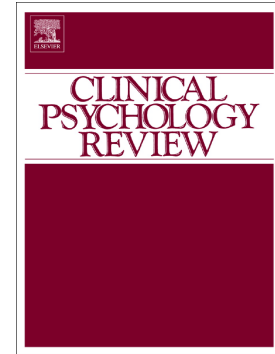


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The experience and role of dissociation in psychosis following developmental trauma: A systematic review

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

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### Abstract

Developmental trauma (DT), defined as abuse or neglect before age 18, is linked with elevated risk and poorer outcomes in psychosis. This systematic review aimed to elucidate the relationship between DT and dissociation in psychosis and discern the potential mediating role of dissociation in the link between DT and psychotic manifestations. Our study protocol was pre-registered with PROSPERO (CRD42022330026). We adopted broad criteria, including a variety of methodologies exploring dissociation post-DT in individuals exhibiting psychosis or psychotic features. Risk of bias was assessed for all included studies. Our review incorporated 40 studies, totalling 6,941 participants. A significant moderate association was observed between DT and dissociation ( $r = .33$  (95%CI: .28–.38)), underscored by dose-response effects. Sexual and emotional abuse demonstrated the most robust associations with dissociation. Individuals with psychosis and DT reported elevated dissociation relative to their non-traumatized counterparts. Dissociation mediated the link between DT and positive psychotic symptoms, notably hallucinations, across clinical and general populations. Five studies pinpointed dissociation's mediating role in tying DT to paranoia and delusional ideation. The review delves into clinical considerations, emphasizing screening for psychotic and dissociative symptoms in DT survivors, and outlining dissociation management strategies. Future research, employing longitudinal, qualitative, and experimental approaches, remains paramount.

*Keywords:* Abuse, Dissociation, Hallucination, Trauma, Psychosis

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The earliest conceptualization of “schizophrenia” (Bleuler, 1911) drew heavily from Pierre Janet's dissociation theory, positing schizophrenia as a psychological response to trauma, characterized by a "loosening of associations" among thoughts, emotions, and behaviours. Modern research underscores developmental trauma—a form of interpersonal trauma encompassing emotional, physical, and sexual abuse, as well as emotional and physical neglect—as a significant risk factor for psychosis (Bendall et al., 2008; Read et al., 2005; Varese et al., 2012b). Developmental trauma is linked to increased psychotic experiences (Kelleher et al., 2013), greater symptom severity, poorer outcomes (Bailey et al., 2018), and higher hospitalisation rates (Schenkel et al., 2005). The spectrum of psychotic symptoms, ranging from subclinical to clinical manifestations (Stefanis et al., 2002; Van Os et al., 2009), shares etiological roots with childhood adversities (Linscott & Van Os, 2013; Pries et al., 2018).

From foundational theories, Breuer and Freud (1893) highlighted trauma's psychological aftermath as a "severely paralyzing affect... during a modified state of consciousness" (p. 110). While trauma-induced dissociation has been extensively studied within the realms of post-traumatic stress disorder (PTSD)—evident in the recognition of a derealisation/depersonalisation PTSD subtype in DSM-5 (American Psychiatric Association, 2013) and the “boundary” with dissociative disorders in PTSD and complex PTSD in the ICD-11 (World Health Organization, 2018)—its significance in psychosis has historically been overshadowed. However, as traumatogenic models of psychosis (Bloomfield et al., 2021) and trauma-informed care approaches (Bloomfield et al., 2020; Isobel, 2016) gain momentum, there's a resurgent interest in developmental trauma and consequential post-traumatic processes, like dissociation, in shaping psychosis trajectories.

Dissociation, in contemporary discourse, is a psychological process characterized by "a disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour," (p. 291, American Psychiatric Association, 2013). *The bipartite dissociation model (Holmes et al., 2005) differentiates the dissociative responses of "detachment" states, encompassing depersonalisation and derealisation, from "compartmentalisation" processes like dissociative amnesia or identity fragmentation. Along with dissociative absorption, the aforementioned experiences constitute the most studied types of dissociation and are captured by the*

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*Dissociative Experiences Scale (DES) (Carlson & Putnam, 1993), a prominent dissociation metric. These dissociative manifestations are believed to span a spectrum, being fundamentally non-pathological but residing on a continuum of severity and disadvantage. For example, transient phenomena like brief daydreaming are common and usually harmless, while more pertinent dissociative absorption (Hunter et al., 2004; Soffer-Dudek et al., 2015) — described as deep immersion in a stimulus, leading to environmental obliviousness — is less common and can be detrimental for one's safety and relationships. Similarly, one's mind going blank for a moment is a frequent and often benign experience, but depersonalisation involving out of body experiences can feel uncontrollable and disturbing. At the extreme, severe dissociative responses can also culminate in profound experiences of the self as fragmented, as observed in dissociative identity disorder.*

### **Developmental Trauma, Dissociation, and Psychosis**

Within trauma paradigms, dissociation has been considered a response to overwhelming traumatic stress, both as a defence mechanism (Putnam, 1992; Winnicott, 1980) but also a consequence of trauma on one's integrative capacity (Van der Hart, Nijenhuis and Steele, 2006). This aligns with the defence cascade model (Schauer & Elbert, 2015), which contends that in extreme, inescapable fear-inducing situations, peri-traumatic dissociative symptoms emerge as a “shutdown” of sensorimotor processes (Brown, 2006). Such a “fright-flag-faint” response is deemed adaptive when neither “fight” nor “flight” is viable, paralleling the final “playing dead” reaction observed in prey animals cornered by predators. Psychologically, this induces peri-traumatic detachment, impeding the dual processing of sensory and contextual details (Holmes et al., 2005), a factor hypothesized to foster the involuntary intrusions symptomatic of post-traumatic stress reactions (Brewin et al., 2010). Importantly, dissociation is often elicited during the recall of these traumatic events, or in the experience of further trauma. Furthermore, as any memory, traumatic recollections may become distorted over time and lean towards threat among frightened individuals (Brewin, 2011), causing additional distress to which dissociation may arise as a response.

Considering dissociation developmentally offers additional insights. Early-life trauma, particularly recurring maltreatment or neglect and inconsistent or neglectful parenting can gravely compromise healthy attachment mechanisms between a child and their primary

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Within the framework of developmental trauma, dissociation can be a recurrent phenomenon from an early age, impeding cognitive and emotional processes and adversely affecting one's neuro-architecture and brain biochemistry, as well as neural integration when recurrent dissociation persists to adulthood (De Bellis & Zisk, 2014). While detachment is theorized to serve an initial protective function when a child is faced with developmental trauma, both its experience during involuntary recalls and its persistent, automatic, and indiscriminate manifestations as a way of coping with memories, emotions and experience in relationships can evolve into maladaptive responses (Steinberg, 1995; Van der Kolk & Van der Hart, 1991) aligning with the latent vulnerability hypothesis (McCrary & Viding, 2015).

Although historically, dissociation and psychosis were conceived as closely related constructs, as articulated by theorists such as Bleuler and Schneider (Ross, 2014), modern clinical demarcations distinguish dissociative from psychotic disorders and dissociative symptoms in psychosis are often overlooked. Recent meta-analyses underscore the robust association between the two constructs (Longden et al., 2020), and the large association with voice-hearing (Pilton et al., 2015), which is also supported by qualitative evidence tying dissociation to both paranoia and voice-hearing (Černis et al., 2020). High levels of dissociation can be found across diagnostic groups (Schäfer et al., 2018; Renard et al., 2017), especially

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when a significant trauma history is present (Rafiq et al., 2018). In psychosis however, dissociation is proposed to contribute to underly the development of symptoms in a subgroup of patients and contribute to the phenomenology of psychotic experiences. As evidenced in the source monitoring challenges associated with psychosis (Allen et al., 1997; Parnas, 2000; Postmes et al., 2014), depersonalisation and derealization, processes signifying blurred distinctions between reality and unreality (Allen et al., 1997; Sierra & David, 2011) can over time accentuate detachment from the external world and preoccupation with internal phenomena and perturb one's self-concept. Additionally, auditory hallucinations have been proposed as manifesting dissociative phenomena based on several premises (Moskowitz & Corstens, 2018): they aren't confined to schizophrenia spectrum disorders, surface across varied diagnoses, and encompass shared phenomenological attributes. While this shared phenomenology is frequently identified (Brewin et al., 2022), mechanisms such as metaphysical thinking, delusional ideation and increased thought disorder have been proposed to distinguish psychotic presentations (Dorahy et al., 2024). In addition, delusional ideation may at times occur in response to dissociative experiences in this group (Moskowitz et al., 2009) and obscure the recognition of the dissociative nature of psychotic features, like hallucinations (Schäfer et al., 2018).

Linking trauma, dissociation and psychosis, individuals with clinical psychosis compounded by histories of developmental trauma demonstrate increased prevalence of dissociative symptoms (Dorahy et al., 2009) and of dissociative identity disorder (Ross & Keyes, 2004; Schäfer et al., 2018), the latter representing the ultimate experience of the self as fragmented (Van der Hart & Witztum, 2008), compared to their non-traumatised counterparts. Conversely, schizophrenia patients with higher dissociation report escalated rates of developmental trauma (Ross & Keyes, 2004; Şar & Öztürk, 2018), suggestive of a potential “trauma-dissociation subgroup” in schizophrenia. The postulation that dissociation mediates the trajectory from developmental trauma to psychotic experiences has also garnered attention (Alameda et al., 2020; Bloomfield et al., 2021; Varese et al., 2012b), and has been examined alongside other post-traumatic reactions (Alameda et al., 2020; Sideli et al., 2020), with efforts to discern its role in predicting specific psychotic symptoms (Bloomfield et al., 2021). Considering the suggested dissociative nature of hallucinations related to experiences of trauma, some authors propose (Berry et al., 2017; Moskowitz & Corstens, 2018) that for certain people, psychotic experiences, like auditory hallucinations, reflect dissociated facets of the self

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or memories that have been “compartmentalized.” According to this model, which has garnered empirical support (Brewin et al., 2022; Pilton et al., 2015; Varese et al., 2011; Steele et al., 2005), voices often represent fragments of past memories that manifest as present-time experiences, and are typically perceived as ego-dystonic, i.e. alien or separate from the person's sense of self. Another proposal, that of “dissociative psychosis” (Van der Hart & Witztum, 2008), suggests that psychotic experiences deriving from traumatic content arise in the context of structural dissociation, as seen in complex PTSD, borderline personality disorder or other dissociative disorders. The external perception of hallucinations in psychosis, relative to traumatic intrusions or voices which are felt as having an internal origin, likely depends on the severity of the structural disintegration of the self (Van der Hart & Witztum, 2008), but also on delusional thinking that determines the interpretation of a voice's origin (Dorahy et al., 2024). Overall, although a plethora of theoretical models propose links between trauma, dissociation and psychosis, the distinct influence of various dissociative mechanisms on the interplay between trauma and psychotic experiences remains to be empirically elucidated (Longden et al., 2020).

