation and grounding strategies among individuals with subclinical psychotic experiences.

Extending the findings to clinical samples, identifying during treatment whether dissociation occurs in the context of re-experiencing, with specific triggers vs as a general state could help direct when and how strategies should be implemented. The greater experience of state depersonalisation and distress experienced by participants with histories of DT in study 2 suggests that formulating around the meaning and emotional reaction to anomalous experiences using a normalising person-centred approach may help prevent attempts to suppress or avoid these experiences, which has been found to increase their occurrence (Varese et al., 2011) . Overall, it is important to research whether addressing dissociation in treatment and considering how it impacts psychotic symptoms improves outcomes of known and new treatments, such as trauma-focused interventions, which have been found to be helpful among individuals with trauma related psychosis (Bloomfield et al., 2021).

Conclusions

We found increased levels of dissociation, including higher absorption, dissociative amnesia and depersonalisation/derealisation and higher DT associated with subclinical psychosis based on the CAPE-15. Consistent with previous studies in clinical and non-clinical groups, in our sample of participants with and without subclinical psychotic symptoms DT was associated with more dissociative experiences. The partial mediating role of dissociation in the relationship between developmental trauma and positive psychotic symptoms replicates past findings in a sample that is more representative of individuals with subclinical psychosis. Our novel finding of the role of dissociation in predicting paranoia following DT adds to a small body of studies and the processes involved warrant further investigation. Our interesting finding that dissociation acts as a mediator in the relationship between DT and positive psychotic symptoms in the context but also independent of PTSD indicates that multiple processes are likely at play that implicate dissociation. Extending past findings, which have mainly used cross-sectional observational designs, we identified that DT also impacts state depersonalisation using an experimental paradigm. More research is needed in the phenomenology of dissociative experiences across the psychosis spectrum, and on whether dissociation is a candidate vulnerability mechanism for psychosis. Screening for dissociative symptoms and further considering the role of dissociation as a risk factor and the reciprocal relationship with psychotic experiences, in both research and clinical practice, may be useful for prevention and early intervention of psychotic experiences.

Chapter 4

Integration, Impact and Dissemination

Introduction

This chapter will aim to achieve an integration of the findings from the systematic review and empirical project as a unified piece of research. The experience of conducting the study, strengths and limitations of the study are discussed, along with the implications for future research and clinical practice. Finally, the ways in which the study findings will be disseminated is discussed.

Background and Summary of Aims

The relationship between trauma in childhood and adolescence, hereon referred to as developmental trauma (DT), and dissociation and psychosis has been discussed for over a century from a multitude of theoretical viewpoints. But in spite of the many findings and the plethora of theoretical viewpoints, different historical contexts and methodological approaches make it complicated to draw conclusions that will be appropriate for further research and implementation in today's evidence-based practice.

A fundamental premise of this study is that it approaches psychosis from the lens of the psychosis continuum, where psychotic experiences lie on a continuum of severity. The continuum ranges from subclinical experiences in the general population, including transient psychotic experiences and meeting criteria for an Ultra High-risk of psychosis, to a first episode of clinical psychosis and chronic or repetitive psychotic episodes, as in the case of schizophrenia spectrum disorders. Understanding the factors that characterise the different stages in the development of psychosis among individuals with DT is important, as 1) a large proportion of psychotic experience have been considered attributable to developmental trauma (Kelleher et al., 2013; Varese al., 2012) 2) individuals with DT tend to report worse

clinical and functional outcomes (Bailey et al., 2018) and 3) subclinical psychosis is associated with an increased risk for clinical psychosis and associated with other forms of psychopathology. While dissociative symptoms have been established to be associated with psychotic symptoms and clinical psychosis (Longden et al., 2020) and even suggested to mediate the relationship between DT and psychosis (Alameda et al., 2020; Bloomfield et al., 2021) there has not been a synthesis of the literature to date that addresses methodological and conceptual issues, and the experience of dissociation in samples with subclinical psychosis, such as UHR groups, is understudied.

In the systematic review (Chapter 2), I intended to explore both phenomenological and severity differences in the experiences of dissociation among individuals with clinical or subclinical psychosis and experiences of DT. I also reviewed the associations between DT and dissociation in individuals with psychosis. I further aimed to explore whether dissociation has a mediating role in the relationship between DT and psychotic experiences, and aimed to include both general population and clinical samples, studying individuals along the psychosis continuum.

For the purpose of my empirical study (Chapter 3) I joined the Translational Psychiatry Research Group at UCL, where since 2021 I assisted with the planning, data collection and management of the community arm of a large NHS approved UKRI-funded study. We collected quantitative data using validated measures of developmental trauma (Childhood Trauma Questionnaire) (Bernstein et al., 1998) ,Dissociative Experiences (Dissociative Experiences Scale) (Carlson & Putnam, 1993), subclinical psychotic experiences (CAPE-15) and paranoia (General Paranoia Scale) (Fenigstein & Vanable, 1992), as well as sociodemographic covariates. Although we used a convenience sample, in comparison to previous studies we aimed to identify individuals with and without

developmental trauma and with and without subclinical psychotic experiences (i.e. individuals meeting criteria for UHR for psychosis as measured by the CAPE-15).

Integration

In this section, I will describe the findings identified in the systematic review and how these were replicated and extended in the empirical study, and how potential gaps in the literature were addressed. First, in the systematic review, clear differences in levels of dissociation were established between individuals with clinical psychosis and experiences of DT compared to those without DT, and especially among individuals with polytraumatisation and chronic psychosis. However, although some studies used general population samples, no study compared levels of dissociation between individuals with subclinical psychotic experiences, such as participants grouped as ultra high-risk of psychosis (UHR), with and without DT. As such, ambiguity surrounds whether dissociation following DT is more pronounced in subclinical psychosis (such as UHR) and whether differences are evident in subclinical levels of psychosis. In the empirical study, in comparison to previous general population studies, more than half of our sample had experienced DT at moderate to severe levels and approximately half met criteria for subclinical psychotic experiences. Importantly, the composition of our sample is an important addition to past studies, as our between-group comparisons on individuals meeting subclinical psychotic symptoms with and without developmental trauma used a screening measure for UHR status, thus being more clinically relevant. Significant differences were established between groups, replicating past findings, and indicating that dissociation and all its subtypes is characteristic of individuals with DT, but is more pronounced among individuals meeting UHR status, at the highest levels among individuals with both UHR and DT.

In the systematic review, a consistent finding was that dissociation partially mediated the relationship between DT and psychosis in clinical samples and community samples, but little attention was placed on exploring this mediating effect among individuals with subclinical psychosis. In the empirical study, I replicated this finding with positive psychotic symptoms and a validated measurement of paranoia as outcomes in an aggregate sample with a broader variance of psychotic experiences as previously described. In addition, I identified that these mediating effects were significant for a total score of dissociation and the dissociative absorption and depersonalisation/derealisation subtypes of dissociative experiences, but not for dissociative amnesia, and compared and contrasted this to the findings of the systematic review. On a conceptual level, studies identified in the systematic review conceptualised dissociative experiences from a trauma-informed lens, with one theoretical perspective suggesting that dissociation arises and mediates the relationship between DT and psychosis in the context of PTSD. However, no study actually tested this proposition. In the empirical study, I addressed this question by conducting a moderated mediation analysis using a screening tool for PTSD and Complex PTSD, and found that the mediating role of dissociation is significant regardless of PTSD or Complex PTSD. Yet, it should be noted that only a small percentage of the sample (20%) had PTSD, and meeting diagnostic threshold was based on a self-report screening tool rather than actual diagnosis.

Importantly, the systematic review identified no qualitative or experimental studies investigating dissociative experiences among individuals along the psychosis spectrum with experiences of DT. This finding is particularly striking considering the phenomenological nuance of both dissociative and psychotic experiences that risk being lost in a research body dominated by survey methods, and in a few studies only single items to capture complex experiences. The empirical study partially addressed this limitation by using, for the first time, the Mirror Gazing task with this population, an experimental task eliciting anomalous

self-experiences and depersonalisation, and triangulated the finding of higher trait dissociation with higher state depersonalisation among individuals with DT. Unfortunately, due to the challenge to recruit participants meeting threshold for UHR without any experience of developmental trauma, as well as the underpowered sample to do a comparison between 4 groups, I was limited to a comparison between 2 groups, namely participants with and without DT.

Dilemmas, Challenges and Methodological Choices

Being part of a larger study team at UCL comprised of a Principal Clinical Research fellow, PhD students and Masters students was an experience that I am grateful to have had, as it allowed me to really become immersed in the topic and the project for the past two years. It has given me the opportunity to participate in weekly team meetings, exchange ideas, present findings and think together of the impact of findings and potential ways to disseminate. Collecting data allowed me to feel more in touch with the project and to understand first-hand the challenges and requirements of a large-scale study. In terms of designing the study, the project benefitted from the Division of Psychiatry's Service User Forum, and members of the research team including myself had lived experience of mental health difficulties, and thus the experience of participants was frequently discussed.

In terms of recruitment, study 1 used social media advertising that had been approved by the Health Research Authority and previously by the UCL Ethics committee. The study received a mix of responses as comments on the social media advertisements, in particular around the limited age group (18-40 years of old), and the exclusion of participants taking medication. These considerations were discussed in team meetings and replies were sent agreeing that this is an important area for research and acknowledging our funding limitations. Unfortunately due to this being a multi-arm study that predominantly focuses on brain imaging, it was necessary to minimise the effects of maturation changes due to age and

to control for confounders (e.g. medication) within and across groups (community and clinical). Participants however were mostly understanding with these responses, although expressed a wish for studies on the effects of DT on older adults. Many participants expressed in the adverts and during the face-to-face session an appreciation for the topic.

Another challenge was that the location of study 2 was closed for an extensive period of time due to the Covid-19 pandemic, and therefore recruitment had been halted. As the majority of online recruitment had taken place in the summer of 2020-2021, identifying participants for study 2 was a challenge which required recruitment to resume. This meant that significant more time was spent on online recruitment at a later stage than anticipated.

One unexpected finding was the difficulty in recruiting participants who met our threshold for subclinical psychotic experiences but had not experienced any forms of developmental trauma, which led to only 67 participants (5% of overall recruited) being part of this group. This occurred in spite of using targeted ads with no mention of DT. While adjustments (e.g. post-hoc tests) had to be made for between-groups analysis, it is an interesting finding in itself, demonstrating the prevalence of trauma in groups with subclinical psychotic experiences, although the risk of selection bias is acknowledged. Another potential explanation is that some participants with subclinical psychotic experience may have been more withdrawn, or experience more paranoia, and would not have wanted to participate in an online study on this topic.

In terms of design and measurements, it is important to consider that the measures employed in the study are cross-sectional. While all measures have been used extensively, with the exception of the newly introduced yet repeatedly validated International Trauma Questionnaire as a screening tool for PTSD and Complex PTSD, we did not do a factor analysis which is a limitation in our study. While the factor structure of depersonalisation/derealization subscale of the DES appears stable across studies, mixed

findings have arisen in the past regarding which items should be included in the amnesia and absorption factors. Furthermore, the CAPE is only a screening measure, and thus the identification of people with subclinical psychosis is sensitive to type 1 errors.

As the community arm of the study aims at identifying neurocognitive differences using a 2 (DT vs no DT) and (subclinical psychosis vs no psychosis) design, employing neurocognitive paradigms and neuroscience methods, it was important to form groups for between groups analysis in a way that maximizes effect sizes, namely non-low trauma vs 2 moderate or 1 severe trauma. This meant that in the between group analysis and in study 2 I excluded some participants with only one type of trauma rated as moderate. I decided to go ahead with this choice given the online nature of the study, which in the past has been associated with over-reporting of DT. Of course, as this was a larger study there were also some limitations in terms of study design which I was unable to address. For example, in the Mirror Gazing Task, depersonalization was chosen as an outcome, however more recent studies have indicated that other forms of dissociation may be experienced during this task.

