Trauma, bipolar disorder and at-risk presentations: Exploring pathways that influence clinical outcomes

Georgia Horne

A thesis submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology

Clinical and Applied Psychology Unit
Department of Psychology
The University of Sheffield

June 2025

Declaration

This thesis has been submitted for the award of Doctorate in Clinical Psychology at the University of Sheffield. It has not been submitted to any other institution or for the attainment of any other qualifications. All sources have been referenced appropriately.

Structure and Word Count

Section 1: Literature Review

Excluding references and tables: 7,994

Including references and tables: 16,427

Section 2: Empirical Study

Excluding references and tables: 7,499

Including references and tables: 10,698

Total

Excluding references and tables: 15,493

Including references and tables: 27,125

Lay Summary

The relationship between trauma and bipolar disorder (BD) is well-established. However, mechanisms that might explain this association remain unclear. The first chapter involved a systematic review exploring psychological mediators between early trauma and BD-related outcomes.

Searches on three databases led to the inclusion of twenty studies. Study quality varied, and different approaches to analyses and outcomes meant that the findings could not be directly compared, impacting the strength of the conclusions that can be made.

The mediators fell into five categories: affective processes, cognitive processes, interpersonal factors, personality-related variables and behavioural risk factors. Outcomes included course/ severity, suicidality, comorbidities, dissociation, and resilience. Consistent mediators included emotional dysregulation and attachment patterns. Depressive symptoms were most frequently studied, with less focus on manic symptoms. Future research should explore mediators affecting mania and work towards similar methodological approaches so true mediation effects can be understood.

The second chapter, an empirical study, looked at individuals at risk of developing BD (BAR) compared to a non-clinical group on experiences of trauma, post-traumatic stress disorder and sleep difficulties. 140 people participated, 64 were in the non-clinical group and 76 were in the BAR group. The BAR group had taken part

in a previous study looking at a new therapy and were happy for their information to be used in this study. Participants had a clinical interview with researchers to understand experiences of trauma and completed questionnaires looking at sleep difficulties and mood states. Number of traumas and rates of PTSD were higher in the BAR group, as were sleep difficulties. The BAR group also had higher levels of depressive symptoms. Having PTSD did not impact on levels of depression, manic symptoms or sleep difficulties for the BAR group. Research with bigger samples and longer follow-up periods would help us better understand this group and target support.

Acknowledgements

I firstly want to thank my research supervisor, Professor Richard Bentall for your support, kindness and patience with me throughout this thesis journey. It has been full circle from my first ‘real’ psychology job to completing my doctoral thesis under your guidance and I am so appreciative of this. You have truly inspired me and my journey in clinical psychology.

A big thank you to the BART trial team, especially Professor Sophie Parker and Dr Lydia Pearson. Your advice, knowledge and time has been greatly appreciated and was vital in the success of this project. Thank you to all participants and PPI group members – your contributions and openness have been invaluable.

Nikki – my co-researcher, you have been a dream to collaborate with on this project, and I am so grateful for the moral support and debriefs.

To my lovely cohort, I can’t express my appreciation for you all enough. We have been through the craziest journey together and I am so proud of the amazing psychologists you all are. I have made friends for life and cannot wait to see all the great things you do.

Lastly, I am so grateful for my friends and family – you have all ridden the DClinPsy rollercoaster with me, supported me to keep going at the most difficult of times, and have picked me up when I have needed it. We got there!

Contents

Section One: Literature Review

Psychological mediators between early adversity and bipolar disorder: A systematic review

Abstract

Objectives

The relationship between childhood adversity and bipolar disorder is well established, though mechanisms underpinning this relationship are less understood. This systematic review aimed to explore the psychological factors that may mediate the relationship between early trauma and bipolar disorder.

Method

Database searches were conducted using PsycInfo, MEDLINE and Scopus in line with a pre-registered protocol on Prospero (CRD42024598653). Twenty quantitative studies investigating psychological mediators of the relationship between childhood trauma and outcomes relating to bipolar disorder were included. A narrative synthesis was conducted, and each of the papers quality appraised against Joanna Briggs Institute (JBI) guidance.

Results

There was variation across the mediators and outcomes explored, although mediators could be grouped into five conceptual domains; affective processes, cognitive and perceptual processes, interpersonal factors, personality-related factors and behavioural risk factors. Outcomes explored included clinical expressions of

bipolar such as course and severity, suicidality, comorbidities, dissociation, and resilience.

Conclusions

The relationship between childhood trauma and bipolar disorder involves complex, multifaceted pathways rather than a direct association. Multiple psychological factors contribute to this relationship, with emotional dysregulation emerging as a significant mediator that consistently influenced various outcomes. While further research is needed to establish the relative importance and interplay of different mediating factors, the identified mechanisms offer valuable targets for therapeutic intervention in individuals with bipolar disorder. The findings have important implications for both clinical practice and future research directions.

Practitioner Points

- Comprehensive trauma-informed assessments may be useful in generating formulations of each patient's pathway from early adversity to bipolar disorder.
- Consideration should be given to the incorporation of validated screening measures of trauma experiences and potentially mediating mechanisms to inform individualised formulations.
- Trauma-focused approaches to therapy should be considered when working with patients with bipolar disorder who have a trauma history.

Keywords

Bipolar disorder, psychological mediators, childhood trauma, systematic review.

Introduction

Bipolar disorder

Bipolar disorder (BD) is characterised by fluctuation in mood states, including episodes of mania (euphoria, excitement and disinhibition, often with psychotic symptoms such as delusions and thought disorder), hypomania (less severe than mania) and depression (low mood, apathy, anhedonia). Modern diagnostic systems distinguish between bipolar I disorder, characterised by manic episodes, and bipolar II disorder, characterised by hypomanic episodes (American Psychiatric Association [APA], 2013). However, it should be noted that the distinction between BD and other psychiatric disorders has been the subject of protracted debate over more than a century, with some researchers pointing to similarities with unipolar depression (Goodwin & Jamison, 2007), others pointing to overlapping symptomatology with schizophrenia (Tamminga et al., 2014), and others arguing that all of these disorders represent different expressions of a general psychopathology or psychosis syndrome (Caspi et al., 2013; Reininghaus et al., 2013).

According to conventional criteria, BD affects more than 1% of individuals worldwide and have many negative consequences, including cognitive and functional impairment, worsened health outcomes, and increased risk of death by suicide (Ferrari et al., 2011; Grande et al., 2016). The highest prevalence of diagnoses is in individuals under the age of 34 (Baker & Kirk-Wade, 2024), with the typical onset between late adolescence and early adulthood (Joslyn et al., 2016; Joyce, 1984).

Trauma within the context of bipolar

A long tradition of research has focused on biological aspects of BD. For example, genetic studies have suggested that BD is highly heritable (Barnett & Smoller, 2009; Gordovez & McMahon, 2020), although the risk of developing bipolar appears to be highly polygenic with many variants implicated, including variants shared with other psychiatric diagnoses, such as schizophrenia (Potash & Bienvenu, 2009). Other research has focused on neurobiological mechanisms such as abnormalities in neuronal cell networks which may or may not be linked to genetic risk (Harrison et al., 2018) and which, again, may be overlapping with abnormalities found in schizophrenia (de Sousa et al., 2023). However, recent research has also emphasized the importance of traumatic experiences in childhood as an environmental factor that can contribute to the development of BD.

Childhood adversity has been defined as “negative environmental experiences that are likely to require significant adaptation and that represent a deviation from the expectable environment” (McLaughlin, 2017). Deviations from what would be expected may include threats to the child’s physical safety, wellbeing or an absence of what may be expected (McLaughlin et al., 2019). To express this another way, adversity can be understood as a range of potentially harmful experiences that occur in childhood/ adolescence (Williams et al., 2018). These kinds of experiences are unfortunately common worldwide and estimated to affect approximately a third of the global population (Kessler et al., 2010).

Childhood adversity is widely recognised as a potential risk factor for psychopathology, including psychosis (Varese et al., 2012; Zhou et al., 2025), BD (Palmier-Claus et al., 2016) and personality disorders (Porter et al., 2020). A recent

umbrella review found that adversity conferred an approximately three times risk of developing any kind of psychiatric disorder (Hogg et al., 2023). There is also evidence to support a dose-response relationship (i.e., the more exposure to traumatic experiences, the stronger the relationship with adverse outcomes, which is suggestive of causality) between early trauma and adult psychopathology (Flinn et al., 2025).

If trauma is an important causal factor in BD, a high prevalence of comorbid Post-Traumatic Stress Disorder (PTSD) might be expected. Estimates of this kind of comorbidity range between 16% and 39% (Aas et al., 2016) with traumatic experiences reported in approximately 50% of those with BD (Garno et al., 2005). Palmier-Claus et al. (2016) conducted a meta-analysis of the literature on childhood adversity and BD, concluding that childhood adversity was 2.63 times (95% CI 2.00-3.47) more likely to have occurred in individuals with BD compared with non-clinical controls. Rowe et al. (2024) explored the dose-response relationship between cumulative trauma (the experience of more than one type of traumatic event) and BD, concluding that at least a third of participants experienced childhood cumulative trauma, with prevalence estimates between 29% to 82%. Cumulative traumas are also thought to impact symptom complexity and are associated with more severe symptoms of depression and a greater likelihood of PTSD (Briere et al., 2008; Martin et al., 2013).

Childhood trauma has been found to influence the trajectory and course of BD, and is related to earlier age of onset, an increased likelihood of ‘rapid cycling’ course (usually defined as four or more episodes a year; APA, 2013), longer episode

duration, occurrence of psychotic symptoms, the number of lifetime mood episodes, risk of suicide ideation/ attempts and substance misuse (Aas et al., 2016; Rowe et al., 2023). Furthermore, Quarantini et al. (2010) found that individuals who had experienced trauma and had a diagnosis of BD experienced more manic symptoms than depressive symptoms when compared with a control group of individuals with bipolar but no reported trauma.

There is less consensus around the impact of trauma subtypes, though there appears to be emerging evidence that levels of emotional abuse are greater in individuals with BD compared with healthy controls (Hett et al., 2022) with emotional abuse most strongly associated with a complex course of BD (Gu et al., 2022), including earlier onset, increased mood episodes and suicide attempts (Dualibe & Osório, 2017; Etain et al., 2008). A recent case-control study found that patients who had experienced physical and/or sexual abuse were more likely to have a ‘rapid cycling’ presentation (Galvez-Florez et al., 2025) with a retrospective cohort study (Guillen-Burgos et al., 2025) demonstrating increased exposure to physical or sexual abuse, and emotional and physical neglect, in individuals with a bipolar type I diagnosis when compared to individuals with bipolar type II.

The current review

Palmier-Claus et al. (2016) highlighted the need for research to elucidate psychological mechanisms that might explain the association between adversity and BD and its related symptomatology. These mechanisms can be explored using cross-sectional, longitudinal and experimental designs but early studies typically use cross-sectional data and a range of statistical mediation analysis techniques to test

whether specific variables could account for the pathway between an environmental exposure and an outcome (Baron & Kenny, 1986). These techniques typically seek to demonstrate that the relationship between the exposure and the outcome (the direct effect) is reduced when a pathway from the exposure to the outcome through the mediator (the indirect effect) is included in a statistical model (Hayes, 2013). Although these techniques cannot prove causality, they can provide preliminary evidence that is useful for the design of future, more sophisticated studies that can establish causality.

Several reviews of mediating mechanisms in the trauma-psychosis pathway have been published. Williams et al. (2018) highlighted several 'families' of mediating factors, including post-traumatic sequalae, affective dysfunction and dysregulation and maladaptive cognitive factors, such as self-esteem and beliefs about self/ others. Similarly, Alameda et al. (2020) identified negative cognitive schemas, post-traumatic stress symptomatology, dissociative phenomena, and affective dysregulation as significant mediating pathways for psychotic symptoms, offering further evidence for, at least partial, contributions for the link between early trauma and psychosis. Given the overlap in psychopathology and risk factors for BD and other conditions noted earlier, it is plausible that some, or all, of these mediating mechanisms may be important in the pathway from trauma to bipolar symptoms.

Although some reviews have explored the role of biological mechanisms implicated in the trauma pathway to BD (Aas et al., 2016), to the authors' knowledge, there has not been a systematic review of psychological factors that may act as mediators. Increased understanding of such mechanisms could lead to clinical

improvements in targeting interventions for individuals with a diagnosis of BD who have experienced early trauma, leading to improved outcomes.

Aims

Accordingly, this review aimed to systematically synthesise the current research findings from studies that have used mediation analysis to identify psychological factors that may explain the relationship between early adversity and BD. This review was exploratory with no a priori hypotheses about which mechanisms may be implicated between early adversity and BD outcomes. The specific research question is therefore general, and as follows: Which psychological factors have been identified by researchers as potential mediators of the relationship between early traumatic experiences and BD outcomes?

Method

Search Strategy

This systematic review was pre-registered on PROSPERO (CRD42024598653) and was guided by Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) recommendations (Page et al., 2021; Appendix A).

A literature search was conducted in March 2025 to identify relevant studies on early trauma, BD and mediating variables, using three databases (PsycInfo, MEDLINE, and Scopus). Keywords/ search terms used in similar reviews (i.e. Alameda et al., 2020) were considered when developing search terms for the current review. Attempts were made to ensure the search terms were inclusive to minimise

the likelihood of relevant papers being overlooked. The full search strategy can be found in Appendix B. Manual backward citation searches of reference lists was conducted to support identification and inclusion of all relevant papers. Two additional papers were identified through this method.

This review included peer-reviewed, published studies only, with grey literature not included. This was appropriate given potential methodological flaws of grey literature (Hoffecker, 2020) thus ensuring quality of the present review. Furthermore, all papers were required to have been written in English due to financial and time constraints. In a deviation from the registered protocol, a small number of studies were included because they had a mean sample age above 18 years despite including some younger participants.

Inclusion and Exclusion Criteria

The Population, Exposure, and Outcome (PEO) framework was utilised to support the identification of relevant studies, which focused on population (individuals with a BD diagnosis and early trauma), the exposure variables (early adversity and psychological factors as mediators) and outcome (onset, symptomology and other presentations relating to BD). Studies were eligible if they met the criteria outlined in Table 1.

Table 1

Inclusion and Exclusion Criteria

	Inclusion Criteria	Exclusion Criteria
Population	Individuals with a diagnosis of BD aged 18 years + or who were from a sample with a mean age of 18 + No restrictions on gender, country, setting (community, clinical etc.)	Individuals who do not have a diagnosis of BD/ experience of childhood trauma
Exposure	Studies that include measures of trauma and psychological factors with a mediation analysis	Studies that examined the mediation effect of other factors (e.g. biological, genetic) or studies that do not explore mediation effects
Outcome	Studies that explore clinical presentation relating to BD (onset, symptomatology, relevant clinical outcomes)	Papers not relevant to the review topic (e.g. exploring other mood disorder diagnoses, psychotic disorders)
Other	Peer-reviewed studies published and written in English language, quantitative research	Studies not published in the English language, qualitative research, grey literature and non-empirical research

Study Selection

The PRISMA diagram for the searches is displayed in Figure 1. 276 papers were identified from the searches (PsycInfo = 93, MEDLINE = 109, Scopus = 74). These were exported to reference management software, EndNote 21, where any duplicates were removed (*n* = 118), leaving 158 papers remaining. Backward citation searching was completed against included texts to ensure any further relevant papers were identified, two additional texts were screened using their titles and abstracts, *n* = 160.

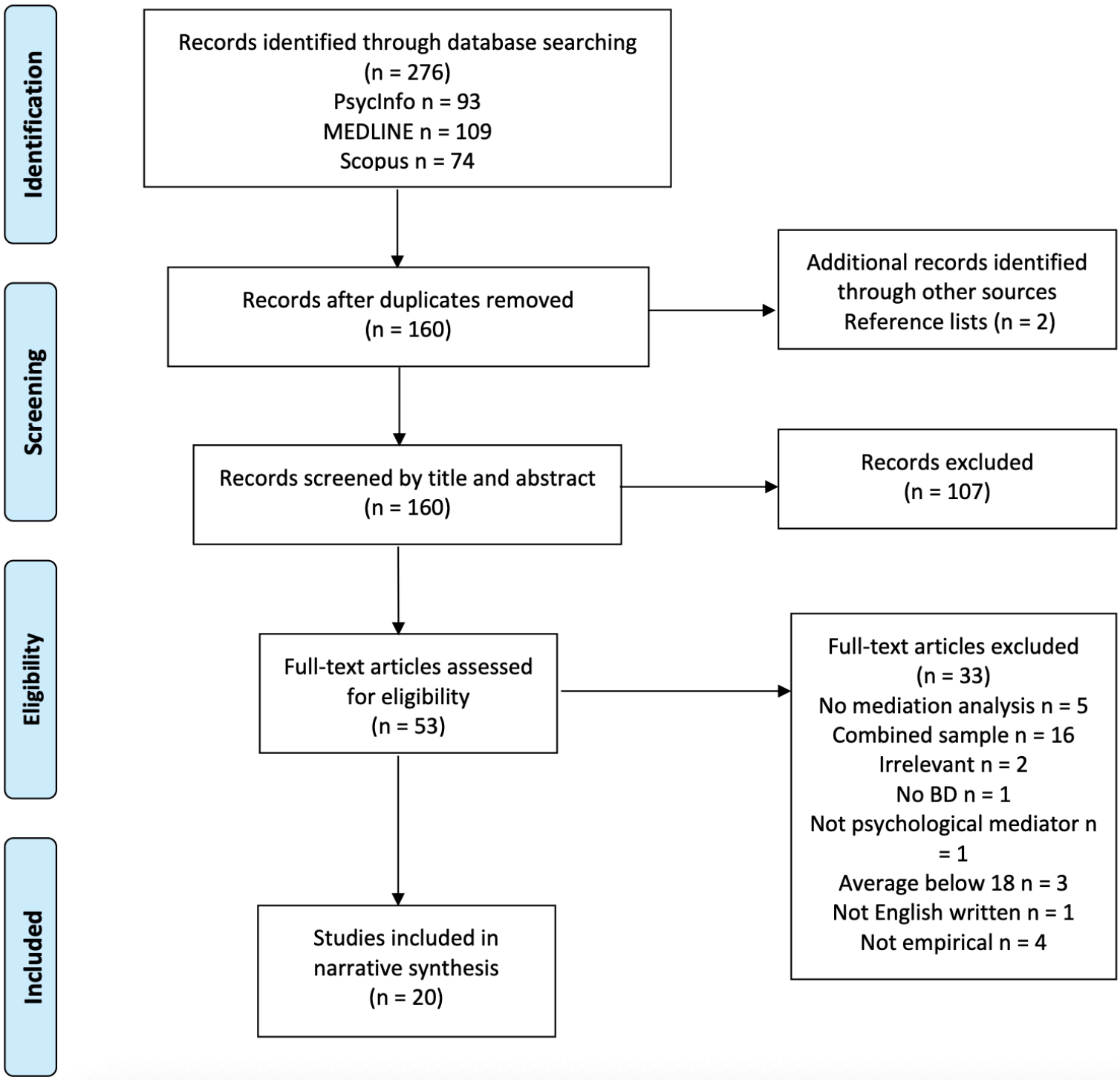
Titles and abstracts of the identified articles were screened for eligibility by the author (*n* = 160), and papers that did not meet the inclusion criteria were excluded (*n* = 107). Following initial screening, full texts for the articles meeting the inclusion criteria were obtained and re-assessed for eligibility (*n* = 53) by the author, after which 20 studies remained.

A second reviewer provided reliability assurance for this process. Ten of the 53 papers were chosen at random and independently assessed at the full text screening stage using the PEO framework. The reviewers had 100% inter-rater reliability, so no further discussions were required.

Thus, 20 papers were included in this review.

Figure 1

PRISMA flowchart displaying search processes



Data Extraction

Data were extracted and information inputted into a table summarising key characteristics (Table 2). This included author(s) details, publication year, country, study design, and sample characteristics (size, gender, age, diagnosis and setting). Measurement of childhood trauma, the psychological mediator studied and type of mediation analysis, and outcomes measured were also recorded.

The main findings from the studies relating to the research question are presented in Table 3, including the mediation pathway, magnitude of mediation effect where available, and a summary of relevant conclusions.

Table 2

Summary of included studies, including study and sample characteristics and key variables

Study Characteristics			Sample Characteristics								
First author, Year	Country	Design	n	Age (M and SD)	Gender n	Diagnosis, population	Measure of early adversity	Mediator	Mediation analysis	BD measure	Additional outcomes
Aas, 2014	France and Norway	Cross-sectional	418 (France), 169 (Norway)	40.6 (13.6)	M = 234, F = 353	Bipolar I = 72.4%, Bipolar II = 21.5%, Bipolar NOS = 6.1%, Inpatient and outpatient	CTQ	Cannabis use	Baron & Kenny (1986)	DIGS, SCID-I	Clinical assessment – age of onset, rapid cycling, suicide attempts, mood episodes
Aas, 2017	France and Norway	Cross-sectional	300 (France), 42 (Norway)	41.4 (13.1)	M = 136, F = 206	Bipolar I = 77.2%, Bipolar II = 18.7, Bipolar NOS = 4.1, Inpatient and outpatient	CTQ	Affective lability	SPSS Process Macro (Hayes, 2012)	DIGS, SCID-I, YMRS, MADRS	Clinical assessments - number of episodes, suicide attempts, mixed episodes, anxiety disorders, age of onset
Aghaeimazraji, 2024	Iran	Cross-sectional	300	34.99 (10.04)	M = 161, F = 139	Bipolar I = 66%, Bipolar II = 34%, Inpatient	CTQ-SF	Sensory processing	Path analysis, bootstrapping using SPSS Process Macro (Hayes, 2017)	SCID-5-RV, BDRS, YMRS	-

Chiu, 2024	Taiwan	Case control, cross-sectional	32 (BD), 43 (SZ), 59 (MDD), 40 (HC)	BD - 41.38 (7.09)	M = 31, F = 1	BD, Inpatient	BBTS-CT (childhood trauma subscale)	Dissociation	Process (Hayes, 2022)	DSM-5 criteria	Psychotic symptoms (PANSS, LSHS, PDI)
Citak, 2021	Turkey	Cross-sectional	110	37.21 (10.63)	M = 45, F = 65	Bipolar I = 100, Bipolar II = 10 (Remission) Outpatient	CTQ	Attachment	Baron & Kenny (1986)	DSM-5 criteria	Resilience (RSA)
De Filippis, 2023	Italy	Cross-sectional	100	46.50 (13.94)	F = 50, remaining NR	Bipolar I = 55, other not specified, Hospital	CTQ	Impulsivity	Preacher & Hayes (2004)	SCID-5-CV	Dissociation (DES-II)
Du, 2024	China	Case control, Cross-sectional	266 (BD), 336 (MDD), 204 (HC)	BD - 24.9 (8.2)	M = 77, F = 149	BD with a current major depressive episode, Hospital	CTQ	Family functioning	R Process	DSM-5 criteria	Depression severity (HAMD-17)
Etain, 2017a	France	Cross-sectional	270	43 (12.5)	M = 39.3%, F = 60.7%	Bipolar I and Bipolar II (Remitted), Community	CTQ	Cannabis use	Path analysis	DIGS	Delusional beliefs (PDI)
Etain, 2017b	France	Cross-sectional	485	40.9 (12.6)	M = 203, F = 282	Bipolar I = 301, Bipolar II or NOS not reported, (Remitted), Outpatient	CTQ	Dimensions of psychopathology (affect intensity, affective lability, impulsivity, attitudinal hostility and motor hostility)	Path analysis	SCID-IV	Clinical assessment - age at onset, polarity at onset, suicide attempts, rapid cycling and substance misuse disorder
Freitag, 2022	United States	Cross-sectional	150	39.49 (10.93)	F = 104, remaining NR	BD, Outpatient	CTQ-SF	Impulsive aggression	Path analysis	MDQ	Suicidality (SBQ-R)

	of America										
Khosravani, 2021	Iran	Cross-sectional	300	33.08 (10.29)	F = 300	BD, Inpatient	CTQ-SF	Emotional dysregulation	Structural Equation Modelling	SCID-V-RV, BDRS, YMRS	Suicidal ideation (BSSI)
Lamis, 2019	United States of America	Cross-sectional	112	39.63 (10.97)	F = 82, remaining NR	BD, Outpatient	CTQ-SF (CSA)	Existential and religious wellbeing	Path analysis	MDQ	Suicidal ideation (BSSI)
Marwaha, 2020	United Kingdom	Cross-sectional	923	49 (11.5)	F = 692, remaining NR	Bipolar I, Community	CLEQ	Affective instability and impulsivity	Path analysis	SCAN	Age of onset, depression eps/years, mania eps/ years, anxiety, rapid cycling, suicidal behaviour, substance misuse
Palagini, 2021	Italy	Cross-sectional	162	47 (12.5)	F = 98, M = 64	BD with a depressive episode, Inpatient	ETISR-SF	Insomnia	Sobel test (Sobel, 1982)	SCID-V, BDI-II, YMRS	Suicidal ideation (BSSI) and behaviours, hopelessness (BHS)
Terao, 2023	Japan	Cross-sectional	75	47.3 (11.6)	M = 42, F = 33	BD, Hospital	CATS	Affective temperament	Structural Equation Modelling	DSM-IV criteria	Depressive symptoms (PHQ-9)
Vieira, 2023	Brazil	Case control, Cross-sectional	90 (BD), 317 (MDD), 837 (HC)	BD - 25.78 (2.11)	F = 73.3%, remaining NR	Bipolar I and Bipolar II, not reported, Community	CTQ	Resilience	Preacher & Hayes (2008)	MINI, SCID	Depressive symptoms (MADRS)
Wang, 2021	China	Case control,	44 (BD-I), 42 (BD-II), 43 (HC)	BD-I – 33.0 (11.6), BD-II – 30.2 (12.3)	M = 14, remaining NR (BD-	Bipolar I and Bipolar II (Remitted)	CTQ	Defence mechanisms	SPSS Process	DSM-IV criteria	-

		Cross-sectional			I), M = 22, remaining NR (BD-II)	Inpatient and Outpatient			Macro (Hayes, 2012)		
Wrobel, 2022	United States of America	Cross-sectional	143	47.6 (14.1)	F = 97, remaining NR	Bipolar I, Bipolar II, Bipolar NOS, Schizoaffective Disorder (Bipolar type), Inpatient and Outpatient	CTQ	Attachment insecurity	Path analysis	DIGS	Depressive severity (HAM-D)
Wrobel, 2023	United States of America	Cross-sectional	209	51.5 (14.0)	F = 140, M = 68	Bipolar I, Bipolar II, Bipolar NOS, Schizoaffective Disorder (Bipolar type), Inpatient and Outpatient	CTQ	Personality traits	Structural Equation Modelling	DIGS	Depressive severity (HAM-D)
Yang, 2024	China	Case control, Cross-sectional	121 (BD), 50 (HC)	Drug naïve BD – 22.68 (5.12), BD long term medication – 24.11 (6.60)	F = 121	Medicated and unmedicated BD, Hospital	CTQ	Social support	Bootstrap mediation using Process	MINI, HDRS-17, YMRS	Anxiety (HAM-A) Insomnia (AIS), Suicidality (ideation, plans, attempts, frequency)

Note. M = males, F = females, SZ = schizophrenia, MDD = Major Depressive Disorder, HC = healthy controls, NR = not reported, Bipolar NOS = Bipolar Not Otherwise Specified, CTQ = Childhood Trauma Questionnaire (Bernstein et al., 1994), CTQ-SF = Childhood Trauma Questionnaire Short Form (Bernstein et al., 2003), BBTS-CT = Brief Betrayal Trauma Survey (Goldberg & Freyd, 2006), CLEQ = Children Life Event Questionnaire (Upthegrove et al., 2015), ETISR-SF = Early Trauma Inventory – Short Form (Bremner et al., 2000), CATS = Child and Adolescent Trauma Screen ((Hamilton, 1959), DIGS = Diagnostic Interview for Genetic Studies (Nurnberger et al., 1994), SCID = Structured Clinical Interview for DSM Disorders, YMRS = Young Mania Rating Scale (Young et al., 1978), MADRS = Montgomery–Asberg Depression Rating Scale (Montgomery & Asberg, 1979), DSM = Diagnostic and Statistical Manual of Mental Disorders, MDQ =

Mood Disorder Questionnaire (Hirschfeld et al., 2000), SCAN = Schedules for Clinical Assessment in Neuropsychiatry (Wing et al., 1990), BDI-II = Beck Depression Inventory -II ((Beck et al., 2011), MINI = Mini-International Neuropsychiatric Interview (Sheehan et al., 1998), HDRS-17 = the Hamilton Rating Scale for Depression (HAMD-17/ HDRS/ HAM-D; Hamilton, 1960), PANSS = Positive and Negative Syndrome Scale (Kay et al., 1987), LSHS = Launay–Slade Hallucination Scale (Launay & Slade, 1981), PDI = Peters et al. Delusions Inventory 03/09/2025 17:43:00RSA.= Resilience Scale for Adults (Friborg et al., 2005), DES-II = Dissociative Experiences Scale – II (Bernstein & Putnam, 1986), SBQ-R = Suicidality Questionnaire—Revised (Osman et al., 2001), BSSI = Beck Scale for Suicide Ideation (Beck et al., 1979), BHS = Beck Hopelessness Scale (Beck et al., 1974), PHQ-9 = Patient Health Questionnaire (Kroenke et al., 2001), HAM-A = Hamilton Anxiety Scale (Hamilton, 1959), AIS = Athens Insomnia Scale (Soldatos et al., 2000).03/09/2025 17:43:00

Quality Assessment

Eligible papers were appraised using the relevant appraisal checklist from the Joanna Briggs Institute (2017). The use of these tools allowed for comprehensive evaluation of the risk of bias and the overall quality of evidence strengthening conclusions of the current review. Whilst some papers employed a case-control approach (e.g. having a bipolar sample and a healthy control sample), their design provided cross-sectional data. Thus, the tool for cross-sectional research was utilised (Moola et al., 2020, Appendix C). The checklist included eight items concerning sample, validity/ reliability of variables, analytic method and confounding factors. For a response of 'yes', a score of one was provided and for scores of 'no', 'unclear' or 'not applicable', a score of zero was given. Studies that were rated poorer quality were not excluded for this reason. To accurately capture features pertinent to the review topic, some items were adapted. Sub-sections were added to item 7 ("Were the outcomes measured in a valid and reliable way?") to consider the measurement of the mediating variable and the outcome variable. Also, consideration was given to the analytic method utilised following the procedure used by Williams et al. (2018) resulting in the classification of methods with a "strong", "moderate" or "weak" rating on item 8. Mediation analyses using regression methods (for example, Baron & Kenny, 1986) that relied on inference rather than direct statistical observation (Hayes, 2009) received weak ratings. Studies employing regression methods supplemented with indirect effect tests, such as the Sobel test were rated as moderate quality. Strong ratings were assigned to analyses that explicitly estimated direct and indirect effects (e.g., using bootstrapping methods described by Hayes, 2017; Preacher & Hayes, 2004).