### **Aims and Rationale**

In this rapidly expanding field, our objective was to present an exhaustive review that effectively synthesizes existing research, thus providing insights for prevention, early intervention, and clinical management. Specifically, our aims were to:

- 1) Analyse the association between developmental trauma and dissociation, and compare the prevalence and characteristics of dissociative occurrences among psychotic individuals with and without a history of developmental trauma.
- 2) Investigate the potential intermediary function of dissociation and its subtypes in the nexus between developmental trauma and psychotic experiences across the psychosis continuum.

We adopted a wide-ranging inclusion approach, critically examining various methodological and study attributes such as population (clinical vs. general), illness phase, specific forms of developmental trauma, and the various dissociative phenomena under



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consideration. In our endeavour to offer a contemporaneous and thorough overview of the  
existing literature, we aimed to incorporate both quantitative and qualitative research studies.

## Methods

Our study protocol was registered with PROSPERO (CRD42022330026). We used the PRISMA framework (Page et al., 2021) in the systematic search, extraction, synthesis and evaluation of data.

## Eligibility Criteria

Our review included studies with adults aged over 16 spanning the psychosis continuum, which examined developmental trauma, dissociation, and psychosis or psychotic experiences. Developmental trauma was defined as psychological trauma experienced prior to age 18, covering emotional, physical, or sexual abuse, emotional or physical neglect, and bullying. Dissociation was operationally recognized through diagnostic, screening, or experimental evaluations, embracing clinical assessments of shutdown dissociation, dissociative identity disorder, anomalous experiences, depersonalisation/derealisation, absorption, and dissociative amnesia, while also considering the perspectives on compartmentalisation/detachment. Eligibility extended to diagnostic tools and clinical records denoting psychotic disorder, schizophrenia, schizoaffective disorder, first episode psychosis, and diagnostic/screening tools for psychotic symptoms.

Accepted methodologies consisted of between-group dissociation comparisons in psychotic individuals based on their developmental history, observational research delving into the triad of developmental trauma, dissociation, and psychosis within clinical samples (with or without comparators) or the general population, and studies probing the intermediary function of dissociation between developmental trauma and psychosis.

Exclusions encompassed non-English, non-peer-reviewed works, outcomes-based research, reviews, case reports, and studies where differentiation between developmental trauma and adult trauma was unclear or where differentiation between psychotic symptoms from other symptomatology was not possible. We omitted research focused on substance/alcohol effects or the so-called "organic" aetiologies for dissociation or psychosis, like structural neural defects or epilepsy.

We systematically searched the literature in "Embase," "MEDLINE," and "PsychINFO" databases without publication date boundaries, employing predetermined search terminologies. Additional sources were reference list hand searches and perusal of Google Scholar. Boolean operators ("OR") were employed to link medical subject headings and keywords associated with a) developmental trauma, b) psychosis or associated experiences, and c) dissociation. These aggregated search terms were then linked using the Boolean operator ("AND") (Full search terms available in Supplementary Material 1). Searches were initiated on May 6, 2022, and updated on January 12, 2023, January 30, 2024, and September 19, 2024. Two independent evaluators (EM and RT) screened all titles and abstracts ( $\kappa=0.80$ ) as well as complete articles ( $\kappa=0.89$ ), signifying an almost perfect agreement. Differences in interpretation were resolved through dialogue, occasionally involving a third assessor (MB). Data collation was executed using a standardized matrix.

### **Assessment of Risk of Bias**

The appraisal of bias risk was conducted employing the Newcastle-Ottawa Scale (NOS) for cohort and case-control studies and the National Heart, Lung, and Blood Institute (NHLBI) quality assessment tool for observational and cross-sectional studies, with further details provided in Supplementary Material 2. The NOS, recommended for evaluating case-control and cohort studies (Zeng et al., 2015), utilizes a rating system wherein scores of 7 or above are deemed satisfactory (Bloomfield et al., 2021). We adapted the NOS in line with extant literature (Alameda et al., 2020), accepting self-report measures of developmental trauma for exposure determination.

The NHLBI tool, encompassing a broad spectrum of research designs, was selected for its thorough assessment of methodological shortcomings and bias sources (e.g., selection, measurement). It also considers confounding bias and power, rendering it particularly apt for cross-sectional studies. Two evaluators (EM and RT) assessed study quality, scrutinizing the risk of bias, and discussed any discrepancies. Studies were assigned ratings indicating low, moderate, or high risk of bias. The Oxford Centre for Evidence-based Medicine – Levels of Evidence (Phillips, 2009) guideline was employed to allocate an evidence level to each incorporated study, thereby aiding the formulation of clinical recommendations.

**Data Analysis**

We synthesized the studies narratively, categorizing them based on the outcomes and specific psychotic symptoms examined. Data on various forms of developmental trauma (such as emotional, physical, and sexual abuse, as well as emotional or physical neglect), dissociation (e.g., depersonalisation, derealisation, absorption, detachment versus compartmentalisation, etc.), and psychotic manifestations (including positive and negative symptoms, hallucinations, delusions, paranoia, etc.) were integrated as available. For studies presenting findings on distinct subgroups (like initial episode versus long-term patients or inpatients versus control subjects), we documented the results separately.

Utilizing the "metafor" package in R (Viechtbauer, 2010), we executed a set of random-effects meta-analyses, aiming to accommodate the heterogeneity inherent in studies, especially those involving clinical samples of varied illness intensities and diverse measures of developmental trauma or dissociation. The effect size predominantly used was Pearson's  $r$  correlation coefficient, selected to quantify associations. For studies showcasing between-group effects, we derived Cohen's  $d$  using the means, standard deviations, and sample sizes of groups, both with and devoid of developmental trauma, and subsequently transposed this to Pearson's  $r$ . If studies presented multiple effect sizes but lacked a cumulative trauma score, or if they exhibited subtypes of dissociative experiences without an aggregate dissociation score (which was infrequent), a composite metric was formulated. For studies contrasting acute and stabilized data points in inpatient cohorts, we incorporated the measurements from the stabilized time-point. Our meta-analyses centred on the correlation between overarching developmental trauma and dissociation, followed by individualized analyses examining the ties between specific forms of developmental trauma (sexual abuse, physical abuse, emotional abuse, physical neglect, emotional neglect, etc.) and dissociation. Heterogeneity was scrutinized using the  $I^2$  statistic. Potential publication bias was evaluated both visually, by inspecting funnel plots, and analytically, via the Egger's test for funnel plot asymmetry.

**Results**

As shown in the Prisma flow diagram (Figure 1) 40 studies on dissociation in relation to developmental trauma and psychosis were included, published between 1990 and 2024.

**Description of Included Studies**

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The review encompassed 40 studies with an aggregate of 6,941 participants. Notably, no qualitative studies were identified. Of the studies, 26 (Álvarez et al., 2021; Berry et al., 2018; Blose et al., 2023; Bortolon et al., 2017; Bortolon & Raffard, 2018; Chae et al., 2015; Cole et al., 2016; Degnan et al., 2022; Fung et al., 2024; Gibson et al., 2019; Goff et al., 1991; Gómez & Freyd, 2017; Holowka et al., 2003; Mertens et al., 2021; Offen et al., 2003; O'Neill et al., 2021; Pearce et al., 2017; Perona-Garcelán et al., 2010; Perona-Garcelán et al., 2012; Perona-Garcelán et al., 2014; Şar et al., 2009; Schalinski & Teicher, 2015; Schroeder et al., 2016; Sun et al., 2018; Sun et al., 2019; Vogel et al., 2009) were cross-sectional, 10 (Álvarez et al., 2015; Braehler et al., 2013; Dorahy et al., 2009; Evans et al., 2015; Khosravi et al., 2021; Longden et al., 2016; Nesbit et al., 2022; Schalinski et al., 2019; Uyan et al., 2022; Varese et al., 2012a) were case-control, and 4 (Muenzenmaier et al., 2015; Schäfer et al., 2006; Schäfer et al., 2012; Thompson et al., 2016) were cohort in design. Clinical samples featured in 28 studies: among these, 6 focused on first-episode psychosis, and 8 on inpatient samples. Additionally, one study investigated a sample at ultra-high risk for psychosis, 10 studies centred on general population samples, and one study categorized its sample as "help-seeking."

### **Risk of Bias Assessment**

Out of the 40 studies, 18 were designated with a high risk of bias (ROB), 15 with a moderate ROB, and 6 as having a low ROB (refer to Tables 1-3). Twenty-one of these studies accounted for multiple confounders either in their design or analysis. A majority, 32 out of 40, employed validated measures for developmental trauma, all 40 for dissociative experiences, and 36 for psychotic experiences. Only two studies used a random sampling method (Khosravi et al., 2021; Longden et al., 2016). The remainder predominantly relied on convenience sampling, and many lacked detailed information on participation rates, potentially amplifying selection bias. Several studies failed to clarify whether participants were inpatients or outpatients or to provide specifics regarding their illness stage or treatment phase.

### **Study Characteristics**

Clinical studies focused on an older demographic and had a lower proportion of females (Mean=33.26, SD=10.32; 41% female) compared to studies on the general population (Mean=25.25, SD=7.27; 76.8% female) (Presented in Supplementary material 3).