Impact

The present study carries a multitude of implications for both research and clinical practice, but also to conceptualisations of pathways to psychosis in the context of evidence-based practice. Subclinical levels of psychosis and UHR may not involve the same symptom severity or functional impairment as clinical psychosis, but they constitute a state with increased risk of psychosis onset and worse outcomes. Treating psychosis as a continuum has been a pivotal shift in the way we think about, as well as address psychotic experiences, driving a progressive shift from clinical management to early intervention and prevention before psychotic experiences reach clinical severity. Some of the benefits of the systematic review lie in its novelty, in that it provides a comprehensive review of a vast field of research

on dissociation following childhood trauma, with discussions around conceptual and methodological issues, in clinical and subclinical psychosis.

The findings from the empirical study can benefit clinicians who work with subclinical psychosis, particularly in early intervention services. DT needs to be screened for among participants with subclinical psychosis and dissociative experiences need to be assessed for in individuals with subclinical psychosis with and without childhood trauma, as they were prevalent in both groups, and may be aggravating the experience of positive symptoms. Participants in this and previous studies have found it difficult to put experiences of dissociation, such as depersonalisation into words, so including prompts when assessing for these experiences might be helpful. Trying to understand patients' experience of dissociative symptoms over time and in the present and the reciprocal relationships between dissociation and psychotic and other psychological experiences, such as distress, experiential avoidance, reflective functioning and attempts at coping could help direct treatment using multimodal interventions. Findings from the systematic review demonstrate that dissociation is particularly present in acute and chronic stages psychosis, which might be an indicator of the distress and burden experienced from severe psychosis, underscoring the need for the implementation of trauma informed care.

Evidencing Benefits

The findings from the systematic review require replication in order for benefits to be evidenced. The finding that the majority of past studies are limited in methodological rigor due to being cross-sectional, not controlling for confounders, having small samples, not always using validated measures to measure psychotic experiences, and mainly using the DES as a measure of dissociation, highlights the urgent need for high quality research in the area. A fundamental assumption in this thesis is the theoretical proposition that dissociative

symptoms are separate experiences to psychotic symptoms, and that dissociative symptoms contribute to psychotic symptoms. The association has been supported by Longden et al. (2020) and recent studies using directed acyclic graphs (Černis et al., 2021) indicated a direction of causal inference supporting this idea. It has also been suggested, as indicated in the systematic review, that some proportion of dissociative symptoms may arise in response to psychotic experiences. This was replicated by our empirical study, but due to its cross-sectional nature the causal inferences that can be made are limited. As such, a big first task that requires investigation is primarily to phenomenologically capture how dissociative symptoms manifest, and how the different positions on subtypes of dissociative experiences relate to each other (Holmes et al., 2005; Cernis, 2021; Carlos &Putnam, 1993). The study of the phenomenology of dissociative experiences in individuals with DT would benefit greatly from qualitative research. A second task is to understand the impact of dissociation on psychotic experiences longitudinally, to what extent they are comorbid, and to what extent they might represent the same phenomenon, as proposed by Moskowitz and colleagues, (2009).

While dissociation , in the context of emotion dysregulation, is frequently discussed in clinical settings as a factors that may add complexity to treatment, it is unclear if dissociation itself hinders outcomes for the clinical management of psychotic experiences and which part of treatment in particular. Further research is needed to 1)understand if dissociative experiences impact other clinical and functional outcomes and treatment response 2) establish whether targeting dissociation would be a useful therapeutic component, compared to treatments currently implemented. The novel finding that dissociation mediates the relationship between DT and psychosis independent of PTSD and CPTSD needs to be studied further, as it is suggested that multiple processes are likely at play. Identifying a role for dissociation and its potential value in treatment could help advance current trials and

therapies used for comorbid PTSD and psychosis. Finally, it is important for any intervention tested to have good face validity and for feedback to have been received *a priori,* as often dissociative experiences constitute deeply ingrained experiences which are experienced as unconsciously driven, uncontrollable and distressing, and should be addressed with sensitivity and compassion.

Dissemination Plan

The findings of this thesis will be disseminated through a range of networks to ensure the access of professionals from multiple disciplines working with trauma and psychosis. They will be submitted for a poster presentation in a regional conference which is attended by students and early career researchers. As I am lucky to be a member of a London Specialist Trauma Service, the findings will be presented to the service's journal club which is open to clinicians from other services. I also have links with a Forensics team and a Community Mental Health Team, where I was previously on clinical placements, and I will be contacting the teams to offer to present these findings in their research meetings.

A submission will be made to present the findings in international conferences, such as The Schizophrenia International Research Society and conferences on Traumatic Stress. The empirical paper and systematic review will be submitted to high impact peer-reviewed journals for publication, such as Schizophrenia Bulletin, Psychological Medicine and Schizophrenia Research. We will aim to submit to journals which will be read by a broad range of mental health professionals, in order to maximise the chance of these findings being further investigated.

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Appendix A

Full search terms used for Psychinfo, EMBASE, Medline.

(dissociat* or dereali*ation or depersonali*ation or detachment or compartmentali*ation or exp Dissociative Disorders/) AND (psychos*s or psychot* or schizo* or subclinical psych* or at-risk-mental state* or at risk mental state* or clinical high risk or clinical high-risk or ultra high risk or ultra high-risk or delusion* or hallucinat* or negative sympt* or paranoi* or exp Affective Disorders, Psychotic/ OR exp Paranoid Disorders/ OR exp Psychotic Disorders/ OR exp Psychoses, Substance-Induced/ OR exp Schizophrenia/) AND (Advers* or (early life or childhood) adj3 (stress or trauma* or abuse* or neglect) or exp Child Abuse/ OR exp Child Abuse, Sexual/ OR exp Physical Abuse/ OR exp Psychological Trauma/ OR exp Sexual Trauma/ OR neglect* OR exp Bullying/ or psychological* trauma* or sexual* abus* or sexual* maltreat* or physical* abuse* or physical* maltreat* or emotional* abus* or emotional* maltreat*)

Appendix B

Quality Assessment Tools

1. Newcastle Ottawa Scale for Case-control studies

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Exposure categories. A maximum of two stars can be given for Comparability.

Selection

1) Is the case definition adequate?
   a) yes, with independent validation □
   b) yes, eg record linkage or based on self-reports
   c) no description

2) Representativeness of the cases
   a) consecutive or obviously representative series of cases □
   b) potential for selection biases or not stated

3) Selection of Controls
   a) community controls □
   b) hospital controls
   c) no description

4) Definition of Controls
   a) no history of disease (endpoint) □
   b) no description of source

Comparability

1) Comparability of cases and controls on the basis of the design or analysis
   a) study controls for _____ (Select the most important factor.) □
   b) study controls for any additional factor □ (This criteria could be modified to indicate specific control for a second important factor.)

Exposure

1) Ascertainment of exposure
   a) secure record (eg surgical records) □
   b) structured interview where blind to case/control status □
   c) interview not blinded to case/control status
   d) written self report or medical record only
   e) no description

2) Same method of ascertainment for cases and controls
   a) yes □
   b) no

3) Non-Response rate
   a) same rate for both groups □
   b) non respondents described
   c) rate different and no designation

2. Newcastle Ottawa Scale for Cohort studies

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability

Selection

1) Representativeness of the exposed cohort
   a) truly representative of the average _____ (describe) in the community □
   b) somewhat representative of the average _____ in the community □
   c) selected group of users eg nurses, volunteers
   d) no description of the derivation of the cohort

2) Selection of the non exposed cohort
   a) drawn from the same community as the exposed cohort □
   b) drawn from a different source
   c) no description of the derivation of the non exposed cohort

3) Ascertainment of exposure
   a) secure record (eg surgical records) □
   b) structured interview □
   c) written self report
   d) no description

4) Demonstration that outcome of interest was not present at start of study
   a) yes □
   b) no

Comparability

1) Comparability of cohorts on the basis of the design or analysis
   a) study controls for _____ (select the most important factor) □
   b) study controls for any additional factor □ (This criteria could be modified to indicate specific control for a second important factor.)

Outcome

1) Assessment of outcome
   a) independent blind assessment □
   b) record linkage □
   c) self report
   d) no description

2) Was follow-up long enough for outcomes to occur
   a) yes (select an adequate follow up period for outcome of interest) □
   b) no 3) Adequacy of follow up of cohorts

   a) complete follow up - all subjects accounted for □

b) subjects lost to follow up unlikely to introduce bias - small number lost - > ____ % (select an adequate %) follow up, or description provided of those lost) □
c) follow up rate < ____% (select an adequate %) and no description of those lost
d) no statement.

3. Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

Criteria	Yes	No	Other (CD, NR, NA)*
1. Was the research question or objective in this paper clearly stated?			
2. Was the study population clearly specified and defined?			
3. Was the participation rate of eligible persons at least 50%?			
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?			
5. Was a sample size justification, power description, or variance and effect estimates provided?			
6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?			

Criteria	Yes	No	Other (CD, NR, NA)*
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?			
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?			
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			
10. Was the exposure(s) assessed more than once over time?			
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			
12. Were the outcome assessors blinded to the exposure status of participants?			
13. Was loss to follow-up after baseline 20% or less?			

Criteria	Yes	No	Other (CD, NR, NA)*
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?			

Appendix C

Sample Sociodemographic and Additional Clinical Characteristics

Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication
Alvarez et al. 2015	123	45 individuals with psychosis in outpatient treatment and 78 healthy controls.	Spain	37.23%	18	N/R	37.9	N/R	N/R	N/R	N/R for patients, exclusion criterion for controls.
Álvarez et al., 2021	45	45 individuals with psychosis in outpatient treatment	Spain	44%	18	N/R	41.1	10	N/R	N/R	N/R
Berry et al. 2018	123	123 Students and staff with no previous contact with secondary care	United Kingdom	69.00%	18	N/R	22	1.5	47.9% White British, 13.0% Other White, 30.9% Asian, 8.1% Other	Recorded continuous measures of anxiety	N/A
Blose et al. 2023	356	University students	United States	52%	18	24	19.1	1.33	67.9% White, 15.9% Asian, 6% Hispanic/latino,6.4% African american	N/R	N/R
Bortolon et al. 2017	425	Participants recruited online	France-online	79.10%	N/R	N/R	33.23	15.2	No	depression and anxiety symptoms	N/R

Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication
Bortolon et al. 2018	425	Participants recruited online	France-online	82.10%	18	60	33.23	11.12	N/A	depression and anxiety symptoms	N/R
Braehler et al. 2013	172	62 patients with FEP; 43 chronic patients (39 with schizophrenia, and 4 were diagnosed with schizoaffective disorder) 67 community control	United Kingdom	32.15%	18	50	27.1	6.04	90%+ Caucasian,	20 FEP had comorbidities; 4 chronic psychosis had comorbidities; community controls (35 had comorbidities)	N/R
Chae et al. 2015	98	N = 98	Korea	49%	18	65	19.4	8.9	N/R	No	all participants were receiving at least one type of antipsychotic medication
Cole et al. 2016	200	200 undergraduate students	United Kingdom	82.50%	18	38	19.96	2.18	British (69%), Any other White background (7.5%), India(4.5%)	N/R	N/R
Degnan et al. 2022	242	n = 242, recruited online	Internatio nal-online	30.60%	N/R	N/R	31.17	13.06	White British (49.2%), White other (36.8%), South/Southeast Asian (3.3%), Black British (0.8%), Mixed ethnic background (9.9%).	N/R	N/R

Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication
Dorahy et al. 2009	65	65 outpatients and inpatient users of services (DID,SSD with and without maltreatment)	Northern Ireland, Australia	55.40%	19	63	41.61	11.12	N/R	N/R	All patients received medication
Evans et al. 2015	60	29 FEP participants 31 non-clinical	United Kingdom	36.70%	18	38	N/R	N/R	Clinical: 86.2% White British, Non-Clinical: 93.5% White British	N/R	N/R
Gibson et al. 2019	945	945 individuals	USA	75.60%	18	34	20.13	2.47	55% White, 17.9% African/African American, 15.3% Asian, 5.10% Mixed, 6.7% Other	depressive symptoms, generalized anxiety symptoms, and substance use	N/R
Goff et al. 1990	61	61 chronic patients	USA	33.90%	N/R	N/R	42	11.5	N/R	BPD, substance misuse	Neuroleptics (maintenance treatment)
Gomez & Freyd 2017	192	192 University students	USA	65%	N/R	N/R	N/R	N/R	N/R	N/R	N/R

Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication

Khosravi et al. 2021	210	70 FEP patients and 70 chronic chronic-outpatients and 70 age-, gender-, and education level-matched community controls	Iran	35.70%	18	65	N/R	N/R	N/R	3 chronic psychotic patients were comorbid with borderline personality disorder, 2 with DID	N/R
Longden et al. 2016	67	36 patients with FEP and non-auditory hallucinations and 31 with auditory hallucinations	United Kingdom	50%	N/R	N/R	25.85	4.3	50% and 67.7% white, 44.4% and 29% Asian, 5.6 % and 3.8% Afro-Caribbean	N/R	Cases were more likely to be prescribed anxiolytic medication
Mertens et al. 2021	89	University students	Spain	61.80%	N/R	N/R	24.8	2.7	predominantly Western European (94.4% Spanish	N/A	N/R
Muenzenmaier et al. 2015	183	Outpatients	USA	39.34%	18	65	N/R	N/R	98 (53.5%) African American and 53 (29.0%) as non-White Hispanic.	N/R	N/R
Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication
Nesbit et al. 2022	99	DID group=50 SSD group= 49 Stabilized inpatients and outpatients	New Zealand and Australia	42.90%	N/R	N/R	43.76	10.84	N/R	N/R	N/R

Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication
O Neil et al. 2021	268	268 sexual trauma survivors: 237 CSA and 32 ASA- recruited online	United Kingdom, USA, Australia	88%	N/R	N/R	32.98	10.71	72% White	N/R	N/R
Offen et al. 2003	26	SCZ (21), psychosis (1), manic-depression (1), psychotic depression (1), schizoid (1)- all outpatients with previous inpatient treatment	UK	27%	23	67	34		88% white, 1 black, 2 mixed	N/R	N/R
Pearce et al. 2017	112	112 Participants past or present SSD	United Kingdom - Online	72%	18	72	40.26	12.5	89% Caucasian	N/R	69% using medication
Perona-Garcelan et al. 2010	37	Outpatients; 34 had been diagnosed with schizophrenic disorder and 3 with a schizoaffective disorder.	Spain	83.78%	N/R	N/R	36.48	8.09	N/R	N/R	All subjects had been prescribed pharmacological treatment.
Perona-Garcelan et al., 2012	71	71 outpatients with psychosis: 66 paranoid schizophrenic disorder, 3 with schizoaffective disorder,1 delusional disorder, DSM-IV-TR	Spain	31.48%	20	62	39.08	9.98	N/R	N/R	All participants prescribed pharmacological treatment
Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication

Perona-Garcelan et al., 2014	318	318 volunteer students at the Universities of Seville and Almería	Spain	79%	N/R	N/R	21.41	5.78	N/R	N/R	Exclusion criterion
Sar et al. 2010	70	SCZ	Turkey	54.30%	19	59	38.3	11.3	N/R	Description of dissociative and borderline criteria	Neuroleptic drug treatment
Schäfer et al. 2006	30	30 inpatients	Germany	100%	18	60	34.6	5.5	N/R	N/R	N/R
Schäfer et al. 2012	145	Inpatients with schizophrenia spectrum disorders	Hamburg, Germany	33%	N/R	N/R	39	11.5	100% Caucasian	N/R	N/R
Schalinski & Teicher, 2015	75	Inpatients with schizophrenia spectrum disorders	Germany	38.66%	N/R	N/R	31	10	N/R	N/R	N/R
Schalinski et al. 2019	250	180 patients and 70 controls recruited from the community.	Germany	34.02%	N/R	N/R	28.6	8.8	N/R	N/R	95.55% currently treated with neuroleptics (chlorpromazine equivalent, M = 518, SD = 390).
Schroeder et al. 2016	145	Inpatients with schizophrenia spectrum disorders	Germany	33%	18	65	34	11.5	N/R	N/R	N/R
Study	Sample size	Sample	Location	% female	min age	max age	Mean age	SD age	Reports on Ethnicity	Reports on comorbidity	Medication

Sun, Alvarez-Jimenez, Simpson et al. 2018	66	66 FEP participants	Melbourne, Australia	54.50%	15	25	20.18	2.69	White 69.7% , Australian aboriginal 3% and "Other" 27.3%	N/R	60% antipsychotics, 18.2% antidepressants, 4.5% mood stabilizers, 1.5% other,15.2% no medication
Sun,Alvarez-Jimenez, Lawrence al. 2019	66	66 FEP participants	Melbourne, Australia	54.50%	15	25	20.18	2.69	White 69.7% , Australian aboriginal 3% and "Other" 27.3%	13.6% of the sample met criteria for a dissociative disorder	84.80%
Thompson et al. 2016	233		Australia	51.90%	N/R	N/R	18.9	3.4	N/R	measures of depression, anxiety, liability, mania, and mood swings	N/R
Uyan et al. 2022	200	100 patients and 100 controls recruited from the community	Turkey	51%	18	64	42.38	15.38	N/R	in 32 (60.4%) among patients and in 21 (39.6%) among controls	100% of patients
Varese et al. 2012	65	45 Patients and 20 controls	North Wales, United Kingdom	22%	18	65	43.05	13.18	N/R	N/R	88.88%

Appendix D
Correlation Tables Between Types of Abuse and Total Dissociation and Subscales

Table 1.

Correlation between physical abuse and dissociation subscales

Study name	Total dissociation	Absorption	Depersonalisation/ derealisation	Amnesia
Berry et al. 2018	.249*	.207*	0.133	.264*
Braehler et al. 2013 (FEP)	.185	N/R	N/R	N/R
Braehler et al. 2013 (chronic)	.349***	N/R	N/R	N/R
Braehler et al. 2013 (community)	0.073	N/R	N/R	N/R
Chae et al. 2015	.36*	N/R	N/R	N/R
Cole et al. 2016	.39*	N/R	N/R	N/R
Goff et al. 1990	.19*	N/R	N/R	N/R
Khosravi et al. 2021	N/R	0.07	0.1	0.016
Schafer et al. 2012	.223*	.245*	.09	.224*
Schafer et al. 2006	nil	nil	nil	nil
Varese et al. 2012 (clinical)	0.10	N/R	N/R	N/R
Varese et al. 2012 (aggregate)	.24	N/R	N/R	N/R

* $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2.

Correlation between sexual abuse and dissociation subscales

Study name	Total DES	DES absorption	Depersonalisation/derealisation	Amnesia
Berry et al. 2018	0.146	0.121	0.023	0.117
Braehler et al. 2013 (FEP)	.35***	N/R	N/R	N/R
Braehler et al. 2013 (chronic)	.427***	N/R	N/R	N/R
Braehler et al. 2013 (community)	.348***	N/R	N/R	N/R
Chae et al. 2015	.50*	N/R	N/R	N/R
Cole et al. 2016	.22**	N/R	N/R	N/R
Goff et al. 1990	.34*	N/R	N/R	N/R
Khosravi et al.	.65***	.64***	.64***	.62***
Schafer et al. 2012	.26*	.26*	.22*	32**
Schafer et al. 2006	nil		nil	nil
Varese et al. 2012 (clinical)	0.31*	N/R	N/R	N/R
Varese et al. 2012 (aggregate)	.35**	N/R	N/R	N/R

Note * p<0.05, ** p<0.01, *** p<0.001, FEP= First Episode Psychosis., N/R= Not Reported

Table 3

Correlation between emotional abuse and dissociation subscales

Study name	Total dissociation	Absorption	Depersonalisation/ derealisation	Amnesia
Berry et al. 2018	.403*	.393*	.351*	.273*
Braehler et al. 2013 (FEP)	.476***	N/R	N/R	N/R
Braehler et al. 2013 (chronic)	.653***	N/R	N/R	N/R
Braehler et al. 2013 (community)	0.319***	N/R	N/R	N/R
Chae et al. 2015	0.47*	N/R	N/R	N/R
Cole et al. 2016	.45**	N/R	N/R	N/R
Goff et al. 1990	N/R	N/R	N/R	N/R
Khosravi et al.	N/R	0.03	-0.08	0
Mertens et al. 2021	.31**	N/R	N/R	N/R
Schafer et al. 2012	.234*	.26*	.15*	.239**
Schafer et al. 2006	nil	nil	nil	.55*
Varese et al. 2012 (clinical)	0.26	N/R	N/R	N/R
Varese et al. 2012 (aggregate)	.38**	N/R	N/R	N/R

Note * p<0.05, ** p<0.01, *** p<0.001, FEP= First Episode Psychosis., N/R= Not Reported

Table 4

Correlation between physical neglect and dissociation subscales

Study name	Total dissociation	Absorption	Depersonalisation/ derealisation	Amnesia
Berry et al. 2018	.275*	.261*	0.171	0.202
Braehler et al. 2013 (FEP)	0.18	N/R	N/R	N/R
Braehler et al. 2013 (chronic)	.393***	N/R	N/R	N/R
Braehler et al. 2013 (community)	0.306**	N/R	N/R	N/R
Chae et al. 2015	.35*	N/R	N/R	N/R
Cole et al. 2016	.57**	N/R	N/R	N/R
Goff et al. 1990	N/R	N/R	N/R	N/R
Khosravi et al.	N/R	0	-0.05	0.01
Schafer et al. 2012	.129	0.124	0.171	.217*
Schafer et al. 2006	nil	nil	nil	.58*
Varese et al. 2012 (clinical)	0.23	N/R	N/R	N/R
Varese et al. 2012 (aggregate)	.41*	N/R	N/R	N/R

Note. * p<0.05, ** p<0.01, *** p<0.001. FEP= First Episode Psychosis., N/R= Not Reported

Table 5

Correlation between emotional neglect and dissociation subscales

Study name	Total dissociation	Absorption	Depersonalisation/ derealisation	Amnesia
Berry et al. 2018	.33*	.307*	.225*	.201*
Braehler et al. 2013 (FEP)	.290*	N/R	N/R	N/R
Braehler et al. 2013 (chronic)	0.106	N/R	N/R	N/R
Braehler et al. 2013 (community)	0.161	N/R	N/R	N/R
Chae et al. 2015	.35*	N/R	N/R	N/R
Cole et al. 2016		N/R	N/R	N/R
Goff et al. 1990	N/R	N/R	N/R	N/R
Khosravi et al.	N/R	-0.07	-0.03	-0.02
Schafer et al. 2012	0.32	0.32	-.03	.077
Schafer et al. 2006	nil	nil	nil	nil
Varese et al. 2012 (clinical)	0.23	N/R	N/R	N/R
Varese et al. 2012 (aggregate)	.41*	N/R	N/R	N/R

Note. * $p<0.05$, FEP= First Episode Psychosis, ., N/R= Not Reported,

Appendix E

Health Research Authority Approval

Dr Michael A. P. Bloomfield
Division of Psychiatry, Wing B
Maple House, 6th floor
149 Tottenham Court Road
W1T 7NF

Email: approvals@hra.nhs.uk
HCRW.approvals@wales.nhs.uk

07 June 2022

Dear Dr Bloomfield

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**IMPACT: Investigating the Mechanisms underlying Psychosis Associated with Childhood Trauma**
IRAS project ID:	**269253**
REC reference:	**22/YH/0096**
Sponsor	**University College London**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **269253**. Please quote this on all correspondence.