Table 3

Main findings relevant to review questions

First author(s), Year	Mediator (measure)	Full or partial mediation, pathway, indirect (IE) and direct effect (DE) inc. confidence intervals	Percentage of total effect mediated	Main findings relevant to research questions
Aas, 2014	Cannabis use	No mediation effect	NA	No mediation effects of cannabis use were found between childhood trauma and symptom severity (age of onset, suicide attempts, mood and mixed episodes, rapid cycling); both childhood trauma and cannabis use were independently significantly associated with clinical outcomes.
Aas, 2017	Affective lability (ALS)	Full CTQ → ALS → suicide attempts IE = .0043, [.0006, .0105] DE = .0141, [-.0045, .0328] CTQ → ALS → mixed episodes IE = .0081, [.0027, .0164] DE = .0050, [-.0155, .0255] CTQ → ALS → anxiety disorders IE = .0077, [.0024, .0166] DE = .0161, [-0054, .0375] EA → anger → suicide attempts IE = .0113, [.0016, .0289] DE = .0457, [-.0053, .0967]	% NR	Childhood trauma was significantly associated with affective lability (β = .01, $p < .05$), which in turn predicted suicide attempts (β = .38, $p < .05$), mixed episodes (β = .69, $p < .05$), and anxiety disorders (β = .71, $p < .05$). These indirect pathways were significant while direct paths between trauma and outcomes were not, indicating full mediation effects. Major mood episodes were included as a covariate to control for illness severity. Specifically, emotional abuse was associated with anger (β = .03, $p < .05$), which mediated relationships with suicide attempts (β = .39, $p < .05$) and mixed episodes (β = .59, $p < .05$). The anxiety/depression subscale mediated between emotional abuse and anxiety disorders (β = .67, $p < .05$). No direct effects were observed for these relationships, and no significant mediation was found for rapid cycling or age of onset.

		EA → anger → mixed episodes IE = .0175, [.0050, .0400] DE = .011, [-.0453, .0672] EA → anxiety/ depression → anxiety disorders IE = .0284, [.0102, .0565] DE = .0312, [-.0279, .0903]		
Aghaeimazraji, 2024	Sensory processing (AASP)	Partial CTQ-SF → AASP low registration → BDRS IE = .05, [.01, .01] DE = NR, [95% CI NR] CTQ-SF → AASP sensation avoidance → BDRS IE = .04, [.01, .08] DE = NR, [95% CI NR]	% NR	Childhood maltreatment was indirectly associated with depressive symptoms through low registration (β = 0.05; 95% CI = 0.01, 0.10) and sensation avoidance (β = 0.04; 95% CI = 0.01, 0.08). There were no significant indirect effects between childhood trauma and symptoms of mania through sensory processing patterns. As the full model included alexithymia and impulsivity, the percentage of effect mediated cannot be accurately reported. Covariates included comorbidity of psychiatric conditions.
Chiu, 2024	Dissociation (CADSS)	Full CT → CADSS → PANSS IE = .188, [.051, .370] DE = -.297, [95% CI NR]	% NR	Dissociation mediated the relationship between childhood trauma and psychotic symptoms, as measured on the PANSS, in a sample of individuals with bipolar disorder (M_{IE} = .188, [0.051, 0.370]). This remained similar when age, gender, and education were controlled for (M_{IE} = .175, [0.039, 0.367]). The direct effect of childhood trauma on psychosis symptoms was not significant (β = -.297, t = -1.676, *p* = .104). When patient ratings were explored, as measured using the PDI and LSHS, dissociation (DSS) mediated the associations between trauma and both hallucinations and delusions (statistical details NR).
Citak, 2021	Attachment-related avoidance (ECR-R)	Partial CTQ → Avoidance → RSA IE = -2.295, [95% CI NR]	% NR	Attachment-related avoidance (z = -2.295, *p* < .05) and attachment-related anxiety (z = -2.463, *p* < .05) partially mediated the relationship between childhood trauma (CTQ total score) and resilience (RSA). The effect of childhood trauma on resilience was reduced but remained significant after including each attachment variable in separate regression models,

		DE = NR		indicating partial mediation. Sobel tests confirmed that both mediation effects were statistically significant.
	Attachment-related anxiety (ECR-R)	Partial CTQ → Anxiety → RSA IE = -2.463, [95% CI NR] DE = NR	% NR	
De Filippis, 2023	Impulsivity (BIS)	Partial CTQ → BIS → DES-II IE = 4.20, [.0559, .152] DE = 25.71, [.9301, 1.084]	9.29	Impulsivity significantly mediated the relationship between childhood trauma and dissociative symptoms. The mediation effect was statistically significant (z = 4.20, $p < .05$), indicating that higher childhood trauma was associated with greater impulsivity, which in turn contributed to increased dissociative symptomatology. The direct pathway between trauma and dissociation remained significant (z = 25.71, $p < .05$).
Du, 2024	Family cohesion (FC)	Partial EN → FC → Depression IE = .169, [.008, .344] DE = NR	% NR	Childhood trauma (CT) subtypes had significant direct effects on depression severity. Among the family functioning variables tested as mediators, family cohesion significantly mediated the relationship between emotional neglect (EN) and depression severity (effect = 0.169, [0.008, 0.344], $p < .05$). No other trauma subtypes or family functioning variables (e.g., family adaptability) showed significant mediation effects in the BD group. Age and years of education acted as covariates.
Etain, 2017a	Cannabis use	No mediation effect	NA	Path analyses demonstrated independent relationships between childhood trauma (emotional abuse; β = 0.19, $p = .003$, and physical abuse; β = 0.13, $p = .015$ and delusional beliefs, and cannabis use and psychotic features (β = 0.18, $p = .003$), independent of childhood trauma.
Etain, 2017b	Dimensions of psychopathology (affect intensity, affective lability, impulsivity, attitudinal hostility and motor hostility)	Partial EA → AIM → Suicide attempts IE = NR DE = NR EA → AL → Suicide attempts IE = NR DE = NR EA → BHDI-att → Suicide attempts IE = NR DE = NR	% NR	In the path model, the three types of childhood adversity (emotional abuse, physical abuse and sexual abuse) were correlated with each other. No mediation effects were discovered with respect to physical abuse. Dimensions of psychopathology (affect intensity, affect lability, attitudinal hostility, motor hostility) partially mediated the effect of emotional abuse on suicide attempts and substance misuse. The total effects were significant ($p < 0.0001$), as well as all indirect effects. The relationship between emotional abuse and suicide attempts was partially mediated by affect intensity (AIM, $p = .004$), affect lability (ALS, $p = .001$), attitudinal (BHDI-att, $p < .001$) and motor (BHDI-mot, $p = .023$) hostility. The relationship between emotional abuse and substance misuse was partially mediated by impulsivity (BIS, $p = .001$) and motor hostility, $p = .023$. The associations between sexual abuse and suicide attempts were also partially mediated by affect intensity and attitudinal hostility, $p < .05$.

		EA → BHDI-mot → Suicide attempts IE = NR DE = NR EA → BIS → Substance misuse IE = NR DE = NR EA → BHDI-mot → Substance misuse IE = NR DE = NR SA → BHDI-att → Suicide attempts IE = NR DE = NR SA → AIM → Suicide attempts IE = NR DE = NR		
Freitag, 2022	Impulsive aggression (IPAS)	Partial SA → IPAS → SBQ-R IE = .03, SE = .014, [.003, .056] DE = NR	% NR	Childhood sexual abuse was associated with increased suicidality, with this relationship partially mediated by impulsive aggression (*ab* = .03, SE = .014, [.003, .056], $p < .05$), with the direct effect remaining significant. The standardized effect size for the indirect effect was .05, [.006, .102], indicating that suicidality increased by .05 standard deviations for every 1-standard-deviation increase in childhood sexual abuse indirectly via impulsive aggression.
		Partial EA → IPAS → SBQ-R IE = .02, SE = .014, [.002, .058] DE = NR	% NR	Childhood emotional abuse was significantly related to higher suicidality, and this relationship was partially mediated by impulsive aggression (*ab* = .02, SE = .014, [.002, .058], $p < .05$), indicating that emotional abuse indirectly increased suicidality through its effect on impulsive aggression. The standardized effect size for the indirect effect was .04, [.003, .086], indicating that suicidality increased by .04 standard deviations for every 1-standard-deviation increase in childhood emotional abuse indirectly via impulsive aggression. Childhood physical abuse was not significantly associated with impulsive aggression or suicidality, and no indirect effect of impulsive aggression was found, indicating no support for mediation in this model. Covariates for the models included age, sex, race, homelessness, and employment.

Khosravani, 2021	Emotional dysregulation (DERS)	Full EA → DERS → YMRS IE = .08, [-.14, -.04] DE = NR EA → DERS → BDRS IE = .011, [.05, .19] DE = NR EA → DERS → BSSI IE = .010, [.04, .18] DE = NR	% NR	Emotional dysregulation significantly mediated the relationship between childhood emotional abuse and mania (effect = .08, [-.14, -.04]) and depressive symptoms (effect = .011, [.05, .19]), and suicidal ideation (effect = .010, [.04, .18]) in a female sample. When the mediator was added into the model, direct effects between emotional abuse and emotional neglect and the outcome variables were not significant. There were no significant indirect effects through emotional dysregulation as a mediator between emotional neglect and manic or depressive symptoms, or for suicidal ideation. Childhood emotional abuse and difficulty in identifying feelings, but not emotional neglect, were significantly associated with difficulties in emotion regulation. Difficulties in emotion regulation, subsequently, were significantly related to depressive and manic symptoms and suicidal ideation ($p < 0.001$). The model explained 19%, 31%, and 41% of the variance in manic and depressive symptoms and suicidal ideation, respectively. As the model also incorporated difficulties in identifying feelings, the percentage of mediated effect between emotional abuse and symptomology cannot be reported.
Lamis, 2019	Existential wellbeing (EWB) and religious wellbeing (RWB)	CSA → EW → BSSI IE = .090, [.015, .189] DE = NR	% NR	The relationship between childhood sexual abuse and suicidal ideation was significantly mediated by existential wellbeing, (ab = 0.090, 95% CI: 0.015, 0.189, $p < .05$), but not religious wellbeing. Age, gender, and race were used as covariates.
Marwaha, 2020	Affective instability (ALS-SF)	Full CA → ALS-SF → Rapid cycling IE = 2.252 DE = NR CA → ALS-SF → No. of depression episodes IE = 2.077 DE = NR CA → ALS-SF → No. of mania episodes IE =1.319 DE = NR Partial CA → ALS-SF → AD IE = 1.979 DE = 2.913	% NR	Indirect effects were found between childhood abuse (CA) and suicidal behaviour (SB), and CA and substance misuse (SM), both partially mediated by impulsivity (θ/SE: 2.123; θ/SE: 2.095). The relationship between childhood abuse and rapid cycling presentations was fully mediated by affective instability (θ/SE: 2.252) and impulsivity (θ/SE: 1.809). The relationship between childhood abuse and presence of an anxiety disorder (AD) was partially mediated by affective instability (θ/SE: 1.979) and impulsivity (θ/SE: 1.587). For age of illness onset (AOO), the direct path from childhood abuse was significant (θ/SE: −2.758), as was the indirect path via affective instability (θ/SE: −2.488) with abuse being associated with an earlier age of onset. For the number of depressive episodes per year, only the indirect path via affective instability was significant (θ/SE: 2.077) and for manic episodes, the indirect paths via affective instability (θ/SE: 1.319) and impulsivity (θ/SE: 1.792) were significant, but not the direct paths.

		CA → ALS-SF → AOO IE = -2.488 DE = -2.758		
	Impulsivity (BIS)	Full CA → BIS → Rapid cycling IE = 1.809 DE = NR CA → BIS → No. of mania episodes IE = 1.792 DE = NR Partial CA → BIS → SB IE = 2.123 DE = 3.284 CA → BIS → SM IE = 2.095 DE = 3.089 CA → BIS → AD IE = 1.587 DE = 2.913		
Palagini, 2021	Insomnia (ISI)	NR ES → ISI → BDI-II IE = 2.72, [95% CI NR] DE = NR ES → ISI →BHS IE = 3.02, [95% CI NR] DE = NR LS → ISI → BSSI IE = 2.07, [95% CI NR] DE = NR	% NR	The relationship between early life emotional stress (ES) and depressive symptoms was mediated by symptoms of insomnia (z = 2.72, *p* = .0006), as was the relationship between emotional stress and hopelessness (z = 3.02, *p* = .0001). The association between early life stress (LS) and suicidal plans was also mediated by insomnia (z = 2.07, *p* = .037). No other mediations were significant. The mediation type (full or partial) has not been reported.

Terao, 2023	Affective temperament (TEMPS-A)	Full CATS → TEMPS-A → PHQ-9 IE = .29, [95% CI NR] DE = .04, [95% CI NR]	46	Affective temperament significantly mediated the relationship between childhood trauma and depression severity (standardized indirect effect = 0.29; p = 0.001). A full mediation effect was observed with the direct relationship between early trauma and depression severity as insignificant.
Vieira, 2023	Resilience (RS-25)	Partial CTQ → RS-25 → MADRS IE = 0.11, [.0461, .2261] DE = 0.14, [.0237, .3634]	45	The relationship between childhood trauma and depression severity was partially mediated by levels of resilience (z = 2.73, p < .05), demonstrating a protective role of resilience. The direct path between childhood trauma and depression severity remained significant and was reduced with the mediator to .14 [.0129,.1983]. Analyses were adjusted for sex, ethnicity, socioeconomic status and suicide risk.
Wang, 2021	Immature defence mechanisms (DSQ)	**BD-I** <u>Partial</u> CTQ → DSQ → BD-I IE = .04, [.01, .09] DE = .07 [95% CI NR] PN → DSQ → BD-I IE = .13, [.04, .34] DE = .038, [95% CI NR] EA → DSQ → BD-I IE = -.04, [-.11, -.0016] DE = -.08, [95% CI NR] **BD-II** <u>Full</u> CTQ → DSQ → BD-II IE = .10, [.06, .25] DE = .05, [95% CI NR] <u>Partial</u> EA → DSQ → BD-II IE = .24, [.12, .36] DE = .30, [95% CI NR] PN → DSQ → BD-II IE = .37, [.19, .64] DE = .36, [95% CI NR]	% NR	In participants with BD-I, the relationship between a BD-I diagnosis and childhood trauma was partially mediated by immature defences (B = .04). The relationship between physical neglect and diagnosis (B = .13, [.04, .34]) and emotional abuse and diagnosis (-.04, [-.11, -.0016]) were also partially mediated by immature defence mechanisms. For BD-II patients, the diagnosis was mainly associated with the physical neglect and emotional abuse sub-scores, as well as the total CTQ score, with immature defence mechanisms mediating these relationships. The CTQ total score and a BD-II diagnosis was fully mediated by immature defence mechanisms (B = .10, [.06, .25]), with the direct effect no longer significant (B = .05, z = 1.58, p = .011). Education was used as a covariate in the analyses.

Wrobel, 2022	Attachment insecurity (ECR)	Partial CTQ → attachment anxiety and avoidance → HAM-D IE = .03, [.01, .06] DE = .24, [.10, .39]	12	The effect between childhood trauma and depression severity was partially mediated via attachment anxiety in childhood (mother) and attachment avoidance in adulthood (partner) (β = 0.03, 95% bootstrap, CI = [0.01, 0.06], *p* = 0.019. Other attachment insecurities in childhood and adulthood did not mediate the relationship.
Wrobel, 2023	Personality traits (NEO-PI)	Partial CTQ → N → HAM-D IE = .03, [.002, .07] DE = .32, [.20, .45] ET → N → HAM-D IE = .04, [.004, .07] DE = .27, [.15, .40]	9 12	Neuroticism (N) partially mediated the relationships between childhood trauma and depression severity (β = 0.03, 95% bootstrap CI [0.002, 0.07], *p* = 0.039), and emotional trauma (abuse and neglect) and depression severity (β = 0.04, 95% bootstrap CI [0.004, 0.07], *p* = 0.030). The direct relationship between CT and depression severity, and ET and depression severity remained significant. The other personality traits (extraversion, openness, agreeableness and conscientiousness) did not mediate these relationships.
Yang, 2024	Social support (SSRS)	Partial in drug-naïve group CTQ → SSRS → AIS IE = .025, [.001, .067] DE = .092, [95% CI NR]	% NR	In the drug-naïve group, social support demonstrated a significant indirect effect between trauma and insomnia symptoms (ab = .025, *p* = .011). Social support did not mediate childhood trauma and other clinical symptoms (suicidal ideation, attempts, plans or frequency) in this group, nor did it mediate the association between childhood trauma and any clinical outcomes in the BD on long-term medication group.

Note. NR = not reported. NA = not applicable.

To enhance the rigor of the quality assessment process, a second reviewer (trainee clinical psychologist) assessed 30% of randomly selected papers (*n* = 6) which led to 93% agreement. The minimal discrepancies were discussed until inter-rater reliability was 100% consistent.

Data Synthesis

The review consisted of a narrative synthesis. An inductive, thematic approach was adopted to understand and synthesise the mediating variables identified, supported by the definition posed by Harvey's (2004) definition of a psychological mechanism as any aspect of cognition, behaviour, affective symptoms or mood; this definition has been utilised in previous systematic reviews exploring psychological mediators (Li et al., 2020; Williams et al., 2018). Mediators were grouped into broader thematic categories based on their definitions in the included papers and conceptual similarity. The synthesis was not based on a pre-determined theoretical model, instead aiming to understand the different mechanisms explored across the literature. Meta-analysis was considered, though ultimately was not conducted due to heterogeneity of mediating variables and the outcomes measured. Moreover, there were inconsistencies in the statistical approaches employed to report indirect effects testing mediation. Whilst conducting a random-effects meta-analysis could accommodate variability across studies and would be appropriate in addressing between- and within-study variation, theoretically comparable mediators and outcome variables would still be required; there were insufficient studies available for this purpose in the present review.

Results

Summary of included studies

Twenty studies were included in the review, with main study features outlined in Table 2 and findings in Table 3. Each study utilised a cross-sectional design, an appropriate approach when yielding information regarding associations between independent and dependent variables (Hulley et al., 2013) and one which can be adapted to estimate mediating effects (Hayes, 2017). Despite recent advances in estimating causal influences in designs of this kind (Pearl & McKenzie, 2018), caution should be taken when inferring causal effects from these kinds of studies, notably because of the lack of evidence of a temporal sequence in the mediating process.

Studies were conducted across various countries. Four took place in the United States of America (Freitag et al., 2022; Lamis et al., 2019; Wrobel et al., 2022; Wrobel et al., 2023), with three conducted in China (Du et al., 2024; Wang et al., 2021; Yang et al., 2024) and four in France (Aas et al., 2014; Aas et al., 2017; Etain et al., 2017a; Etain et al., 2017b). Two were conducted in Iran (Aghaeimazraji et al., 2024; Khosravani et al., 2021) and Italy (De Fillipis et al., 2023; Palagini et al., 2021). One study came from Brazil (Vieira et al., 2023), Japan (Terao et al., 2023), the United Kingdom (Marwaha et al., 2020), Taiwan (Chiu et al., 2024), and Turkey (Citak & Erten, 2021). Aas et al.'s (2017) paper included a combined sample of individuals from France (*n* = 300) and Norway (*n* = 42), as did Aas et al.'s (2014) paper (France, *n* = 418; Norway, *n* = 169).

Across all studies, 4,521 participants with a diagnosis of BD were recruited with sample sizes ranging between 75 and 923. The sample used in Aas et al.

(2017) is a subsample of that used in Aas et al. (2014), and this total includes the larger of the two sample sizes.

One study included individuals with a diagnosis of schizoaffective disorder (bipolar type) within their bipolar sample (Wrobel et al, 2023), with justification referencing the clinical overlap between bipolar and schizoaffective disorders (Benabarre et al., 2001). For this reason, it was felt appropriate to include this paper. Some studies included a subgroup of individuals with BD and had subsamples of individuals with a diagnosis of schizophrenia, major depressive disorder, or a comparison non-clinical control group; only the information for the bipolar subgroups was extracted. Four studies included individuals with a diagnosis of BD who were in remission (Citak & Erten, 2021; Etain et al., 2017a; Etain et al., 2017b; Wang et al., 2021).

Not all studies reported a full breakdown of gender differences, so this information could not be accurately calculated. The mean ages of participants ranged from 22.68 (*SD* 5.12) to 51.5 (*SD* 14.0). A range of inpatient/ hospital and outpatient/ community settings were used within the included studies. Lastly, the studies included individuals with bipolar I, bipolar II, bipolar not otherwise specified (NOS), bipolar with a current major depressive episode, schizoaffective disorder (bipolar type) and individuals with a bipolar diagnosis who were and were not medicated.

Overview of measures used

Childhood trauma

Different measures were used to assess childhood trauma; most utilised was the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994) (*n* = 11) with four studies using the short-form version (CTQ-SF; Bernstein et al., 2003). One study used the childhood trauma subscale of the Brief Betrayal Trauma Survey (BBTS-CT; Goldberg & and Freyd, 2006), one used the Childhood Life Events Questionnaire (CLEQ), developed by the Bipolar Disorder Research Network in 2001 (Upthegrove et al., 2015), one used the Early Trauma Inventory Self Report - Short Form (ETISR-SF; Bremner et al., 2007) and one used the Child Abuse and Trauma Scale (CATS; Sanders & Becker-Lausen, 1995).

Bipolar disorder

Various means were utilised to ensure that participants met the inclusion criteria of having a diagnosis of BD, and related clinical outcomes, including clinical interviews and other relevant measures. Eight studies utilised a version of the Structured Clinical Interview for DSM Disorders (SCID) within their assessment, with a further five studies clinically assessing whether participants met the relevant Diagnostic and Statistical Manual of Mental Disorder (DSM) DSM-IV (*n* = 2) or DSM-V (*n* = 3) criteria. Five studies used the Diagnostic Interview for Genetic Studies (DIGS; Nurnberger et al., 1994), two administered the Mini-International Neuropsychiatric Interview (MINI; Sheehan et al., 1998), and one used the Schedules for Clinical Assessment in Neuropsychiatry (SCAN; Wing et al., 1990). Measures for symptoms of depression included Montgomery–Asberg Depression Rating Scale (MADRS; Montgomery & Asberg, 1979), Beck Depression Inventory -II (BDI-II; Beck et al., 1996), the Bipolar Depression Rating Scale (BDRS; Berk et al., 2007), the Mood Disorder Questionnaire (MDQ; Hirschfeld et al., 2000), the Hamilton

Rating Scale for Depression (HAMD-17/ HDRS/ HAM-D; Hamilton, 1960) and the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). Five studies used the Young Mania Rating Scale to assess mania (YMRS; Young et al., 1978). Further information for mediating variables and the measure utilised, alongside additional outcomes measured, are included within Table 2.

Study quality

Quality appraisal ratings are outlined in Table 4. Appraisal of the included studies displayed methodological variations across the studies. Particular strengths included the use of largely appropriate measures for the exposure variable, the respective mediating factors and outcome variables. Measurement of BD was mostly conducted in a reliable and valid way, with structured assessments aligning with diagnostic classifications such as the DSM, improving the validity of the research. Two studies (Freitag et al., 2022, Lamis et al., 2019) used the MDQ to confirm bipolar diagnoses; the self-report nature of this measure may not have captured nuances of symptomology and presentations as recognised in clinical interviews given its intended use is primarily as a screening tool, impacting upon internal and external validity.