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Predominantly, the research was conducted in high-income regions, including Europe, the USA, and Australia. Three studies originated from the Middle East and Asia. The Dissociative Experiences Scale (DES) was the primary tool employed to gauge dissociation, chosen by 27 out of 40 studies. Distinctions like "automatic pilot" versus "shutdown dissociation" were made in two studies (Bortolon et al., 2017; Bortolon & Raffard, 2018). To control for the potential confounding effect of hallucinations, nine studies (Degnan et al., 2022; Evans et al., 2015; Longden et al., 2016; Nesbit et al., 2022; Pearce et al., 2017; Perona-Garcelán et al., 2010; Perona-Garcelán et al., 2012; Sun et al., 2018) excluded item 27 from the DES in their analyses. Four studies (Dorahy et al., 2009; Muenzenmaier et al., 2015; Schäfer et al., 2012; Varese et al., 2012a) employed the DES-T, a modified version of the DES emphasizing pathological dissociation, which contains an 8-item set devised to segregate routine from pathological dissociative experiences present in the original DES. One study employed the Somatoform Dissociation Scale and the Multiscale Dissociation Inventory (Fung et al., 2024). Only five studies utilized interview-based evaluation tools, such as the SCID. Developmental trauma was assessed retrospectively across all studies, with the Childhood Trauma Questionnaire (Bernstein et al., 1998) being the predominant instrument for developmental trauma measurement and used by 22 studies.

### **Developmental Trauma and Psychosis**

Seven case-control studies comparing patients to community controls (Álvarez et al., 2015; Braehler et al., 2013; Evans et al., 2015; Khosravi et al., 2021; Schalinski et al., 2019; Varese et al., 2012; Uyan et al., 2022), 5 of which were of low and 2 of moderate ROB, all identified elevated levels of total developmental trauma in psychosis patients. One high ROB study (Longden et al., 2016) found higher exposure to childhood sexual abuse among participants with non-auditory hallucinations compared to clinical participants without non-auditory hallucinations. One study (Dorahy et al., 2009) found greater command hallucinations in patients with dissociative identity disorder or with schizophrenia and a history of developmental trauma, compared to patients with schizophrenia and no history of developmental trauma.

Both clinical and general population studies identified small to moderate correlation between developmental trauma and psychotic symptoms (Perona-Garcelán et al., 2012;

A systematic review of dissociation in psychosis following developmental trauma (O'Neil et al., 2021; Schäfer et al., 2006), as well as schizotypy (Bloese et al., 2023), positive symptoms (Chae et al., 2015; Schalinski et al., 2019; Khosravi et al., 2021), hallucinations (Berry et al., 2018; Perona-Garcelán et al., 2012; Cole et al., 2016; Sun et al., 2018; Pearce et al., 2017; Varese et al., 2012), perceptual anomalies and bizarre experiences (Fung et al., 2024), paranoia (Pearce et al., 2017; Mertens et al., 2021) and delusions (Perona-Garcelán et al., 2012; Cole et al., 2016; Muenzenmaier et al., 2015; Sun et al., 2018; Fung et al., 2024). Five clinical studies, spanning from low to high ROB (Álvarez et al., 2015; Longden et al., 2016; Muenzenmaier et al., 2015; Schalinski & Teicher, 2015; Schalinski et al., 2019) demonstrated a dose-response relationship between trauma and psychosis. One study with low ROB (Álvarez et al., 2015) revealed that severe polytraumatization was linked with a tenfold increased risk of schizophrenia, while moderate polytraumatization indicated a fourfold increased risk compared to unaffected individuals. Notably, the relationship was more pronounced among patients. However, not every study observed a significant association between developmental trauma and psychosis, including an absence of a relationship with positive symptoms noted in two studies (Álvarez et al., 2021; Şar et al., 2009), hallucination proneness (Perona-Garcelán et al., 2014) and frequency and distress of hallucinations (Dorahy et al., 2009; Nesbit et al., 2022).

### **Dissociation and Psychosis**

All comparisons in case-control studies demonstrated higher dissociation levels in clinical groups relative to non-clinical counterparts (Álvarez et al., 2015; Braehler et al., 2013; Evans et al., 2015; Khosravi et al., 2021; Uyan et al., 2022; Varese et al., 2012a). Evidence also emerged by two studies suggesting elevated dissociation levels in chronic patients than in those experiencing their first episode of psychosis (FEP) (Braehler et al., 2013; Khosravi et al., 2021). Dissociation metrics correlated with positive symptoms (Chae et al., 2015; Longden et al., 2016; Perona-Garcelán et al., 2012; Şar et al., 2009; Sun et al., 2019), although this wasn't universally reported across studies (Schäfer et al., 2006). Two studies highlighted that dissociation independently predicted positive symptoms, after controlling for developmental trauma (Berry et al., 2018; Longden et al., 2016). Looking at the inverse relationship without controlling for developmental trauma, another study (Schäfer et al., 2012) determined that psychotic symptoms predicted dissociation, but solely during the acute phase of the illness.

### **Associations between Developmental Trauma and Dissociation in Clinical Samples**

Within clinical psychosis cohorts, a 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; Şar et al., 2009; Schäfer et al., 2006; Schäfer et al., 2012; Schalinski & Teicher, 2015; Schalinski et al., 2019; Varese et al., 2012a) to large (Chae et al., 2015; Khosravi et al., 2021; Sun et al., 2018) correlation between developmental trauma and dissociation was reported (refer to Table 4). A random-effects meta-analysis of 19 effects (presented in Figure 1- Supplementary material) identified a significant medium association between developmental trauma and dissociation, with  $r = .33$  (95% CI: .28-.38). Heterogeneity was non-evident:  $I^2 = 0\%$ ,  $\tau^2 = 0.0007$ ,  $p = 0.78$ . In comparison to their counterparts without developmental trauma, psychosis patients with developmental trauma exhibited increased dissociation levels (Dorahy et al., 2009; Goff et al., 1991; Offen et al., 2003; Perona-Garcelán et al., 2010; Schroeder et al., 2016).

In terms of abuse subtypes, a random-effects meta-analysis of 9 effects (illustrated in Figure 2-Supplementary material) showed a significant yet small association between physical abuse and dissociation, with  $r = .19$  (95% CI: .12-.26). Heterogeneity was non-evident:  $I^2 = 0\%$ ,  $\tau^2 = 0$ ,  $p = 0.81$ , and the Egger's test signalled no publication bias ( $p = 0.48$ ). Another random-effects meta-analysis of 10 effects (displayed in Figure 3-Supplementary material) indicated a significant moderate relationship between sexual abuse and dissociation,  $r = .32$  (95% CI: .23-.40). There was limited statistical heterogeneity:  $I^2 = 17\%$ ,  $\tau^2 = 0.01$ ,  $p = 0.29$ , with the Egger's test suggesting no publication bias ( $p = 0.203$ ). Specific associations were identified between sexual abuse and enhanced depersonalization, absorption (O'Neill et al., 2021), and dissociative amnesia (O'Neill et al., 2021; Schroeder et al., 2016). In two instances, sexual abuse was the dominant predictor of dissociation (Schäfer et al., 2012) and demonstrated a stronger relationship with dissociation than physical abuse (Goff et al., 1991). Nonetheless, these studies were characterized by high risk of bias, small cohorts, and lacked confounding control.

An additional random-effects meta-analysis on ten effects (Figure 4- Supplementary material) highlighted a moderate correlation between emotional abuse and dissociation,  $r = .31$  (95% CI: .19-.42). After adjusting for sampling error, a significant moderate heterogeneity was observed:  $I^2 = 62\%$ ,  $\tau^2 = 0.02$ ,  $p < 0.01$ . The Egger's test detected publication bias,  $z = 3.23$ ,  $p = 0.001$ . Holowka et al. (2003) reported that, after controlling for other maltreatment types, the correlation between emotional abuse and dissociation remained strongly significant.

In a random-effects meta-analysis of 9 effects (as detailed in Figure 5-Supplementary material) from clinical cohorts, there was a small yet significant association between physical neglect and dissociation,  $r = .19$  (95% CI: .11-.28). Heterogeneity tests revealed minimal statistical inconsistency:  $I^2 = 0\%$ ,  $\tau^2 = 0.0036$ ,  $p = 0.46$ . Further, the Egger's test was non-significant, suggesting no influence of publication bias ( $p = 0.164$ ). A study with a moderate risk of bias (Şar et al., 2009) pinpointed that only physical neglect was a predictor of dissociation scores.

Another random-effects meta-analysis of 9 effects (shown in Figure 6-Supplementary material) highlighted a small, significant relationship between emotional neglect and dissociation,  $r = .14$  (95% CI: .05-.24). The heterogeneity tests demonstrated minor, non-significant statistical variance:  $I^2 = 23\%$ ,  $\tau^2 = 0.0064$ ,  $p = 0.24$ . Furthermore, the Egger's test was non-significant, indicating an absence of publication bias effects ( $p = 0.444$ ).

### **Dose-Response Relationship Between Developmental Trauma and Dissociation**

Evidence supported a dose-response relationship between developmental trauma and dissociation. Both trauma severity (Braehler et al., 2013; Goff et al., 1991; Schalinski et al., 2019) and polytraumatization levels (Álvarez et al., 2015; Álvarez et al., 2021; Schalinski et al., 2019) correlated with increased dissociation, as evidenced in studies with both moderate and low risk of bias. The dose-response effect was notably more pronounced in patients compared to controls in one study (Álvarez et al., 2015) and those exhibiting pathological dissociation in another study (Perona-Garcelán et al., 2010). Two studies with moderate risk of bias distinguished between adult and childhood trauma, and found that the severity of dissociation correlated with the number of childhood traumatic events, but not with the number of adult traumatic events (O'Neill et al., 2021; Schalinski & Teicher, 2015).

### **Dissociation as a Mediator Between Trauma and Psychosis**

A total of 22 studies investigated the mediating role of dissociative experiences in the context of psychotic experiences. This encompassed 9 studies using general population samples, 11 from clinical settings, 1 from an ultra-high risk for psychosis cohort, and 1 as a



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"help-seeking" community sample (refer to table 5). The study designs were varied: 2 were prospective, 5 employed a case-control design, and 15 were cross-sectional in nature. Two studies with a low ROB identified a mediation effect of dissociative experiences in the association between developmental trauma and psychosis group classification - one for aggregate developmental trauma (Uyan et al., 2022) and another for physical neglect (Evans et al., 2015). Contrastingly, a study with moderate ROB conducted by Thompson et al. (2016) did not discern a mediation effect of dissociation in the progression to a psychotic disorder after exposure to sexual abuse.