Yours sincerely,

Hayley Henderson
Approvals Manager

Email: approvals@hra.nhs.uk

Appendix F

UCL Letter of Sponsorship

Dear M. Bloomfield,

**** PLEASE RETAIN A COPY OF THIS EMAIL IN YOUR TRIAL MASTER FILE****

I am pleased to let you know that UCL has confirmed sponsorship for your study. **Please note that this is not permission for you to begin your research study; you must additionally have in place appropriate regulatory approvals (e.g. HRA, REC,) and NHS confirmations of Capacity and Capability prior to recruitment/data collection. Failure to have these in place will lead to suspension of your study.**

Please can I ask you to save it in your final documents and complete the following:

- Double check all documents before submitting on IRAS.
- ***Once IRAS submission is made, forward all documents submitted as Zip Folder to me (including authorised IRAS form)***

Please complete the following steps below for IRAS sign off and HRA submission:

IRAS Sponsor authorisation

- Check all the documents (typos, version number and date) and upload them into the IRAS checklist following the attached E-Submission Guide (please include all study docs; UCL insurance confirmation; OID and schedule of events
- Please request IRAS authorisations - the CI fields need to be completed first Please then send a final request for sponsor authorisation to Pushpsen Joshi (pushpsen.joshi1@nhs.net) who will sign on behalf of the sponsor. Please use the IRAS form authorisation tab to request the authorisation as per screenshot below:

Health Research Authority (HRA) and Research Ethics Committee (REC) submission process

Once the IRAS form is signed by both the CI, and sponsor, please proceed with the HRA and REC submission process:

- Before electronically submitting your application for HRA and Ethics Approval you need book a meeting through the webform (https://www.hra.nhs.uk/about-us/committees-and-services/online-booking-service/) before you press the e-submission button to book your REC review. This must be done before you submit your IRAS form on the same day.

· You will receive an email confirming that your application has been booked for HRA Approval. You should enter the booking information on the first page of the IRAS Form.

IMPORTANT NOTE: Do not amend any other part of the IRAS Form as this will invalidate your electronic authorisations.

- On the E-submission tab for the IRAS Form you should click the button to electronically submit your application for Approval. You are expected to do this the same day that you book your application via OBS. This will submit your IRAS Form and the supporting documentation you uploaded to the Checklist. Confirmation of your submission will appear in the Submission History area at the bottom of the E-submission tab.

Portfolio Adoption Form (PAF)

If you are applying for NIHR portfolio adoption, please also remember to complete and submit your PAF in IRAS. Please forward any correspondence or confirmations to your portfolio coordinator

HRA and REC Approval

When you receive a REC opinion letter and HRA approval letter please ensure you send these to your portfolio coordinator and to uclh.randd@nhs.net

TRIAL MASTER FILE

As a condition of UCL Sponsorship please can you ensure you create a Trial Master File for your project. You can use the UCLH SOP for guidance - https://www.ucl.ac.uk/joint-research-office/resources-and-templates/sops-management-progress-and-close-down-all-uclh-studies

Amendments:

From this point forwards, if you need to make any amendments to the research documentation, you will need to submit these to the sponsor: uclh.randd@nhs.net as an amendment. Please refer to the following link on the HRA website: http://www.hra.nhs.uk/resources/after-you-apply/amendments/

for information on the national amendment process and amendment documentation.

If you have any questions please do not hesitate to contact me.

Kind regards,

Eirini Tsitsipa
UCLH/UCL Joint Research Office, part of the Research Directorate
4th Floor, West
250 Euston Road
London
NW1 2PG

Appendix G

Royal Holloway Ethics Decision

Result of your application to the Research Ethics Committee (application ID 3407)

EA **Ethics Application System <ethics@rhul.ac.uk>** Tuesday, 1 November 2022 at 1:

To: Melegkovits, Eirini (2020); Ashcroft, Katie; Ethics

PI: Katie Ashcroft
Project title: Dissociation in the relationship between childhood trauma and psychotic experiences

REC ProjectID: 3407

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

Appendix H

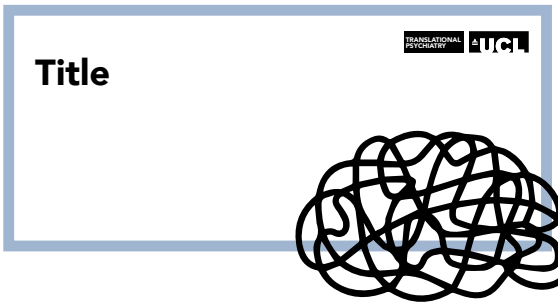
IMPACT A advertisements

Titles

- Did you experience a difficult or traumatic childhood?
- Want to participate in mental health research?
- Do you hear voices, feel scared, or feel that people are out to get you?

Subtitles

- We are looking for healthy volunteers without experiences of childhood trauma.
- We are looking for volunteers who have experiences of childhood trauma.
- Help others by advancing mental health research.



Titles (same as above)

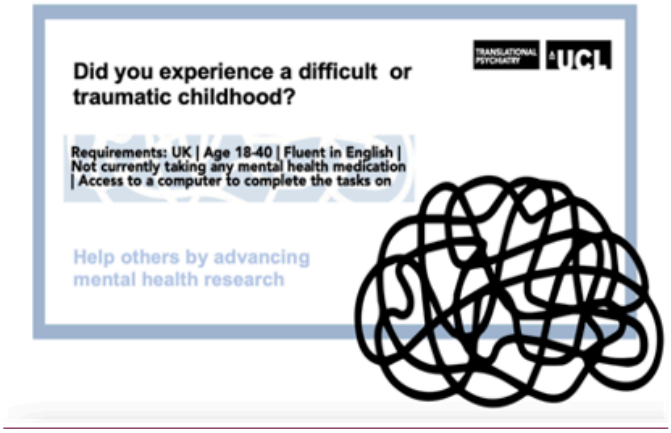
- Did you experience a difficult or traumatic childhood?
- Want to participate in mental health research?
- Do you hear voices, feel scared, or feel that people are out to get you?

Subtitles

- We are looking for healthy volunteers without experiences of childhood trauma.
- We are looking for volunteers who have experiences of childhood trauma.
- Help others by advancing mental health research.

Example text:

"We are researchers in the Psychiatry department of University College London. We are looking for volunteers to participate in our NHS approved study on hearing voices and feeling threatened.
You may or may not hear voices and feel threatened to participate
The first part is an online survey (£50 Amazon Prize Draw)
Subsequent parts if you are eligible include 3 hour paid online behavioural tasks and an fMRI scan in London. (£11.05p/h)
Click here to find out more:
https://uclpsych.eu.qualtrics.com/.../SV_8vrsax4B36QmjUW...
Your participation is anonymous and confidential, and will help contribute to research in psychiatry, which may help future individuals with mental health problems.
Ethical approval from NHS Research Ethics Committee (REC reference: 22/YH/0096).
If you have any questions about taking part in the study, please message our Facebook page for more information or email us at dop.recruit.tp@ucl.ac.uk.



Example text:

We are researchers in the Psychiatry department of University College London. We are looking for volunteers aged 18-40 to participate in our study investigating how childhood trauma affects the way the mind works in adulthood.
You do not need to have experienced trauma in childhood or adulthood to be able to participate.
This involves 3-hour online behavioural tasks and 1-hour questionnaires that will be reimbursed £33, and you will also be entered into a £50 prize draw.
Click here to find out more and participate in the study:
https://uclpsych.eu.qualtrics.com/.../SV_9ulYjzPRtOTUJOS
Your participation is anonymous and confidential and will help contribute to research in psychiatry, which may help future individuals with mental health problems.
Ethical approval from NHS Research Ethics Committee (REC reference: 22/YH/0096).
If you have any questions about taking part in the study, please message our Facebook page for more information.

Appendix I

Part C IMPACT study invitation

Title: IMPACT study invitation

Hello,

Thank you for your participation in part B of the IMPACT study, being conducted by University College London.

We would like to invite you to participate in part C of the IMPACT study, which will take place at the Wellcome Centre for Human Neuroimaging, 12 Queen Square, London WC1N 3AR.

This will involve coming into our labs and completing questionnaires about mood, some pen and paper tasks and a psychological task that will be completed in a functional magnetic resonance imaging (fMRI) scanner that will involve small electric shocks to the wrist or ankle (the shocks will be adjusted so that the shock is mildly uncomfortable but not painful).

This will take approximately 3 hours of your time, for which you will be paid at £11.05/h (**total £33.15**). We will also reimburse your travel expenses.

Please read the Information sheet (see attached) for more information.

If you are interested in participating, please complete the attached consent form and the safety questionnaire.

If you wish to discuss this further or have any questions, please do not hesitate to email me.

I thank you for your time and look forward to hearing from you.

Paul from the IMPACT Study team

Translational Psychiatry Research Group
Division of Psychiatry
University College London
https://twitter.com/TP_UCL
https://www.facebook.com/UCLDevelopmentalTraumaResearch

We keep all of your information confidential in like with the Data Protection Act (1998), and the General Data Protection Regulation (2018).

Appendix J
Participant Information Sheets and Consent Forms

Participant Information Sheet (PIS) For Adult Volunteers- IMPACT A

UCL Research Ethics Committee Approval ID Number: 17495/001
IRAS Number: 269253

Title of Study: IMPACT: Investigating the Mechanisms underlying Psychosis Associated with Childhood Trauma, Part A Online Questionnaires and Cognitive Tasks

This study has been approved by the UCL Research Ethics Committee (Project ID Number 17495/001*) and by the Health Research Authority (IRAS Number: 269253). Investigators to whom correspondence should be addressed are Ms Ava Mason (ava.mason.20@ucl.ac.uk) and Mr Paul Jung (paul.jung.15@ucl.ac.uk), University College London.*

1. Invitation Paragraph

Thank you for your interest in this study. Before you decide whether to take part, it is important that you understand why this study is being conducted, and what your participation will involve. Please read the below information carefully, and feel free to ask questions about anything you do not understand (see below for contact details).

If you wish to take part after reading the information below, then please note that **you will need to use a computer to complete the tasks instead of a phone/tablet/touchscreen device**. This study will take **approximately 1 hour - 1 hour 15 minutes** and will require a stable internet connection and charging supply and, where possible, tasks will need to be completed in a setting with as few distractions as possible.

2. What is the project's purpose?

Childhood trauma has been found to increase the risk of psychosis, a mental health problem that causes people to interpret things differently from those around them. This might involve hearing voices (hallucinations), paranoia or delusions. By understanding how childhood trauma increases the risk of psychosis will improve detection and treatment of people who are most at risk. The project aims to test how a how experiencing childhood trauma affects the brain, behaviour, and mental state in adult volunteers. The project is expected to run for a year.

3. Why have I been chosen?

We are inviting people aged 18-40. Volunteers must be fluent in reading, understanding, and communicating in English, as well as good vision, no colour blindness. If you are pregnant or are at risk of becoming pregnant you will not be able to take part. If you are afraid of small closed spaces or loud noises you may not be suitable for this study.

4. Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you are able to print this information sheet to keep. You can withdraw at any time without giving a reason and without it

affecting any benefits that you are entitled to. If you decide to withdraw from the study, data already collected with consent will be retained and used in the study. No further data will be collected, or any other research procedures carries out on or in relation to you.

5. What will happen if I take part?

If you agree to take part in the study, you will first be asked to complete a series of online questionnaires on this web-based experimental platform. Firstly, you will be asked for some demographic information (e.g. age, sex) and also your smoking and alcohol history, whether you have a serious medical condition, and whether you have previously used mental health services. Then, you will complete surveys investigating your exposure to traumatic experiences during childhood and adolescence, such as emotional, physical, and sexual abuse. You will also complete a few more questionnaires to measure any mental health symptoms you might currently have, such as low mood, anxiety, or psychosis. Data from these questionnaires will be recorded for analysis.