Confounding variables were often reported, and considered within the analyses, with common factors including age, gender, and education level; however, other potentially relevant confounds were not regularly considered which could have impacted upon clinical presentations and outcomes, including any medication use and/ or engagement with other treatments, which likely could influence on findings and the external validity of conclusions.

Other areas of concern included a lack of consistent reporting of explicit inclusion/ exclusion criteria and smaller sample sizes. Although not overtly noted within the JBI appraisal tool, only three papers (Aghaeimazraji et al., 2024, Du et al., 2024, Freitag et al., 2022) referred to power analyses to justify sample size, with the remaining studies not including a power calculation and thus limiting understanding of whether the studies were sufficiently powered to detect significant findings.

Table 4

Quality appraisal for included studies

First author, Study	1. Inclusion criteria	2. Subjects/ setting detailed	3. Exposure measure (trauma)	4. Condition measurement (BD)	5. Confounds	6. Strategies to deal with confounds	7. Outcome measurement (mediator, outcome)		8. Appropriate statistical analysis (strong - 2, moderate - 1, weak - 0)	9. Overall (out of 10)
							7a. Mediator	7b. Outcome		
Aas, 2014	N	N	Y	Y	Y	Y	Y	Y	Weak	6
Aas, 2017	N	N	Y	Y	Y	Y	Y	Y	Strong	8
Aghaeimazraji, 2024	Y	Y	Y	Y	Y	Y	Y	Y	Strong	10
Chiu, 2024	Y	N	Unclear	Y	Y	Y	Y	Y	Strong	8
Citak, 2021	Y	Y	Y	Y	N	N	Y	Y	Moderate	7
De Filippis, 2023	Y	Y	Y	Y	N	N	Y	Y	Strong	8
Du, 2024	Y	Y	Y	Y	Y	Y	Y	Y	Strong	10
Etain, 2017a	N	N	Y	Y	N	N	Y	Y	Moderate	5
Etain, 2017b	N	N	Y	Y	Y	Y	Y	Y	Moderate	7

Freitag, 2022	Y	N	Y	N	Y	Y	Y	Y	Strong	8
Khosravani, 2021	Y	Y	Y	Y	Y	Y	Y	Y	Strong	10
Lamis, 2019	Y	N	Y	N	Y	Y	Y	Y	Strong	8
Marwaha, 2020	Y	N	Unclear	Y	Y	Y	Y	Y	Strong	8
Palagini, 2021	Y	N	N	Y	Y	Y	Y	Y	Moderate	7
Terao, 2023	Y	Y	Y	Y	Y	Y	Y	y	Strong	10
Vieira, 2023	N	Y	Y	Y	Y	Y	Y	Y	Strong	9
Wang, 2021	Y	N	Y	Y	Y	Y	Y	Y	Strong	9
Wrobel, 2022	N	Y	Y	Y	Y	Y	Y	Y	Strong	9
Wrobel, 2023	N	Y	Y	Y	Y	Y	Y	Y	Strong	9
Yang, 2024	Y	Y	Y	Y	Y	Y	Y	Unclear	Strong	9

Whilst all studies employed statistical analytic methods that considered mediation effects, the specific approaches used varied greatly which impacts upon the interpretation of the findings presented. As noted earlier, consideration of 'strong', 'moderate' and 'weak' mediation methods was given to the studies with 15 assigned a strong rating, four moderate and one weak. Where inferences of mediation were made in absence of robust statistical testing, the conclusions that can be drawn are limited and should be interpreted with caution. Heterogeneity in the analytic methods and how the direct and indirect effects have been reported have, thus, led to difficulties in systematically comparing effect sizes across studies via meta-analytic approaches.

Impact on outcomes

There was variation in the outcomes measured. To support the synthesising and interpretation of the conclusions drawn, outcomes have been grouped and included clinical expressions of BD such as course and severity, suicidality, comorbidities, dissociative experiences, and resilience. A diagram summarising all relevant mediational relationships identified in this review is shown in Figure 2.

Figure 2

Overall conceptual diagram of trauma-mediator-outcomes pathway

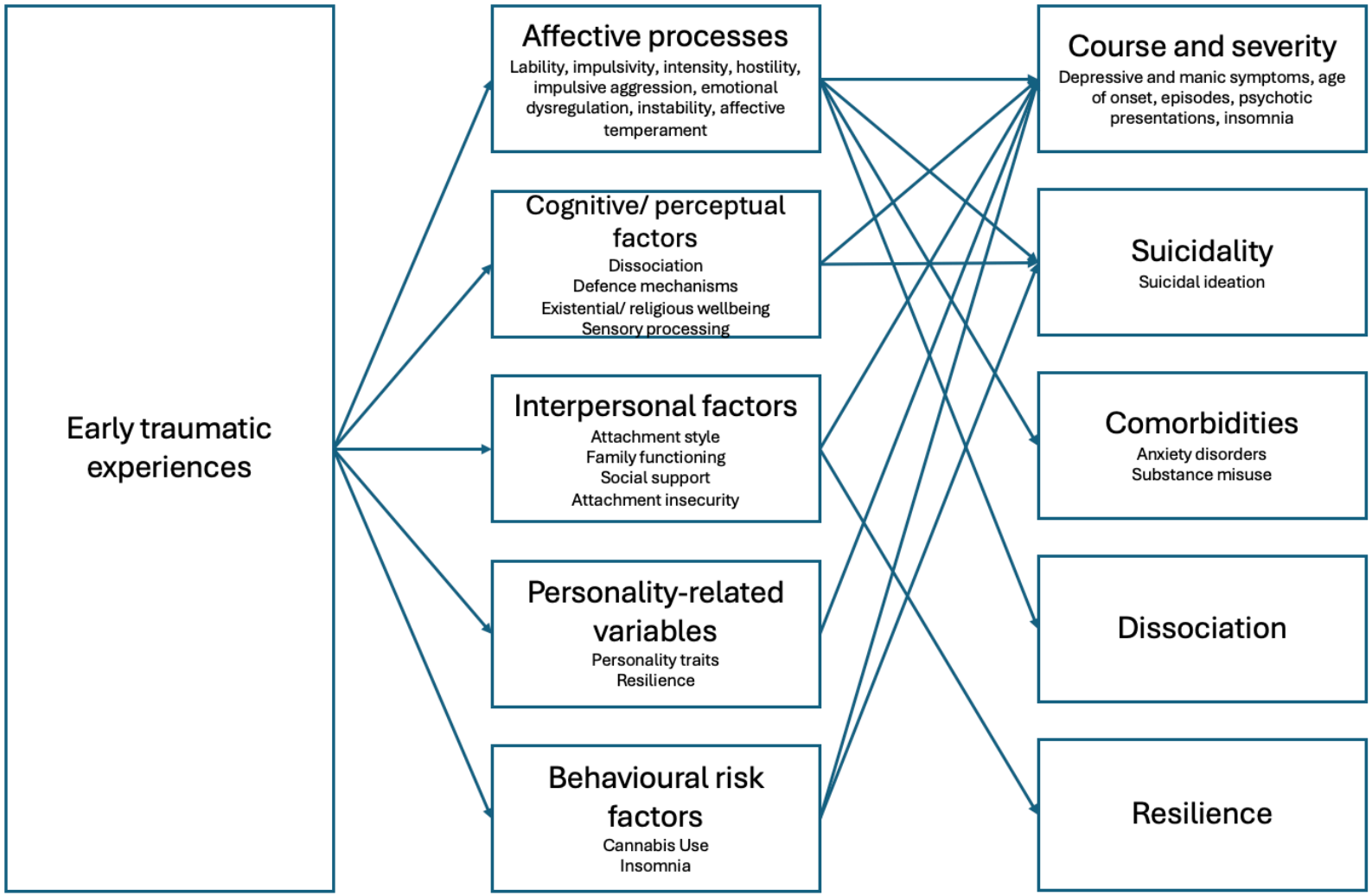


Figure 3

Affective processes as mediators

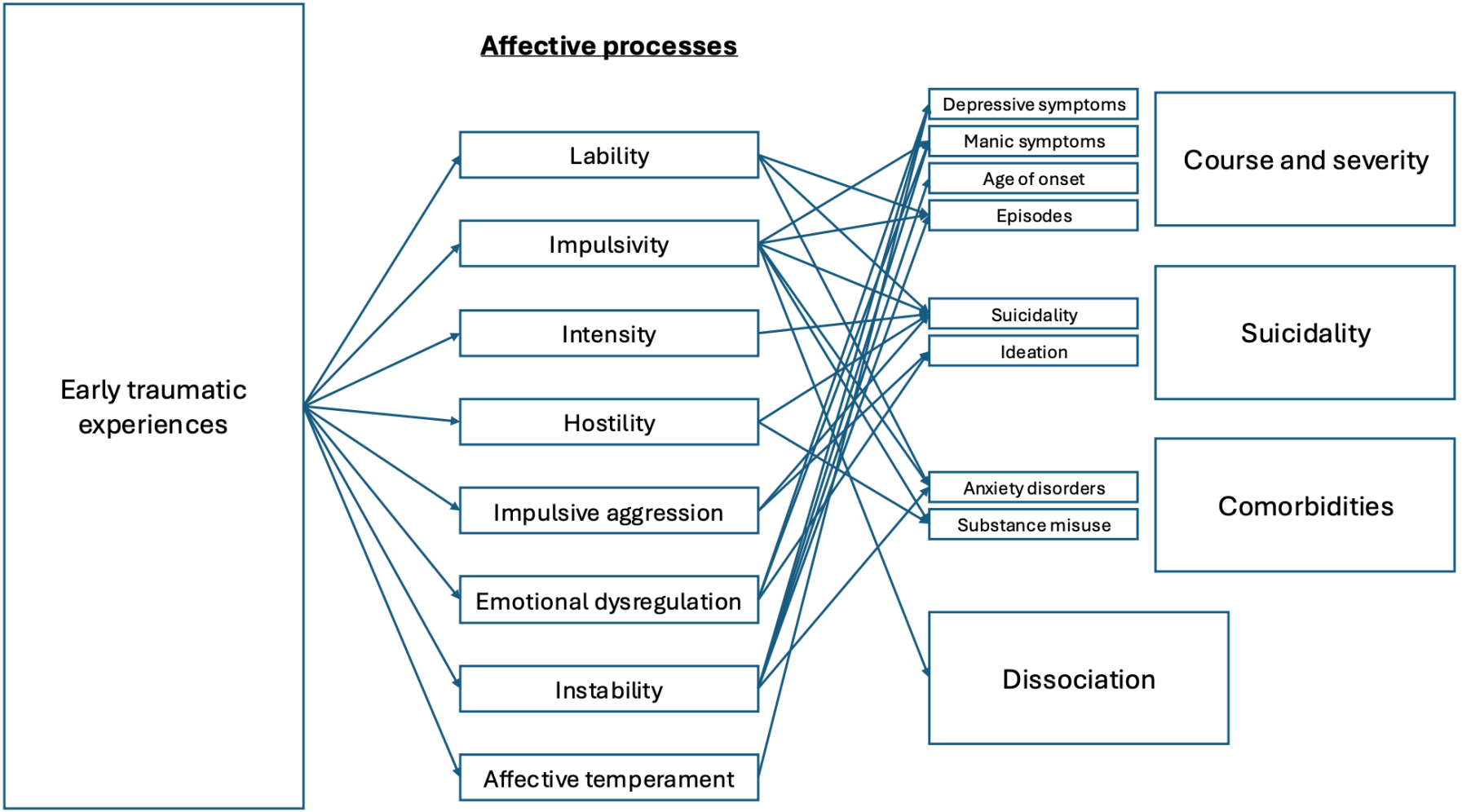


Figure 4

Cognitive/ perceptual factors as mediators

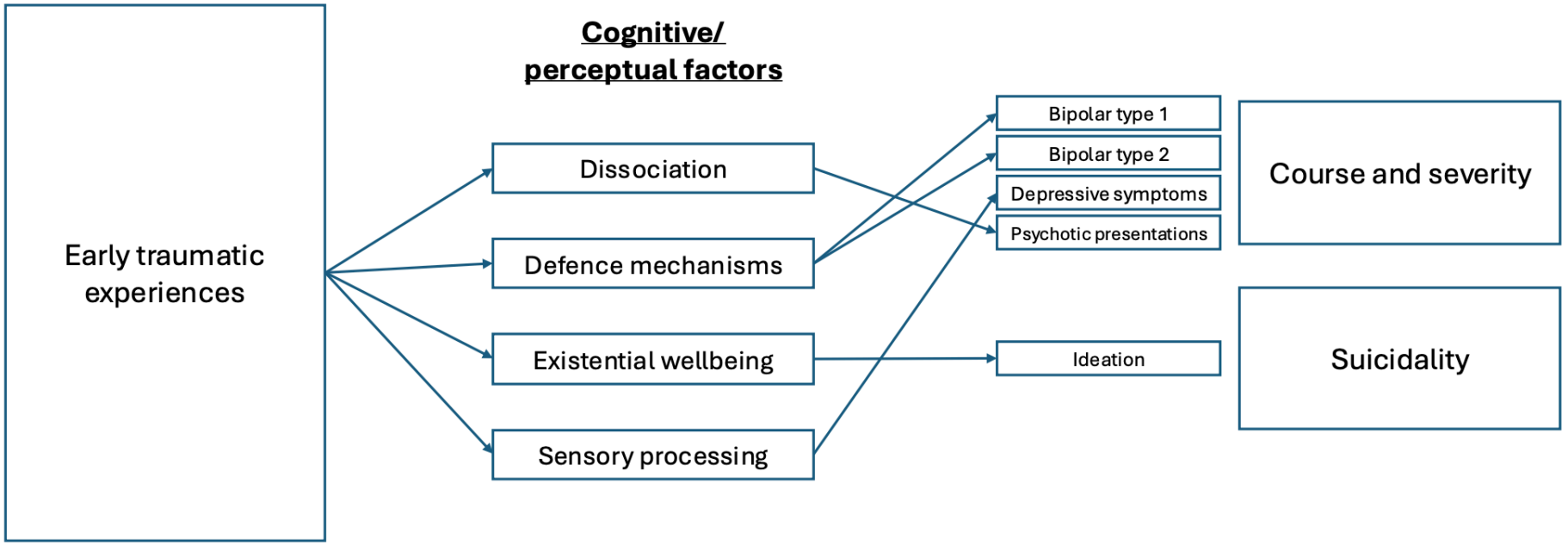


Figure 5

Interpersonal factors as mediators

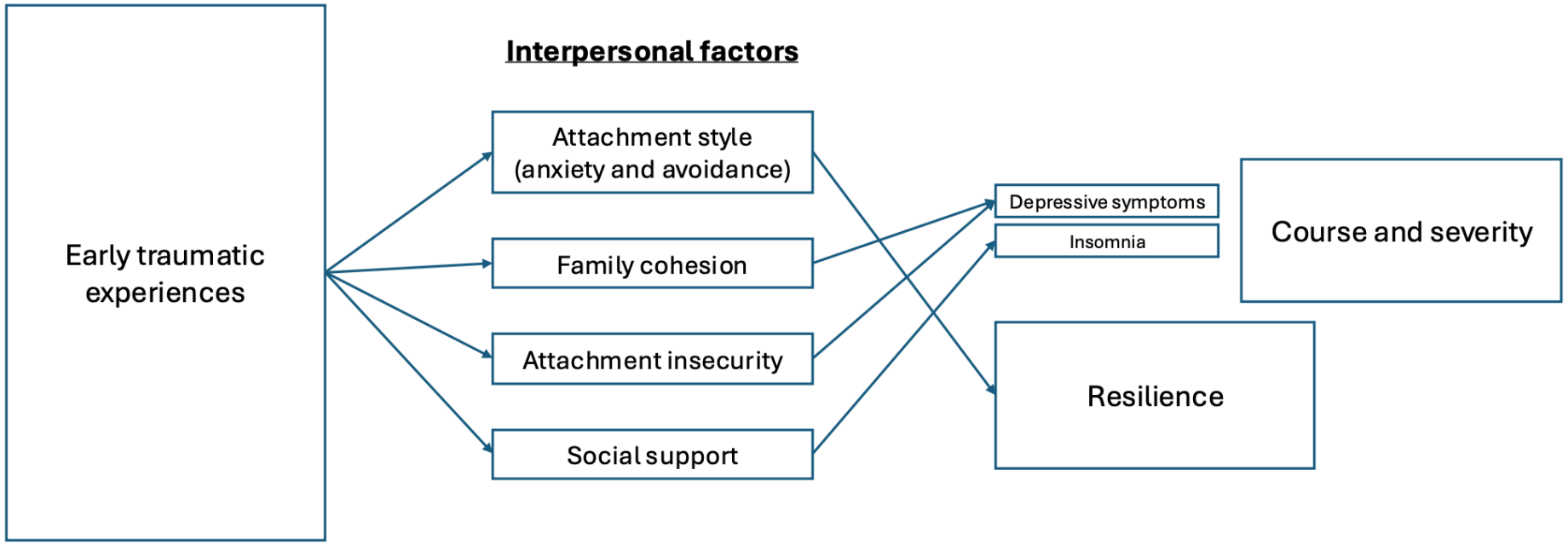


Figure 6

Personality related variables as mediators

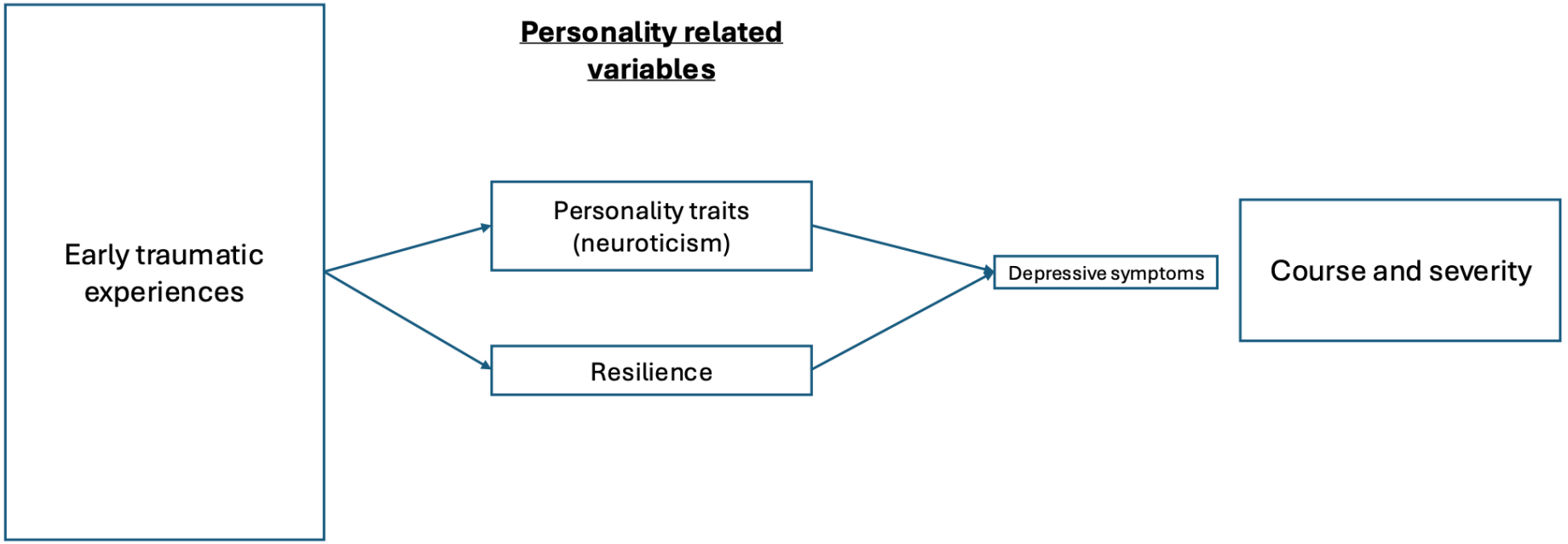
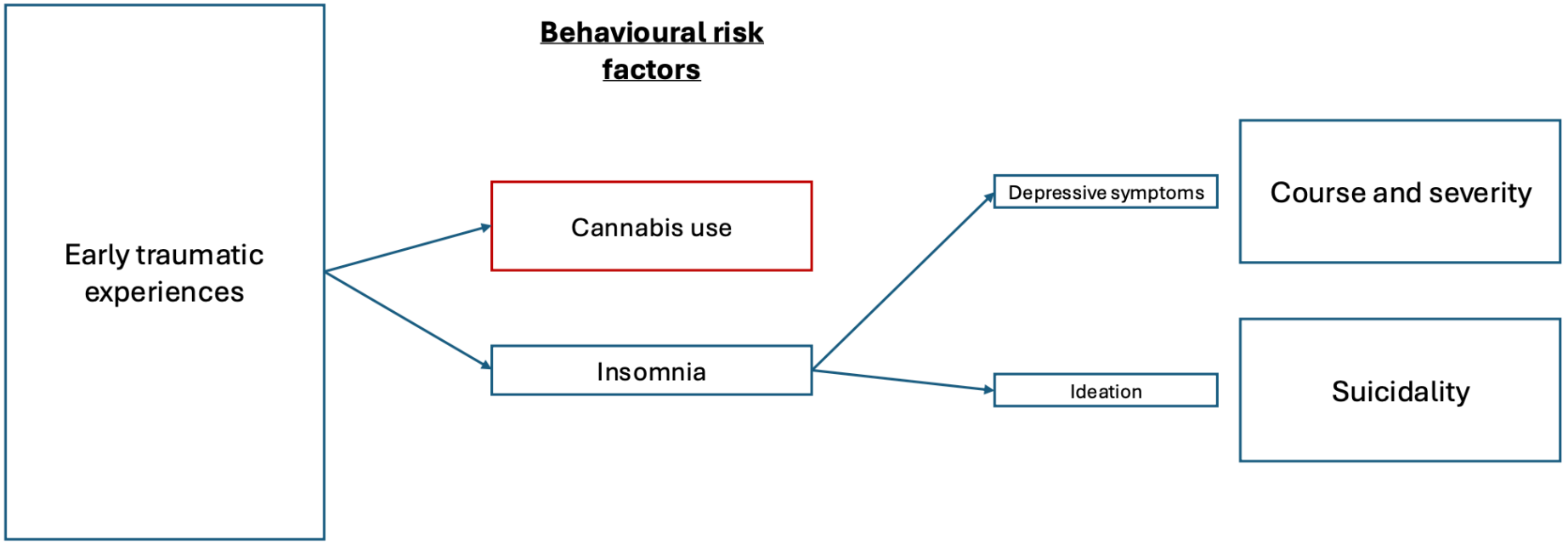


Figure 7

Behavioural risk factors as mediators



Course and severity

Thirteen studies explored outcomes relating to the course and severity of bipolar presentations. Clinical outcomes included depressive and manic symptoms, age of onset, episodes, rapid cycling, psychotic presentations and insomnia.

One study (Wang et al., 2024) distinguished between diagnoses of bipolar type I and type II, finding that the effect of childhood trauma and the physical neglect subscale on a diagnosis of bipolar I was partially mediated by immature defence styles. A bipolar II diagnosis was related to overall childhood trauma, physical neglect and emotional abuse, as mediated by immature defence mechanisms. These findings suggest that immature defence mechanisms may serve as a key mediating pathway linking childhood trauma to the development of both BD subtypes, though the specific trauma types and strength of associations differ between type of disorder.

Depressive symptoms. Depression severity was the most researched outcome, with ten studies examining this relationship (Aghaeimazraji et al., 2024; Du et al., 2024; Khosravani et al., 2021; Marwaha et al., 2020; Palagini et al., 2021; Terao et al., 2023; Vieira et al., 2023; Wrobel et al., 2022; Wrobel et al., 2023; Yang et al., 2024). These studies identified diverse mediating pathways linking childhood trauma, including subtypes of trauma, to depressive symptoms in BD.

Emotional regulation (ER) difficulties emerged as prominent mediators, with emotional dysregulation fully mediating the relationship between emotional abuse and depressive symptoms (Khosravani et al., 2021), while affective instability

mediated the association with depression episode frequency (Marwaha et al., 2020). Temperamental factors were explored, with affective temperament fully mediating the trauma-depression association (Terao et al., 2023) and neuroticism providing partial mediation for both general childhood trauma and emotional trauma specifically (Wrobel et al., 2023).

Additional pathways identified included sensory processing difficulties, where low registration and sensation avoidance mediated the maltreatment-depression relationship (Aghaeimazraji et al., 2024), and sleep disturbances, with insomnia mediating between early emotional stress and depressive symptoms (Palagini et al., 2021).

Interpersonal mechanisms were evident, with family cohesion mediating the effects of emotional neglect (Du et al., 2024) and attachment styles mediating between childhood maternal attachment anxiety and adult partner attachment avoidance (Wrobel et al., 2022). Notably, resilience demonstrated a protective mediating role, partially buffering the trauma-depression relationship (Vieira et al., 2023). These findings reveal multiple, often concurrent pathways through which childhood trauma influences depression severity in BD, encompassing emotional, temperamental, sensory, sleep-related, and interpersonal mechanisms.

Manic symptoms. Three studies, which considered different affective pathways, examined effects on symptoms of mania, including severity and number of episodes (Aghaeimazraji et al., 2024; Khosravani et al., 2021; Marwaha et al., 2020). Emotional dysregulation fully mediated the relationship between childhood emotional abuse and symptoms of mania (Khosravani et al., 2021). Affective instability and impulsivity also demonstrating full mediation effects between

childhood abuse and number of manic episodes (Marwaha et al., 2020). However, Aghaeimazraji et al. (2024) found no mediation effect of sensory processing patterns between childhood trauma and symptoms of mania.

Collectively, these findings highlight that affective dysregulation represents a primary pathway through which childhood trauma influences manic symptomatology, operating through full rather than partial mediation, with implications for both symptom intensity and episode recurrence patterns, although additional studies are warranted to further explore this effect.

Age of onset. Four studies examined the mediating mechanisms through which childhood trauma influences age of onset in BD (Aas et al., 2014; Aas et al., 2017; Etain et al., 2017b; Marwaha et al., 2020). Marwaha et al. (2020) demonstrated that childhood abuse exerted both direct and indirect effects on the age of onset. The analysis revealed a significant direct pathway from childhood abuse to earlier age of onset alongside a significant indirect pathway mediated through affective instability, suggesting that childhood abuse accelerates illness onset both directly and through its impact on emotional dysregulation. In contrast, Aas et al. (2014) found no evidence for cannabis use as a mediating factor between childhood trauma and age of onset, indicating that substance use may not represent a significant mechanistic pathway in this relationship. Furthermore, Aas et al. (2017) found no mediating effect of affective lability on age of onset as no independent association existed between the two variables. Similarly, Etain et al. (2017b) did not find any effects of affective dimensions for age of onset.

Episodes. Three studies investigated mediating mechanisms through which childhood trauma influences episode characteristics in BD (Aas et al., 2014; Aas et al., 2017; Marwaha et al., 2020), revealing contrasting effects. Aas et al. (2014) found no evidence for cannabis use as a mediating factor between childhood trauma and clinical outcomes, including mood episodes, mixed episodes, and rapid cycling. Instead, both childhood trauma and cannabis use demonstrated independent significant associations with clinical outcomes, suggesting parallel rather than sequential pathways.