Of the total, 17 studies explored the potential mediating role of dissociation between developmental trauma and positive psychotic symptoms. Within clinical samples, one study (Schalinski et al., 2019) reported a partial mediating effect of "shutdown dissociation" when linking developmental trauma load with positive symptoms (accounting for 25.9% of the relationship). However, this effect was not observed when evaluating abuse or neglect in isolation. When considering subtypes of dissociation and its interactions with trauma, divergent results were found. For instance, in a community sample of developmental trauma survivors (O'Neill et al., 2021), the association between sexual abuse and psychotic experiences was partially mediated by depersonalization. In contrast, in a patient cohort (Khosravi et al., 2021), the relationship was partially mediated by dissociative amnesia and absorption.

### ***Hallucinations***

Five clinical studies (Muenzenmaier et al., 2015; Pearce et al., 2017; Perona-Garcelán et al., 2012; Sun et al., 2018; Varese et al., 2012a) provided evidence for dissociative experiences mediating the occurrence of hallucinations, with one of these being a prospective cohort (Muenzenmaier et al., 2015). The mediation was noted not only for the frequency and quality of auditory hallucinations (Dorahy et al., 2009), like those of a commanding nature, but also for visual, olfactory, and gustatory hallucinations by dissociative absorption (Nesbit et al., 2022). In terms of dissociative subtypes, self-reported dissociation played a mediating role (Sun et al., 2018), with one outpatient study pinpointing the depersonalization subtype of dissociation as the primary mediator (Perona-Garcelán et al., 2012). Concerning specific types of developmental trauma, Varese et al. (2012a) highlighted a particularly strong mediating effect of pathological dissociation (DES-T) in cases of sexual abuse exposure.

Similarly, mediation for hallucinations was documented in 7 general population studies (Bortolon et al., 2017; Bortolon & Raffard, 2018; Cole et al., 2016; Fung et al., 2024; Gibson et al., 2019; Gómez & Freyd, 2017; Perona-Garcelán et al., 2014). The dissociative mediating effects in these studies were measured through the Curious Experiences Scale (Gómez & Freyd, 2017), the Multidimensional Inventory of Dissociation (MDI) (Fung et al., 2024) and “defensive dissociation” (Bortolon et al., 2017; Bortolon & Raffard, 2018), which encompassed dissociative amnesia and depersonalization. Out of the studies considered, depersonalization was found to mediate the link between developmental trauma and predisposition to hallucinations in half (Cole et al., 2016; Gómez & Freyd, 2017; Perona-Garcelán et al., 2014). Using multiple mediation, Fung et al. (2024) identified that identity dissociation, somatoform dissociation and derealization were the 3 top mediators in the relationship between developmental trauma and perceptual anomalies.

### ***Delusions and Paranoia***

Dissociation emerged as a mediator for paranoia in 2/2 investigations. The first assessed individuals with self-reported psychosis (Pearce et al., 2017), while the second involved a general population (Mertens et al., 2021), gauging paranoia through both interview techniques and self-reported traits. Significantly, the latter found the mediation effect persisted even when accounting for insecure attachment factors. Both, however, had a high ROB as they did not control for potential confounders and displayed potential selection bias. The association between developmental trauma and delusions saw mediation by dissociation in 1/3 clinical samples and 2/2 general population sample. Sun et al. (2018) only found a mediation when utilizing a clinical dissociation metric. Meanwhile, in a general population sample (Cole et al., 2016), while dissociative amnesia served as a negative partial mediator, the total Dissociative Experiences Scale and absorption were positive partial mediators in the connection between developmental trauma and delusional ideation. Depersonalization, however, had no discernible mediating effect. Fung et al. (2024) identified that the identity dissociation and memory disturbance subscales of the MDI, along with sense of current threat, mediated the relationship between developmental trauma and delusional ideation. However, the study has high ROB and low generalisability, as the worldwide sample comprised of 91% female with no measure of ethnicity or control of confounding variables.

## Negative Symptoms

Of the 40 studies reviewed, 11 addressed negative symptoms. The Positive and Negative Syndrome Scale (PANSS) was employed in seven of these, while a study leveraged the Self-Evaluation for Negative Symptoms for self-reporting. A rigorously controlled study (Degnan et al., 2022) identified dissociation as a mediator in the connection between developmental trauma and self-reported negative symptoms. This was observed in a convenience online sample comprising individuals diagnosed with psychosis. Fung et al. (2024) reported that emotional constriction as measured by the MDI was the strongest mediator for negative symptoms, but no direct effect was observed. Only two studies, one with low ROB (Khosravi et al., 2021) and the other with moderate ROB (Şar et al., 2009), drew correlations between the DES subscales and negative symptoms. Out of seven studies (Álvarez et al., 2021; Chae et al., 2015; Khosravi et al., 2021; Şar et al., 2009; Schäfer et al., 2006; Schalinski et al., 2019; Uyan et al., 2022), just two (Khosravi et al., 2021; Şar et al., 2009) highlighted a significant relationship between developmental trauma and negative symptoms.

## Discussion

This research is the first comprehensive review of dissociative experiences in psychosis subsequent to developmental trauma. We identified a moderate association between developmental trauma and dissociation in psychosis patients, and evidence suggesting that dissociation may mediate the link between developmental trauma and psychosis. While most of our findings were cross-sectional, constraining the scope for causal interpretation, they underscore the centrality of dissociation to psychosis after developmental trauma. This potentially indicates dissociation's role in the manifestation of psychotic symptoms post-developmental trauma, a topic we shall explore below.

Aligned with our primary objective of examining dissociative experiences within the psychosis framework, our findings showed a moderate association between developmental trauma and dissociation in clinical contexts. We also noted elevated dissociation levels in those with past developmental traumas, which rose depending on the level of trauma severity and polytraumatization. This complements prior reviews on dissociation in severe mental disorders

A systematic review of dissociation in psychosis following developmental trauma (Rafiq et al., 2018) and bolsters the established connection between trauma and dissociation (Vonderlin et al., 2018). Several mechanisms may underpin this. For instance, during traumatic events, dissociation may manifest as peri-traumatic detachment, a defence mechanism against extreme, unescapable distress (Holmes et al., 2005). This biopsychological response pattern to trauma can recur when the threat processing system is subsequently triggered. Moreover, children might resort to detachment as an adaptive strategy when caregivers oscillate between being sources of threat and sources of care. Such fluctuating caregiver behaviour can profoundly disrupt a young child's capacity to establish unified self and other perceptions (Liotti, 2004). As the structural theory of dissociation suggests, this could consequently affect the integrity of the personality structure (van der Hart et al., 2010).

Attachment theories suggest that the lack of a stabilizing caregiving experience, frequently observed in cases of disorganized attachment associated with developmental trauma, can foster detachment. This is because it fails to offer a consistent framework to "organize" a child's intrinsic perceptions of themselves and others, leading to enduring dissociated states. Developmental trauma has been demonstrated to impair mentalization abilities, which refer to the skill of introspecting on the mental states of oneself and others (Huang et al., 2020). Reduced mentalization is predictive of dissociation in developmental trauma victims, evident in paediatric (Ensink et al., 2017) and adult cohorts (Huang et al., 2020). Additional dissociative dynamics, such as intense preoccupation with inner reality while detaching from shared experiences, can significantly disrupt a child's evolution of vital social cognition and emotion regulation processes. These processes are crucial for managing intense emotions. Thus, although dissociation might serve an immediate protective role during a traumatic episode or shield a child from the harrowing process of discerning caregivers' malicious intentions (Fonagy et al., 2018), it can impede a child's capacity to process trauma and to assimilate varied emotional states and perceptions of self and others (Bateman & Fonagy, 2010; Fonagy & Campbell, 2016). This can set the stage for persistent dissociative states (Guérin-Marion et al., 2020).

In-depth analyses revealed that dissociation had stronger ties with sexual and emotional abuse than with physical abuse or neglect, whether physical or emotional. Both sexual and emotional abuses are intensely threatening experiences, often imbued with profound shame, stigma, and depending on a child's developmental phase, emotions of confusion, inferiority,

A systematic review of dissociation in psychosis following developmental trauma and degradation (Herman, 1998), creating a cognitive dissonance to which dissociation may be the only coping response possible. Childhood sexual abuse is linked with heightened autonomic arousal (Deblinger et al., 1989). Beyond its psychological threat due to its deeply sadistic nature, it physically breaches a child's bodily sanctity, entailing a more invasive, painful and multi-sensory experience which at times includes repellent tastes, smells and sounds, potentially leading to both physical and psychological harm. This aligns with clinical descriptions of deep-seated peri-traumatic dissociation during such abuse, encompassing depersonalization, derealisation, emotional blunting, and out-of-body episodes.

Our meta-analysis on emotional abuse pointed to moderate heterogeneity and a possible publication bias, factors that merit attention in results interpretation. Delineating the effects of distinct developmental trauma forms is difficult due to the frequent co-occurrence of abuse types (with one study reporting an average of 2.3 different developmental trauma types) (Schalinski & Teicher, 2015) and potential developmental stages that trauma may differentially affect (Zhu et al., 2019). The correlation between profound dissociation and multiple abuse forms, as seen in complex (type II) trauma - characterized by recurrent interpersonal abuse, might underscore the continuous triggering of the neurobiological stress mechanism (Wilson et al., 2011). This can amplify the “shutdown” reactions or other peri-traumatic dissociative defences (Schauer & Elbert, 2015), particularly in the context of recurrent and chronic developmental trauma.

### **The Mediating Role of Dissociation**

Dissociation was associated with greater psychotic symptomatology in the majority of studies, especially for positive rather than negative symptoms. In addition, dissociation was found to mediate the relationship between developmental trauma and positive psychotic symptoms, including psychosis status, corroborating prior reviews (Alameda et al., 2020; Bloomfield et al., 2021; Williams et al., 2018). The elevated developmental trauma levels observed in most patient samples and linked to psychotic symptoms align with earlier meta-analyses (Varese et al., 2012b). The contribution of dissociation to the shaping of distinct psychotic symptom manifestation occurs along multiple biopsychosocial mediators and moderators (Gibson et al., 2016), such as emotional dysregulation, memory impairments,

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PTSD, and altered self- and other schemata, in conjunction with neurological changes  
(Bloomfield et al., 2021; Hardy et al., 2016).