During this process, you will also complete a series of online psychological tasks. This will include:

- Memory tasks (to test your ability to remember things like numbers or the positions of objects)
- Reward processing tasks (to assess how you interpret rewards and make subsequent decisions using a game where you will play for points)
- Emotional processing (to test how you interpret and might focus on different emotions)
- Social cognition (to measure your self-esteem)
- Executive function (to measure decision-making)

We anticipate that all of these questionnaires and tasks will take approximately 1 hour - 1 hour 15 minutes to complete. However, you will be able to stop and come back to anything that is remaining at a later stage.

6. Future Studies

There are three parts to the study, of which this is the first part (Part A). Following this part of the study, you will also be asked whether you are happy to be contacted about participation in future parts of the study.

Future parts will be both online (Part B1) and face to face (Part B2 and C) within a UCL test centre, pending government guidelines on COVID-19.

Your participation in these future parts of the study are entirely voluntary. We will provide more information prior to taking part in future studies. Your participation in the present study will not be affected should you choose to be re-contacted or not at a later date.

7. What are the possible disadvantages and risks of taking part?

Although some of our questions may ask you about bad things that may have happened to you in your childhood, they do not go into detail about what happened. However, revisiting any traumatic experiences has the potential to cause upset or anxiety. If you feel upset or anxious whilst completing the questionnaire, we recommend that you discuss your feelings with somebody you are close to, or your healthcare professional.

It is also important to recognise when we are struggling or not coping. If you feel that you are struggling, you can access professional help through your GP, at any A&E or in many other ways:

- Call the Samaritans on *116 123* for 24-hour support if you are feeling distressed, in despair or suicidal,
- You can also call the Victim Support team on *0808 1689 111* if you are struggling with abuse, or the National Association for People Abused in Childhood on *0808 801 0331* for support and guidance if you are an adult survivor of childhood abuse.

More details will be provided about the other parts of the study should you agree to receive these. The main risks of taking part in the other parts of the study are that you will feel stressed and/or scared (I.e. fearful). These experiences will be short-lived I.e. they will last less than hour. From previous research that we and other people have conducted, most people are able to take part in this research without experiencing unpleasant side-effects. If you have a mental health problem, there is a risk that your experience and/or symptoms of your mental health problem may get worse while you are doing these later tasks. If this happens this will most likely be very short lived. If these happen in later parts of the study, a study psychiatrist will be available to help you if you need this.

8. What are the possible benefits of taking part?

You will leave with the knowledge that you have contributed to our understanding of the effect of childhood trauma and further progress in medical and psychological research. You will be entered in a prize draw for a £50 Amazon gift voucher for completing this part of the study (Part A). Part B and C of the study are reimbursed at £11.05 per hour each in line with current London wage.

9. What if something goes wrong?

If you have any problems during the study or would like to discuss the study, you can contact any of the research investigators. You can find their contact detail on last page of this information sheet. Every care will be taken in the course of this study. However, in the unlikely event that you come to harm as a result of you taking part in the study, compensation may be available. If you suspect that the injury is the result of the Sponsor's (University College London), then you may be able to claim compensation. Please make the claim in writing to the supervisor of the study Dr. Michael Bloomfield (m.bloomfield@ucl.ac.uk) who is the Chief Investigator for the study. The Chief Investigator will then pass the claim to the Sponsor and on to Sponsor's Insurers.

10. Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications.

11. Limits to confidentiality

Confidentiality will be respected unless there are compelling and legitimate reasons for this to be breached, such as immediate significant risk of harm to myself or others. If this was the case we would seek to inform you of any decisions that might limit your confidentiality when safe to do so, in line with General Medical Council guidelines.

12. Use of Deception

Research designs often require that the full intent of the study not be explained prior to participation. Although we have described the general nature of the tasks that you will be asked to perform, the full intent of the study will not be explained to you until after the completion of the study (at which point you may withdraw your data from the study).

13. What will happen to the results of the research project?

The results from this research will be presented at scientific meetings and will be published in scientific journals. These will be available on request, and you will not be identified as part of this research.
If you would like to know the results of the study, they can be emailed to you using the email address provided.

14. Local Data Protection Privacy Notice

Notice:

The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at *data-protection@ucl.ac.uk*.

This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice:

For participants in health and care research studies, click here

The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

Your data will initially be processed and collected through Gorilla, an online software platform endorsed by multiple universities (including University College London) and the British Psychological Society (BPS), where it is encrypted using industry-standard cryptography. The data will then be stored pseudonymously on University College London computers, which are also encrypted. It will be stored via a numbered code, so that the information you provide cannot be personally identified. The email address that you provide will be stored separately from these numbered codes. All data will be collected and stored in accordance with the EU General Data Protection Regulation (GDPR).

The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

The lawful basis that would be used to process your personal data will be performance of a task in the public interest. The categories of personal data used will be as follows:

- Gender
- Date of birth

The lawful basis used to process special category personal data will be for research purposes. The categories of special category personal data used will be as follows:

- Racial or ethnic origin
- Socioeconomic status
- Educational attainment
- Mental health

Your personal data will be processed so long as it is required for the research project. If we are able to anonymise or pseudonymise the personal data you provide we will undertake this, and will endeavour to minimise the processing of personal data wherever possible.

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at *data-protection@ucl.ac.uk*.

15. Who is organising and funding this research?

This research is being organised and funded by University College London.

16. Contact for further information?

If you have any further questions or queries regarding this research, do not hesitate to contact by email or phone.

17. Who has reviewed this study?
This study has been reviewed and given favourable opinion by the UCL research ethics committee (Study ID: 17495/001). The study has also been reviewed and approved by the Health Research Authority (IRAS Number: 269253).

18. What do I do now?
Take time to consider the information on this sheet and ask one of us if there is anything you are unsure about. Feel free to discuss the study with your relatives. If you decide you would like to take part simply proceed to the next page by clicking the 'next' button at the bottom of this page and you will be asked to sign the consent form.

Principal researcher: Dr Michael Bloomfield (m.bloomfield@ucl.ac.uk)

Researchers: Ava Mason (ava.mason.20@ucl.ac.uk), Paul Jung (paul.jung.15@ucl.ac.uk), Eirini Melegkovits (Eirini.melegkovits.17@ucl.ac.uk).

UCL Data Protection Officer: Alexandra Potts (data-protection@ucl.ac.uk)

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

Thank you for reading this information sheet and for considering to take part in this research study.

IMPACT A Consent form

CONSENT FORM FOR ADULT PARTICIPANTS IN RESEARCH STUDIES
UCL Research Ethics Committee Approval ID Number: 17495/001
IRAS Number: 269253

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Investigating the Mechanisms underlying Psychosis Associated with Childhood Trauma (IMPACT) – Part A Online Questionnaires and Tasks
Department: Research Department of Mental Health Neuroscience, Division of Psychiatry

Name and Contact Details of the Researcher(s): Paul Jung (paul.jung.15@ucl.ac.uk), Ava Mason (ava.mason.20@ucl.ac.uk), Eirini Melegkovits (eirini.melegkovits.17@ucl.ac.uk).
Name and Contact Details of Data Protection Officer: Alexandra Potts (data-protection@ucl.ac.uk)
Name and Contact Details of the Principal Researcher: Dr. Michael Bloomfield (m.bloomfield@ucl.ac.uk)

This study has been approved by the UCL Research Ethics Committee (Project ID Number 17495/001) and by the by the Health Research Authority (IRAS number: 269253). Investigators to whom correspondence should be addressed are Mr Paul Jung (paul.jung.15@ucl.ac.uk), University College London.

Thank you for your interest in taking part in this research. Before you agree to take part, please ensure you understand the project, and have asked any questions you have to the contacts provided above. Please complete this form after you have read the Participant Information Sheet (PIS).

Participant's statement (click Yes or No):

1. I confirm that I have read and understood the Information Sheet (dated 08/05/2022, version 2.1.4) for the above study. I have had an opportunity to consider the

information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction

2. I agree to take part in the following activities as part of this study and understand that the results will be recorded (please click Yes or No for each of the following):
   - Online questionnaires
   - Computer-based tasks

3. I consent to participate in the study. I understand that my personal information will be used for the purposes explained to me. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing. I understand that according to data protection legislation, 'research purposes' will be the lawful basis for processing special category data.

4. I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified. I understand that if the study researchers feel that I or others are at significant risk of harm, they may inform statutory bodies (e.g. doctors) of this when safe to do so, in line with General Medical Council guidelines. I understand that my data gathered in this study will be stored pseudonymously and securely. This means that your data will be given a unique code without your name or other identifiable information next to your data. It will be possible for researchers who have access to the code to link data to your name and other identifiable information, so that for example, you can be contacted to take part in future research. It will not be possible to identify you in any publications.

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

6. I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, without my medical care or legal rights being affected. I understand that if I decide to withdraw, data or tissue already collected with consent will be retained and used in the study. No further data or tissue will be collected or any other research procedures carries out on or in relation to me.

7. if I decide to withdraw, any personal data I have provided up to that point will be deleted unless I agree otherwise.

8. I understand the potential risks of participating and the support that will be available to me should I become distressed during the course of the research.

9. I understand the direct/indirect benefits of participating.

10. I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.

11. I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.

12. I understand that I will be entered into a prize draw for a £50 Amazon gift voucher as a thank you for taking part.

13. I agree that my anonymised research data may be used by others for future research. (No one will be able to identify you when this data is shared).

14. I understand that the information I have submitted will be published as a report.

15. I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet.

16. I hereby confirm that:

    (a) I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher; and
    (b) I do not fall under the exclusion criteria.

17. I have informed the researcher of any other research in which I am currently involved or have been involved in during the past 12 months.

18. I am aware of who I should contact if I wish to lodge a complaint.

19. I understand that the information held and maintained by University College London may be used to help contact me or provide information about my health status

20. I voluntarily agree to take part in this study

21. I agree to be for my contact details to be retained so that I can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature
22. I understand that the information I have submitted will be published as a report

_____ _____

Name of participant Date

Participant Information Sheet For Adult Volunteers- IMPACT C

UCL Research Ethics Committee study ID: 17495/001
IRAS Number: 269253

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Title of Study:
IMPACT: Investigating the Mechanisms Underlying Psychosis Associated With Childhood Trauma, Part C

Department:
Division of Psychiatry

Name and Contact Details of the Researcher(s):
Ava Mason (ava.mason.20@ucl.ac.uk)
Paul Jung (paul.jung.15@ucl.ac.uk)
Eirini Melegkovits (eirini.melegkovits.17@ucl.ac.uk)

Name and Contact Details of the Principal Researcher:
Dr. Michael Bloomfield (m.bloomfield@ucl.ac.uk)

1. Invitation Paragraph

Following your participation in previous parts of the IMPACT research project conducted at University College London, you are now invited to partake in Part C of this study. This project aims to investigate how childhood trauma can have different effects on the brain, in particular looking at how the brain recognises and responds to threats. The study will be spread over two sessions: the first being conducted over the phone/online, and session two will be a test day. The test day will involve coming into our labs and completing questionnaires about mood, some pen and paper/computer task and a type of brain scan called a functional magnetic resonance imaging (functional MRI) scan. The test day will last for roughly 3 hours.

2. What is the project's purpose?

Childhood trauma has been found to increase the risk of psychosis, a mental health problem that causes people to interpret things differently from those around them. This might involve hearing voices hallucinations, paranoia or delusions. By understanding how childhood trauma

increases the risk of psychosis will improve detection and treatment of people who are most at risk. The project aims to test how a how experiencing childhood trauma affects the brain, behaviour and mental state in healthy adult volunteers. The project is expected to run for a year.

3. Why have I been chosen?

We are inviting people aged 18-40. Volunteers must also have good spoken English and basic literacy skills, as well as good vision, no colour blindness. If you are pregnant or are at risk of becoming pregnant you will not be able to take part. If you are afraid of small closed spaces or loud noises you may not be suitable for this study.

4. Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep (and be asked to sign a consent form). You can withdraw at any time without giving a reason and without it affecting any benefits that you are entitled to. If you decide to withdraw from the study, data already collected with consent will be retained and used in the study. No further data will be collected, or any other research procedures carries out on or in relation to you.

5. What will happen to me if I take part?

Firstly, you will undertake an fMRI scanning session. All volunteers must agree to not use any illicit drugs for seven days prior to each test day, which will be tested with a urine sample. Women will also be tested for pregnancy from a urine sample on each test day. If your test results suggest that you have used illicit drugs in the last seven days, or that you might be pregnant, you will not be permitted to take part. We request that you eat breakfast as you normally would, and only consume your typical caffeine intake in the morning prior to the test session. Please refrain from smoking tobacco in the morning prior to the test session. We will test for recent smoking using a breath test. We ask that you refrain from drinking alcohol in the 24-hour period before the session. We suggest that you aim to have a good night's sleep so that you are well rested for the testing session.

The session will last for roughly two hours. During an MRI scan, you will lie on a flat bed that is moved into the scanner. The fMRI scanner will be operated by a researcher who is trained in carrying out fMRI scans. They will control the scanner using a computer in another room. You will be able to talk to the researcher through an intercom, and they will be able to see you on a television monitor throughout the scan. At certain times during the scan, the scanner will make loud tapping noises. You will be given earplugs or headphones to wear.

The psychological task that you will be completing in the MRI scanner will involve small electric shocks to the wrist or ankle that may be uncomfortable. We will adjust the strength of the shock before the task begins so that the electric shock is mildly uncomfortable but not painful. The whole scan will take approximately one hour. We will also measure how sweaty you are and your pupil sizes. You will also be asked to keep an online diary for a week reporting any intrusive memories you may experience following the scanning session.

Following this, you will also be asked to complete a psychological task that involves gazing at your own reflection in a mirror in a dimly-lit room for 10 minutes. You will then be asked questions on how you felt during this task.

6. What are the possible disadvantages and risks of taking part?

You may find the electric shocks to be uncomfortable or painful. We will ensure that electric shocks are calibrated (adjusted) appropriately before the task begins. Furthermore, the experiment will be stopped as soon as you tell us you are too uncomfortable to continue.

There are no known side-effects from exposure to magnetic fields (MRI). However, because MRI involves being placed in a strong magnetic field, there are times when it is not safe to be scanned. For example, in the first three months of pregnancy, or when there are surgical clips inside the brain, or if you have a heart pacemaker fitted. We have a safety questionnaire that you will fill in on the interview / screening day for the study, so that we can be sure that it is completely safe for you to be scanned. In case you have any questions, we will be happy to discuss this with you. We will also check that you are safe to be scanned on the day you come for the scan.

Some individuals undergoing fMRI become anxious being in a confined space, and some people do not like the sound of the scanner when it is in operation. If these reactions happen to you at any time during the procedure, the experiment can be stopped at any time on your request.

We will be taking pictures of your brain, and occasionally we will have unexpected findings that none of us suspected. The pictures are reviewed by experienced doctors, called neuroradiologists who specialise in looking at pictures of brain and spine. If there are any unexpected findings that need further tests, he/she will write to your GP in the first instance. The GP will then contact you if further tests are required. This is why your GP details are required in the safety check form.

7. What are the possible benefits of taking part?

You will leave with the knowledge that you have contributed to our understanding of the effect of childhood trauma and further progress in medical and psychological research. There will also be a monetary incentive of £32.35 per testing session.

8. What if something goes wrong?

If you have any problems during the study or would like to discuss the study, you can contact any of the research investigators. You can find their contact detail on last page of this information sheet. Every care will be taken in the course of this study. However, in the unlikely event that you come to harm as a result of you taking part in the study, compensation may be available. If you suspect that the injury is the result of the Sponsor's (University College London), then you may be able to claim compensation. Please make the claim in writing to the supervisor of the study Dr. Michael Bloomfield (m.bloomfield@ucl.ac.uk) who is the Chief Investigator for the study. The Chief Investigator will then pass the claim to the Sponsor and on to Sponsor's Insurers.

9. Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications.

10. Limits to confidentiality

Confidentiality will be respected unless there are compelling and legitimate reasons for this to be breached, such as the immediate significant risk of harm to myself or others. If this was the case we would seek to inform you of any decisions that might limit your confidentiality when safe to do so, in line with General Medical Council guidelines.

11. Use of Deception

Research designs often require that the full intent of the study not be explained prior to participation. Although we have described the general nature of the tasks that you will be asked to perform, the full intent of the study will not be explained to you until after the completion of the study (at which point you may withdraw your data from the study).

12. What will happen to the results of the research project?

The results from this research will be presented at scientific meetings and will be published in scientific journals. These will be available on request, and you will not be identified as part of this research.

13. Local Data Protection Privacy Notice

Notice:
The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at data-protection@ucl.ac.uk

This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice:

For participants in health and care research studies, click here

The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

The lawful basis that will be used to process your personal data are: 'Public task' for personal data and' Research purposes' for special category data.
Your personal data will be processed so long as it is required for the research project. If we are able to anonymise or pseudonymise the personal data you provide we will undertake this, and will endeavour to minimise the processing of personal data wherever possible.

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk

14. Who is organising and funding the research?

This research is supported by University College London

15. Who has reviewed this study?

This study has been reviewed and given favourable opinion by the UCL Research Ethics Committee study ID: 17495/001. The study has also been reviewed and approved by the Health Research Authority (IRAS Number: 269253).

16. Contact for further information

If you have any further questions or queries regarding this research, do not hesitate to contact by email or phone.

Principal researcher:
Dr Michael Bloomfield (m.bloomfield@ucl.ac.uk)

Researchers:
Paul Jung (paul.jung.15@ucl.ac.uk), Ava Mason (ava.mason.20@ucl.ac.uk), Eirini Melegkovits (eirini.melegkovits.17@ucl.ac.uk)

UCL Data Protection Officer: Alexandra Potts (data-protection@ucl.ac.uk)
You will be given a copy of the information sheet and a signed consent form.

Thank you for reading this information sheet and for considering to take part in this research study.

CONSENT FORM FOR ADULT PARTICIPANTS IN RESEARCH STUDIES

Impact C

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Investigating the Mechanisms underlying Psychosis Associated with Childhood Trauma (IMPACT) – Part C Functional Magnetic Resonance Imaging (fMRI)
Department: Division of Psychiatry
Name and Contact Details of the Researcher(s): Paul Jung (paul.jung.15@ucl.ac.uk), Ava Mason (ava.mason.20@ucl.ac.uk), Eirini Melegkovits (Eirini.melegkovits.17@ucl.ac.uk).
Name and Contact Details of the Principal Researcher: Dr. Michael Bloomfield (m.bloomfield@ucl.ac.uk)
Name and Contact Details of the UCL Data Protection Officer: Alexandra Potts (data-protection@ucl.ac.uk)
This study has been approved by the UCL Research Ethics Committee: Project ID number: 17495/001
Participant Identification Number for this trial:

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

		Tick Box
1.	I confirm that I have read and understood the Information Sheet (dated 08/05/2022) for the above study. I have had an opportunity to consider the	

	information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction	
2.	I agree to take part in the following activities as part of this study (please tick each of the following): - fMRI scan……... (that involves small electric shocks to the wrist or ankle, that will be adjusted so that the shock is mildly uncomfortable but not painful) - Behavioural task to evaluate processing of threat…...……... - Psychological task to evaluate self-identity…….. - Urine test…….. - Breathalyser test……. - Drug screen ……	
3.	I consent to participate in the study. I understand that my personal information will be used for the purposes explained to me. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing. I understand that according to data protection legislation, 'research purposes' will be the lawful basis for processing special category data.	
4.	I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified. I understand that if the study researchers feel that I or others are at significant risk of harm, they may inform statutory bodies (e.g. doctors) of this when safe to do so, in line with General Medical Council guidelines. I understand that my data gathered in this study will be stored pseudonymously and securely. This means that your data will be given a unique code without your name or other identifiable information next to your data. It will be possible for researchers who have access to the code to link data to your name and other identifiable information, so that for example, you can be contacted to take part in future research. It will not be possible to identify you in any publications	
5.	If I have been recruited from an NHS site, I understand that relevant sections of my medical notes and data collected during the study, may be looked at by individuals from University College London, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.	

6.	I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, without my medical care or legal rights being affected. I understand that if I decide to withdraw, data or tissue already collected with consent will be retained and used in the study. No further data or tissue will be collected or any other research procedures carries out on or in relation to me.	
7.	I understand the potential risks of participating and the support that will be available to me should I become distressed during the course of the research.	
8.	I understand the direct/indirect benefits of participating.	
9.	I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
10.	I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.	
11.	I understand that I will be compensated	
12.	I understand that the information collected about me will be used to support other research in the future, and will be shared anonymously with other researchers.	
13.	I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. Yes/No	
14.	I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet and explained to me by the researcher.	
15.	I hereby confirm that: (a) I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher; and (b) I do not fall under the exclusion criteria.	
16.	(If appropriate) I agree to my General Practitioner (GP) being informed of my participation in the study. / I agree to my GP being involved in the study, including any necessary exchange of information about me between my GP and the research team eg: if any unexpected results are found in relation to my health.	
17.	I have informed the researcher of any other research in which I am currently involved or have been involved in during the past 12 months.	
18.	I am aware of who I should contact if I wish to lodge a complaint.	
19.	I understand that the information held and maintained by University College London may be used to help contact me or provide information about my health status	
20.	I voluntarily agree to take part in this study	

If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.

	Yes, I would be happy to be contacted in this way	
	No, I would not like to be contacted	

_____ _____ _____

Name of participant Date Signature

Researcher	Date	Signature

Appendix K

Childhood Trauma Questionnaire

TRANSLATIONAL PSYCHIATRY RESEARCH GROUP

UCL

This questionnaire asks you about bad or stressful things that might have happened to you when you were a child.

For each question, select the box under the response that best describes how you feel.

1. Before the age of 17, I didn't have enough to eat.

Never true	Rarely true	Sometimes true	Often true	Very often true

2. Before the age of 17, I knew that there was someone to take care of me and protect me.

Never true	Rarely true	Sometimes true	Often true	Very often true

3. Before the age of 17, people in my family called me things like "stupid", "lazy" or "ugly".

Never true	Rarely true	Sometimes true	Often true	Very often true

4. Before the age of 17, my parents were too drunk or high to take care of the family.

Never true	Rarely true	Sometimes true	Often true	Very often true

5. Before the age of 17, there was someone in my family who helped me feel that I was important or special.

Never true	Rarely true	Sometimes true	Often true	Very often true

6. Before the age of 17, I had to wear dirty clothes.

Never true	Rarely true	Sometimes	Often true	Very often

7. Before the age of 17, I felt loved.

Never true	Rarely true	Sometimes true	Often true	Very often true

8. Before the age of 17, I thought that my parents wished I had never been born.

Never true	Rarely true	Sometimes true	Often true	Very often true

9. Before the age of 17, I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.

Never true	Rarely true	Sometimes true	Often true	Very often true

10. Before the age of 17, people in my family hit me so hard that it left me with bruises or marks.

Never true	Rarely true	Sometimes true	Often true	Very often true

11. Before the age of 17, I was punished with a belt, a board, a cord or some other hard object.

Never true	Rarely true	Sometimes true	Often true	Very often true

12. Before the age of 17, people in my family looked out for each other.

Never true	Rarely true	Sometimes true	Often true	Very often true

13. Before the age of 17, people in my family said hurtful or insulting things to me.

Never true	Rarely true	Sometimes true	Often true	Very often true

14. Before the age of 17, I believe that I was physically abused.

Never true	Rarely true	Sometimes true	Often true	Very often true

15. Before the age of 17, I got hit or beaten so badly that it was noticed by someone like a teacher, neighbour or doctor.