In contrast, Aas et al. (2017) identified significant mediation effects involving affective lability. Childhood trauma was significantly associated with affective lability and mixed episodes, with indirect pathways proving significant while direct effects were not observed, indicating full mediation. Specifically, emotional abuse was linked to increased anger which mediated the relationship with mixed episodes. No significant mediation was found for rapid cycling, as no association existed between affective lability and rapid cycling.

Similarly, Marwaha et al. (2020) demonstrated full mediation effects through emotional dysregulation pathways. The relationship between childhood abuse and rapid cycling was fully mediated by affective instability and impulsivity while the effect on episode frequency was fully mediated by affective instability in the case of depressive episodes. Both affective instability and impulsivity mediated the effect for manic episodes. These findings collectively suggest that emotional dysregulation represents a critical pathway through which early trauma influences episodic characteristics in BD.

Psychotic presentations. Two studies examined psychotic symptoms, which can be present in individuals with BD. Chiu et al. (2024) found a dissociation-mediated relationship between early trauma and hallucinations and delusions in their bipolar group, using both clinician ratings and a patient-rated measure of hallucinations. Etain et al. (2017a) considered the impact of cannabis use on delusional beliefs in individuals with BD. No mediating effects were found but path analyses demonstrated independent relationships between childhood trauma (emotional abuse and physical abuse) and delusional beliefs, and cannabis use and psychotic features, independent of childhood trauma. These results align with established trauma-psychosis literature (Varese et al., 2012; Flinn et al., 2025) and systematic reviews highlighting post-traumatic sequelae, particularly dissociation, as significant mediating factors. Notably, the dissociative mediation pathway identified by Chiu et al. (2024) demonstrated consistency across both clinician and patient rating scales, strengthening the evidence for this mechanism in bipolar populations.

Insomnia. One study looked at insomnia as an outcome (Yang et al., 2024) concluding that social support, in their drug-naïve group, partially mediated the effect between early trauma and insomnia symptoms. This effect was not found in the group on long-term medication, suggesting a role for medication in moderating the mediated pathway between trauma and sleep disturbance.

Suicidality

Seven studies focused on suicidality as an outcome (Aas et al., 2017; Etain et al., 2017b; Freitag et al., 2022; Khosravani et al., 2021; Lamis et al., 2019; Marwaha et al., 2020; Palagini et al., 2021), with mechanisms relating to emotional

dysregulation consistently identified. Aas et al. (2017) found full mediation effects of both affective lability and anger on increased risk of suicide attempts, particularly for the association between emotional abuse and suicide risk. Similarly, impulsive aggression (Freitag et al., 2022) partially mediated the relationship between childhood emotional and sexual abuse and increased risk for suicidal ideation and behaviours. Etain et al. (2017b) found partial mediation effects of affect intensity, affect lability, and both attitudinal and motor hostility for the association between emotional abuse and suicide attempts. Moreover, attitudinal hostility and affect intensity significantly mediated the association between sexual abuse and suicide attempts. Additionally, Marwaha et al. (2020) demonstrated that impulsivity partially mediated the relationship between childhood abuse and suicidal behaviour.

Suicidal ideation. Emotion regulation difficulties have emerged as a mediating mechanism linking early traumatic experiences to the development of suicidal thoughts and ideation, highlighting how affective dysregulation also influenced consideration of suicide. Khosravani et al. (2021) explored this relationship in an inpatient sample of females with BD, finding a partially mediated relationship between emotional abuse and suicidal ideation through emotional dysregulation but no effect of emotional dysregulation for childhood emotional neglect. Their structural equation model demonstrated that childhood emotional abuse and difficulties identifying feelings indirectly influenced suicidal ideation through specific dysregulation domains (impulse control problems, limited access to emotion regulation strategies, and goal-directed behaviour difficulties). Notably, while depressive symptoms significantly contributed to suicidal ideation in their model, manic symptoms did not. Suicidal ideation and planning were also explored by

Palagini et al. (2021) who looked at the mediating effect of insomnia. They concluded that early emotional stress and the cognitive component of hopelessness, mediated by insomnia, contributed to suicidal plans. Insomnia symptoms mediated the association between early life stress and suicidal ideation and suicidal plans by also predicting the cognitive aspects of hopelessness. Lamis et al. (2019) found that the relationship between childhood sexual abuse and suicidal ideation was significantly mediated by existential wellbeing, but not religious wellbeing, suggesting that a sense of purpose in life can serve a protective function.

Across these studies, emotional dysregulation consistently emerged as a significant mediator for both suicidal behaviours/ attempts, and ideation and plans, Notably, most of the studies also explored emotional abuse as an exposure variable which may be particularly salient given the impact of this on the development of emotional regulatory systems, potentially creating a vulnerability for emotional dysregulation.

Comorbidities

Three studies considered mediated effects between childhood trauma and comorbid presentations; two looked at a comorbid presence of anxiety disorders (Aas et al., 2017; Marwaha et al., 2020) and two looked at substance misuse (Etain et al., 2017b, Marwaha et al., 2020). Affective lability fully mediated the association between childhood trauma and presence of anxiety disorders (Aas et al., 2017), with further analyses showing a mediation effect of the anxiety/ depression subscale of the ALS between emotional abuse and comorbid anxiety disorders. Affective instability and impulsivity both demonstrated partial mediation effects on the

relationship between childhood abuse and presence of anxiety disorders (Marwaha et al., 2020). Moreover, research looking at substance misuse as an outcome found motor hostility (Etain et al., 2017b) and impulsivity (Etain et al., 2017b; Marwaha et al., 2020) to demonstrate significant indirect effects.

Dissociation

One paper considered dissociation as an outcome (De Filippis et al., 2023), although it should be noted that dissociation was also considered as a mediator in the study by Chiu et al. (2024). It was found that impulsivity significantly mediated the relationship between childhood trauma and dissociative symptoms indicating that higher childhood trauma was associated with greater impulsivity, which in turn partially contributed to increased dissociative symptomatology.

Resilience

One study explored resilience (Citak & Erten, 2021). It concluded that attachment-related avoidance and anxiety partially mediated the negative effect of childhood trauma on resilience levels.

Mediating factors

Numerous mediating variables were identified within the review. To support with synthesising this information, the factors were categorised according to constructs that are theoretically related. Broadly, five distinct conceptual domains were identified; affective processes, cognitive and perceptual processes, interpersonal factors, personality-related factors and behavioural risk factors.

Affective processes

Seven studies focused on psychological constructs relating to overall emotion regulation; affective lability (Aas et al., 2017, Etain et al., 2017b), impulsivity (De Fillipis et al., 2023; Etain et al., 2017b; Marwaha et al., 2020), affect intensity (Etain et al., 2017b), attitudinal and motor hostility (Etain et al., 2017b), impulsive aggression (Freitag et al., 2022), emotional dysregulation (Khosravani et al., 2021), affective instability (Marwaha et al., 2020), affective temperament (Terao et al., 2023). This cluster of mediating variables represented the most often studied domain and demonstrated a consistent affective route between childhood trauma and outcomes in individuals with BD.

Cognitive and perceptual factors

Four studies explored cognitive and perceptual factors as potential mediators: dissociation (Chiu et al., 2024), defence mechanisms (Wang et al., 2021), existential/ religious wellbeing (Lamis et al., 2019) and sensory processing (Aghaeimazraji et al., 2024). These factors may highlight internal manifestations of trauma and the adaptive processes that individuals have adopted as a way of coping.

Interpersonal factors

Four of the studies explored interpersonal constructs: attachment style (Citak & Erten, 2021), family functioning (Du et al., 2024), attachment insecurity (Wrobel et al., 2022) and social support (Yang et al., 2024), illuminating the relational contexts, and impact, for individuals who have experienced early trauma.

Personality related factors

Two studies looked at personality-related variables. Wrobel et al. (2023) explored the mediating effects of personality traits, including neuroticism, extraversion, openness, agreeableness and conscientiousness. Resilience (Vieira et al., 2020) was also investigated. Whilst personality traits may be more static in nature, resilience can be viewed as a dynamic process, though both represent enduring individual characteristics that may influence how childhood trauma impacts upon outcomes relating to BD. These factors highlight the importance of considering pre-existing psychological attributes and adaptive capacities when examining pathways between early adversity and clinical outcomes.

Behavioural risk factors

Three studies examined factors related to behavioural health: cannabis use (Aas et al., 2014; Etain et al., 2017a) and insomnia (Palagini et al., 2021). These studies considered behavioural/ external manifestations as potential pathways between early trauma and clinical outcomes.

Summary and synthesis

This review has considered a wide range of mediators and outcome, which creates challenges for understanding the overall picture that emerges. The findings are therefore summarised in Figures 3-7, which shows the identified mediational pathways grouped by type of mediator.

Discussion

The aim of this review was to systematically synthesise the available literature on possible mechanisms mediating the relationship between childhood trauma and outcomes relating to BD.

From the twenty included papers, the mediating variables identified could broadly be categorised into five groups: affective processes, cognitive/ perceptual processes, interpersonal variables, personality-related factors and behavioural risk factors.

Affective dysregulation emerged as the most frequently studied mediating domain, with seven studies reporting consistent mediation effects across a range of outcomes, including symptom severity, episode frequency, suicidality, mixed episodes, dissociation, comorbidities, and earlier age of onset. These findings reinforce the established link between early adversity and emotion regulation (ER) difficulties. ER is shaped by psychological, biological, and interpersonal processes (Dvir et al., 2014). From an attachment perspective, establishing ER is considered a key developmental task, reliant on early caregiving (Burns et al., 2010); thus, childhood trauma may disrupt the formation of adaptive ER strategies (Milojevich et al., 2020). Additionally, childhood maltreatment can lead to neurobiological changes, in turn affecting ER (Cicchetti & Rogosch, 2009). Overall, the evidence highlights the cumulative impact of trauma and ER difficulties on adult psychopathology, with ER demonstrated as a transdiagnostic mediator across various mental health conditions (Alameda et al., 2020; Li et al., 2020; Williams et al., 2018).

The findings support the literature on key pathways from specific forms of emotional trauma (abuse and neglect), with seven studies (more than for any other subtype of trauma) reporting direct and indirect pathways between these types of childhood emotional abuse and unfavourable outcomes. Emotional trauma effects have been implicated in a variety of poor outcomes for people with BD, including early disease onset, rapid cycling, comorbidity with anxiety disorders, and cannabis use (Dualibe & Osório, 2017). These findings emphasise the importance of differentiating between trauma types when considering pathways to illness, as emotional abuse appears to confer a particular risk through direct and indirect effects.

Attachment patterns emerged as another significant mediating pathway, with anxious and avoidant attachment styles associated in three studies with poorer outcomes including reduced resilience, increased depression severity, and greater insomnia symptoms. Supporting this, family cohesion significantly mediated the relationship between emotional neglect and depression (Du et al., 2024), highlighting the central role of relational factors in trauma-bipolar pathways. This aligns with attachment theory (Bowlby, 1973) which posits that early caregiving experiences are internalised, shaping expectations of the self and others, subsequently impacting upon ER, and interpersonal functioning. Attachment insecurity has been shown to be associated with both early trauma (Baer & Martinez, 2006) and bipolar (Kefeli et al., 2018; Moriss et al., 2009). Given the co-existence of experiences of childhood trauma, disrupted relationships and internalised attachment insecurity, and maladaptive ER, these factors likely operate simultaneously to compound risk for adverse outcomes, and the unique contribution of each process may be difficult to truly disentangle.

Interestingly, there was no evidence for cannabis having a mediating role on a range of clinically relevant outcomes. In recognition that adversity might increase likelihood of substance misuse, two papers explored its role, but both concluded no mediation effects. Research consistently reports undesirable effects of cannabis use on mental health with a systematic review highlighting its role in precipitating and worsening bipolar presentations (Maggu et al., 2023) though the current review suggests that the effect is independent of trauma, echoing similar inconsistencies in the psychosis literature (Williams et al., 2018). This distinction is clinically important as it indicates that cannabis use may represent a separate risk factor requiring independent clinical attention, rather than a mechanism that explains how early adversity leads to poorer outcomes.

Importantly, the review highlights the gaps that remain in the literature and our distance from a comprehensive understanding of mechanisms linking trauma to bipolar outcomes at present. Many of the mediation effects found demonstrated partial, not full, effects, suggesting numerous routes that may be implicated, and that further research is warranted to build on the evidence base for alternative potential mediators. Many of the mediators identified also appear to be implicated across other mental health disorders, which suggests that they may be diagnostically nonspecific, and that cofactors may be required to explain specific diagnostic expressions. However, the current study design did not allow systematic comparisons between the mediators in relation to BD and other disorders. A meta-analysis by De Prisco et al. (2023) compared emotional dysregulation in BD to other conditions and found different emotion dysregulation features across psychiatric disorders, for example, lower dysregulation and more adaptive ER strategies in

individuals with BD than borderline personality disorders, and more positive rumination and risk-taking behaviours when compared with major depressive disorder. It is plausible, therefore that, despite their apparent transdiagnostic role, nuances within the expression of certain mediators may be related to different psychiatric outcomes.

Strengths and limitations of included research

A substantial strength of the review is the implementation of rigorous mediation analyses across most of the included studies, where techniques including bootstrapping procedures were utilised. Robust analytic methods increase confidence in the indirect effect of the mediators measured, creating a more reliable foundation for understanding the mechanisms being investigated. However, there was a lack of consistency in the reporting of direct effects, which limited the ability to fully understand the unique contribution of childhood trauma beyond the mediated pathway.

All the included studies employed cross-sectional designs, which, while appropriate for examining mediating relationships, limited causal inferences about the directionality of observed associations between childhood trauma, the mediating variables explored, and outcomes relating to BD.

Relatedly, the disparities between statistical analyses used to calculate the indirect effects through mediating variables across studies meant that findings could not be pooled, and explicit calculations of the effects were not possible, which means that gaps in understanding the true mediating effect remain unaddressed. This limitation is further exacerbated by a lack of consistent reporting of the magnitude of

the mediating effect as a percentage, and of direct effects after accounting for the mediator, limiting the interpretations that were possible for the data presented.

Limitations of this review

All the included papers were required to be written in English, which led to exclusion of at least one potentially relevant article, leading to a potential bias of the included papers. Positively, the included studies varied in geographic location and can be considered representative of diverse settings/ populations. Grey literature was also excluded which has the potential to impact upon the findings. Although this decision aimed to maintain quality of the review, publication biases may lead to over-representation of significant mediation effects, thus skewing the conclusions that are made. Nonetheless, two studies (Aas et al., 2014; Etain et al., 2017a) were identified and included despite not finding significant mediation effects.

Another possible limitation of this review is the inclusion of samples who were considered in remission, as it might be argued that some effects (particularly those on symptoms) will be harder to detect in these circumstances.

The review incorporated database searching alongside backward citation checks, which can allow confidence that the relevant research answering the review question was identified. Nevertheless, there remains a small possibility that some relevant studies could have been inadvertently excluded; one noted issue that arose amidst full text screening was that of ensuring that the samples solely comprised of bipolar populations, as numerous papers with other diagnostic groups (e.g. major

depressive disorder) were excluded. Moreover, forward citation searching was not conducted which could allow strengthened confidence in the research identified.

Clinical implications

The findings from this review illuminate numerous potential pathways that may mediate the relationship between childhood adversity and outcomes relating to BD. These mediating mechanisms offer several considerations for clinical practice that could inform both assessment and intervention approaches for individuals with BD who have experienced childhood trauma.

The largest group of identified mediating factors pertained to emotion dysregulation. The National Institute for Health and Care Excellence (NICE, 2014) endorse cognitive-behavioural therapy and interpersonal therapy for individuals with BD, and although it can be presumed that these therapies are personalised in line with individual need, it may be clinically useful to incorporate a focus on ER within these frameworks. Formulation-driven approaches that consider regulation styles could help with effectively tailoring interventions for those with trauma histories. Furthermore, alternative approaches, such as Dialectical Behavioural Therapy (DBT), that target ER processes may warrant further exploration in bipolar populations with a history of early adverse experiences. Research has suggested that DBT may be an effective treatment option for individuals with bipolar disorder (Jones et al., 2024) although the limited-quality of this research means that this suggestion cannot be endorsed with any confidence; further research would be necessary to understand how DBT may benefit this group prior to any implementation within routine clinical practice.

There is, currently, limited evidence on the efficacy of trauma-focused psychotherapies in bipolar populations despite an abundance of research indicating high rates of trauma in this group. Therapeutic approaches that could merit further exploration include trauma-focused cognitive-behavioural therapy (CBT) and Eye Movement Desensitisation and Reprocessing (EMDR) (Richardson & Amann, 2024). A narrative review of the literature on EMDR for bipolar patients (Perlini et al., 2020) highlighted the poor quality of research in this area, only identifying three studies, although the review concluded that there is preliminary evidence that EMDR is a safe and promising approach for improving mood and trauma symptoms in bipolar patients.

The presence of numerous potential mediating factors highlights the need for a comprehensive assessment phase that considers early experiences, internal and external trauma manifestations, alongside clinical expressions and symptomology. Given the symptom overlap between BD and conditions such as PTSD, clinical interventions may be enhanced by incorporating structured assessments and screening tools that can help distinguish between overlapping features and identify possible mediators. For example, Cogan et al. (2021) recommend targeted assessments to support differential diagnosis, a practice that aligns with the formulation-based approach suggested by this review. Building on this suggestion, utilising relevant measures to assess potentially mediating variables is likely to support the formulation of individual presentations, leading to appropriate intervention. To summarise, the current review supports the value of incorporating trauma-informed assessments and formulations into clinical practice with individuals

with BD. However, recommendations around specific therapeutic interventions remain tentative, given the current limitations of the evidence base.

Research implications

Whilst many of the studies employed robust bootstrapping techniques for mediation analyses, which strengthens confidence in the findings, the lack of power calculations in most studies and, generally, the small samples used, suggest that future research should prioritise adequate power to detect meaningful effects.

The review found an emphasis on depressive symptoms and related constructs such as hopelessness and suicidality, with comparatively less attention given to manic symptomatology. This imbalance highlights an important gap, as understanding the specific pathways through which childhood trauma may influence manic episodes is likely to lead to improved outcomes. Thus, it would be useful for future research to consider mediators specifically relating to manic symptoms to develop a more comprehensive understanding of the impact of trauma across the spectrum of bipolar presentations.

A meta-analysis was unable to be performed due to variations across mediating and outcome variables, alongside the heterogeneity of mediation analyses used. To build confidence in the conclusions drawn from this review, a meta-analysis would allow for more robust quantitative synthesis of effect sizes and the true mediating effects of identified variables, leading to more robust evidence for the pathways. However, achieving this would require greater methodological standardisation, including consistent use of validated trauma measures, the

measuring of specific outcome variables and consistency in approaches to mediation analyses and reporting of both direct and indirect effects.

Conclusion

To the author's knowledge, this is the first systematic review to consolidate findings of psychological mediators between childhood trauma and outcomes in individuals with BD. Twenty papers were included in the review, where numerous mediating factors, and outcomes, were explored. The conclusions mirror those of Williams et al. (2018) and Alameda et al. (2020) in the psychosis literature and provide a synthesised understanding of the mechanisms important in pathways to bipolar. This convergence of findings across diagnostic categories suggest that trauma-mental health relationships likely operate through similar mechanisms supporting transdiagnostic approaches to trauma-related presentations. Implications have been proposed. Comprehensive assessment of childhood trauma is imperative, in addition to assessment of individual experiences such as emotional dysregulation and relational contexts which may act as mechanistic pathways to clinical outcomes. Thorough understanding and formulation of such factors will support the development of tailoring treatments and lead to the most appropriate care for people with BD.

References

Aas, M., Etain, B., Bellivier, F., Henry, C., Lagerberg, T., Ringen, A., Agartz, I., Gard, S., Kahn, J. P., Leboyer, M., Andreassen, O. A., & Melle, I. (2014). Additive effects of childhood abuse and cannabis abuse on clinical expressions of bipolar disorders. *Psychological Medicine, 44*(8), 1653–1662. https://doi.org/10.1017/S0033291713002316

Aas, M., Henry, C., Andreassen, O. A., Bellivier, F., Melle, I., & Etain, B. (2016). The role of childhood trauma in bipolar disorders. *International Journal of Bipolar Disorders*, *4*(1), 2. https://doi.org/10.1186/s40345-015-0042-0

Aas, M., Henry, C., Bellivier, F., Lajnef, M., Gard, S., Kahn, J.-P., Lagerberg, T. V., Aminoff, S. R., Bjella, T., Leboyer, M., Andreassen, O. A., Melle, I., & Etain, B. (2017). Affective lability mediates the association between childhood trauma and suicide attempts, mixed episodes and co-morbid anxiety disorders in bipolar disorders. *Psychological Medicine*, *47*(5), 902–912. https://doi.org/10.1017/S0033291716003081

Aghaeimazraji, M., Khosravani, V., Samimi Ardestani, S. M., Berk, M., & Najafi, M. (2024). The connections between alexithymia, childhood maltreatment, impulsivity and extreme sensory processing patterns in relation to bipolar symptoms in inpatients with bipolar disorder. *Clinical Psychology & Psychotherapy*, *31*(5), e3070. https://doi.org/10.1002/cpp.3070

Alameda, L., Rodriguez, V., Carr, E., Aas, M., Trotta, G., Marino, P., Vorontsova, N., Herane-Vives, A., Gadelrab, R., Spinazzola, E., Forti, M. D., Morgan, C., & Murray, R. M. (2020). A systematic review on mediators between adversity and psychosis: Potential targets for treatment. *Psychological Medicine*, *50*(12), 1966–1976. https://doi.org/10.1017/S0033291720002421

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (*5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Baer, J. C., & Martinez, C. D. (2006). Child maltreatment and insecure attachment: a meta-analysis. *Journal of Reproductive and Infant Psychology, 24*(3), 187–197. https://doi.org/10.1080/02646830600821231

Baker, C., & Kirk Wade, E. (2024). *Mental health statistics: Prevalence, services and funding in England* (House of Commons Library Research Briefing No. SN06988). House of Commons Library. https://researchbriefings.files.parliament.uk/documents/SN06988/SN06988.pdf

Barnett, J. H., & Smoller, J. W. (2009). The genetics of bipolar disorder. *Neuroscience*, *164*(1), 331–343. https://doi.org/10.1016/j.neuroscience.2009.03.080

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Beck, A. T., Kovacs, M., & Weissman, A. (1979). Assessment of suicidal intention: The Scale for Suicide Ideation. *Journal of Consulting and Clinical Psychology*, *47*(2), 343–352. https://doi.org/10.1037/0022-006X.47.2.343

Beck, A. T., Steer, R. A., & Brown, G. (2011). *Beck Depression Inventory–II* [Dataset]. https://doi.org/10.1037/t00742-000

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: The Hopelessness Scale. *Journal of Consulting and Clinical Psychology*, *42*(6), 861–865. https://doi.org/10.1037/h0037562

Benabarre, A., Vieta, E., Colom, F., Martínez-Arán, A., Reinares, M., & Gastó, C. (2001). Bipolar disorder, schizoaffective disorder and schizophrenia: Epidemiologic, clinical and prognostic differences. *European Psychiatry: The Journal of the Association of European Psychiatrists*, *16*(3), 167–172. https://doi.org/10.1016/s0924-9338(01)00559-4

Berk, M., Malhi, G. S., Cahill, C., Carman, A. C., Hadzi-Pavlovic, D., Hawkins, M. T., Tohen, M., & Mitchell, P. B. (2007). The Bipolar Depression Rating Scale (BDRS): Its development, validation and utility. *Bipolar Disorders*, *9*(6), 571–579. https://doi.org/10.1111/j.1399-5618.2007.00536.x

Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., Sapareto, E., & Ruggiero, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *The American Journal of Psychiatry*, *151*(8), 1132–1136. https://doi.org/10.1176/ajp.151.8.1132

Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J., Handelsman, L., Medrano, M., Desmond, D., & Zule, W. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse & Neglect*, *27*(2), 169–190. https://doi.org/10.1016/s0145-2134(02)00541-0

Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. *The Journal of Nervous and Mental Disease*, *174*(12), 727–735. https://doi.org/10.1097/00005053-198612000-00004

Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation: Anxiety and anger*. Penguin Books.

Bremner, J. D., Bolus, R., & Mayer, E. A. (2007). Psychometric properties of the Early Trauma Inventory-Self Report. *The Journal of Nervous and Mental*

Disease, *195*(3), 211–218. https://doi.org/10.1097/01.nmd.0000243824.84651.6c

Briere, J., Kaltman, S., & Green, B. L. (2008). Accumulated childhood trauma and symptom complexity. *Journal of Traumatic Stress*, *21*(2), 223–226. https://doi.org/10.1002/jts.20317

Burns, E. E., Jackson, J. L., & Harding, H. G. (2010). Child maltreatment, emotion regulation, and posttraumatic stress: The impact of emotional abuse. *Journal of Aggression, Maltreatment & Trauma, 19*(8), 801–819. https://doi.org/10.1080/10926771.2010.522947

Caspi, A., Houts, R. M., Belsky, D. W., Goldman-Mellor, S. J., Harrington, H., Israel, S., Meier, M. H., Ramrakha, S., Shalev, I., Poulton, R., & Moffitt, T. E. (2014). The p factor: One general psychopathology factor in the structure of psychiatric disorders? *Clinical Psychological Science, 2*(2), 119–137. https://doi.org/10.1177/2167702613497473

Chiu, C.-D., Li, D.-J., Hsieh, Y.-C., Chou, L.-S., Au, J. S., Chen, Y.-L., & Lin, C.-H. (2024). Linking childhood trauma and dissociation to psychotic symptoms in major depressive disorder, bipolar disorders, and schizophrenia: A transdiagnostic examination using patient and clinician ratings. *Psychological Trauma: Theory, Research, Practice and Policy*, *16*(Suppl 1), S242–S249. https://doi.org/10.1037/tra0001584

Cicchetti, D., & Rogosch, F. A. (2009). Adaptive coping under conditions of extreme stress: Multilevel influences on the determinants of resilience in maltreated children. *New Directions for Child and Adolescent Development, 124*, 47–59. https://doi.org/10.1002/cd.242

Citak, C., & Erten, E. (2021). Impact of childhood trauma and attachment on resilience in remitted patients with bipolar disorder. *Journal of Affective Disorders*, *280*, 219–227. https://doi.org/10.1016/j.jad.2020.11.025

Cogan, C. M., Paquet, C. B., Lee, J. Y., Miller, K. E., Crowley, M. D., & Davis, J. L. (2021). Differentiating the symptoms of posttraumatic stress disorder and bipolar disorders in adults: Utilizing a trauma-informed assessment approach. *Clinical Psychology & Psychotherapy*, *28*(1), 251–260. https://doi.org/10.1002/cpp.2504

De Filippis, R., Carbone, E. A., D'Angelo, M., Liuzza, M. T., De Fazio, P., & Steardo Jr, L. (2023). The mediation role of impulsivity between childhood trauma and dissociative symptomatology in bipolar disorder. *Rivista di Psichiatria,* 58(2), 84-92.