## Hallucinations

Primarily, strong evidence underscored dissociation's mediating effect on the nexus between developmental trauma and hallucinations, both in clinical cohorts and the general populace. Overall, the varied conceptual frameworks of dissociation and different relationships identified hint at potential roles for both detachment and compartmentalization phenomena in the transition from developmental trauma to hallucinations. These, we speculate, interface with other key developmental dynamics and mechanisms intrinsic to psychosis, such as the role of metacognition and delusional ideation (Dorahy et al., 2024), to produce psychotic symptomatology. One study highlighted the influence of pathological dissociation on the severity, commanding nature and recurrence of trauma-related auditory hallucinations (Dorahy et al., 2009). A leading model grounded in the dual representation theory of PTSD (Brewin, 2001; Brewin et al., 2010) proposes that peri-traumatic dissociation might disrupt memory consolidation, culminating in intrusive memory reiterations manifesting as flashbacks or, occasionally, hallucinations. Beyond this PTSD-focused pathway, aligned with complex trauma theories, Wearne et al. (2018) pinpointed a learned, typically auditory, dissociative reiteration mode. Here, the recurrence of decontextualized memories takes on an ego-dystonic nature (Steele et al., 2005), leading to externalized experiences, such as hallucinations. This framework is in keeping with theories positing that voice hearing might be better understood as dissociative, rather than intrinsically psychotic, phenomena (Brewin et al., 2022; Longden et al., 2020; Moskowitz & Corstens, 2018). In a recent investigation, Brewin et al. (2022) noted that for certain individuals, voices represent consciousness modulations marked by elements of detachment, both perceptually and regarding self-experience.

Detachment, intensified by mentalization deficits, internal event immersion, and fragmented self-conceptions, might further amplify deficits in self and external monitoring. This could lead to attributional misjudgements, blurring the lines between intrinsic and extrinsic experiences (Allen et al., 1997), a characteristic often noted in adults with hallucinations. For instance, a predictive coding framework (Silverstein & Lai, 2021) suggests that visual hallucinations may emerge from a prior dissociative consciousness state. This state,

A systematic review of dissociation in psychosis following developmental trauma 22 marked by its entropy, results from reduced suppression of the default mode network, integral to self-experience and autobiographical memories. This supports the notion that inherent dissociation might impair cognitive inhibitory mechanisms (Giesbrecht et al., 2008; Waters et al., 2006), paving the way for hallucinatory episodes. As additionally described by Dorahy et al. (2024), aspects of voice-hearing such as metaphysical beliefs about voices and incoherence of thought are more relevant among individuals with schizophrenia compared to other presentations, such as DID, persisting even after controlling for the effect of depersonalisation. Therefore, while dissociation may be a core feature of voice-hearing, it is necessary to explore additional or interacting factors that change the phenomenology of voice-hearing across presentations.

### **Delusional Ideation and Paranoia**

Separating the effects of dissociation on paranoia and delusions from hallucinations in studies noting a mediation effect for general positive psychotic symptoms remains challenging. However, our investigation provides initial evidence suggesting a role for dissociation in the relationship between developmental trauma and both delusions and paranoia. Delusions have been postulated to manifest as attempts to rationalize an "intrinsically anomalous state", which is perceived and interpreted in a delusional, distrustful, or fear-driven manner (Jaspers, 1977; Freeman, 2016). Depersonalisation is a state influencing interoceptive hierarchies (Seth et al., 2012) (i.e. one's perception of their body's physical experience that informs the generation of subjective feeling states), potentially evoking feelings of threat (Hunter et al., 2017), therefore constituting such an anomalous state that would elicit delusional ideas (Freeman, 2016).

To the best of our understanding, our work is novel in systematically reviewing evidence highlighting dissociation's influence on the association between developmental trauma and paranoia. This was corroborated by two studies employing both self-report tools and interviews. Our research builds on prior examinations of the connection between dissociative phenomena and paranoia (Longden et al., 2020), suggesting that the existence of developmental trauma could, either periodically or in part, anchor this relationship — an insight warranting deeper inquiry, due to the inherent risk of bias in the studies considered. On a broader scale, the studies did not delineate the timeframe of trauma exposure. Experiencing

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trauma, or encountering dismissive, neglectful, or threatening parenting early in one's  
development, could foster internal working models pivotal to paranoia's genesis.

### **Psychotic Symptoms as Predictors of Dissociation**

Three cross-sectional studies pinpointed psychotic symptoms as potential predictors of dissociative experiences (Schäfer et al., 2012), maintaining this association even when accounting for developmental trauma (Longden et al., 2016). A recent network analysis (Černis et al., 2022b), which didn't control for childhood trauma, yielded ambiguous results regarding the directionality between dissociation and hallucinations, albeit suggesting that hallucinations might reciprocally influence dissociation levels. The neurocognitive ramifications and fragmented self-perception resulting from enduring or acute psychosis might enhance dissociative tendencies (Postmes et al., 2014), oscillating between heightened awareness or disengagement. In acute stages, the stressfulness and heightened psychological arousal of a psychotic experience may prompt passive dissociative responses, potentially serving as a protective mechanism to preserve self-integrity during periods of disintegration (Diamond, 2020). Bolstering this notion, two studies (Schäfer et al., 2012; Schroeder et al., 2016) determined that psychotic symptoms predicted dissociative manifestations during acute illness episodes but not during stabilized periods. This suggests dissociation might manifest as a protective "shutdown" mechanism in response to escalated emotional distress elicited by hallucinations (Černis et al., 2022a; Schäfer et al., 2012; Schäfer et al., 2018).

### **Negative Symptoms**

Evidence pointing to a correlation between dissociation and negative symptoms is sparse. Our review found that dissociation wasn't instrumental in bridging developmental trauma and negative symptoms. Only three studies revealed associations among dissociation, developmental trauma, and negative symptoms (Degnan et al., 2022; Khosravi et al., 2021; Uyan et al., 2022), yet these were potentially compromised by unaccounted confounders. Given the indeterminate nature of these outcomes, future inquiries should examine dissociative experiences in tandem with sensory, affective, and notably, social cognitive facets, which neurobiologically resonate with negative symptoms (Debbané et al., 2016).



**Methodological Considerations**

The majority of the studies relied on cross-sectional designs, which inherently curtails the capacity to make causal deductions. This constraint is particularly significant in mediation analyses, where cross-sectional data merely offers tentative insights if temporal sequencing isn't considered (Chmura Kraemer et al., 2008). Approximately half of the studies under review exhibited a high ROB, with primary concerns stemming from uncontrolled confounders, the absence of validated instruments, and the omission of power analysis, potentially paving the way for type-II errors. The undertaking of multiple comparisons without subsequent post-hoc adjustments or sensitivity evaluations further elevates the risk of type-I errors. Frequent omissions of pertinent variables, notably PTSD symptomology, exacerbate concerns over residual confounding. Limited detail on sample characteristics, such as the nature of patient care (inpatient/outpatient) and medication specifics, further hampers the interpretation of results across diverse patient cohorts (Dorahy et al., 2009; Nesbit et al., 2022). Studies focusing on general populations demonstrated potential selection biases, being skewed towards younger, female participants.

Additionally, all investigations captured developmental trauma through retrospective assessments. This method presents reliability and validity concerns, especially given the documented neurocognitive challenges linked to schizophrenia spectrum disorders. A meta-analytic review underscored discrepancies between retrospective and prospective evaluations (Baldwin et al., 2019), with both underestimations and overestimations observed. However, the consistency of retrospective reporting received endorsement in First Episode Psychosis (FEP) cohorts (Fisher et al., 2011; Simpson et al., 2019), independent of the severity of psychotic manifestations. The paucity of experimental and neurobiological studies narrows our scope of understanding regarding the phenomenological and neurocognitive facets of dissociative experiences in psychosis post-developmental trauma.

**Strengths and Limitations of the Current Review**

A chief strength of this review is that it is the first to systematically delve into the interplay of dissociation and developmental trauma across the psychosis continuum. The expansive search criteria, absence of temporal publication constraints, and the commitment to

A systematic review of dissociation in psychosis following developmental trauma 25 embracing diverse methodologies alongside a broad spectrum of psychosis manifestations together offer a comprehensive perspective on the prevailing literature and our extant comprehension of dissociation post-developmental trauma in psychosis. Efforts were made to distinguish between the type of abuse and its relationship with dissociative experiences. The methodological rigor ensured by pre-registering the study and deploying a pair of researchers for the tasks of screening, data extraction, and bias assessment augments the reproducibility of our findings.

Yet, the review is not devoid of limitations. The sole reliance on English-language studies and the exclusion of grey literature, such as unpublished theses, could engender selection biases. Excluding studies that blurred the lines between childhood and adult trauma or did not distinctly identify psychotic symptoms led to the omission of three studies that tackled psychotic phenomena across diagnostic boundaries.

### **Directions for Future Research**

Advancing our understanding necessitates the employment of robust longitudinal designs to elucidate the temporal and causative interplay between dissociation and other contributory mechanisms like threat perception, interoception, and mentalisation that play a role in the onset of psychosis post-trauma. By anchoring research within a developmental risk and resilience framework (McCrory & Viding, 2015), insights can be gleaned about the neurobiological substrates underpinning peri-traumatic dissociation and the enduring repercussions of detachment. This approach would solidify our conclusions on the mediating function of dissociation in the link between developmental trauma and psychosis. Crucially, studies must control for comorbidities and confounding elements to precisely dissect these complex interactions.

There's a pronounced need for qualitative methodologies to delve deeper into the spectrum of dissociative phenomena in psychosis. Such in-depth explorations at varying explanatory levels can bridge the noticeable knowledge lacuna pinpointed in our review concerning the phenomenology of dissociative experiences in the pertinent cohort. Notably, among the numerous studies drawing upon general populations, a large number centred around university demographics or online participants. Future inquiries should prioritize direct assessments of individuals manifesting attenuated psychotic symptoms or those at Ultra High Risk (UHR). This would provide nuanced insights into the dissociative experiences of

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individuals exhibiting subclinical psychosis post-developmental trauma. By grasping the  
evolving trajectory of these mechanisms, we can better understand the potential of dissociative  
symptom screening as a prophylactic measure against subsequent psychotic episodes.

### **Clinical Recommendations**

The current findings underscore the importance of assessing dissociation throughout the evaluation, formulation, and therapeutic interventions for those within the psychosis and developmental trauma spectra. Emphasizing secondary prevention, screening for both dissociative and psychotic experiences, becomes central for those with developmental trauma histories. The observed distinctions in symptomatology between acute and stabilised phases necessitate a trauma-sensitive approach, endorsing dynamic assessments to discern the interplay between dissociative and psychotic manifestations.