Never true	Rarely true	Sometimes true	Often true	Very often true

16. Before the age of 17, I felt that someone in my family hated me.

Never true	Rarely true	Sometimes true	Often true	Very often true

17. Before the age of 17, people in my family felt close to each other.

Never true	Rarely true	Sometimes true	Often true	Very often true

18. Before the age of 17, someone tried to touch me in a sexual way, or tried to make me touch them.

Never true	Rarely true	Sometimes true	Often true	Very often true

19. Before the age of 17, someone threatened to hurt me or tell lies about me unless I did something sexual with them.

Never true	Rarely true	Sometimes true	Often true	Very often true

20. Before the age of 17, someone tried to make me do sexual things or watch sexual things.

Never true	Rarely true	Sometimes true	Often true	Very often true

21. Before the age of 17, someone molested me.

Never true	Rarely true	Sometimes true	Often true	Very often true

22. Before the age of 17, I believe that I was emotionally abused.

Never true	Rarely true	Sometimes true	Often true	Very often true

23. Before the age of 17, there was someone to take me to the doctor if I needed it.

Never true	Rarely true	Sometimes true	Often true	Very often true

24. Before the age of 17, I believe that I was sexually abused.

Never true	Rarely true	Sometimes true	Often true	Very often true

25. Before the age of 17, my family was a source of strength and support.

Never true	Rarely true	Sometimes true	Often true	Very often true

26. Before the age of 17, there was nothing I wanted to change in my family.

Never true	Rarely true	Sometimes true	Often true	Very often true

27. I had the perfect childhood.

Never true	Rarely true	Sometimes true	Often true	Very often true

28. Before the age of 17, I had the best family in the world.

Never true	Rarely true	Sometimes true	Often true	Very often true

Appendix L

Community Assessment of Psychic Experiences (CAPE)

Please choose a response to each of the following questions below:

1. Do you ever feel sad?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

2. Do you ever feel as if people seem to drop hints about you or say things with a double meaning?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

3. Do you ever feel that you are not a very animated person?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

4. Do you ever feel that you are not much of a talker when you are conversing with other people?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

5. Do you ever feel as if things in magazines or on TV were written especially for you?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

6. Do you ever feel as if some people are not what they seem to be?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

7. Do you ever feel as if you are being persecuted in some way?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

8. Do you ever feel that you experience few or no emotions at important events?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

9. Do you ever feel pessimistic about everything?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

10. Do you ever feel as if there is a conspiracy against you?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

11. Do you ever feel as if you are destined to be someone very important?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

12. Do you ever feel as if there is no future for you?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

13. Do you ever feel that you are a very special or unusual person?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

14. Do you ever feel as if you do not want to live anymore?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

15. Do you ever think that people can communicate telepathically?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

16. Do you ever feel that you have no interest to be with other people?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

Do you ever feel as if electrical devices such as computers can influence the way you think?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

18. Do you ever feel that you are lacking in motivation to do things?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

19. Do you ever cry about nothing?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

20. Do you believe in the power of witchcraft, voodoo or the occult?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

21. Do you ever feel that you are lacking in energy?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

22. Do you ever feel that people look at you oddly because of your appearance?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

23. Do you ever feel that your mind is empty?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

24. Do you ever feel as if the thoughts in your head are being taken away from you?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

25. Do you ever feel that you are spending all your days doing nothing?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

26. Do you ever feel as if the thoughts in your head are not your own?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

27. Do you ever feel that your feelings are lacking in intensity?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

28. Have your thoughts ever been so vivid that you were worried other people would hear them?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

29. Do you ever feel that you are lacking in spontaneity?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

30. Do you ever hear your own thoughts being echoed back to you?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

31. Do you ever feel as if you are under the control of some force or power other than yourself?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

32. Do you ever feel that your emotions are blunted?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

33. Do you ever hear voices when you are alone?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

34. Do you ever hear voices talking to each other when you are alone?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

35. Do you ever feel that you are neglecting your appearance or personal hygiene?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

36. Do you ever feel that you can never get things done?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

37. Do you ever feel that you have only few hobbies or interests?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

38. Do you ever feel guilty?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

39. Do you ever feel like a failure?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

40. Do you ever feel tense?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

41. Do you ever feel as if a double has taken the place of a family member, friend or acquaintance?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

42. Do you ever see objects, people or animals that other people cannot see?

Never	Sometimes	Often	Nearly always

If you said sometimes or more, how distressed does it make you feel when this happens?

(I responded no)	Not distressed	A bit distressed	Quite distressed	Very distressed

Appendix M

Paranoia Scale

TRANSLATIONAL PSYCHIATRY RESEARCH GROUP

UCL

Please rate how applicable each belief is to you

Select a number between 1 (not at all applicable to me) and 5 (extremely applicable to me).

1. Someone has it in for me

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

2. I sometimes feel as if I'm being followed

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

3. I believe that I have often been punished without cause

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

4. Some people have tried to steal my ideas and take credit for them

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

5. My parents and family find more fault with me than they should

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

6. No one really cares much what happens to you

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

7. I am sure I get a raw deal from life

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

8. Most people will use somewhat unfair means to gain profit or advantage, rather than lose it

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

9. I often wonder what hidden reason another person may have for doing something nice for you

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

10. It is safer to trust no one

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

11. I have often felt that strangers were looking at me critically

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

12. Most people make friends because friends are likely to be useful to them

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

13. Someone has been trying to influence my mind

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

14. I am sure I have been talked about behind my back

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

15. Most people inwardly dislike putting themselves out to help other people

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

16. I tend to be on my guard with people who are somewhat more friendly than expected

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

17. People have said insulting and unkind things about me

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

18. People often disappoint me

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

19. I am bothered by people outside, in cars, in stores, etc., watching me

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

20. I have often found people jealous of my good ideas just because they had not thought of them first

Not at all applicable to me	1	2	3	4	5	**Extremely applicable to me**

Appendix N
Dissociative Experiences Scale (DES)

TRANSLATIONAL PSYCHIATRY RESEARCH GROUP UCL

This questionnaire consists of twenty-eight questions about experiences that you may have in your *daily life*

We are interested in how often you have these experiences

It is important, however, that your answers show how often these experiences happen to you when you are **not under the influence of alcohol or drugs**.

To answer the questions, please determine to what degree the experience described in the question applies to you and select the number to show **what percentage of the time you have the experience**.

100% means 'always', 0% means 'never' with 10% increments in between.

1. Some people have the experience of driving a car and suddenly realising that they don't remember what has happened during all or part of the trip. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

2. Some people find that sometimes they are listening to someone talk and they suddenly realise that they did not hear all or part of what was said. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

3. Some people have the experience of finding themselves in a place and having no idea how they got there. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

5. Some people have the experience of finding new things among their belongings that they do not remember buying. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

6. Some people sometimes find that they are approached by people that they do not know who call them by another name or insist that they have met them before. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something as if they were looking at another person. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

8. Some people are told that they sometimes do not recognise friends or family members. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

10. Some people have the experience of being accused of lying when they do not think that they have lied. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

11. Some people have the experience of looking in a mirror and not recognising themselves. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

12. Some people sometimes have the experience of feeling that other people, objects, and the world around them are not real. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

13. Some people sometimes have the experience of feeling that their body does not belong to them. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them. Select a number to show what percentage of the time this happenes to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

18. Some people sometimes find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

19. Some people find that they are sometimes able to ignore pain. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

21. Some people sometimes find that when they are alone they talk out loud to themselves. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

22. Some people find that in one situation they may act so differently compared to another situation that they feel almost as if they were different people. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example sports, work, social situations, etc.). Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing that thing (for example not knowing whether they have just mailed a letter or have just thought about mailing it). Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

25. Some people find evidence that they have done things that they do not remember doing. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

27. Some people find that they sometimes hear voices inside their head that tell them to do things or comment on things that they are doing. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

28. Some people sometimes feel as if they are looking at the world through a fog or that people or objects appear far away or unclear. Select a number to show what percentage of the time this happens to you:

Never 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% **Always**

Appendix O
International Trauma Questionnaire (ITQ)

Some people experience traumatic or stressful life events that are troubling

Have you experienced a life event that troubles you?

Yes/No

International Trauma Questionnaire

Instructions: Please identify the experience that troubles you most and answer the questions in relation to this experience.

Brief description of the experience _____

When did the experience occur? (circle one)

a. less than 6 months ago
b. 6 to 12 months ago
c. 1 to 5 years ago
d. 5 to 10 years ago
e. 10 to 20 years ago
f. more than 20 years ago

Below are a number of problems that people sometimes report in response to traumatic or stressful life events. Please read each item carefully, then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

	Not at all	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
P1. Having upsetting dreams that replay part of the experience or are clearly related to the experience?	0	1	2	3	4
P2. Having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now?	0	1	2	3	4
P3. Avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)?	0	1	2	3	4
P4. Avoiding external reminders of the experience (for example, people, places, conversations, objects, activities, or situations)?	0	1	2	3	4
P5. Being "super-alert", watchful, or on guard?	0	1	2	3	4
P6. Feeling jumpy or easily startled?	0	1	2	3	4

In the past month have the above problems:

P7. Affected your relationships or social life?	0	1	2	3	4
P8. Affected your work or ability to work?	0	1	2	3	4
P9. Affected any other important part of your life such as parenting, or school or college work, or other important activities?	0	1	2	3	4

Cloitre et al. (2018) *Acta Psychiatrica Scandinavica.* DOI: 10.1111/acps.12956

Below are problems that people who have had stressful or traumatic events sometimes experience. The questions refer to ways you typically feel, ways you typically think about yourself and ways you typically relate to others. Answer the following thinking about how true each statement is of you.

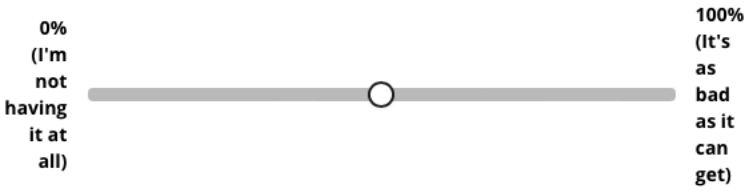
How true is this of you?	***Not at all***	***A little bit***	***Moderately***	***Quit a bit***	***Extremely***
C1. When I am upset, it takes me a long time to calm down.	0	1	2	3	4
C2. I feel numb or emotionally shut down.	0	1	2	3	4
C3. I feel like a failure.	0	1	2	3	4
C4. I feel worthless.	0	1	2	3	4
C5. I feel distant or cut off from people.	0	1	2	3	4
C6. I find it hard to stay emotionally close to people.	0	1	2	3	4
In the past month, have the above problems in emotions, in beliefs about yourself and in relationships:					
C7. Created concern or distress about your relationships or social life?	0	1	2	3	4
C8. Affected your work or ability to work?	0	1	2	3	4
C9. Affected any other important parts of your life such as parenting, or school or college work, or other important activities?	0	1	2	3	4

Appendix P

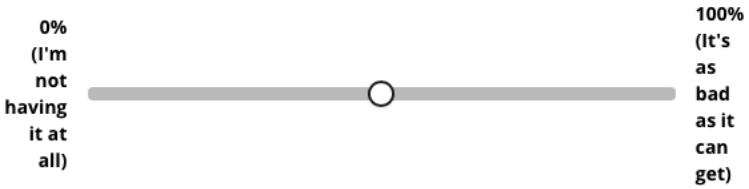
Cambridge Depersonalisation Scale-State Version

This questionnaire describes strange and 'funny' feelings that people may have in their daily life. If you feel you are having right now, any of the following experiences, please let us know how bad it is at the moment by dragging the slider.