De Prisco, M., Oliva, V., Fico, G., Radua, J., Grande, I., Roberto, N., Anmella, G., Hidalgo-Mazzei, D., Fornaro, M., de Bartolomeis, A., Serretti, A., Vieta, E., & Murru, A. (2023). Emotion dysregulation in bipolar disorder compared to other mental illnesses: a systematic review and meta-analysis. *Psychological Medicine, 53*(16), 7484–7503. https://doi.org/10.1017/S003329172300243X

De Sousa, T. R., Dt, C., & Novais, F. (2023). Exploring the hypothesis of a schizophrenia and bipolar disorder continuum: Biological, genetic and pharmacologic data. *CNS & Neurological Disorders Drug Targets*, *22*(2), 161–171. https://doi.org/10.2174/1871527320666210902164235

Du, Y., Liu, J., Lin, R., Chattun, M. R., Gong, W., Hua, L., Tang, H., Han, Y., Lu, Q., & Yao, Z. (2024). The mediating role of family functioning between childhood trauma and depression severity in major depressive disorder and bipolar

disorder. *Journal of Affective Disorders*, *365*, 443–450. https://doi.org/10.1016/j.jad.2024.08.155

Dualibe, A. L., & Osório, F. L. (2017). Bipolar disorder and early emotional trauma: A critical literature review on indicators of prevalence rates and clinical outcomes. *Harvard Review of Psychiatry*, *25*(5), 198. https://doi.org/10.1097/HRP.0000000000000154

Dvir, Y., Ford, J. D., Hill, M., & Frazier, J. A. (2014). Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities. *Harvard Review of Psychiatry*, *22*(3), 149–161. https://doi.org/10.1097/HRP.0000000000000014

Etain, B., Henry, C., Bellivier, F., Mathieu, F., & Leboyer, M. (2008). Beyond genetics: Childhood affective trauma in bipolar disorder. *Bipolar Disorders*, *10*(8), 867–876. https://doi.org/10.1111/j.1399-5618.2008.00635.x

Etain, B., Lajnef, M., Bellivier, F., Henry, C., M'bailara, K., Kahn, J. P., Leboyer, M., & Fisher, H. L. (2017a). Revisiting the association between childhood trauma and psychosis in bipolar disorder: A quasi-dimensional path-analysis. *Journal of Psychiatric Research,* 84, 73-79. https://doi.org/10.1016/j.jpsychires.2016.09.022

Etain, B., Lajnef, M., Henry, C., Aubin, V., Azorin, J. M., Bellivier, F., ... & Albertini, L. (2017b). Childhood trauma, dimensions of psychopathology and the clinical expression of bipolar disorders: a pathway analysis. *Journal of Psychiatric Research*, *95*, 37-45. https://doi.org/10.1016/j.jpsychires.2017.07.013

Ferrari, A. J., Baxter, A. J., & Whiteford, H. A. (2011). A systematic review of the global distribution and availability of prevalence data for bipolar disorder. *Journal of Affective Disorders*, *134*(1), 1–13. https://doi.org/10.1016/j.jad.2010.11.007

Flinn, A., Hefferman-Clarke, R., Parker, S., Allsopp, K., Zhou, L., Begemann, M., Bentall, R., & Varese, F. (2025). Cumulative exposure to childhood adversity and risk of adult psychosis: A dose–response meta-analysis. *Psychological Medicine*, *55*, e162. https://doi.org/10.1017/S0033291725001138

Freitag, S., Kapoor, S., & Lamis, D. A. (2022). Childhood maltreatment, impulsive aggression, and suicidality among patients diagnosed with bipolar disorder. *Psychological Trauma: Theory, Research, Practice, and Policy, 14*(8), 1256-1262.https://doi.org/10.1037/tra0001218

Friborg, O., Barlaug, D., Martinussen, M., Rosenvinge, J. H., & Hjemdal, O. (2005). Resilience in relation to personality and intelligence. *International Journal of Methods in Psychiatric Research*, *14*(1), 29–42. https://doi.org/10.1002/mpr.15

Galvez-Florez, J. F., Guillen-Burgos ,Hernan F., Moreno-Lopez ,Sergio, Kwan ,Angela T.H., & and McIntyre, R. S. (2025). Subtypes of childhood trauma exposure associated with earlier onset and delayed treatment in rapid cycling bipolar disorder: A case control study. *Journal of Aggression, Maltreatment & Trauma*, *34*(1), 165–183. https://doi.org/10.1080/10926771.2024.2410739

Garno, J. L., Goldberg, J. F., Ramirez, P. M., & Ritzler, B. A. (2005). Impact of childhood abuse on the clinical course of bipolar disorder. *British Journal of Psychiatry*, *186*(2), 121–125. https://doi.org/10.1192/bjp.186.2.121

Goldberg, L. R., & and Freyd, J. J. (2006). Self-reports of potentially traumatic experiences in an adult community sample: Gender differences and test-retest stabilities of the items in a Brief Betrayal-Trauma Survey. *Journal of Trauma & Dissociation*, *7*(3), 39–63. https://doi.org/10.1300/J229v07n03_04

Goodwin, F. K., & Jamison, K. R. (2007). *Manic-depressive illness: bipolar disorders and recurrent depression* (2nd ed.). Oxford University Press.

Gordovez, F. J. A., & McMahon, F. J. (2020). The genetics of bipolar disorder. *Molecular Psychiatry*, *25*(3), 544–559. https://doi.org/10.1038/s41380-019-0634-7

Grande, I., Berk, M., Birmaher, B., & Vieta, E. (2016). Bipolar disorder. *The Lancet*, *387*(10027), 1561–1572. https://doi.org/10.1016/S0140-6736(15)00241-X

Gu, W., Zhao, Q., Yuan, C., Yi, Z., Zhao, M., & Wang, Z. (2022). Impact of adverse childhood experiences on the symptom severity of different mental disorders: A cross-diagnostic study. *General Psychiatry*, *35*(2), e100741. https://doi.org/10.1136/gpsych-2021-100741

Guillen-Burgos, H. F., Gálvez-Flórez, J. F., Moreno-Lopez, S., Kwan, A. T. H., Gomez, O., González-Haddad, G., & McIntyre, R. S. (2025). Differences in bipolar disorder type I and type II exposed to childhood trauma: A retrospective cohort study. *Journal of Affective Disorders Reports*, *19*, 100869. https://doi.org/10.1016/j.jadr.2024.100869

Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, *32*, 50–55. https://doi.org/10.1111/j.2044-8341.1959.tb00467.x

Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, Neurosurgery, and Psychiatry*, *23*(1), 56–62. https://doi.org/10.1136/jnnp.23.1.56

Harrison, P. J., Geddes, J. R., & Tunbridge, E. M. (2018). The emerging neurobiology of bipolar disorder. *Trends in Neurosciences*, *41*(1), 18–30. https://doi.org/10.1016/j.tins.2017.10.006

Harvey, A. G. (2004). *Cognitive behavioural processes across psychological disorders: a transdiagnostic approach to research and treatment.* Oxford University Press.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, *76*(4), 408–420. https://doi.org/10.1080/03637750903310360

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling* (White paper). http://www.afhayes.com/public/process2012.pdf

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis : a regression-based approach*. The Guilford Press.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis, Second Edition: A regression-based approach*. Guilford Publications.

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). The Guilford Press.

Hett, D., Etain, B., & Marwaha, S. (2022). Childhood trauma in bipolar disorder: New targets for future interventions. *BJPsych Open*, *8*(4), e130. https://doi.org/10.1192/bjo.2022.529

Hirschfeld, R. M., Williams, J. B., Spitzer, R. L., Calabrese, J. R., Flynn, L., Keck, P. E., Lewis, L., McElroy, S. L., Post, R. M., Rapport, D. J., Russell, J. M., Sachs, G. S., & Zajecka, J. (2000). Development and validation of a screening instrument for bipolar spectrum disorder: The Mood Disorder Questionnaire. *The American Journal of Psychiatry*, *157*(11), 1873–1875. https://doi.org/10.1176/appi.ajp.157.11.1873

Hoffecker, L. (2020). Grey literature searching for systematic reviews in the health sciences. *The Serials Librarian*, *79*(3–4), 252–260. https://doi.org/10.1080/0361526X.2020.1847745

Hogg, B., Gardoki-Souto, I., Valiente-Gómez, A., Rosa, A. R., Fortea, L., Radua, J., Amann, B. L., & Moreno-Alcázar, A. (2023). Psychological trauma as a transdiagnostic risk factor for mental disorder: An umbrella meta-analysis. *European Archives of Psychiatry and Clinical Neuroscience*, *273*(2), 397–410. https://doi.org/10.1007/s00406-022-01495-5

Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D., & Newman, T. B. (2013). *Designing clinical research.* (4th edition / Stephen B. Hulley, Steven R. Cummings, Warren S. Browner, Deborah G. Grady and Thomas B. Newman.). Lippincott Williams & Wilkins.

Jones, B. D. M., Umer, M., Kittur, M. E., Finkelstein, O., Xue, S., Dimick, M. K., Ortiz, A., Goldstein, B. I., Mulsant, B. H., & Husain, M. I. (2023). A systematic review on the effectiveness of dialectical behavior therapy for improving mood symptoms in bipolar disorders. *International Journal of Bipolar Disorders*, *11*(1), Article 6. https://doi.org/10.1186/s40345-023-00288-6

Joslyn, C., Hawes, D. J., Hunt, C., & Mitchell, P. B. (2016). Is age of onset associated with severity, prognosis, and clinical features in bipolar disorder? A meta-analytic review. *Bipolar Disorders*, *18*(5), 389–403. https://doi.org/10.1111/bdi.12419

Joyce, P. R. (1984). Age of onset in bipolar affective disorder and misdiagnosis as schizophrenia. *Psychological Medicine*, *14*(1), 145–149. https://doi.org/10.1017/S0033291700003147

Kay, S. R., Fiszbein, A., & Opler, L. A. (1987). The Positive and Negative Syndrome Scale (PANSS) for schizophrenia. *Schizophrenia Bulletin*, *13*(2), 261–276. https://doi.org/10.1093/schbul/13.2.261

Kefeli, M. C., Turow, R. G., Yıldırım, A., & Boysan, M. (2018). Childhood maltreatment is associated with attachment insecurities, dissociation and alexithymia in bipolar disorder. *Psychiatry Research, 260*, 391-399. https://doi.org/10.1016/j.psychres.2017.12.026

Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., Aguilar-Gaxiola, S., Alhamzawi, A. O., Alonso, J., Angermeyer, M., Benjet, C., Bromet, E., Chatterji, S., Girolamo, G. de, Demyttenaere, K., Fayyad, J., Florescu, S., Gal, G., Gureje, O., … Williams, D. R. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *The British Journal of Psychiatry*, *197*(5), 378–385. https://doi.org/10.1192/bjp.bp.110.080499

Khosravani, V., Berk, M., Sharifi Bastan, F., Samimi Ardestani, S. M., & Wrobel, A. (2021). The effects of childhood emotional maltreatment and alexithymia on depressive and manic symptoms and suicidal ideation in females with bipolar disorder: Emotion dysregulation as a mediator. *International Journal of Psychiatry in Clinical Practice*, *25*(1), 90–102. https://doi.org/10.1080/13651501.2021.1879867

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. *Journal of General Internal Medicine*, *16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Lamis, D. A., Kapoor, S., & Evans, A. P. B. (2019). Childhood sexual abuse and suicidal ideation among bipolar patients: Existential but not religious well-

being as a protective factor. *Suicide and Life-Threatening Behavior*, *49*(2), 401–412. https://doi.org/10.1111/sltb.12438

Launay, G., & Slade, P. (1981). The measurement of hallucinatory predisposition in male and female prisoners. *Personality and Individual Differences*, *2*(3), 221–234. https://doi.org/10.1016/0191-8869(81)90027-1

Li, E. T., Luyten, P., & Midgley, N. (2020). Psychological mediators of the association between childhood emotional abuse and depression: A systematic review. *Frontiers in Psychiatry*, *11*. https://doi.org/10.3389/fpsyt.2020.559213

Liu, J., Wang, Y., Wilson, A., Chen, H., Liu, P., Chen, X., Tang, H., Luo, C., Tian, Y., Wang, X., Cao, X., & Zhou, J. (2023). Anticipating unipolar depression and bipolar depression in young adult with first episode of depression using childhood trauma and personality. *Frontiers in Public Health, 10*, 1061894. https://doi.org/10.3389/fpubh.2022.1061894

Maggu, G., Choudhary, S., Jaishy, R., Chaudhury, S., Saldanha, D., & Borasi, M. (2023). Cannabis use and its relationship with bipolar disorder: A systematic review and meta-analysis. *Industrial Psychiatry Journal*, *32*(2), 202. https://doi.org/10.4103/ipj.ipj_43_23

Martin, C. G., Cromer, L. D., DePrince, A. P., & Freyd, J. J. (2013). The role of cumulative trauma, betrayal, and appraisals in understanding trauma symptomatology. *Psychological Trauma: Theory, Research, Practice, and Policy*, *5*(2), 110–118. https://doi.org/10.1037/a0025686

Marwaha, S., Briley, P. M., Perry, A., Rankin, P., DiFlorio, A., Craddock, N., Jones, I., Broome, M., Gordon-Smith, K., & Jones, L. (2020). Explaining why childhood abuse is a risk factor for poorer clinical course in bipolar disorder: A

path analysis of 923 people with bipolar I disorder. *Psychological Medicine*, *50*(14), 2346–2354. https://doi.org/10.1017/S0033291719002411

McLaughlin, K. A. (2017). Future directions in childhood adversity and youth psychopathology. In *Future Work in Clinical Child and Adolescent Psychology*. Routledge.

McLaughlin, K. A., DeCross, S. N., Jovanovic, T., & Tottenham, N. (2019). Mechanisms linking childhood adversity with psychopathology: Learning as an intervention target. *Behaviour Research and Therapy*, *118*, 101–109. https://doi.org/10.1016/j.brat.2019.04.008

Milojevich, H. M., Machlin, L., & Sheridan, M. A. (2020). Early adversity and children's emotion regulation: Differential roles of parent emotion regulation and adversity exposure. *Development and Psychopathology*, *32*(5), 1788–1798. https://doi.org/10.1017/S0954579420001273

Montgomery, S. A., & Asberg, M. (1979). A new depression scale designed to be sensitive to change. *The British Journal of Psychiatry: The Journal of Mental Science*, *134*, 382–389. https://doi.org/10.1192/bjp.134.4.382

Moola, S., Munn, Z., Tufanaru, C., Aromataris, E., Sears, K., Sfetcu, R., Currie, M., Qureshi, R., Mattis, P., Lisy, K., & Mu, P.-F. (2020). Chapter 7: Systematic reviews of etiology and risk. In E. Aromataris & Z. Munn (Eds.), *JBI manual for evidence synthesis*. JBI. https://synthesismanual.jbi.global

Morriss, R. K., Van der Gucht, E., Lancaster, G., & Bentall, R. P. (2009). Adult attachment in bipolar 1 disorder. *Psychology and Psychotherapy: theory, research and practice, 82*(3), 267-277. https://doi.org/10.1348/147608309X415309

National Institute for Health and Care Excellence. (2014). *Bipolar disorder: Assessment and management* (NICE Clinical Guideline No. 185). https://www.nice.org.uk/guidance/cg185

Nurnberger, J. I., Blehar, M. C., Kaufmann, C. A., York-Cooler, C., Simpson, S. G., Harkavy-Friedman, J., Severe, J. B., Malaspina, D., & Reich, T. (1994). Diagnostic interview for genetic studies. Rationale, unique features, and training. NIMH Genetics Initiative. *Archives of General Psychiatry*, *51*(11), 849–859; discussion 863-864. https://doi.org/10.1001/archpsyc.1994.03950110009002

Osman, A., Bagge, C. L., Gutierrez, P. M., Konick, L. C., Kopper, B. A., & Barrios, F. X. (2001). The Suicidal Behaviors Questionnaire-Revised (SBQ-R): Validation with clinical and nonclinical samples. *Assessment*, *8*(4), 443–454. https://doi.org/10.1177/107319110100800409

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372,* Article n71. https://doi.org/10.1136/bmj.n71

Palagini, L., Miniati, M., Marazziti, D., Sharma, V., & Riemann, D. (2021). Association among early life stress, mood features, hopelessness and suicidal risk in bipolar disorder: The potential contribution of insomnia symptoms. *Journal of Psychiatric Research*, *135*, 52–59. https://doi.org/10.1016/j.jpsychires.2020.12.069

Palmier-Claus, J. E., Berry, K., Bucci, S., Mansell, W., & Varese, F. (2016). Relationship between childhood adversity and bipolar affective disorder: Systematic review and meta-analysis. *The British Journal of Psychiatry: The Journal of Mental Science*, *209*(6), 454–459. https://doi.org/10.1192/bjp.bp.115.179655

Pearl, J., & Mackenzie, D. (2018). *The book of why : the new science of cause and effect*. Allen Lane.

Perlini, C., Donisi, V., Rossetti, M. G., Moltrasio, C., Bellani, M., & Brambilla, P. (2020). The potential role of EMDR on trauma in affective disorders: A narrative review. *Journal of Affective Disorders*, *269*, 1–11. https://doi.org/10.1016/j.jad.2020.03.001

Peters, E. R., Joseph, S. A., & Garety, P. A. (1999). Measurement of delusional ideation in the normal population: introducing the PDI (Peters et al. Delusions Inventory). *Schizophrenia Bulletin*, *25*(3), 553–576. https://doi.org/10.1093/oxfordjournals.schbul.a033401

Porter, C., Palmier-Claus, J., Branitsky, A., Mansell, W., Warwick, H., & Varese, F. (2020). Childhood adversity and borderline personality disorder: A meta-analysis. *Acta Psychiatrica Scandinavica*, *141*(1), 6–20. https://doi.org/10.1111/acps.13118

Potash, J. B., & Bienvenu, O. J. (2009). Neuropsychiatric disorders: Shared genetics of bipolar disorder and schizophrenia. *Nature Reviews. Neurology*, *5*(6), 299–300. https://doi.org/10.1038/nrneurol.2009.71

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods,*

Instruments & Computers, *36*(4), 717–731. https://doi.org/10.3758/BF03206553

Quarantini, L. C., Miranda-Scippa, Â., Nery-Fernandes, F., Andrade-Nascimento, M., Galvão-de-Almeida, A., Guimarães, J. L., Teles, C. A. S., Netto, L. R., Lira, S. B., de Oliveira, I. R., Post, R. M., Kapczinski, F., & Koenen, K. C. (2010). The impact of comorbid posttraumatic stress disorder on bipolar disorder patients. *Journal of Affective Disorders*, *123*(1), 71–76. https://doi.org/10.1016/j.jad.2009.08.005

Reininghaus, U., Priebe, S., & Bentall, R. P. (2013). Testing the psychopathology of psychosis: Evidence for a general psychosis dimension. *Schizophrenia Bulletin, 39(*4), 884–895. https://doi.org/10.1093/schbul/sbr182

Richardson, T., & Amann, B. L. (2024). Trauma Focused Therapy in Bipolar Disorder: Adapting CBT and EMDR. In T. Richardson (Ed.), *Handbook of Psychological Therapies for Bipolar Disorder: Evidence-Based and Emerging Techniques* (pp. 567–596). https://doi.org/10.1007/978-3-031-63349-2_21

Rowe, A.-L., Perich, T., & Meade, T. (2023). Cumulative trauma in bipolar disorder: An examination of prevalence and outcomes across the lifespan. *Journal of Affective Disorders*, *327*, 254–261. https://doi.org/10.1016/j.jad.2022.12.041

Rowe, A.-L., Perich, T., & Meade, T. (2024). Bipolar disorder and cumulative trauma: A systematic review of prevalence and illness outcomes. *Journal of Clinical Psychology*, *80*(3), 692–713. https://doi.org/10.1002/jclp.23650

Sanders, B., & Becker-Lausen, E. (1995). The measurement of psychological maltreatment: Early data on the child abuse and trauma scale. *Child Abuse & Neglect*, *19*(3), 315–323. https://doi.org/10.1016/S0145-2134(94)00131-6

Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., & Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, *59 Suppl 20*, 22-33;quiz 34-57.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, *13*, 290–312. https://doi.org/10.2307/270723

Soldatos, C. R., Dikeos, D. G., & Paparrigopoulos, T. J. (2000). Athens Insomnia Scale: Validation of an instrument based on ICD-10 criteria. *Journal of Psychosomatic Research*, *48*(6), 555–560. https://doi.org/10.1016/S0022-3999(00)00095-7

Tamminga, C. A., Pearlson, G., Keshavan, M., Sweeney, J., Clementz, B., & Thaker, G. (2014). Bipolar and schizophrenia network for intermediate phenotypes: Outcomes across the psychosis continuum. *Schizophrenia Bulletin*, *40*(Suppl 2), S131–S137. https://doi.org/10.1093/schbul/sbt179

Terao, I., Morishita, C., Tamada, Y., Masuya, J., Fujimura, Y., Toda, H., Kusumi, I., Tanabe, H., & Inoue, T. (2023). Affective temperaments mediate the effect of childhood maltreatment on bipolar depression severity. *Psychiatry and Clinical Neurosciences Reports*, *2*(2), e94. https://doi.org/10.1002/pcn5.94

Upthegrove, R., Chard, C., Jones, L., Gordon-Smith, K., Forty, L., Jones, I., & Craddock, N. (2015). Adverse childhood events and psychosis in bipolar affective disorder. *The British Journal of Psychiatry*, *206*(3), 191–197. https://doi.org/10.1192/bjp.bp.114.152611

Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., van Os, J., & Bentall, R. P. (2012). Childhood adversities increase the risk of psychosis: A meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophrenia Bulletin*, *38*(4), 661–671. https://doi.org/10.1093/schbul/sbs050

Vieira, I. S., Pedrotti Moreira, F., Mondin, T. C., Cardoso, T. de A., Branco, J. C., Kapczinski, F., Jansen, K., Souza, L. D. de M., & da Silva, R. A. (2020). Resilience as a mediator factor in the relationship between childhood trauma and mood disorder: A community sample of young adults. *Journal of Affective Disorders*, *274*, 48–53. https://doi.org/10.1016/j.jad.2020.04.011

Wang, L., Yin, Y., Bian, Q., Zhou, Y., Huang, J., Zhang, P., Chen, S., Fan, H., Cui, Y., Luo, X., Tan, S., Wang, Z., Li, C.-S. R., Tian, B., Tian, L., Hong, L. E., & Tan, Y. (2021). Immature defense mechanisms mediate the relationship between childhood trauma and onset of bipolar disorder. *Journal of Affective Disorders*, *278*, 672–677. https://doi.org/10.1016/j.jad.2020.10.029

Williams, J., Bucci, S., Berry, K., & Varese, F. (2018). Psychological mediators of the association between childhood adversities and psychosis: A systematic review. *Clinical Psychology Review*, *65*, 175–196. https://doi.org/10.1016/j.cpr.2018.05.009

Wing, J. K., Babor, T., Brugha, T., Burke, J., Cooper, J. E., Giel, R., Jablenski, A., Regier, D., & Sartorius, N. (1990). SCAN. Schedules for Clinical Assessment in Neuropsychiatry. *Archives of General Psychiatry*, *47*(6), 589–593. https://doi.org/10.1001/archpsyc.1990.01810180089012

Wrobel, A. L., Russell, S. E., Jayasinghe, A., Kavanagh, B. E., Lotfaliany, M., Turner, A., Dean, O. M., Cotton, S. M., Diaz-Byrd, C., Yocum, A. K., Duval, E. R.,

Ehrlich, T. J., Marshall, D. F., Berk, M., & McInnis, M. G. (2023a). Personality traits as mediators of the relationship between childhood trauma and depression severity in bipolar disorder: A structural equation model. *Australian and New Zealand Journal of Psychiatry*, *57*(7), 1031–1042. https://doi.org/10.1177/00048674221115644

Wrobel, A. L., Russell, S. E., Jayasinghe, A., Lotfaliany, M., Turner, A., Dean, O. M., Cotton, S. M., Diaz-Byrd, C., Yocum, A. K., Duval, E. R., Ehrlich, T. J., Marshall, D. F., Berk, M., & McInnis, M. G. (2022). Attachment insecurity partially mediates the relationship between childhood trauma and depression severity in bipolar disorder. *Acta Psychiatrica Scandinavica*, *145*(6), 591–603. https://doi.org/10.1111/acps.13419

Yang, M., Li, J., Fu, Y., Wang, G., Liu, M., Chen, J., & Liu, J. (2024). Association of childhood trauma, social support, cognition, and suicidality in females with bipolar disorder. *BMC Psychiatry*, *24*(1), 243. https://doi.org/10.1186/s12888-024-05672-9

Young, R. C., Biggs, J. T., Ziegler, V. E., & Meyer, D. A. (1978). A rating scale for mania: Reliability, validity and sensitivity. *The British Journal of Psychiatry: The Journal of Mental Science*, *133*, 429–435. https://doi.org/10.1192/bjp.133.5.429

Zhou, L., Sommer, I. E. C., Yang, P., Sikirin, L., van Os, J., Bentall, R. P., Varese, F., & Begemann, M. J. H. (2025). What do four decades of research tell us about the association between childhood adversity and psychosis: An updated and extended multi-level meta-analysis. *The American Journal of Psychiatry*, *182*(4), 360–372. https://doi.org/10.1176/appi.ajp.20240456

Appendices

Appendix A - PRISMA Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 1, 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 6, 7
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 7
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 9
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 8
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix B
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 10
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Page 10,11
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 12
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 12
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 18, 28
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Table 3

Section and Topic	Item #	Checklist item	Location where item is reported
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	N/a
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 28
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	N/a
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 28
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/a
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/a
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/a
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/a
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Figure 1, Page 11
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 10
Study characteristics	17	Cite each included study and present its characteristics.	Table 2 (Page 13-17)
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Table 4 (Page 33-34)
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Page 20-27
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Page 28-32
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/a
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/a
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/a
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/a

Section and Topic	Item #	Checklist item	Location where item is reported
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/a
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Page 45-48
	23b	Discuss any limitations of the evidence included in the review.	Page 48-49
	23c	Discuss any limitations of the review processes used.	Page 49-50
	23d	Discuss implications of the results for practice, policy, and future research.	Page 50-52
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page 7
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 7
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Page 8
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/a
Competing interests	26	Declare any competing interests of review authors.	N/a
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	N/a

Appendix B – Search terms

Database	Search terms
MEDLINE	1. bipolar disorder.mp. or exp Bipolar Disorder/ 2. psychological mediators.mp. 3. mediat*.mp. 4. path analysis.mp. or exp Path Analysis/ 5. network analysis.mp. 6. structural equation.mp. 7. 2 or 3 or 4 or 5 or 6 8. exp Posttraumatic Stress Disorder/ or exp Emotional Trauma/ or exp Trauma/ or exp Early Experience/ or exp Child Abuse/ or childhood trauma.mp. or exp Childhood Adversity/ 9. exp Childhood Adversity/ or child adversity.mp. 10. exp Childhood Adversity/ or exp Child Abuse/ or ACES.mp. 11. sexual abuse.mp. or exp Sexual Abuse/ 12. physical abuse.mp. or exp Physical Abuse/ 13. emotional abuse.mp. or exp Emotional Abuse/ 14. psychological abuse.mp. or exp Emotional Abuse/ 15. exp Physical Abuse/ or exp Emotional Abuse/ or exp Victimization/ or maltreatment.mp. or exp Child Welfare/ or exp Child Neglect/ or exp Child Abuse/ or exp Childhood Adversity/ or exp Sexual Abuse/ 16. exp Bullying/ or bully*.mp. 17. exp Parental Absence/ or exp Parental Death/ or exp Grief/ or exp Bereavement/ or parental loss.mp. 18. 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 19. 1 and 7 and 18
Scopus	(TITLE-ABS-KEY ("bipolar disorder" OR "bipolar spectrum disorder" OR mania OR hypomania OR "bipolar affective disorder") AND TITLE-ABS-KEY ("early childhood trauma" OR "child adversity" OR "adverse childhood experiences" OR aces OR "sexual abuse" OR "physical abuse" OR "emotional abuse" OR "psychological abuse"OR maltreatment OR bully OR neglect OR adversity OR "parental loss") AND TITLE-ABS-KEY (mediat* OR"path analysis" OR "network analysis" OR "structural equation" OR "psychological mediators"
PsycInfo	1. bipolar disorder.mp. or exp Bipolar Disorder/ 2. mania.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 3. hypomania.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 4. bipolar spectrum disorder.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 5. bipolar affective disorder.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 6. childhood adversity.mp. or exp Childhood Adversity/

	7. early childhood trauma.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 8. child adversity.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 9. ACES.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 10. adverse childhood experiences.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 11. sexual abuse.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 12. physical abuse.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 13. emotional abuse.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 14. psychological abuse.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 15. maltreatment.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 16. bully.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 17. neglect.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 18. adversity.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 19. parental loss.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 20. mediat*.mp. 21. path analysis.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 22. network analysis.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 23. structural equation.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 24. psychological mediators.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] 25. 1 or 2 or 3 or 4 or 5 26. 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 27. 20 or 21 or 22 or 23 or 24 28. 25 and 26 and 27

Note: Boolean operators were used to account for different terms for the same construct, “OR”, with “AND” allowing combination of constructs required to identify research relevant to the review question. Truncation of certain terms allowed expansion to include variation in endings of words.