Clinically, increased dissociative positive symptoms were prominent in developmental trauma individuals, more so after polytraumatization. Given that dissociation often emerges as a default coping mechanism for developmental trauma survivors, clinicians should recognize and normalize its spontaneous occurrence. A compassionate exploration of its role and fostering environments for mastering grounding techniques becomes essential. When addressing hallucinations, focusing on unprocessed memories and patient's interpretation of these auditory phenomena, paired with deriving meaning from them, aligns well with trauma-centric treatment paradigms (Bloomfield et al., 2020). During trauma-focused therapeutic sessions, practitioners must be vigilant of dissociative indicators like pauses, a patients' detached demeanour, or lack of responsiveness, as these often arise during intense reliving which can trigger strong emotions such as terror or shame (Kouri et al., 2023). Tailored strategies, such as modulating the intensity of imaginal reliving, employing narrative writing, and reinforcing grounding techniques when appropriate, can address trauma-triggered dissociative responses and develop confidence in the patient.

An emergent insight from our review is the intermediary function of dissociation between developmental trauma and symptoms of paranoia and delusion. While this discovery beckons further validation and inquiry, therapeutic measures could accentuate formulating the specific contexts triggering such symptoms (like emotional states or relationships in which they

A systematic review of dissociation in psychosis following developmental trauma (arise) and devise compassionate interventions enabling individuals to navigate and make sense of these overwhelming experiences. 27

## Conclusion

This review delineates a relationship between developmental trauma and dissociative phenomena in psychosis sufferers, identifying dissociation as a predictor for hallucinations, and offering initial evidence pointing towards its role in delusional ideation and paranoia post-developmental trauma. The linkages between trauma, dissociation, and negative symptoms emerged as tenuous. The intermediary role of dissociation is evident across both clinical and general populations. However, the predominant research design was cross-sectional, with a notable absence of qualitative or experimental methodologies. Postulating a co-occurrence of dissociation and psychosis after developmental trauma suggests dissociation as a probable contributor to psychosis, nestled among other critical developmental facets like post-traumatic reactions, emotion regulation, and socio-cognitive functions like mentalization. Imminent research endeavours should probe the dissociation phenomenology in psychosis post-developmental trauma, validate the proposed mechanisms employing robust research designs, and assess the therapeutic benefits of addressing dissociation.

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Figure 1. Prisma Flow Diagram of Study Screening and Inclusion

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	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
Degna et al. 2022	Yes	Yes	N/R	Yes	Yes	No	No	Yes	Yes	No	Yes	No	N/A	Yes	Low
Fung et al. 2023	Yes	Yes	N/R	No	No	No	No	Yes	Yes	No	Yes	No	N/A	No	High
Gibson et al. 2019	Yes	Yes	N/R	N/R	No	No	No	Yes	Yes	No	Yes	No	N/A	Yes	High

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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
Holowka et al. 2003	Yes	No	N/R	N/R	N/R	No	No	Yes	Yes	No	No	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

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Vogel et al. 2009	Yes	Yes	N/R	N/R	No	No	No	Yes	Yes	No	Yes	No	N/A	No	High
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Note. N/R= Not reported. N/A= Not applicable.

Table 2

Cohort studies: Quality Assessment Table (Newcastle Ottawa Scale)

	Representativeness of Exposed Cohort	Selection of Non-Exposed Cohort	Ascertainment of Exposure	Outcomes at start of study	Comparability	Ascertainment of outcome	Follow up	Adequacy of follow-up	/ 9	Risk of Bias Rating
Muenzenmaier et al. 2015	*	*	*	-	**	No	*	*	7	Low
Schäfer et al. 2006	*	*	*	-	*	*	No	*	6	Moderate
Schäfer et al. 2012	*	*	*	-	*	No	No	*	5	Moderate
Thompson et al. 2016	*	*	*	-	No	No	Yes	*	5	Moderate

Table 3

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Case-control studies: *Quality Assessment Table (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	High
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



Table 4. Characteristics of Studies Exploring the Association Between DT and Dissociation

Study	Design	Sample	Level of evidence	DT Measure	Measure of Dissociation	Psychosis experience	Main findings
Álvarez et al., 2015	Case-control	Clinical-outpatient	3b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Schizophrenia or schizoaffective disorder (DSM-IV)	Higher dissociation in high ( $M=20.06$ , $SD=16.6$ ) vs low DT ( $M=6.64$ , $SD=5.92$ ), $p<.05$ .  Dose response relationship between polytraumatization, risk of schizophrenia (4.23 times higher) and dissociation (10 times greater).
Álvarez et al., 2021	Cross-sectional	Clinical	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Schizophrenia or schizoaffective disorder (DSM-IV); PANSS	All DT types and intensity of EA, SA, PA associated with higher dissociation, $p < 0.05$ .  No correlation between positive symptoms and DT and inverse association between negative symptoms and DT, $\rho = -0.300$ , $p = 0.045$ .  Dose-response relationship between dissociation and number of DTs, $p < 0.005$ .
Berry et al. 2018	Cross-sectional	General Population	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Hallucinations (LSHS-R)	Total DT associated with hallucination-proneness, $r=.624$ , $p<.05$ and dissociation, $r=.488$ , $p<.05$ .  Dissociation, $B=1.17$ , 95% $CI=.075-.160$ , and

							avoidant attachment, $B=2.35$ , 95% $CI=.107-.444$ , predicted hallucination proneness.
Braehler et al. 2013	Case-control	Clinical-Chronic patients, FEP, controls	3b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Chart diagnosis	Higher dissociation for chronic patients compared to FEP and controls, and FEP and controls, $F(2,168)=17.52$ , $p<0.01$ .  Dissociation positively associated with with DT, $r=.30-.48$ , $p<.001$ , EA $r=.22-.65$ , $p<.001$ , SA $r=.35-.43$ , $p<.001$ across groups. PA $r=.35$ , $p<.001$ and EN $r=.29$ , $p<.05$ , correlated with dissociation in FEP group. PN correlated with dissociation in chronic patients $r=.39$ , $p<.001$ , and controls $r=.31$ , $p<.01$ .
<b>Study</b>	<b>Design</b>	<b>Sample</b>	<b>Level of evidence</b>	<b>DT Measure</b>	<b>Measure of Dissociation</b>	<b>Psychosis experience</b>	<b>Main findings</b>
Chae et al. 2015	Cross – sectional-	Clinical-inpatient	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Positive and Negative Symptoms (PANSS)	SA, $F=5.16$ , $p<.05$ and dissociation $F=4.34$ , $p<.05$ predicted positive symptoms, controlling for sex and age.
Dorahy et al. 2009	Case-control	Clinical-inpatient and	3b	Emotional, Physical, Sexual Abuse and	Dissociative Disorders (DDIS)	Auditory hallucinations (Mental Health Research	Schizophrenia with DT ( $M=32.5$ , $SD=21.0$ ) and

		outpatient		Emotional and Physical Neglect  CTQ	Pathological Dissociation (DES-T)	Institute Unusual Perceptions Schedule)	DID groups ( $M=65.7$ , $SD=18.0$ ) had higher levels of dissociation and command hallucinations compared to no DT ( $M=11.8$ , $SD=9.9$ ), $F(14, 100) = 8.64$ ; $p < .001$ .  Higher pathological dissociation 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, $B=1.03$ , $p < .001$ .
Goff et al. 1990	Cross-sectional	Clinical-chronic patients	4	LEQ: PA or SA before 16	Dissociative Experiences (DES-II)	Binary: Voices inside or outside head, presence of voices.	Higher dissociation 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 $M=6$ , $SD=18$ ), $p < .05$ .
Holowka et al. 2003	Cross-sectional	Clinical-outpatient	4	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES)	Diagnosis based on SCID (DSM- III-R)	DES correlated with emotional abuse, $r = 0.84$ , physical abuse, $r=0.55$ , both $p < 0.01$ , controlling for age.  Correlation with emotional abuse was significant after controlling

							for other forms or abuse or neglect, ( $r=0.77, p<0.001$ ).
Longden et al., 2016	Case-control	Clinical-FEP with non-AH	3b	Child Sexual Abuse	Dissociative Experiences (DES-II)	Non-auditory hallucinations	Dissociation, but not SA predicted non-auditory hallucinations after controlling for cumulative adversity, $OR=1.05$ , $95\%CI=1.01;1.08$ , $p = .019$ .
<b>Study</b>	<b>Design</b>	<b>Sample</b>	<b>Level of evidence</b>	<b>DT Measure</b>	<b>Measure of Dissociation</b>	<b>Psychosis experience</b>	<b>Main findings</b>
Offen et al. 2003	Cross-sectional	Clinical-Psychosis	4	Sexual Abuse (single item)	Dissociative Experiences (DES-II)	Beliefs, feelings and behaviours around hearing voices	Higher abuse among females, $\chi^2 = 4.40, p < .04$ .  Higher dissociation among patients with SA histories ( $M=30.5$ , $SD=14.9$ ) vs without ( $M=23.1$ , $SD=16.6$ ), Mann-Whitney $z = 1.77, p < .04$  Dissociation and beliefs of voices being malevolent correlated with age at first abuse, $\rho = -.68, p < .04$ .
Perona-Garcelán et al., 2010	Cross-sectional	Clinical	4	Trauma Questionnaire items	Dissociative Experiences (DES-II)	Hallucination and delusion (PANSS)	Higher dissociation 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, $U = 37.00$ , $p = .001$ .
Sar et al. 2010	Cross-sectional	Clinical	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)  Dissociative Disorders (DDIS)	SCID (DSM-IV); Scales for the Assessment of Negative and Positive Symptoms	Positive correlations between DT and dissociation, $r = 0.36$ , $p = .002$ .  Only physical abuse, $\beta = 0.28$ , $p = .011$ , and neglect, $\beta = 0.28$ , $p = .013$ , predicted dissociation.  DT not associated with psychotic symptoms.
Schäfer et al. 2006	Cohort-prospective	Clinical-inpatients	1b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Positive and Negative Symptoms (PANSS)	Admission: DT, only with amnesia, $\rho = .71$ , $p = .003$ . No correlation between DT, dissociation and positive symptoms.  T1: Amnesia and DT no longer correlated, only correlation with emotional abuse, $\rho = .34$ , $p = .032$ . No other significant correlations.  Total dissociation, amnesia and absorption not correlated between timepoints.
<b>Study</b>	<b>Design</b>	<b>Sample</b>	<b>Level of evidence</b>	<b>DT Measure</b>	<b>Measure of Dissociation</b>	<b>Psychosis experience</b>	<b>Main findings</b>
Schäfer et al. 2012	Cohort-prospective	Clinical-inpatients	1b	Emotional, Physical, Sexual	Dissociative	Positive and Negative	Dissociation and psychotic symptoms