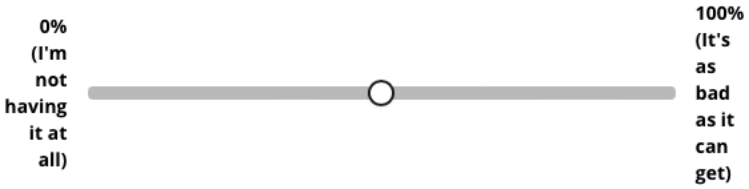
I'm feeling strange, as if I were not real or as if I were cut off from the world. Please mark the line to show the present intensity of this experience.



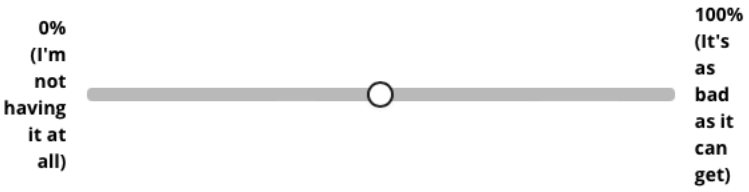
Things around me are now looking 'flat' or 'lifeless', as if I were looking at a picture. Please mark the line to show the present intensity of this experience.



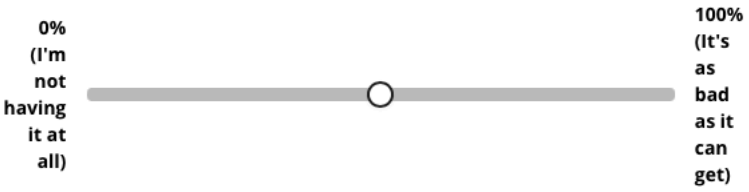
I am feeling as if parts of my body don't belong to me. Please mark the line to show the present intensity of this experience.



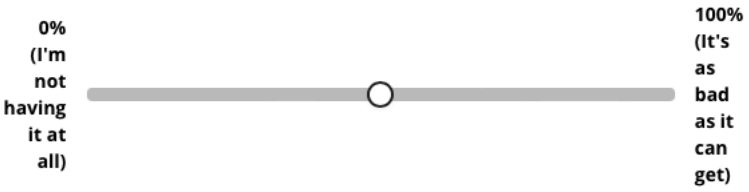
I'm now having the feeling of being a 'detached' observer of myself.



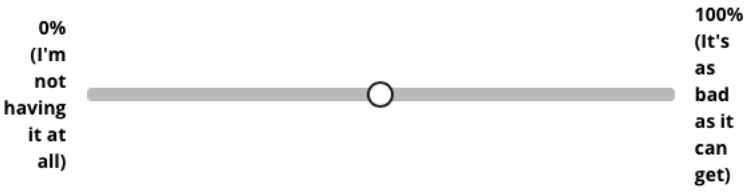
My body is feeling very light now, as if I were floating on air.



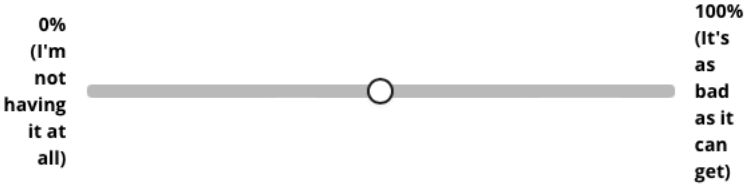
I am not feeling any emotions at all.



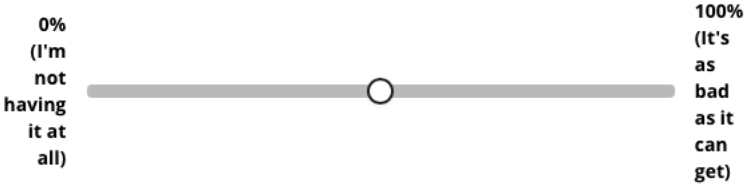
If I read this sentence aloud, my voice sounds remote and unreal.



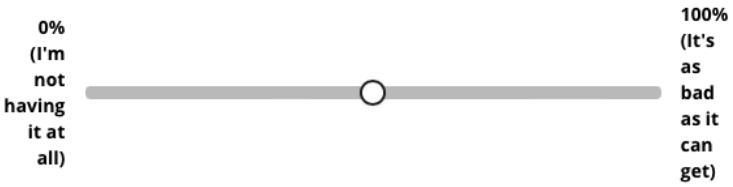
I am having a feeling of complete emptiness in my head so that I am not having any thoughts at all.



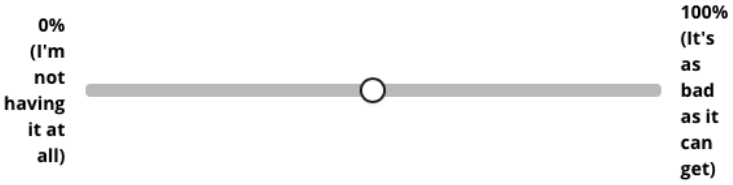
I'm having the feeling that my hands or my feet have become larger or smaller.



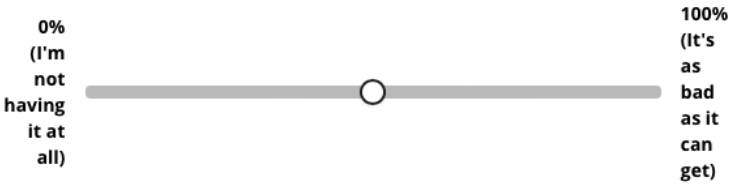
My surroundings are feeling detached or unreal, as if there was a veil or a fog between me and the outside world.



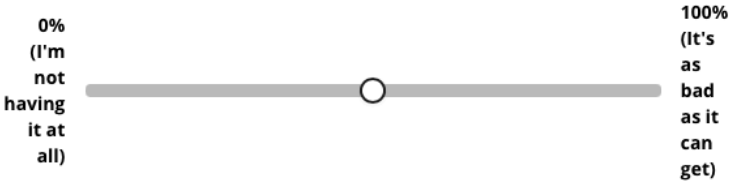
It seems now as if things that I have recently done took place a long time ago. For example, anything which I have done this morning feels as if it were done weeks ago.



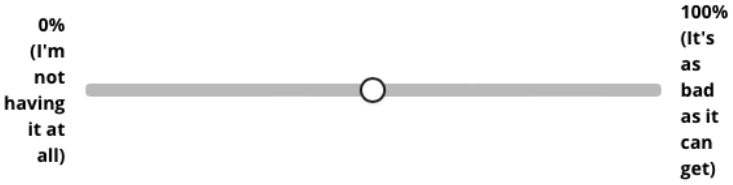
If I now try to remember important events in my life (e.g. graduation, wedding etc.) , I feel so detached from the memories that it seems as if I had not been involved in them.



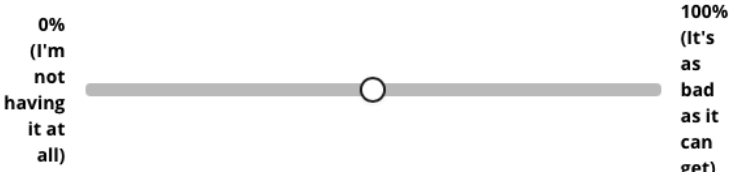
I don't seem to be feeling any affection towards my family and close friends.



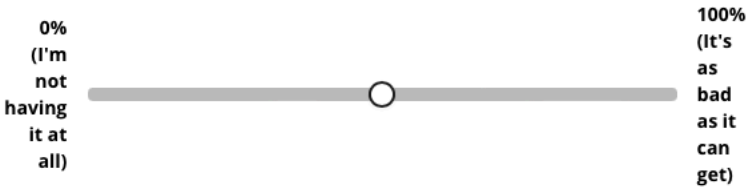
Objects around me are looking smaller or further away.



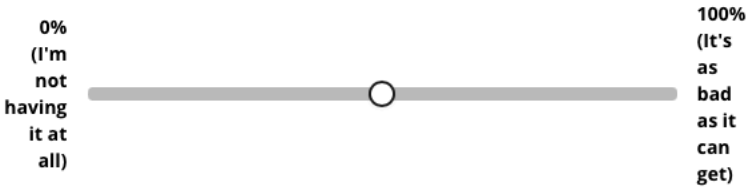
I cannot feel properly the pencil that I have in my hand, as if it were not me who were holding it.



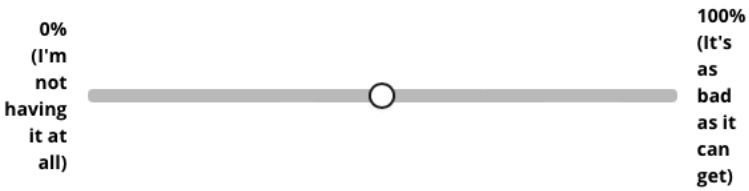
If I now try to imagine the face of a relative or friend whom I frequently see (but who is not with. meat present), I. do not seem able to picture it. in my mind.



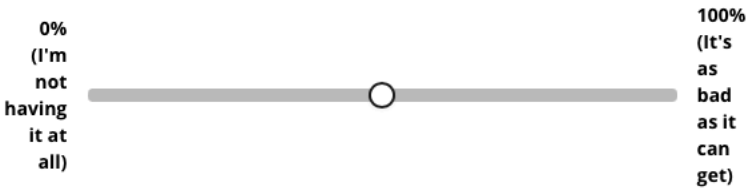
If I Pinch myself in my arm now, I feel so detached from the pain that it feels as if it were 'somebody else's pain'.



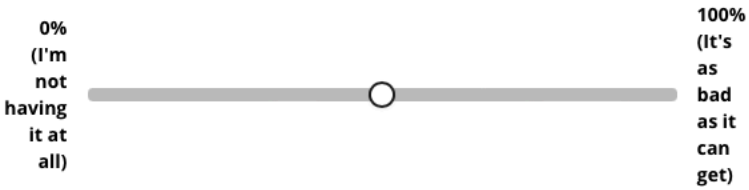
I am now having the feeling of being outside my body.



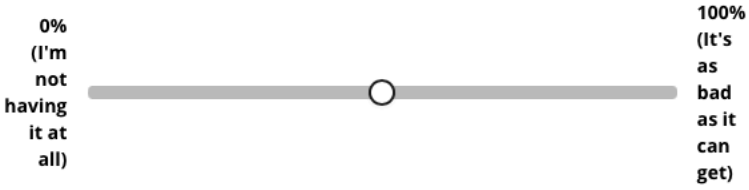
I am feeling as if I were not in charge of my movements, so that I feel 'automatic' and mechanical, as if I were a 'robot'.



I am feeling so detached from my thoughts that they seem to have a 'life' of their own.



I feel like touching myself to make sure that I have a body or a real existence.



I am still having the same strange feeling as when I started to answer this questionnaire.

Appendix Q

Table 1.
Sociodemographic Variables Presented Across Study Groups, P Values for Differences Between Study Groups.

Sociodemographic Variable	DT- (*n*=212)	DT+ (*n*=193)	SDT- (*n*=67)	SDT+ (*n*=421)	Excluded (*n*=350)	
Age [Mean (*SD*)]	28.65 (6.43)	30 (5.83)	29.49 (5.89)	28.00 (6.34)	29.04 (6.39)	*p*<.001
Sex (% female)	69.81%	76.17%	62.69%	70.07%	67.1%	*p*=170
Ethnicity						*p*=.002
White British/Irish	54.25%	67.88%	49.25%	65.96%	58.00%	
Black/Mixed Black	3.30%	3.11%	2.99%	2.60%	1.43%	
Asian/ Mixed Asian	11.32%	5.70%	14.93%	8.51%	9.71%	
Other(White/Mixed/Asian/Black)	31.13%	22.80%	32.84%	22.70%	30.86%	
Socioeconomic status (FAS) (median)	5	4	5	4	5	*p*<.001

Note. DT-= Without developmental trauma, DT+= With Developmental Trauma, SDT-= With Subclinical Psychosis and no Developmental Trauma, SDT+= With Subclinical Psychosis and Developmental Trauma, FAS= Family Affluence Scale