Appendix C – Joanna Briggs Institute (JBI) checklist for analytical cross-sectional studies

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	☐	☐	☐	☐
2. Were the study subjects and the setting described in detail?	☐	☐	☐	☐
3. Was the exposure measured in a valid and reliable way?	☐	☐	☐	☐
4. Were objective, standard criteria used for measurement of the condition?	☐	☐	☐	☐
5. Were confounding factors identified?	☐	☐	☐	☐
6. Were strategies to deal with confounding factors stated?	☐	☐	☐	☐
7. Were the outcomes measured in a valid and reliable way?	☐	☐	☐	☐
8. Was appropriate statistical analysis used?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

_____

_____

_____

_____

Section Two: Empirical study

The role of trauma and sleep in bipolar at-risk states

Abstract

Objectives

This study, for the first time, aimed to compare rates of lifetime post-traumatic stress disorder (PTSD) between people meeting bipolar at-risk (BAR) criteria and a non-clinical group, alongside prevalence of sleep disturbance. It aimed to examine the impact of comorbid PTSD on mood states, including symptoms of mania and depression across groups.

Design

A between-groups design was employed. Data from a previous study comprised the clinical group, with 64 non-clinical participants recruited to the control group.

Methods

Control participants were recruited through social media and local university participant recruitment systems. The BAR sample were recruited through mental health services and assessed for meeting BAR criteria. A structured clinical interview was conducted by researchers to confirm eligibility and to attain clinical information around trauma. Participants, facilitated by researchers, completed questionnaires measuring sleep difficulties and mood states. Analyses included chi-squared tests and analyses of covariance, controlling for socioeconomic status.

Results

Frequency of trauma experiences and prevalence of comorbid PTSD rates were higher in the BAR group. The clinical group had poorer sleep, on average, compared to the control group, although there were no significant differences depending on the presence of PTSD or not. Meeting BAR criteria led to significantly higher depressive symptoms, and elevated levels of mania, though this was not at a significant level. Comorbid PTSD did not impact upon this.

Conclusions

The findings contribute new evidence about bipolar at-risk presentations and indicate the importance of trauma exposure, PTSD and sleep disturbance in this group. Clinical implications and directions for future research are proposed.

Practitioner Points

- Thorough assessments and routine screening for trauma exposure, post-traumatic symptoms, and sleep disturbance, are indicated for those meeting at-risk criteria.
- Enhancing clinician's awareness and understanding of at-risk states and how individuals may present clinically is important to ensure identification and early intervention. Utilising specific assessments tools for at-risk states could be helpful for clinicians.
- Studies investigating appropriate therapeutic interventions, with trauma-informed adaptations will be important to inform clinical practice.

Key words

Bipolar at risk, sleep disturbance, trauma, post-traumatic stress disorder

Introduction

Bipolar disorder (BD) is characterised by episodes of depressive and manic symptoms, that are persistent in nature and cause significant distress to the individual. BD encompasses four distinct categories of mood episodes; depressive episodes, manic episodes, hypomanic episodes and mixed features. Depressive episodes consist of at least two weeks of low mood alongside a loss of interest, or pleasure, in activities with other symptoms including hopelessness and fatigue, with manic episodes characterised by distinct periods of elevated mood that is persistent, expansive or irritable, alongside increased activity/ energy for at least a week (American Psychiatric Association [APA], 2013). Hypomania typically refers to subthreshold symptoms similar to those seen in episodes of mania though without profound impairment and shorter in duration (at least four days). Mixed features involve the presence of manic and depressive symptoms for a period of at least one week (Müller-Oerlinghausen et al., 2002). Diagnostic systems differentiate between bipolar I and bipolar II (APA, 2013); bipolar I has been defined as the presence of a manic episode alongside depressive episodes, with bipolar II characterised by the presence of depressive episodes and experiences of hypomania.

BD affects approximately 1% of the global population and is one of the leading causes of disability amongst younger people (Grande et al., 2016). Negative outcomes relate to reduced life expectancy and increased risk of suicide (McIntyre et al., 2020). It is typically recurrent and chronic in nature, often leading to considerable economic costs (Grande et al., 2016). Individuals under the age of 34 have highest prevalence rates of BD (Baker & Kirk- Wade, 2024), and onset typically occurs between late adolescence and early adulthood (Joslyn et al., 2016; Joyce, 1984).

There is often a lengthy duration of untreated illness (DUI) for individuals who receive a BD diagnosis. Whilst the peak age of onset is between 15 and 25, a formal diagnosis and evidence-based interventions are typically accessible between the ages of 25 and 35 (Scott et al., 2022). A systematic review examined DUI and delay between symptoms, help-seeking and diagnosis of BD (Scott et al., 2022) concluding that the median delay between onset of symptoms and formal help- seeking was 3.5 years, 6.7 years between onset of symptoms and a formal diagnosis, and 5.9 years between the age of diagnosis and the initiation of recommended treatment. Lengthy DUI is associated with a negative course of BD, increased risk of suicide attempts and more mood episodes (Buoli et al., 2021). These delays represent a critical period during which individuals experience significant distress without receiving appropriate intervention, highlighting the importance of improved early identification and timely access to evidence-based treatments to prevent deterioration and to optimise longer term clinical outcomes.

Consideration around timely intervention for mental health difficulties has led to early intervention being prioritised in National Health Service (NHS) policies over recent years (Department of Health and Social Care, 1999; NHS Five Year Forward View, 2014; NHS Long Term Plan, 2019). Early detection paradigms have been applied in Early Intervention for Psychosis (EIP) services, which provide support to people experiencing first episode psychosis, with outcome data showing significant improvements in clinical outcomes and demonstrating cost effectiveness (McCrone et al., 2010; Nordentoft et al., 2002). Identifying an ‘Ultra High Risk’ (UHR) group (Yung et al., 1998), which includes the presence of state, trait and familial

characteristics (Yung et al., 2010) has created the opportunity for evidence-based support, early detection and monitoring for those at risk of developing psychosis. The risk of transition from UHR to a first episode of psychosis has been found to be about 25% over a 2-3 year period (Salazar de Pablo et al., 2021) and has shown to be predicted by the UHR criteria, leading to the development of interventions to significantly reduce transition to a full episode of psychosis (Stafford et al., 2013). This success of EIP services has led to the proposal to extend early detection and intervention paradigms to other disorders, including those at risk of developing BD (McGorry et al., 2013).

Underpinned by research on the early detection of BD, including age of onset and familial risk, Bechdolf et al. (2012) used a 'risk clustering' approach and proposed a set of bipolar at-risk (BAR) criteria. These criteria identify individuals aged 15-25 and encompasses three groups:

1) individuals experiencing subthreshold symptoms of mania;
2) individuals with depression plus cyclothymic features;
3) individuals with a first degree relative with BD alongside depressive symptoms.

The predictive validity of the criteria has been demonstrated, with findings supporting the possibility of identification prior to the onset of mania/ hypomania. Bechdolf et al. (2014) found that 14.3% of individuals who met the BAR criteria transitioned to a diagnosis of BD within 12 months. However, these findings were based on a relatively small sample of 35 BAR participants, and the authors

acknowledged the need for larger-scale research to establish the criteria's predictive validity and to allow for more robust conclusions. More recently, a prospective study of 69 BAR individuals found that 11% developed BD over one year and 28% over the following decade (Ratheesh et al., 2023). In contrast, a matched comparison group who did not meet the BAR criteria had 0% transition to BD; interestingly, however, both groups had high prevalence rates of comorbidity for a borderline personality disorder diagnosis. These findings provide stronger evidence for the predictive validity of Bechdolf's BAR criteria while highlighting greater questions around diagnostic complexity and the potential for comorbidities in at-risk populations.

Despite a growing evidence base around BAR presentations, difficulties remain for individuals accessing appropriate treatments. For example, individuals may be misdiagnosed by professionals and started with ineffective treatments. This can result in the exacerbation of distressing symptoms, for example when antidepressants induce manic symptoms (Salvi et al., 2008). Establishing the BAR criteria has allowed for the consideration of effective treatment options, though at present, research is largely underpowered, limiting the conclusions that can be drawn. The Bipolar At-Risk (BART) Trial (https://www.isrctn.com/ISRCTN13363197) was a feasibility randomised controlled trial (RCT) of a cognitive-behavioural (CBT) intervention versus treatment as usual in a BAR sample (Jones et al., 2021) conducted in Greater Manchester between 2015 and 2018. Applying Bechdolf et al's (2012) criteria, the study contributed to early literature around targeted therapeutic interventions appropriate for people at risk of developing BD, demonstrating acceptability and feasibility of an adapted CBT therapy; subsequent funding was

secured for a larger-scale, multi-site RCT which is currently ongoing to assess the efficacy of the intervention.

Whilst research has sought to provide an evidence-base for the BAR criteria and has started to explore therapeutic approaches, less studies have explored factors that may confer vulnerability to meeting these criteria. Drawing on the evidence base for BD, numerous potential risk factors have been identified including biological, psychological and social influences (Steardo et al., 2020).

Trauma and BD

There is an established relationship between the role of trauma in the development of mental health difficulties including depression, personality disorders, and psychosis (Mandelli et al., 2015; Porter et al., 2020; Varese et al., 2012) with this relationship apparent across a wide range of psychiatric disorders (Hogg et al., 2023). Post-traumatic stress disorder (PTSD) comorbidities for individuals with a diagnosis of BD are estimated between 16% and 29% (Aas et al., 2016), with experiences of trauma reported for approximately 50% of individuals with BD (Garno et al., 2005). A meta-analysis found that individuals with BD, compared to healthy controls, were 2.63 times more likely to have experienced childhood trauma (Palmier-Claus et al., 2016), with prevalence of cumulative traumas estimated between 29% and 82% in individuals with BD (Rowe et al., 2023). Childhood trauma has been found to influence clinical outcomes relating to BD, such as age of onset, rapid cycling presentations, longer episode duration, comorbidities with other psychiatric diagnoses, and suicidal ideation and attempts (Aas et al., 2016; Etain et al., 2013; Rowe et al., 2023).

Alongside trauma exposure, comorbid PTSD has been found to impact on the clinical expression of BD (Quarantini et al., 2010) including elevated levels of depression (Frost et al., 2020), risk of suicide, induced mood states impacted by post-traumatic symptoms, such as flashbacks (Otto et al., 2004), and overall reduced quality of life (Russell et al., 2023).

It can be expected that early trauma will also be prevalent in those at risk for BD given the clear trauma-bipolar associations, though research specifically exploring trauma exposure in BAR populations has so far not been conducted, highlighting a need to better understanding the underlying mechanisms for the development of BD.

Sleep difficulties and BD

Research has also explored the role of sleep in BD, showing that sleep disturbances can occur both prior to mood episodes and during acute episodes (Gold & Sylvia, 2016). Disturbance type can vary, with manic symptoms leading to a reduced need for sleep and depressive episodes leading to hypersomnia in some and insomnia in others (Kaplan et al., 2015; Robillard et al., 2013). Individuals considered at-risk for BD have reported sleep/ wake time irregularity, poor sleep quality and circadian rhythm disruption (Melo et al., 2016). Hence, some researchers have proposed that sleep disturbance plays a causal role in bipolar symptoms (Alloy et al. 2015; Wehr et al., 1987) but this theory has been undermined by the failure of sleep-based interventions to produce a therapeutic effect (Frank et al., 2005; Inder et al., 2015).

This clinical picture can be complicated for those with comorbid PTSD, however, given the cross-over of symptomology between BD and PTSD, with sleep difficulties identified as a clinically important overlapping difficulty (Cogan et al., 2021).

A meta-analysis found that sleep disturbance mediated the relationship between adverse childhood experiences and psychopathology in children and adolescents (Liu et al., 2023) though there has been little research on the interaction between trauma and sleep in individuals with BD, and none on those meeting the BAR criteria. However, research has highlighted the need to explore how trauma may interact with other known risk factors in the development of BD (Hett et al., 2022). Hence, and considering the limited, yet emerging literature on BAR populations, there is a need to evidence the prevalence of sleep disturbances that may increase vulnerability to meeting BAR criteria and, potentially, later transition to illness.

Aims

There are currently no guidelines for services for the identification and intervention for those considered at risk of developing BD. At-risk presentations are often poorly recognised by mental health professionals potentially leading to misdiagnoses and, importantly, inappropriate or ineffective treatment approaches. Little is known about factors that may confer vulnerability to BD. Hence, this study explores the prevalence of trauma and sleep difficulties in the BAR population by comparing those in the BART trial with a healthy control group. This study forms part

of a joint project with another trainee clinical psychologist whose work focuses on cognitive vulnerability and BAR criteria (further information in Appendix A).

Hypotheses

The primary hypothesis was that the BAR clinical group would report higher levels of trauma symptoms than the non-clinical control group and would be more likely to meet the PTSD diagnostic criteria. It was also hypothesised that the BAR group, compared to the control group, would have higher levels of sleep disturbance. As a secondary hypothesis, it was predicted that presence of trauma would be associated with more symptoms of mania and depression in the BAR participants.

Methods

Design

A quantitative, cross-sectional design was used to address the research aims. Data from the BART trial which took place in Greater Manchester Mental Health (GMMH) NHS Foundation Trust were utilised to make up the clinical BAR sample which was compared with a non-clinical control group, recruited for the purpose of the current study, allowing for between-subjects analysis to explore differences between the two groups. The researchers thank the BART team and, in particular, Professor Sophie Parker at the University of Manchester and GMMH for making these data available to us. The present study was pre-registered using Open Science Framework (https://osf.io/6hx8c/).

Participants

Two groups comprised the overall sample of 140: a BAR clinical group and a non-clinical comparison group.

The BAR group was made up of 76 individuals who met the following criteria: aged 16-25 years old, were help-seeking, competent and willing to provide informed consent and met the BAR criteria:

Group 1: Sub-threshold mania (Young Mania Rating Scale total score between 5 and 15 and elevated mood ≥ 2 and irritability ≥ 2 for at least 4 days),

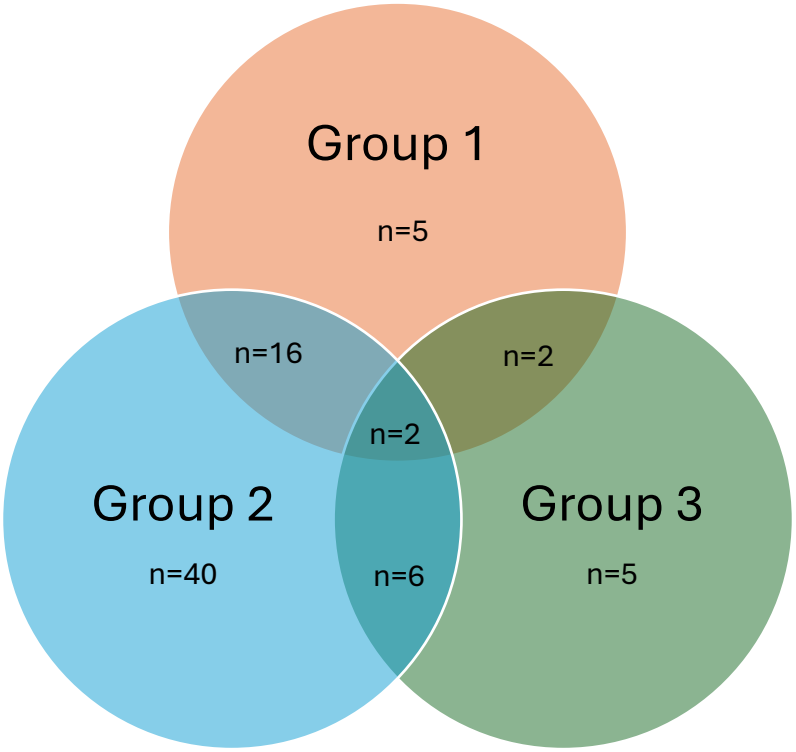
Group 2: Depression and Cyclothymia: mild depressive symptoms (BDI-II >20 for at least 1 week) and diagnosis of cyclothymic disorder or bipolar disorder NOS as assessed by SCID-I/K-SADS,

Group 3: Depression and genetic risk: mild depressive symptoms (BDI-II >20 for at least 1 week) and genetic risk (first degree relative with bipolar disorder).

A summary of the number of participants who met each group criterion is displayed in Figure 1. The majority (*n* = 40) met the criteria for group two and had subsyndromal symptoms of bipolar.

Figure 1

Breakdown of BAR participants meeting group criterion



Individuals were excluded from the BART trial if they had a past history of a treated or untreated manic episode or psychosis of one week duration or longer, past treatment with a mood stabiliser for longer than six weeks or antipsychotic for three weeks, moderate to severe learning disability, organic brain disorder, were non-English speaking, required inpatient or acute psychiatric care, or had primary substance dependency. The BART trial received approval from an NHS ethics committee (15/NW/0336) and all participants provided consent for the use of their data to be used in other research studies.

The control group met the following criteria: between the ages of 16-25, willing and able to provide informed consent, able to access an electronic device/ the internet enabling them to complete the assessment through a video conferencing platform. Individuals were excluded if they were above the age of 25, met the criteria for psychotic or mood disorders (International Classification of Diseases Eleventh Revision (ICD-11: World Health Organization, 2022), met the criteria for BAR as posed by Bechdolf et al. (2012), had history of receiving treatment for psychotic/ mood disorders, or were not fluent in English.

Recruitment

An opportunity sample was recruited as the control group. Various means were used to reach potential participants, including advertisement sharing (Appendix B) on social media platforms, university distribution lists, and the University of Sheffield's recruitment system, SONA, which allowed psychology students to volunteer to participate in research studies in exchange for payment and/ or credits. All participants were recruited between August 2024 and March 2025.

Although the study initially aimed to match the clinical and control groups on the key demographics of age, sex and highest level of education reached, this was ultimately not feasible due to time constraints and difficulties in recruiting participants in particular demographics, particularly those with low educational attainment. Accordingly, covariates were introduced into the analyses to adjust for the resulting discrepancies between the groups, as detailed in the results section.

Measures

The questionnaire battery for the present study was made up of demographic questions, the Internal States Scale (ISS; Bauer et al., 1991), Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989), alongside the SCID-IV interview. Additional measures utilised in the wider project included the Meta-Cognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004), the Desire Thinking Questionnaire (DTQ; Caselli & Spada, 2011) and the Hypomanic Attitudes and Positive Predictions Inventory (HAPPI; Mansell, 2006), though these were not considered for the purposes of this paper.

Demographic information

Demographic data was obtained (Appendix C) including participant's age, sex, ethnicity, highest level of education reached, and employment status. Participants were also asked to report their current postcode and their postcode at age 17 to retrieve Indices of Multiple Deprivation (Ministry of Housing, Communities & Local Government, 2019) and understand socioeconomic characteristics of the sample.

Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (anxiety, affective and psychotic disorders modules, SCID-IV; First et al., 2007)

The SCID (Appendix D) is a structured clinical interview and was administered to confirm eligibility for the project. The affective disorders and psychotic disorders modules were used to ensure participants met the inclusion criteria, allowing for a comparison between clinical and non-clinical samples. Whilst a more recent version

of the interview has been published, the research used the older DSM-IV version (First et al., 2007) to maintain consistency with the original BART data.

The SCID anxiety module (PTSD questions) was administered to obtain information around trauma, corresponding to the 17 DSM-IV symptoms of PTSD. This allowed for the screening of traumatic experiences, including type of trauma and the age when it occurred, in addition to the presence of traumatic symptoms (reexperiencing, avoidance, increased arousal), coded as present, subthreshold, or absent. This module is widely used by clinicians to screen for PTSD (Elhai et al., 2005), and in research (Elhai et al., 2008), and is considered the 'gold standard' when compared to other trauma clinical interviews (Weiss, 2004). Training in administering the SCID was provided by BART's Trial Manager to assure consistency amongst researchers. For interrater reliability assurances, the first six interviews were completed jointly by both researchers and scored independently, before being discussed. Any discrepancies or questions that arose in future interviews were discussed by the researchers and supervisor.

Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989)

Sleep disturbance was assessed using the PSQI (Appendix E). The PSQI is a 19-item self-report measure assessing sleep quality to distinguish 'poor' from 'good' sleep and comprises seven domains. The seven areas measured are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction over the previous month. Scoring utilises a 0 to 3 scale, from "not during the past month" to "three or more times a week" for each item. Scores are summed to provide a global score,

with a score of 5 or more indicating a ‘poor’ sleeper. The PSQI has demonstrated good internal consistency, with a Cronbach’s α of 0.83.

Internal State Scale (ISS; Bauer et al., 1991)

The ISS (Appendix F) is a 16-item self-report measure which assesses the severity of symptoms of mania and depression over the previous 24 hours. It has four empirically derived subscales: activation, wellbeing, perceived conflict, and depression which discriminate mood states in individuals with a BD diagnosis and allow tracking of symptoms (Bauer et al., 1991; Cooke et al., 1996). Responses are recorded using a 0 to 100 rating from “not at all, rarely” to “very much so, much of the time”, on a 10-point scale. All ISS subscales have demonstrated good internal consistency; activation α = 0.92, wellbeing α = 0.84, perceived conflict α = 0.87 and depression index α = 0.81. The Activation and Depression Index subscales correlate well with clinician-administered measures of mania and depression, and other well-validated measures (Bauer et al., 2000), and the Activation and Wellbeing subscales perform well when discriminating between different mood states (depressed mood, mixed, euthymic, manic/ hypomanic).

Procedure

Interested potential participants were provided with a Participant Information Sheet (Appendix G) explaining the study aims, and what would be involved. Those who wished to participate had the opportunity to discuss the study with the researchers and had at least 24 hours to consider the information. In initial conversations, researchers confirmed that individuals who wished to participate had access to a computer or device to allow the facilitation of a video call, whereby

assessments were conducted. Assessments were conducted online using the video conferencing platform, Google Meet.

After agreeing to take part, potential participants received a link to an online consent form (Appendix H) which was to be completed before progressing further. Potential participants were screened and assessed for eligibility using the SCID affective disorders and psychotic disorders modules; for individuals who did not meet the inclusion criteria and thus were not eligible, this was sensitively relayed with signposting to relevant services, and details were taken to ensure they could still receive a reimbursement voucher. For any participants where eligibility was unclear, discussions were held between researchers and supervisor to confirm.

Once screened in, the SCID anxiety module (questions pertaining to PTSD) was administered. Remaining measures included the PSQI, ISS, HAPPI, MCQ-30 and DTQ, which were administered using Qualtrics software. Following the completion of measures, participants had the opportunity for a verbal debrief, and a Debrief Sheet (Appendix I) was emailed over, including signposting to relevant support services if required. All participants were reimbursed with a £10 Amazon voucher as an appreciation for their time.

Ethical considerations

Ethical approval for the recruitment of the control group was received through the University of Sheffield Ethics Committee (Appendix J). Given the topic of the research looking at traumatic experiences, there was the potential for participants to experience psychological distress. This was closely monitored throughout the

assessments and participants were made aware that they could pause, rearrange or stop the assessment if this was needed, whilst also being assured that participation was voluntary. Participants were verbally debriefed following the assessment and safety was ensured prior to the ending of the call. Signposting to appropriate services was offered verbally and via the debrief sheet provided at the end of their participation. As already noted, the BAR group had provided consent for their data to be used in further relevant research at the time of their participation in the BART Trial.

Patient and Public Involvement (PPI)

Consultation was undertaken with GMMH's bipolar service user reference group in July 2024. A short presentation was given summarising the overall research project. Given the time that this meeting occurred, which was after ethical approval of the proposed study procedures and materials, the meeting focused on practicalities around the assessment processes. Points of discussion particularly pertained to study inclusion/ exclusion and sensitivity of conversations around 'at risk mental states'; helpful proposals were offered including prefacing assessments with potential outcomes (e.g. if somebody did meet the exclusion criteria, sensitively signposting), ensuring relevant services were considered in signposting, and allowing future contact with researchers if this would be felt beneficial. One group member could not attend the virtual meeting and provided written feedback. All group members were provided with a £25 gift voucher payment as a token of appreciation.

Data analysis

Data was analysed using IBM Statistical Package for Social Sciences (SPSS Version 29). Descriptive statistics were used to explore the characteristics of the non-clinical sample and select potential covariates in later analyses. BAR participants were divided into those who did and did not meet PTSD criteria for some analyses.

Chi-squared tests and two-way analyses of covariance (ANCOVAs) (group x education) were conducted to analyse group differences in trauma, sleep quality and responses on the ISS.

Relevant assumptions were tested for and deemed satisfactory: normality of residuals was met, homogeneity of variance was satisfied for two of three outcomes (one had a significant Levene's test, however ANCOVA can be considered robust to moderate violations), homogeneity of regression slopes was confirmed for each outcome, linearity was established, and no outliers were identified. Independence of observations was met through the study design.

Statistical power

G*Power was used to calculate the sample size required for our primary hypotheses, assuming a power of 0.8 and alpha of 0.05. For expected PTSD rates, we took the mean of two papers which, together, found that 31% of individuals with BD met the criteria for PTSD (Dilsaver et al., 2007; Goldberg & Garno, 2005). National Institute for Health and Care Excellence (2022) reported a national prevalence of PTSD of 4.4%; this is an effect size of 0.78 (calculated by the equation provided in Cohen, 1988) and the numbers needed to detect this difference would be

48. If the rate of PTSD in the BAR sample was only half that of patients with BD, and that the corresponding proportions of 15% and 4%, the effect size would fall to 0.392. A sample size of 152 would have a power of 0.75, which would be slightly underpowered.