				Abuse and Emotional and Physical Neglect  CTQ	Experiences (DES-II)  Pathological Dissociation (DES-T)	Symptoms (PANSS)	significantly less over time, $F_{(1,14)} = 5.1$ ; $p = 0.041$ ; $\eta^2 = .265$ .  Admission: Positive symptoms, $\beta = 2.91$ , $p = .005$ , predicted dissociation. DT did not predict dissociation.  T1: SA only predictor of dissociation, $\beta = 2.02$ , $p = .047$ .
Schalinski & Teicher, 2015	Cross-sectional	Clinical-inpatient stabilized	2b	MACE: physical, emotional, sexual abuse witnessed DV, verbal and physical bullying, emotional and physical neglect.	Shutdown Dissociation Scale	Positive and Negative Symptoms (PANSS)	Severity of DT experienced $r = .30$ , $p = .009$ and witnessed $r = .41$ , $p < .001$ , 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.  Emotional neglect followed by emotional abuse biggest predictors of dissociation.
Sun et al. 2019	Cross-sectional	Clinical-FEP	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	SCID-Dissociative Disorders-Revised	Presence of diagnosis (SCID) (DSM-IV)	Significant difference in the prevalence of clinical dissociative symptoms (any SCID-D-R subscale rated as moderate or severe) between those with and without DT histories, $\chi^2(1) =$

							17.99, $p < 0.0001$ .
Schroeder et al. 2016	Cross-sectional	Clinical-inpatient	2b	Physical and sexual abuse, DV, parental loss, parental dysfunction	Dissociative Experiences (DES-II)	Positive and Negative Symptoms (PANSS, including general psychopathology)	Positive correlation between positive symptoms and dissociation, $r = .216$ , $p = .039$ . Significantly different dissociation scores between patients with DT and without DT, $t(18.19) = 2.225$ , $p = .040$ .
<b>Study</b>	<b>Design</b>	<b>Sample</b>	<b>Level of evidence</b>	<b>DT Measure</b>	<b>Measure of Dissociation</b>	<b>Psychosis experience</b>	<b>Main findings</b>
Vogel et al. 2009	Cross-sectional	Clinical-inpatient	4	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Symptom Check List 90-R	Significant difference in the distribution of physical neglect scores between individuals with low and high, $\chi^2 = 11.7$ , $p < .008$ .

*Note.* CTQ: Childhood Trauma Questionnaire. DES: Dissociative Experiences Scale. DES-T: DES Taxon. DSM-IV: Diagnostic and Statistical Manual, 4<sup>th</sup> Edition. DT: Developmental Trauma. 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. DID: Dissociative Identity Disorder. SCID: Structured Clinical Interview. T1: Time 1.

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

Study	Design	Sample	Level of evidence	DT measure	Measure of Dissociation	Psychosis experience	Main findings
Blose et al. 2023	Cross-sectional	General Population	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)  Peri-traumatic Dissociation	Schizotypal Personality Traits	Peritraumatic dissociation mediated DT → schizotypy, $\beta=.06$ , 95% CI:0.01;0.12.  Dissociation did not mediate DT → schizotypy, controlling for peri-traumatic dissociation $\beta = .05$ , 95% CI=-0.02;0.12.
Bortolon et al. 2017	Cross-sectional	General Population	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Defensive dissociation	Hallucinations (LSHS-R)	Defensive dissociation significantly partially mediated DT → AH proneness, $f^2 = .325$ .
Bortolon et al. 2018	Cross-sectional	General Population	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Defensive dissociation	Visual and Auditory Hallucination proneness (LSHS-R)	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	General Population	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect	Dissociative Experiences (DES-II) Depersonalization (CDS)	Delusions and hallucinations	Dissociation mediated DT → hallucination proneness, $\beta=3.94$ , 95% CI=2.15; 6.37.  Dissociation mediated DT → delusional ideation, $\beta=10.75$ , 95% CI=5.87;17.56.



Study	Study design	Sample	Level of evidence	DT measure	Measure of Dissociation	Psychosis experience	Main findings
				CTQ			<p>Only absorption mediated DT→hallucination proneness, <math>\beta=3.45</math>, 95% CI=5.87;17.56.</p> <p>Dissociative amnesia negatively, <math>\beta=-3.68</math>, 95% CI=-9.46;-0.003, and absorption positively, <math>\beta= 7.18</math>, 95% CI= 2.87;13.33, mediated DT→delusional ideation, <math>p&lt;.05</math>.</p>
Varese et al. 2012	Case-control	Clinical-Schizophrenia Spectrum Disorders	3b	Severity of developmental trauma, sexual, emotional, physical abuse and neglect	Taxon Dissociation (DES-T)	Positive and Negative symptoms (PANSS)  Hallucination Proneness	Dissociation mediated DT→hallucination proneness in clinical and aggregate samples, $\beta=0.11$ , 95% CI=0.06; 0.17.
Degnan et al. 2022	Cross-sectional	Clinical-Self-reported psychosis	2b	Brief Betrayal Trauma Survey	Dissociative Experiences (DES-II)  PSQ	Negative symptoms	<p>DES dissociation <math>r=0.395</math>, <math>p&lt;.05</math> but not compartmentalisation was associated with DT, but this effect ceased after controlling for positive symptoms.</p> <p>DT was associated with negative symptoms <math>r=0.291</math>, <math>p&lt;.05</math>, but this effect ceased after controlling for positive symptoms, <math>r= 0.109</math>.</p> <p>DT <math>r=0.324</math>, DES dissociation <math>r=.649</math> and compartmentalisation <math>r=.429</math>, were associated with positive symptoms, <math>p&lt;.05</math>.</p>

							Disorganized attachment, $\beta=.34$ , 95% CI=0.20;0.47, and dissociation, $\beta=.04$ , 95% CI=0.01; 0.10, mediated DT $\rightarrow$ negative symptoms.
Evans et al. 2015	Case-control	FEP and controls	3b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	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 $\rightarrow$ psychosis group membership, $\beta = 0.10$ , 95% CI= 0.002; 0.37. No direct effect was observed.
Fung et al. 2024	Cross-sectional	General Population		Brief Betrayal Trauma Survey	The Multiscale Dissociation Inventory  Somatoform Dissociation Questionnaire	Positive and Negative Symptom Frequency (CAPE)	Memory disturbance was one of the strongest mediators of the DT $\rightarrow$ Delusional ideation relationship ( $\beta = 0.09$ , $p < .01$ ). Somatoform dissociation was the strongest mediator for perceptual anomalies ( $\beta = 0.12$ , $p < .01$ ).  Dissociation was not directly related to negative symptoms or bizarre experiences.
<b>Study</b>	<b>Design</b>	<b>Sample</b>	<b>Level of evidence</b>	<b>DT Measure</b>	<b>Measure of Dissociation</b>	<b>Psychosis experience</b>	<b>Main findings</b>
Gibson et al. 2019	Cross-sectional	General Population	2b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect	Dissociative Experiences (DES-II)	Psychotic Like Experiences	Dissociation was significantly related to TLEs ( $F[1, 940] = 55.08$ , $p < 0.0001$ ) and PLEs ( $r=.045$ , $p < 0.0001$ ).  Dissociation mediated DT $\rightarrow$ psychotic

				CTQ			experiences, $\beta = .15$ , 95% CI=.01;.02.
Gomez & Freyd 2017	Cross-sectional	General Population	2b	Sexual abuse of Brief Betrayal Trauma Survey	Curious Experiences	Hallucinations (Beliefs and Experiences Module)	Dissociation mediated SA $\rightarrow$ hallucinations, 95% CI= .16;.66.
Khosravi et al. 2021	Case-control	Clinical-chronic psychotic patients, FEP, community controls	3b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative experiences (DES-II) SCID-D	Positive and Negative Symptoms (PANSS)	<p>Higher abuse in FEP and chronic patients, <math>p &lt; .001</math>. No group differences in neglect. Higher dissociative scores in chronic patients, <math>p &lt; .001</math>.</p> <p>Moderate correlations between SA and PA and positive, negative and depressive symptoms, <math>r = .29-.42</math>, <math>p &lt; .001</math>.</p> <p>Large correlation between SA and amnesia <math>r = .62</math>, depersonalisation/derelation <math>r = .67</math>, and absorption, <math>r = .64</math>, <math>p &lt; .001</math>. No correlation between other types of DT and dissociation.</p> <p>Amnesia and absorption mediated SA <math>\rightarrow</math> positive symptoms, <math>\beta = -0.23</math>, 95% CI= <math>-0.497; -0.024</math> and <math>\beta = 0.24</math>, %CI=0.02;0.49, respectively.</p>
Mertens et al. 2021	Cross-sectional	General Population	2b	Emotional Abuse (ITEC)	Dissociative experiences (DES-II) (Aggregate)	Suspiciousness (self-report) and paranoia (interview)	<p>EA correlated with dissociation, <math>r = .31</math>, <math>p &lt; .01</math>, interview and self-report paranoid traits, <math>r = .5</math>, <math>p &lt; .01</math>.</p> <p>Dissociation correlated with both interview <math>r = .44</math>, <math>p &lt; .01</math> and self-report</p>