For the remaining comparisons sample sizes for an ANCOVA with 2 covariates were calculated. PSQI data from Pearson et al. (2022) found a mean of 5.4 (*SD* = 3.5) in a non-clinical sample, and a mean of 6.71 (*SD* = 2.83) in a clinical sample with depressive disorder. For an observed effect size of 0.41, 75 participants would be required per group for a power of .8 and an alpha of .05.

Using data for the ISS activation subscale, the clinical BAR sample in Dodd et al's (2013) research had a mean of 196.64 with a standard deviation of 92.19, with the non-clinical sample (Dodd et al., 2010) having a mean of 138.55 and a standard deviation of 84.86. 30 participants would be required in each group to detect an observed effect size of 0.65.

For the ISS depression subscale, data from Dodd et al (2010) was utilised for the non-clinical sample with a mean of 48.54 and a standard deviation of 50.83, and a clinical BAR sample with a mean of 65.96 and a standard deviation of 30.42 (Dodd et al., 2013). For an observed effect size of 0.42, 72 participants would be required per group.

Results

Sixty-four control participants were recruited for the present study, which was slightly below target, leading to the overall sample of 140 including the BAR group of *n* = 76. Table 1 illustrates a summary of demographic information for the two groups. An additional five individuals commenced the assessment, though were ultimately excluded due to ineligibility (meeting BAR criteria/ extended period of low mood), and to concerns around integrity of data. Missing data will be indicated throughout the results section where relevant; this was largely due to the introduction of the ISS and PSQI following an ethics amendment after the initial commencement of recruitment and because, in a small number of individual data cases, information had been recorded by the trial team in an ambiguous way.

Demographics

Demographic information and relevant statistical tests are summarised in Table 1. The total sample consisted predominantly of females (77.1%, *n* = 108), but there were no significant differences between the two groups for gender. Ages in the control group ranged 16 to 25 years old and, in the BAR group, between 16 and 26 years old. The sample was comprised of predominantly White British individuals (80%). The level of education reached by the participants (dichotomized into experience of vs no experience of higher education) did significantly differ between groups, accounted for by more of the control group reporting higher education compared to the BAR group. There was also a significant difference between the two groups in employment status with more of the control group currently in education (85.9%), and more of the BAR group in employment (27.6%). There were also higher rates of individuals being out of work in the BAR group. Finally, Index of Multiple Deprivation (IMD) scores were compared between groups, using decile scores

retrieved from the Office of National Statistics (Ministry of Housing, Communities & Local Government, 2019), with Decile 1 representing the 10% most deprived areas in the United Kingdom and 10 represents the 10% least deprived areas; there were two cases of missing data in the control group because the address data was not logged with Office for National Statistics. The difference of IMD score between groups was highly significant. See Appendix K for demographic SPSS output.

Table 1

Summary of demographic information per group and overall and tests of group differences

Demographic Variables	Control Group (*n* = 64)	BAR Group (*n* = 76)	Overall (*n* = 140)	Group differences
	n (%)	*n* (%)	*n* (%)	
Gender				
Male	11 (17.2)	21 (27.6)	32 (22.9)	X^2 (1) = 2.15, *p* = .143
Female	53 (82.8)	55 (72.4)	108 (77.1)	
Age				
Mean	19.73	20.53	20.16	*t* (138) = -1.79, *p* = .08, 2 tailed (equal variances not assumed)
(SD)	2.405	2.840	2.670	
Education				
School/ college	5 (7.8)	67 (88.2)	72 (51.4)	X^2 (1) = 89.79, *p* < .001
University	59 (92.2)	9 (11.8)	68 (48.6)	
Ethnicity				
White British	45 (70.3)	67 (88.2)	112 (80)	X^2 (9) = 19.91, *p* = .019
White other/ Non white	19 (29.7)	9 (11.8)	28 (20)	
Employment				
Employed	9 (14.1)	21 (27.6)	30 (21.4)	X^2 (3) = 77.68, *p* < .001
In education	55 (85.9)	11 (14.5)	66 (47.1)	
Voluntary/ carer	0 (0)	2 (2.6)	2 (1.4)	
Out of work	0 (0)	42 (55.3)	42 (30)	

IMD Decile			
Decile rank mean	7.65	3.80	$U = 785.5$, $p < .001$
SD	2.83	2.46	

Note: SD = standard deviation.

PTSD

It was hypothesised that the BAR group would report a greater prevalence of post-traumatic symptoms meeting the diagnostic criteria for PTSD, compared to the control group. Fourteen patients from the BAR group and two from the control group were not screened for PTSD, leaving 62 in each of the groups. Twenty-one of those in the BAR group met the criteria for lifetime PTSD (one remitted), whereas none of the controls met the criteria. This difference was highly significant, X^2 [1] = 25.28, p <.001. Table 2 presents a summary of this data. Although full diagnostic criteria were not met for any cases in the control group, seven participants met the criteria for re-experiencing symptoms, two for avoidance and one for hyperarousal. A symptom-level breakdown was not available for the BAR group. Out of the 42 BAR individuals who did not meet PTSD criteria, 19 of those had still reported at least one traumatic experience. Overall, 40 of the 62 BAR individuals (64.52%) who completed the trauma assessment reported having experienced adverse events.

Table 2

Summary of PTSD diagnostic data between groups, overall, and group differences

Clinical Variable	Control Group	BAR Group	Overall	Group differences
	n (%)	*n* (%)	*n* (%)	
PTSD	*n* = 62	*n* = 62	*n* = 124	
Met diagnostic criteria	0 (0)	21 (33.9)	21 (16.9)	Fisher's exact test, $p < .001$ (X^2 (1) = 25.28, $p < .001$)
Did not meet criteria	62 (100)	41 (66.1)	103 (83.1)	

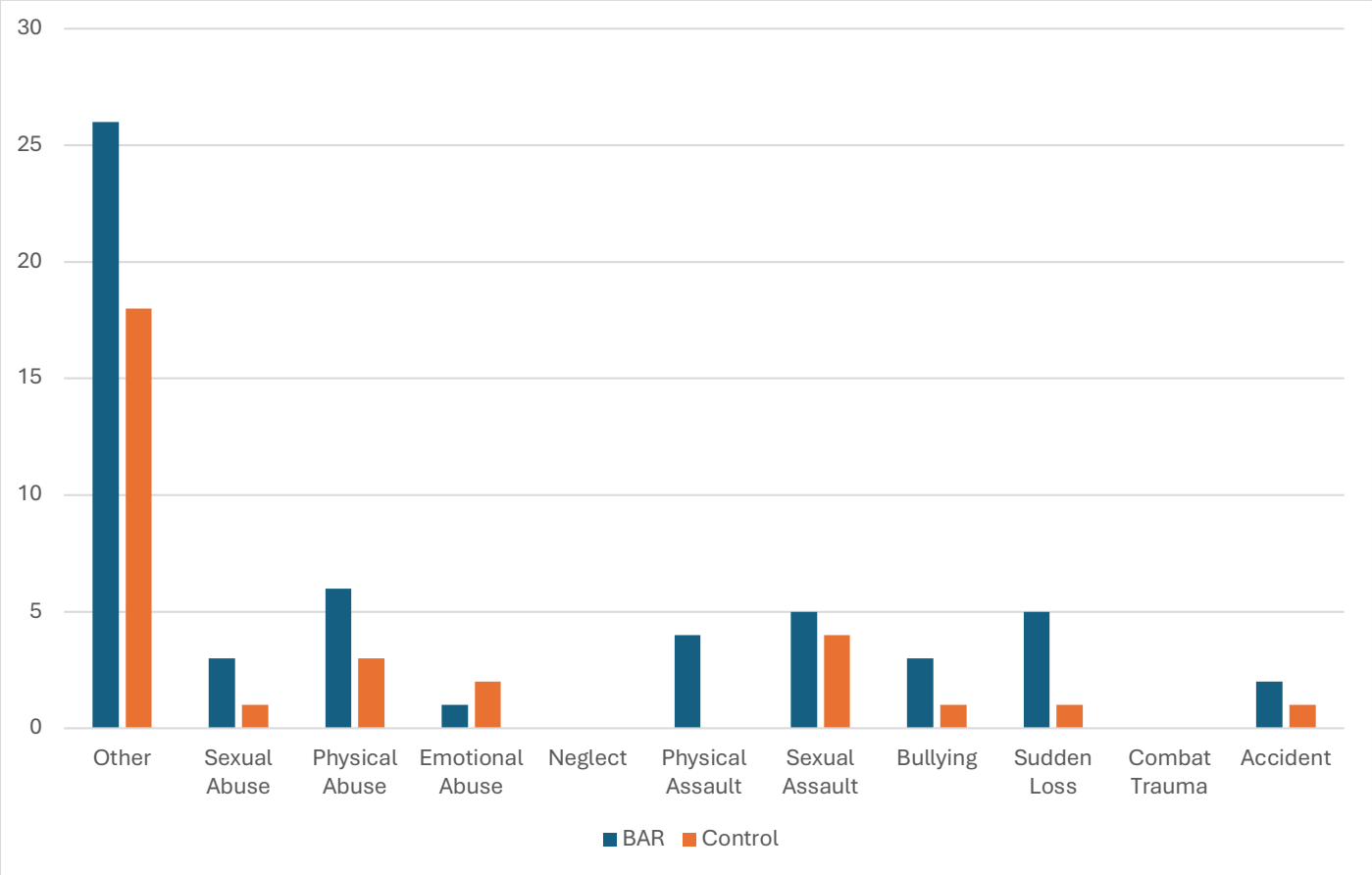
Information was obtained regarding the types of traumas experienced categorised in line with the original BART subtypes, displayed in Figure 2. On average, the control group had experienced < 1 traumas (mean = .49, *SD* = .78) compared to the BAR group who had a mean of 1.25 traumatic experiences, *SD* = 1.10.

In the BAR group, the 'other' category was most prevalent (*n* = 26), followed by physical abuse (*n* = 6), sexual assault (*n* = 5) and sudden loss (*n* = 5), physical assault (*n* = 4), sexual abuse (*n* = 3) and bullying (*n* = 3), accidents (*n* = 2) and emotional abuse (*n* = 1). Example reported traumas categorised as 'other' included attempted suicides, witnessing/ hearing about other's significant traumas, and negative experiences with police or social services.

The control group similarly had the greatest prevalence in the 'other' category (*n* = 18), followed by sexual assault (*n* = 4), physical abuse (*n* = 3), emotional abuse (*n* = 2), and sexual abuse (*n* = 1), bullying (*n* = 1), sudden loss (*n* = 1) and an accident (*n* = 1). Example other traumas in this group included others being unwell/ passing away, personal illness and witnessing others in traumatic situations.

Figure 2

Frequencies of trauma categorisation in the two groups



Further analyses were conducted taking the PTSD diagnostic information into account, creating three groups: control, BAR-PTSD+, BAR-PTSD-, though regrettably missing data reduced the sample size in some analyses.

Clinical variables

Table 3 includes relevant information for participants scores on both the PSQI and ISS.

Sleep disturbance

Available data for the PSQI in the BAR sample was limited, with 21 cases missing this measure entirely. Due to further missing data for items, which led to an inability to calculate a global score, available BAR data for the PSQI was $n = 48$, of which 21 were BAR-PTSD+. It was hypothesised that there would be higher levels of sleep disturbance in the BAR group compared to controls.

A chi-squared test was conducted on the two groups (control or BAR) according to whether they were categorised as a poor or good sleeper, using the prescribed 'cut off' of > 5 indicating 'poor' sleep., There was a significant difference between the groups, X^2 (1) = 19.44, $p < .001$, as the BAR group had more poor sleepers (95.8%) compared to the control group (59.4%).

Further analyses utilised three groups: control, BAR-PTSD+, BAR-PTSD-. Because the groups differed in educational achievement and current IMD (with the control participants being more educated and living in better circumstances), a two-way analysis of covariance (ANCOVA) was conducted on the PSQI total scores, with groups (BAR-PTSD+, BAR-PTSD-, control) and education (higher versus not) as between-subjects variables, and IMD as a covariate. There was a significant difference between the groups, $F[2, 96] = 9.98$, $p < .001$, partial eta^2 = .172. Post-hoc

Bonferroni adjusted pairwise comparisons revealed that both clinical groups scored higher than the controls, $p < .001$ for each comparison, but there were no significant differences between the clinical groups, $p = 1$. There was no significant effect for education, $F[1, 96] = .26$, $p = .261$, which suggests that education level did not influence sleep quality, nor was there a significant interaction, $F[2, 96] = .73$, $p = .725$. Mean global scores were significantly higher in both BAR groups (with PTSD, mean = 11.58, *SD* = 3.12; without PTSD, mean = 9.45, *SD* = 3.25) compared to the control group (mean = 5.60, *SD* = 2.65).

Table 3

Summary of sleep disturbance, mood states data and tests of group differences

Clinical Variables	Control Group	BAR-PTSD+	BAR-PTSD-	Overall	Group differences
Sleep disturbance					
Mean	5.60	11.58	9.45	7.38	$F[2, 96] = 9.98$, $p < .001$,
SD	2.65	3.12	3.25	3.66	partial $eta^2 = .172$
Mood states	*n* (%)	*n* (%)	*n* (%)	*n* (%)	
(Hypo)mania	6 (9.4)	3 (25)	12 (37.5)	21 (19.4)	X^2 (6) = 59.40, $p < .001$
Mixed State	0 (0)	5 (41.7)	7 (21.9)	12 (11.1)	
Euthymic	54 (84.4)	3 (52)	4 (12.5)	61 (56.5)	
Depression	4 (6.3)	1 (8.3)	9 (28.1)	14 (12)	

Note: SD = standard deviation.

Mood states

The ISS was used to assess mood states in participants. There were 22 cases missing in the BAR group. Furthermore, given the missing PTSD diagnostic information for some cases, n = 44 was the sample size for the combined BAR groups in the analyses, of which 21 were BAR-PTSD+. It was hypothesised that experiences of trauma would impact upon symptoms of mania and depression.

A chi-squared test was used to assess categorical mood states of (hypo)mania, mixed state, depression, and euthymic between the three groups based on their activation and wellbeing subscale scores, which demonstrated significant differences, X^2 (6) = 59.40, p < .001. The control group had the greatest proportion of euthymic states (84.4%) whereas the BAR-PTSD+ had a highest percentage of mixed states (41.7%) and those without PTSD had greatest proportion of (hypo)manic states (37.5%). Given the small numbers in this analysis, this conclusion should be treated with extreme caution.

A two-way ANCOVA was conducted on the ISS activation subscale with groups (BAR-PTSD+, BAR-PTSD-, control) and education (higher versus not) as between-subjects variables, and IMD decile as a covariate. There was no significant difference between the groups, F[2, 99] = 2.90, p = .060, partial eta^2 = .055. There was no significant effect for education, F[1, 99] = 3.45, p = .066, which suggests that education level did not affect activation, nor was there a significant interaction, F[2, 99] = .42, p = .661.

Another two-way ANCOVA was conducted on the ISS depression index score. There was a significant difference between the groups, $F[2, 99] = 27.52$, $p < .001$, partial $eta^2 = .357$. Post-hoc Bonferroni adjusted pairwise comparisons revealed that both clinical groups scored higher than the control group, $p < .001$ for each comparison, but there were no significant differences between the two BAR groups, $p = .114$. There was a significant effect for education, $F[1, 99] = 12.75$, $p < .001$, which suggests that education level was associated with depression. The interaction was also significant, $F[2, 99] = 3.58$, $p = .031$. As shown in Table 3, both BAR groups had higher depression scores than the control group. Whist overall means suggested that participants with experience of higher education experienced less depression (mean = 21.40, *SD* = 43.42) compared to those without higher education (mean = 63.93, *SD* = 59.43), the marginally significant interaction effect suggested that the difference in depression scores between those with and without higher education was greater in the BAR-PTSD+ group (with, mean = 200.00, *SD* = NA, versus without, mean = 89.09, *SD* = 63.51, respectively) and in the BAR-PTSD- group (with, mean = 126.75, *SD* = 69.08 versus without, mean = 64.75, *SD* = 56.63) compared to the control group (with, mean = 10.88, *SD* = 17.96 versus without, mean = 4.00, *SD* = 8.94). Full output from SPSS can be found in Appendix L.

Discussion

The present study utilised a between-subjects design to understand factors that may confer vulnerability to a BAR presentation. It sought to examine traumatic experiences and post-traumatic symptoms, sleep disturbance and mood states in individuals meeting BAR criteria compared to a control, non-clinical group.

In line with our primary hypothesis, post-traumatic symptoms and, thus, prevalence of PTSD levels, were elevated in the BAR group compared to controls, with the BAR group also reporting on average, more traumatic experiences. This is consistent with research showing that individuals with clinical BD have elevated levels of trauma exposure, and PTSD prevalence (Aas et al., 2016; Etain et al., 2013; Palmier-Claus et al. 2016). Approximately 34% of the BAR sample met the diagnostic criteria for PTSD, slightly higher than the comorbidity rates reported in those with BD (Aas et al., 2016).

The diathesis-stress model (Zuckerman, 1999) is a widely used framework for understanding how trauma may impact upon the development of various mental health presentations including at-risk mental states for psychosis (Brew et al., 2018). Hence, this framework could be conceptually relevant for other at-risk states, such as BAR. The model posits that environmental stressors interact with underlying vulnerabilities to lead to mental health difficulties; thus, trauma exposure and, in particular, exposure to multiple adversities, may activate latent vulnerabilities relating to BD in individuals meeting the BAR criteria. An unexpected finding was the relatively low number of reported abusive/ neglectful experiences in the BAR group, as shown in Figure 2. This contrasts with existing literature, which reports higher rates; for example, around 20% of a sample of 446 youths with BD reported sexual or physical abuse (Romero et al., 2009), and approximately half of a sample of 100 individuals with BD reported at least one subtype of abuse (Garno et al., 2005). Several factors could account for this discrepancy, including potential underreporting during assessment, or the normalisation of adverse experiences, which may not have been recognised by participants as abusive. Additionally, as research has yet

to explore trauma in BAR presentations specifically, it is possible that this pattern reflects a feature of the at-risk prodromal phase, rather than full BD diagnosis. It should also be born in mind that many people who meet the BAR criteria may not progress to clinical BD and therefore may have a ‘false positive’ at-risk status.

When considering the presence, or not, of PTSD in the BAR group, there were no significant between-group differences, with both BAR groups having higher levels of sleep disturbance than the control group; a trend for slightly worse sleep levels in the group with PTSD did not survive testing with the Bonferroni pairwise corrections, and lack of statistical power may have undermined our ability to detect more subtle differences. Nonetheless, the descriptive pattern of higher mean sleep disturbance scores in the PTSD group could suggest that PTSD may further compound sleep difficulties in at-risk individuals, and this should be considered in future research. Sleep difficulties are prevalent in BD populations (Gold & Sylvia, 2016), and previous studies have found trauma to compound such difficulties (Aubert et al., 2016). However, this pattern was not replicated in the present study. This contrasts with findings in individuals with BD and PTSD, where significantly greater sleep disturbance has been reported compared to those with BD alone (Cruz Sanabria et al., 2019). One possible explanation is that sleep disturbance is already elevated in those meeting BAR criteria, such that the presence of PTSD does not confer additional impairment. These findings support the clinical relevance of sleep as a treatment target in at-risk populations and highlight the need for future research to explore the interaction between trauma and sleep disturbance in BAR presentations, ideally using samples with sufficient power to detect more nuanced effects.

Finally, it was hypothesised that presence of PTSD would impact upon symptoms of mania and depression. The control group predominantly had euthymic mood states, with the BAR-PTSD+ showing higher levels of mixed states, and BAR-PTSD- showing the highest rates of (hypo)manic states. Depression symptoms were significantly higher in both BAR groups, but there were no significant differences depending on PTSD comorbidity. Mania symptoms demonstrated an elevated trend in both BAR groups, however this was not statistically significant. As such, this hypothesis was partially supported but, again, the findings should be treated with caution given the small numbers involved. Previous research has concluded that PTSD impacts upon clinical outcomes in individuals with BD (Quarantini et al., 2010), including higher levels of depressive symptoms (Frost et al., 2020), a finding that was not replicated in the present study.

Strengths and limitations

The study had some clear strengths; firstly, its relevance in furthering the empirical evidence base of an under-researched at-risk clinical group. Whilst extrapolation from BD populations indicate that trauma and sleep may be important factors in the early stages of BD, empirical validation is needed at the at-risk level, also. This study, we believe the first of its kind, thus, advances the limited BAR literature. A relevant PPI group was consulted, and feedback was considered when developing study procedures. Furthermore, PTSD information was obtained using the SCID, a structured clinical interview that enhances clinical rigor and validity of the findings. Screening around any pre-existing or co-morbid mental health difficulties

occurred prior to the full assessment to support with recruiting a true ‘non-clinical’ control group.

Nevertheless, several limitations should be acknowledged. The two groups were significantly different across multiple demographic variables, including education level, employment status, and IMD scores, which may have confounded the findings. Efforts were made to stratify recruitment to match the groups on key demographic characteristics, however, challenges with recruitment prevented complete matching between the two groups. This additionally led to an over-representation of students, educated to university level, in the control group potentially limiting the generalisability of the findings.

There was missing data in the BAR trial records for some of the variables, as indicated throughout the results section where relevant; it was possible that these data were not missing at random, although for the ISS and PSQI, it was because these measures were introduced after the commencement of the trial. Furthermore, the study was underpowered for some of the analyses. Despite researcher’s efforts, there were some recruitment challenges within the control group which led to a smaller sample than intended. As such, the results can only be interpreted as a starting point for future research. To match the procedures used in the BART trial, a version of the SCID was used in the present study which corresponded to a previous version of the DSM. Whilst this ensured methodological consistency with the clinical sample, it introduced a potential limitation by not reflecting the current diagnostic criteria. The changes from DSM-IV to DSM-V have led to re-classification of PTSD symptoms to include: a) intrusion, b) avoidance, c) negative alterations in cognition

and mood, and d) marked alterations in arousal and reactivity, alongside dissociative subtypes. As such, the generalisability and clinical applicability could be impacted. Lastly, the study was cross-sectional in design which limits inferences that can be made around any causal associations between the clinical variables.

Clinical implications

The study offers several important clinical considerations. Firstly, the interplay of different variables highlights the need for comprehensive screening and assessment for individuals who may present with an at-risk mental state. Mental health services are increasingly working towards the provision of trauma-informed care, and the conclusions support the recommendations for routine and comprehensive assessment of trauma in individuals who may be considered at risk for BD. Incorporating relevant measures to support with this, such as the International Trauma Questionnaire (ITQ; Cloitre et al., 2018) or the PSQI could help clinicians to identify crucial areas of distress, and potential clinical relevance allowing for individualised formulations that support with treatment targeting. Research has explored BAR-specific clinical interviews, such as the Semi Structured Interview for Bipolar At Risk States (SIBARS; Fusar-Poli et al., 2018), which could be a useful tool to support structured assessments for those at risk. Furthermore, both clinical groups demonstrated differences in their mood state presentation depending on PTSD comorbidity or not; this highlights the potential heterogeneity of individuals meeting BAR criteria's clinical presentation. The three BAR groups consider this, and educating clinicians on the differing presentations would be crucial for early identification and intervention. For example, the higher proportion of mixed states in the BAR-PTSD+ group may warrant different approaches to care planning and

therapeutic intervention than those at risk who may not have extensive trauma experiences/ symptoms but higher levels symptoms relating to mania.

Directions for future research

It is acknowledged that the BAR evidence base is limited at present, and future research is warranted to progress the empirical support necessary to support with service development. Replication of the current study, in addition to exploration of other clinically relevant variables, is required on a larger scale. Research with better matched samples, particularly on key demographics, such as socioeconomic status and education, is imperative given significant differences observed in the current study. Unsurprisingly, longitudinal and prospective research will be vital in understanding the value and validity of the BAR criteria where stronger conclusions can be drawn about transition rates from BAR-BD to support with case finding accuracy.

Moreover, research exploring trauma-focused interventions adapted for BAR groups is important. As mentioned earlier, there is currently a multi-site RCT investigating an adapted version of CBT for BAR populations, which is likely to offer invaluable findings regarding the efficacy of this intervention for at-risk individuals. The literature on trauma-focused interventions for BD is limited in scope, but is promising (Richardson & Amann, 2024; Valiente-Gómez et al., 2019), warranting larger scale RCTs to ascertain intervention effects. Given the elevated rates of PTSD comorbidity in the BAR group, compared to controls, considering trauma within BAR adapted interventions is indicated.

Conclusions

To conclude, the current study adds the evidence base of at-risk states for BD. It offers preliminary support for elevated prevalence of traumatic experiences, symptomology and comorbid PTSD diagnoses in BAR individuals. It also has demonstrated significantly higher levels of sleep difficulties, though there were not clear differences in sleep disturbance regardless of PTSD presence for the BAR group, suggesting that PTSD may not impact significantly on sleep levels in this population. Lastly, mood states were investigated concluding heightened mania trends, not reaching significance, in the BAR groups alongside raised depression levels across both clinical groups. Further research is warranted to explore whether similar conclusions can be drawn in larger samples, with sample stratification to account for important confounders. Clinical implications are discussed.