Study	Design	Sample	Level of evidence	DT Measure	Measure of Dissociation	Psychosis experience	Main findings
							<p>paranoid traits, <math>r=.53</math>, <math>p&lt;.01</math>.</p> <p>Dissociation mediated EA→paranoid traits (self-report and interview) controlling for insecure attachment, <math>\beta=0.043</math>, 95%CI=.004;.13.</p> <p>Fearful attachment mediated EA→paranoia (self-report), <math>\beta = 0.019</math>; 95%CI= 0.003; 0.05.</p>
Muenzenmaier et al. 2015	Cohort-prospective	Clinical outpatients with psychosis	1b	Childhood sexual, physical, emotional abuse, domestic violence, parental mental illness, substance misuse, arrest of family member	Taxon Dissociation (DES-T)	Delusions and hallucinations (SCID)	<p>1.20 IRR increase, 95%CI=1.09;1.32, for hallucinations and 1.19 IRR increase, 95%CI=1.09;1.29, for delusions with every additional adverse experience.</p> <p>DES-T related to delusions, OR=1.03, 95%CI= 1.01; 1.04 and hallucinations, OR=1.03, 95%CI =1.01;1.05.</p> <p>Support for partial 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.</p>
Nesbit et al. 2022	Case-control	Clinical inpatients with psychosis	3b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect	Dissociative Experiences (DES-II)	Hallucination frequency, duration and distress of AH and non-AH.	<p>No correlation between DT-AH measures, and DES subscales and tactile hallucinations.</p> <p>Absorption mediated DT→visual, <math>\beta = .010</math>, 95%CI=.004;.026, olfactory, <math>\beta = .008</math>, 95%CI=.01;</p>

				CTQ			.020 and gustatory hallucinations, $\beta = .010$ , 95% CI=.002; .022).
O'Neil et al. 2021	Cross-sectional	Help-seeking	2b	Sexual Abuse (SAQ-Part II)	Dissociative Experiences (DES-II)	Psychotic Like Experiences (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 $\rightarrow$ PLEs, $\beta = 0.249$ , 95% CI= 0.16; 0.34, and adult SA $\rightarrow$ PLEs, $\beta = 0.081$ , 95% CI= 0.03; 0.13.
Pearce et al. 2017	Cross-sectional	Clinical and subclinical	2b	Brief Betrayal Trauma Survey	Dissociative Experiences (DES-R)	Paranoia and hallucinations (CAPE)	Dissociation, $\beta = 0.09$ , 95% CI=0.03, 0.17, but not fearful attachment, $\beta = 0.02$ , 95% CI=-0.001;0.07, mediated DT $\rightarrow$ voices.  Both dissociation, $\beta = .17$ , 95% CI=0.07; 0.30) and fearful attachment, $\beta = 0.05$ , 95% CI=0.01, 0.12, mediated DT $\rightarrow$ paranoia.
<b>Study</b>	<b>Design</b>	<b>Sample</b>	<b>Level of evidence</b>	<b>DT Measure</b>	<b>Measure of Dissociation</b>	<b>Psychosis experience</b>	<b>Main findings</b>
Perona-Garcelán et al. 2012	Cross-sectional	Clinical	2b	Sexual, physical abuse, death of a relative or friend, near-drowning, assault, accident	Dissociative Experiences (DES-II)	Hallucination and Delusion	DT associated with dissociation, $r=.41$ , $p<.01$ , subscales ( $r=.25$ , $p<.05$ , $r=.34$ , $p<.01$ , $r=.37$ , $p<.01$ , hallucinations, $r=.36$ , $p<.01$ , and delusions, $r=.32$ , $p<.01$ .  Total dissociation significantly mediated DT $\rightarrow$ hallucinations, $\beta = 0.21$ , 95% CI =0.09; 0.38, but not DT $\rightarrow$ delusions, $\beta = 0.07$ , 95% CI =0.00; 0.21.

							Only depersonalization mediated DT → hallucinations, $\beta =$ 0.19, 95% CI = 0.05; 0.39
Schalinski et al. 2019	Case- control	Clinical inpatients with psychosis and communi ty controls	3b	MACE: Physical, emotional , sexual abuse, witnessin g DV, bullying, emotional , physical neglect	Shutdown Dissociation Scale	Positive and negative symptoms (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 $r=0.26$ , $p<0.001$ 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, $\beta = 0.07$ , $p = 0.032$ , 95%CI=0.01; 0.16.
Sun et al. 2018	Cross- sectional	Clinical patients with psychosis	2b	Emotiona l, Physical, Sexual Abuse and Emotiona l and Physical Neglect  CTQ	Dissociative Experiences (DES-II) Dissociation (SCID-D)	Hallucinat ions and delusions	Interview based dissociation mediated the relationship between DT and delusions, $\beta = 0.02$ , 95%CI=0.01; 0.04.  Self-report dissociation mediated the relationship between DT and hallucinations, $\beta =$ 0.01, 95%CI=0.003, 0.03.

Thompson et al. 2016	Cohort-prospective	Ultra-High Risk for Psychosis	1b	Sexual Abuse	Dissociation -CAARMS	Transition to psychotic disorder	No mediation of SA → transition to psychotic disorder by dissociation, $z=0.92$ , $p=0.358$ .
Uyan et al. 2022	Case-control	Clinical (SCZ) and community controls	3b	Emotional, Physical, Sexual Abuse and Emotional and Physical Neglect  CTQ	Dissociative Experiences (DES-II)	Positive and Negative Symptoms (PANSS) Psychosis Group Membership	Withdrawal symptoms were associated with experiences of neglect, $r=0.223$ , $p<0.001$ - $p<.05$  All types of DT and dissociation levels were significantly higher among cases than controls, $U=2178.5$ , $p<0.001$  Dissociative experiences partially mediated the relationship between DT and presence of schizophrenia, $ab=0.0396$ , $p<.001$ .

*Note.* CAARMS: Comprehensive Assessment of At-Risk Mental States. CATS: The Child Abuse and Trauma Scale. CDS: Cambridge Depersonalisation Scale. CTQ: Childhood Trauma Questionnaire. DES-II: Dissociative Experiences Scale. DES-T: DES Taxon. DSM-IV: Diagnostic and Statistical Manual, 4<sup>th</sup> 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 Identity Disorder. SCID: Structured Clinical Interview TAS: The Tellegen Absorption Scale. T1: Time 1.

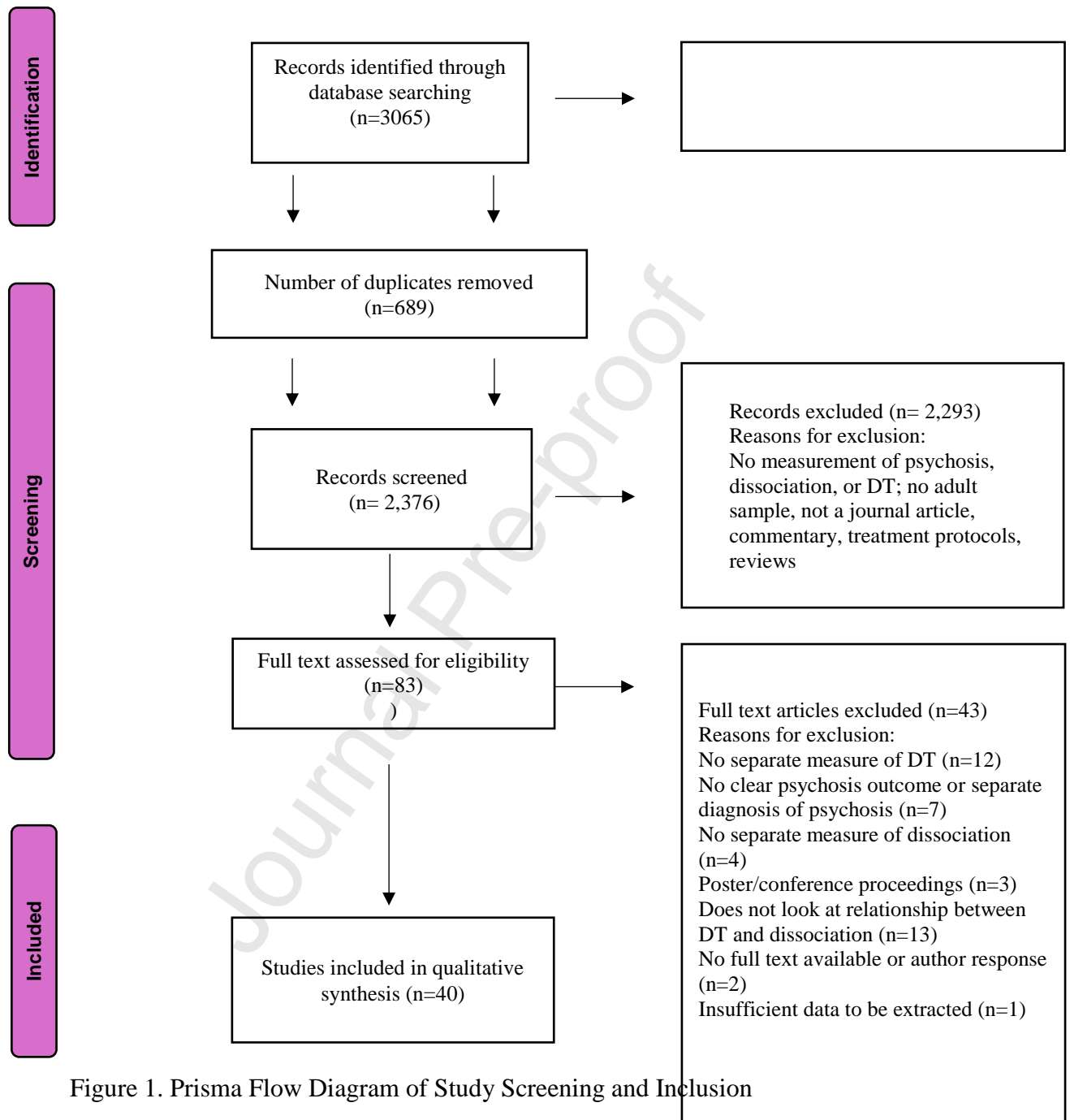


Figure 1. Prisma Flow Diagram of Study Screening and Inclusion



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Statement 2: Contributors

EM was involved in the conceptualization, design, data collection, analysis and curation of results, writing the first draft of the manuscript, reviewing and editing the manuscript. RT and OP were involved in conducting literature searches and screening data, and RT was also involved in data curation. PJ was involved in quantitative data analysis. HK and PF were involved in writing, reviewing and editing the manuscript. KA and MB were involved in the conceptualization, design, reviewing and editing of the manuscript. All authors contributed to the final review of the manuscript.

Statement 3: Conflict of Interest

No conflict of interest is identified by the authors.

Statement 4: Acknowledgements

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- Developmental trauma is linked to dissociative symptoms in patients with psychosis.
- Dissociation contributes to hallucinations following developmental trauma.
- The link between developmental trauma and paranoia may be explained by dissociation.
- Dissociation may be both a cause and a response to psychotic symptoms.
- Qualitative research is needed to understand the phenomenology of dissociation.

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