References

Aas, M., Henry, C., Andreassen, O. A., Bellivier, F., Melle, I., & Etain, B. (2016). The role of childhood trauma in bipolar disorders. *International Journal of Bipolar Disorders*, *4*(1), 2. https://doi.org/10.1186/s40345-015-0042-0

Alloy, L. B., Nusslock, R., & Boland, E. M. (2015). The development and course of bipolar spectrum disorders: An integrated reward and circadian rhythm dysregulation model. *Annual Review of Clinical Psychology*, 11, 213-250. https://doi.org/10.1146/annurev-clinpsy-032814-112902

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (*5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Aubert, E., Jaussent, I., Olié, E., Ducasse, D., Azorin, J. M., Bellivier, F., Belzeaux, R., Bougerol, T., Etain, B., Gard, S., Henry, C., Kahn, J. P., Leboyer, M., Loftus, J., Passerieux, C., Lopez-Castroman, J., & Courtet, Ph. (2016). Effect of early trauma on the sleep quality of euthymic bipolar patients. *Journal of Affective Disorders*, *206*, 261–267. https://doi.org/10.1016/j.jad.2016.07.045

Bauer, M. S., Crits-Christoph, P., Ball, W. A., Dewees, E., McAllister, T., Alahi, P., Cacciola, J., & Whybrow, P. C. (1991). Independent assessment of manic and depressive symptoms by self-rating. Scale characteristics and implications for the study of mania. *Archives of General Psychiatry*, *48*(9), 807–812. https://doi.org/10.1001/archpsyc.1991.01810330031005

Baker, C., & Kirk Wade, E. (2024). *Mental health statistics: Prevalence, services and funding in England* (House of Commons Library Research Briefing No. SN06988). House of Commons Library. https://researchbriefings.files.parliament.uk/documents/SN06988/SN06988.pdf

Bauer, M. S., Crits-Christoph, P., Ball, W. A., Dewees, E., McAllister, T., Alahi, P., Cacciola, J., & Whybrow, P. C. (1991). Independent assessment of manic and depressive symptoms by self-rating: Scale characteristics and implications for the study of mania. *Archives of General Psychiatry*, *48*(9), 807–812. https://doi.org/10.1001/archpsyc.1991.01810330031005

Bauer, M. S., Vojta, C., Kinosian, B., Altshuler, L., & Glick, H. (2000). The Internal State Scale: Replication of its discriminating abilities in a multisite, public sector sample. *Bipolar Disorders*, *2*(4), 340–346. https://doi.org/10.1034/j.1399-5618.2000.020409.x

Bechdolf, A., Ratheesh, A., Cotton, S. M., Nelson, B., Chanen, A. M., Betts, J., Bingmann, T., Yung, A. R., Berk, M., & McGorry, P. D. (2014). The predictive validity of bipolar at-risk (prodromal) criteria in help-seeking adolescents and young adults: A prospective study. *Bipolar Disorders*, *16*(5), 493–504. https://doi.org/10.1111/bdi.12205

Bechdolf, A., Ratheesh, A., Wood, S., Tecic, T., Conus, P., Nelson, B., Cotton, S., Chanen, A., Amminger, G., Ruhrmann, S., Schultze-Lutter, F., Klosterkötter, J., Fusar-Poli, P., Yung, A., Berk, M., & Mcgorry, P. (2012). Rationale and first results of developing at-risk (prodromal) criteria for bipolar disorder. *Current Pharmaceutical Design*, *18*, 358–375. https://doi.org/10.2174/138161212799316226

Brew, B., Doris, M., Shannon, C., & Mulholland, C. (2018). What impact does trauma have on the at-risk mental state? A systematic literature review. *Early Intervention in Psychiatry*, *12*(2), 115–124. https://doi.org/10.1111/eip.12453

Buoli, M., Cesana, B. M., Fagiolini, A., Albert, U., Maina, G., de Bartolomeis, A., Pompili, M., Bondi, E., Steardo, L., Amore, M., Bellomo, A., Bertolino, A., Di

Nicola, M., Di Sciascio, G., Fiorillo, A., Rocca, P., Sacchetti, E., Sani, G., Siracusano, A., … ISBD Italian Chapter Epidemiologic Group. (2021). Which factors delay treatment in bipolar disorder? A nationwide study focussed on duration of untreated illness. *Early Intervention in Psychiatry*, *15*(5), 1136–1145. https://doi.org/10.1111/eip.13051

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, *28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Caselli, G., & Spada, M. M. (2011). The Desire Thinking Questionnaire: Development and psychometric properties. *Addictive Behaviors*, *36*(11), 1061–1067. https://doi.org/10.1016/j.addbeh.2011.06.013

Cloitre, M., Shevlin, M., Brewin, C. R., Bisson, J. I., Roberts, N. P., Maercker, A., Karatzias, T., & Hyland, P. (2018). The International Trauma Questionnaire: Development of a self-report measure of ICD-11 PTSD and complex PTSD. *Acta Psychiatrica Scandinavica*, *138*(6), 536–546. https://doi.org/10.1111/acps.12956

Cogan, C. M., Paquet, C. B., Lee, J. Y., Miller, K. E., Crowley, M. D., & Davis, J. L. (2021). Differentiating the symptoms of posttraumatic stress disorder and bipolar disorders in adults: Utilizing a trauma-informed assessment approach. *Clinical Psychology & Psychotherapy*, *28*(1), 251–260. https://doi.org/10.1002/cpp.2504

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Lawrence Erlbaum Associates.

Cooke, R. G., Krüger, S., & Shugar, G. (1996). Comparative evaluation of two self-report mania rating scales. *Biological Psychiatry*, *40*(4), 279–283. https://doi.org/10.1016/0006-3223(95)00392-4

Cruz Sanabria, F., Bonelli, C., Gravina, D., Violi, M., Massoni, L., Bruno, S., Faraguna, U., Dell'Osso, L., & Carmassi, C. (2023). Sleep disturbances in bipolar disorder with comorbid post-traumatic stress disorder. *European Psychiatry, 66*(S1), S196–S197. https://doi.org/10.1192/j.eurpsy.2023.463

Department of Health and Social Care. (1999). *National service framework: mental health.* GOV.UK. https://www.gov.uk/government/publications/quality-standards-for-mental-health-services

Dilsaver, S. C., Benazzi, F., Akiskal, H. S., & Akiskal, K. K. (2007). Post-traumatic stress disorder among adolescents with bipolar disorder and its relationship to suicidality. *Bipolar Disorders*, *9*(6), 649–655. https://doi.org/10.1111/j.1399-5618.2007.00396.x

Dodd, A. L., Mansell, W., Beck, R. A., & Tai, S. J. (2013). Self appraisals of internal states and risk of analogue bipolar symptoms in student samples: Evidence from standardised behavioural observations and a diary study. *Cognitive Therapy and Research*, *37*(5), 981–995. https://doi.org/10.1007/s10608-013-9541-4

Dodd, A. L., Mansell, W., Sadhnani, V., Morrison, A. P., & Tai, S. (2010). Principal components analysis of the Hypomanic Attitudes and Positive Predictions Inventory and associations with measures of personality, cognitive style and analogue symptoms in a student sample. *Behavioural and Cognitive Psychotherapy*, *38*(1), 15–33. https://doi.org/10.1017/S1352465809990476

Elhai, J. D., Franklin, C. L., & Gray, M. J. (2008). The SCID PTSD module's trauma screen: Validity with two samples in detecting trauma history. *Depression and Anxiety*, *25*(9), 737–741. https://doi.org/10.1002/da.20318

Elhai, J. D., Gray, M. J., Kashdan, T. B., & Franklin, C. L. (2005). Which instruments are most commonly used to assess traumatic event exposure and posttraumatic effects?: A survey of traumatic stress professionals. *Journal of Traumatic Stress*, *18*(5), 541–545. https://doi.org/10.1002/jts.20062

Etain, B., Aas, M., Andreassen, O. A., Lorentzen, S., Dieset, I., Gard, S., Kahn, J.-P., Bellivier, F., Leboyer, M., Melle, I., & Henry, C. (2013). Childhood trauma is associated with severe clinical characteristics of bipolar disorders. *The Journal of Clinical Psychiatry*, *74*(10), 991–998. https://doi.org/10.4088/jcp.13m08353

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2007). *Structured clinical interview for DSM-IV-TR Axis I Disorders - Non Patient Edition (SCID-I/NP).* Biometrics Research, New York State Psychiatric Institute.

Frank, E., Kupfer, D. J., Thase, M. E., Mallinger, A. G., Swartz, H. A., Fagiolini, A. M., Grochocinski, V., Houck, P., Scott, J., Thompson, W., & Monk, T. (2005). Two-year outcomes for interpersonal and social rhythm therapy in individuals with bipolar I disorder. *Archives of General Psychiatry,* 62(9), 996–1004. https://doi.org/10.1001/archpsyc.62.9.996

Frost, L., Mansell, W., Varese, F., & Tai, S. (2020). What is the relationship between post-traumatic stress disorder, extreme appraisals of internal state and symptoms in bipolar disorder? *Behavioural and Cognitive Psychotherapy*, *48*(1), 103–115. https://doi.org/10.1017/S1352465819000572

Fusar-Poli, P., De Micheli, A., Rocchetti, M., Cappucciati, M., Ramella-Cravaro, V., Rutigliano, G., Bonoldi, I., McGuire, P., & Falkenberg, I. (2018). Semistructured Interview for Bipolar At Risk States (SIBARS). *Psychiatry Research*, *264*, 302–309. https://doi.org/10.1016/j.psychres.2018.03.074

Garno, J. L., Goldberg, J. F., Ramirez, P. M., & Ritzler, B. A. (2005). Impact of childhood abuse on the clinical course of bipolar disorder. *British Journal of Psychiatry*, *186*(2), 121–125. https://doi.org/10.1192/bjp.186.2.121

Gold, A., & Sylvia, L. (2016). The role of sleep in bipolar disorder. *Nature and Science of Sleep*, *Volume 8*, 207–214. https://doi.org/10.2147/NSS.S85754

Goldberg, J., & Garno, J. (2005). Development of posttraumatic stress disorder in adult bipolar patients with histories of severe childhood abuse. *Journal of Psychiatric Research*, *39*, 595–601. https://doi.org/10.1016/j.jpsychires.2004.11.002

Grande, I., Berk, M., Birmaher, B., & Vieta, E. (2016). Bipolar disorder. *The Lancet*, *387*(10027), 1561–1572. https://doi.org/10.1016/S0140-6736(15)00241-X

Hett, D., Etain, B., & Marwaha, S. (2022). Childhood trauma in bipolar disorder: New targets for future interventions. *BJPsych Open*, *8*(4), e130. https://doi.org/10.1192/bjo.2022.529

Hogg, B., Gardoki-Souto, I., Valiente-Gómez, A., Rosa, A. R., Fortea, L., Radua, J., ... & Moreno-Alcázar, A. (2023). Psychological trauma as a transdiagnostic risk factor for mental disorder: an umbrella meta-analysis. *European Archives of Psychiatry and Clinical Neuroscience*, *273*(2), 397–410. https://doi.org/10.1007/s00406-022-01495-5

Inder, M. L., Crowe, M. T., Luty, S. E., Carter, J. D., Moor, S., Frampton, C. M., & Joyce, P. R. (2015). Randomized, controlled trial of Interpersonal and Social

Rhythm Therapy for young people with bipolar disorder. *Bipolar Disorders*, *17*(2), 128-138. https://doi.org/https://doi.org/10.1111/bdi.12273

Jones, W. T., Peters, S., Byrne, R. E., Shiers, D., Law, H., & Parker, S. (2021). “It felt very special, it felt customised to me”—A qualitative investigation of the experiences of participating in a clinical trial of CBT for young people at risk of bipolar disorder. *Psychology and Psychotherapy: Theory, Research and Practice*, *94*(3), 686–703. https://doi.org/10.1111/papt.12313

Joslyn, C., Hawes, D. J., Hunt, C., & Mitchell, P. B. (2016). Is age of onset associated with severity, prognosis, and clinical features in bipolar disorder? A meta-analytic review. *Bipolar Disorders*, *18*(5), 389–403. https://doi.org/10.1111/bdi.12419

Joyce, P. R. (1984). Age of onset in bipolar affective disorder and misdiagnosis as schizophrenia. *Psychological Medicine*, *14*(1), 145–149. https://doi.org/10.1017/S0033291700003147

Kaplan, K. A., McGlinchey, E. L., Soehner, A., Gershon, A., Talbot, L. S., Eidelman, P., Gruber, J., & Harvey, A. G. (2015). Hypersomnia subtypes, sleep and relapse in bipolar disorder. *Psychological Medicine*, *45*(8), 1751–1763. https://doi.org/10.1017/S0033291714002918

Liu, J., Teh, W. L., Tan, R. H. S., Tan, Y. B., Tang, C., Chandwani, N., & Subramaniam, M. (2023). Sleep disturbance as transdiagnostic mediator between adverse childhood experiences and psychopathology in children and adolescents: A structural equation modeling meta-analysis. *JCPP Advances*, *3*(3), e12156. https://doi.org/10.1002/jcv2.12156

Mandelli, L., Petrelli, C., & Serretti, A. (2015). The role of specific early trauma in adult depression: A meta-analysis of published literature. Childhood trauma

and adult depression. *European Psychiatry*, *30*(6), 665–680. https://doi.org/10.1016/j.eurpsy.2015.04.007

Mansell, W. (2006). The Hypomanic Attitudes and Positive Predictions Inventory (HAPPI): A pilot study to select cognitions that are elevated in individuals with bipolar disorder compared to non-clinical controls. *Behavioural and Cognitive Psychotherapy*, *34*(4), 467–476. https://doi.org/10.1017/S1352465806003109

McCrone, P., Craig, T. K. J., Power, P., & Garety, P. A. (2010). Cost-effectiveness of an early intervention service for people with psychosis. *British Journal of Psychiatry*, *196*(5), 377–382. https://doi.org/10.1192/bjp.bp.109.065896

Mcgorry, P., Bates, T., & Birchwood, M. (2013). Designing youth mental health services for the 21st century: Examples from Australia, Ireland and the UK. *The British Journal of Psychiatry*, *202*, s30–s35. https://doi.org/10.1192/bjp.bp.112.119214

McIntyre, R. S., Berk, M., Brietzke, E., Goldstein, B. I., López-Jaramillo, C., Kessing, L. V., Malhi, G. S., Nierenberg, A. A., Rosenblat, J. D., Majeed, A., Vieta, E., Vinberg, M., Young, A. H., & Mansur, R. B. (2020). Bipolar disorders. *The Lancet*, *396*(10265), 1841–1856. https://doi.org/10.1016/S0140-6736(20)31544-0

Melo, M. C. A., Garcia, R. F., Linhares Neto, V. B., Sá, M. B., de Mesquita, L. M. F., de Araújo, C. F. C., & de Bruin, V. M. S. (2016). Sleep and circadian alterations in people at risk for bipolar disorder: A systematic review. *Journal of Psychiatric Research*, *83*, 211–219. https://doi.org/10.1016/j.jpsychires.2016.09.005

Ministry of Housing, Communities & Local Government. (2019, September 26). *English indices of deprivation 2019: Research report*.

GOV.UK. https://www.gov.uk/government/publications/english-indices-of-deprivation-2019-research-report

Müller-Oerlinghausen, B., Berghöfer, A., & Bauer, M. (2002). Bipolar disorder. *The Lancet*, *359*(9302), 241–247. https://doi.org/10.1016/S0140-6736(02)07450-0

National Institute for Health and Care Excellence. (2022). *Post-traumatic stress disorder: How common is it? https://cks.nice.org.uk/topics/post-traumatic-stress-disorder/background-information/prevalence/*

NHS England. (2014). *Five year forward view.* https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf

NHS England. (2019). *The NHS Long Term Plan (Version 1.2).* https://www.england.nhs.uk/wp-content/uploads/2022/07/nhs-long-term-plan-version-1.2.pdf

Nordentoft, M., Jeppesen, P., Abel, M., Kassow, P., Petersen, L., Thorup, A., Krarup, G., Hemmingsen, R., & Jørgensen, P. (2002). OPUS study: Suicidal behaviour, suicidal ideation and hopelessness among patients with first-episode psychosis: One-year follow-up of a randomised controlled trial. *British Journal of Psychiatry*, *181*(S43), s98–s106. https://doi.org/10.1192/bjp.181.43.s98

Otto, M. W., Perlman, C. A., Wernicke, R., Reese, H. E., Bauer, M. S., & Pollack, M. H. (2004). Posttraumatic stress disorder in patients with bipolar disorder: A review of prevalence, correlates, and treatment strategies. *Bipolar Disorders*, *6*(6), 470–479. https://doi.org/10.1111/j.1399-5618.2004.00151.x

Palmier-Claus, J. E., Berry, K., Bucci, S., Mansell, W., & Varese, F. (2016). Relationship between childhood adversity and bipolar affective disorder: Systematic review and meta-analysis. *The British Journal of Psychiatry: The*

Journal of Mental Science, *209*(6), 454–459. https://doi.org/10.1192/bjp.bp.115.179655

Pearson, L., Parker, S., & Mansell, W. (2022). The positive and negative sleep appraisal measure: Towards a clinical validation of sleep spectrum cognitions. *Clinical Psychology & Psychotherapy*, *29*(2), 687–697. https://doi.org/10.1002/cpp.2662

Porter, C., Palmier-Claus, J., Branitsky, A., Mansell, W., Warwick, H., & Varese, F. (2020). Childhood adversity and borderline personality disorder: A meta-analysis. *Acta Psychiatrica Scandinavica*, *141*(1), 6–20. https://doi.org/10.1111/acps.13118

Quarantini, L. C., Miranda-Scippa, Â., Nery-Fernandes, F., Andrade-Nascimento, M., Galvão-de-Almeida, A., Guimarães, J. L., Teles, C. A. S., Netto, L. R., Lira, S. B., de Oliveira, I. R., Post, R. M., Kapczinski, F., & Koenen, K. C. (2010). The impact of comorbid posttraumatic stress disorder on bipolar disorder patients. *Journal of Affective Disorders*, *123*(1), 71–76. https://doi.org/10.1016/j.jad.2009.08.005

Ratheesh, A., Hammond, D., Watson, M., Betts, J., Siegel, E., McGorry, P., Berk, M., Cotton, S., Chanen, A., Nelson, B., & Bechdolf, A. (2023). Bipolar at-risk criteria and risk of bipolar disorder over 10 or more years. *JAMA Network Open*, *6*(9), e2334078. https://doi.org/10.1001/jamanetworkopen.2023.34078

Richardson, T., & Amann, B. L. (2024). Trauma Focused Therapy in Bipolar Disorder: Adapting CBT and EMDR. In T. Richardson (Ed.), *Handbook of Psychological Therapies for Bipolar Disorder: Evidence-Based and Emerging Techniques* (pp. 567–596). https://doi.org/10.1007/978-3-031-63349-2_21

Robillard, R., Naismith, S. L., & Hickie, I. B. (2013). Recent advances in sleep-wake cycle and biological rhythms in bipolar disorder. *Current Psychiatry Reports*, *15*(10), 402. https://doi.org/10.1007/s11920-013-0402-3

Romero, S., Birmaher, B., Axelson, D., Goldstein, T., Goldstein, B. I., Gill, M. K., Iosif, A. M., Strober, M. A., Hunt, J., Esposito-Smythers, C., Ryan, N. D., Leonard, H., & Keller, M. (2009). Prevalence and correlates of physical and sexual abuse in children and adolescents with bipolar disorder. *Journal of Affective Disorders*, *112*(1-3), 144–150. https://doi.org/10.1016/j.jad.2008.04.005

Rowe, A.-L., Perich, T., & Meade, T. (2023). Cumulative trauma in bipolar disorder: An examination of prevalence and outcomes across the lifespan. *Journal of Affective Disorders*, *327*, 254–261. https://doi.org/10.1016/j.jad.2022.12.041

Russell, S. E., Wrobel, A. L., Skvarc, D., Kavanagh, B. E., Ashton, M. M., Dean, O. M., Berk, M., & Turner, A. (2023). The impact of posttraumatic stress disorder on pharmacologic intervention outcomes for adults with bipolar disorder: A systematic review. *International Journal of Neuropsychopharmacology*, *26*(1), 61–69. https://doi.org/10.1093/ijnp/pyac057

Salazar de Pablo, G., Radua, J., Pereira, J., Bonoldi, I., Arienti, V., Besana, F., Soardo, L., Cabras, A., Fortea, L., Catalan, A., Vaquerizo-Serrano, J., Coronelli, F., Kaur, S., Da Silva, J., Shin, J. I., Solmi, M., Brondino, N., Politi, P., McGuire, P., & Fusar-Poli, P. (2021). Probability of transition to psychosis in individuals at clinical high risk: An updated meta-analysis. *JAMA Psychiatry*, *78*(9), 970–978. https://doi.org/10.1001/jamapsychiatry.2021.0830

Salvi, V., Fagiolini, A., Swartz, H. A., Maina, G., & Frank, E. (2008). The use of antidepressants in bipolar disorder. In *Database of Abstracts of Reviews of*

Effects (DARE): Quality-assessed Reviews [Internet]. Centre for Reviews and Dissemination (UK). https://www.ncbi.nlm.nih.gov/books/NBK75905/

Scott, J., Graham, A., Yung, A., Morgan, C., Bellivier, F., & Etain, B. (2022). A systematic review and meta-analysis of delayed help-seeking, delayed diagnosis and duration of untreated illness in bipolar disorders. *Acta Psychiatrica Scandinavica*, *146*(5), 389–405. https://doi.org/10.1111/acps.13490

Stafford, M. R., Jackson, H., Mayo-Wilson, E., Morrison, A. P., & Kendall, T. (2013). Early interventions to prevent psychosis: systematic review and meta-analysis. *BMJ (Clinical research ed.), 346*, f185. https://doi.org/10.1136/bmj.f185

Steardo, L., Manchia, M., Carpiniello, B., Pisanu, C., Steardo, L., & Squassina, A. (2020). Clinical, genetic, and brain imaging predictors of risk for bipolar disorder in high-risk individuals. *Expert Review of Molecular Diagnostics*, *20*(3), 327–333. https://doi.org/10.1080/14737159.2020.1727743

Valiente-Gómez, A., Moreno-Alcázar, A., Gardoki-Souto, I., Masferrer, C., Porta, S., Royuela, O., Hogg, B., Lupo, W., & Amann, B. L. (2019). Theoretical background and clinical aspects of the use of EMDR in patients with bipolar disorder. *Journal of EMDR Practice and Research*, *13*(4), 307–312. https://doi.org/10.1891/1933-3196.13.4.307

Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., van Os, J., & Bentall, R. P. (2012). Childhood adversities increase the risk of psychosis: A meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophrenia Bulletin*, *38*(4), 661–671. https://doi.org/10.1093/schbul/sbs050

Wehr, T., Sack, D. A., & Rosenthal, N. E. (1987). Sleep reduction as a final common pathway in the genesis of mania. *American Journal of Psychiatry*, 144, 201-204. https://doi.org/10.1176/ajp.144.2.201

Weiss, D. S. (2004). The Impact of Event Scale-Revised. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 168–189). Guilford Press.

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: Properties of the MCQ-30. *Behaviour Research and Therapy*, *42*(4), 385–396. https://doi.org/10.1016/S0005-7967(03)00147-5

World Health Organization. (2022). *ICD-11: International classification of diseases* (11th rev.). https://icd.who.int/

Yung, A. R., Nelson, B., Thompson, A., & Wood, S. J. (2010). The psychosis threshold in Ultra High Risk (prodromal) research: Is it valid? *Schizophrenia Research*, *120*(1–3), 1–6. https://doi.org/10.1016/j.schres.2010.03.014

Yung, A. R., Phillips, L. J., McGorry, P. D., McFarlane, C. A., Francey, S., Harrigan, S., Patton, G. C., & Jackson, H. J. (1998). Prediction of psychosis: A step towards indicated prevention of schizophrenia. *British Journal of Psychiatry*, *172*(S33), 14–20. https://doi.org/10.1192/S0007125000297602

Zuckerman, M. (1999). *Diathesis-stress models.* In M. Zuckerman, *Vulnerability to psychopathology: A biosocial model* (pp. 3–23). American Psychological Association. https://doi.org/10.1037/10316-001

Appendices

Appendix A – Statement of collaboration

Researchers, Georgia Horne and Nikki Dehmahdi, collaborated on the present study, primarily for the purpose of data collection. Data was collected jointly and both projects have the same participants and dataset; however, the projects are, and data analyses, were conducted separately in line with the individual project research questions/ aims. Additionally, the ethics application was conducted jointly, and ethical approval was granted for the joint project.

Appendix B – Study leaflet

University of Sheffield

NHS
Sheffield Health and Social Care
NHS Foundation Trust

Scan this code to register your interest!

Can you help?

We are looking for participants WITHOUT mental health difficulties

Are you aged 16 to 25?

Have you NOT been diagnosed with a mood disorder?

Are you willing to talk about life experiences, emotional states, and your sleep?

This research aims to compare these factors in a group of people at risk of developing Bipolar Disorder to a non clinical group. This will aim to help target the support offered to those at risk of developing Bipolar in the future.

How it works

1. Register your interest by scanning the QR code above
2. Have a video call with a researcher at your convenience
3. Receive a £10 Amazon voucher

Nikki Dehmahdi
Trainee Clinical Psychologist (Researcher)
Ndehmahdi1@sheffield.ac.uk

Georgia Horne
Trainee Clinical Psychologist (Researcher)
Ghorne1@sheffield.ac.uk

Appendix C – Demographic information

1. ***What is your age?*** _____

2. ***What is your marital status?***
   - Single
   - Married
   - Civil partnership
   - Cohabiting
   - Divorced
   - Separated
   - Widowed
   - Prefer not to answer.

3. ***What is your ethnic background?***
   - White – British
   - White – Irish
   - White – Gypsy or Irish Traveller
   - White – Any other background
   - Asian/Asian British – Indian
   - Asian/Asian British – Pakistani
   - Asian/Asian British – Bangladeshi
   - Asian/Asian British – Chinese
   - Asian/Asian British – Any other background
   - Black/Black British – African
   - Black/Black British – Caribbean
   - Black/Black British – Any other background
   - Mixed/Multiple Ethnic group – White and Black Caribbean
   - Mixed/Multiple Ethnic group – White and Black African
   - Mixed/Multiple Ethnic group – White and Asian
   - Mixed/Multiple Ethnic group – Any other backgrounds
   - Other ethnic group – Arab
   - Any other ethnic group – Please specify
   - Prefer not to answer.

4. ***What was your sex at birth?***
   - Female
   - Male
   - Intersex
   - Prefer not to answer.

5. ***What gender do you identify as?***
   - Male

- Female
- Trans-gender
- Non-binary
- Other
- Prefer not to answer.

6. What is the highest level of education that you reached?

- Primary
- Secondary
- Further
- Higher
- Prefer not to answer.

7. How would you describe your current employment status?

- Full-time paid work (30 or more hours per week)
- Part-time paid work (Less than 30 hours per week)
- Full-time education
- Part-time education
- Full-time carer / homemaker (30 or more hours per week)
- Full-time unpaid volunteer (30 or more hours per week)
- Part-time unpaid volunteer (Less than 30 hours per week)
- On leave/Out of work due to illness or disability
- Retired
- Prefer not to answer.

8. How would you best describe your living situation?

- Living with family
- Living with friends
- Living with partner
- Living with children only
- Living with partner and child(ren)
- Living in a supported living accommodation
- Prefer not to answer.

9. What is your current postcode? _____

10. Is your current postcode the same as your postcode at the age of 17 (if this applies)?

- Yes
- No. Please specify _____
- Prefer not to answer.

11. Do you have any dependents?

- No
- Yes
- Prefer not to answer.

Appendix D – SCID

Due to the significant length of the SCID interview schedule, this has not been included within the appendices for the purpose of economy and brevity. This can be made available upon request.

Appendix E – PSQI

The Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.
During the past month,

1. When have you usually gone to bed? _____
2. How long (in minutes) has it taken you to fall asleep each night? _____
3. When have you usually gotten up in the morning? _____
4. How many hours of actual sleep do you get at night? (This may be different than the number of hours you spend in bed) _____

5. During the past month, how often have you had trouble sleeping because you…	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
a. Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				
c. Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
j. Other reason(s), please describe, including how often you have had trouble sleeping because of this reason(s):				
6. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
8. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
	Very good (0)	Fairly good (1)	Fairly bad (2)	Very bad (3)
9. During the past month, how would you rate your sleep quality overall?				

Component 1	#9 Score	C1_____
Component 2	#2 Score (≤15min=0; 16-30 min=1; 31-60 min=2, >60 min=3) + #5a Score (if sum is equal 0=0; 1-2=1; 3-4=2; 5-6=3)	C2_____
Component 3	#4 Score (>7=0; 6-7=1; 5-6=2; <5=3)	C3_____
Component 4	(total # of hours asleep)/(total # of hours in bed) x 100 >85%=0, 75%-84%=1, 65%-74%=2, <65%=3	C4_____
Component 5	Sum of Scores #5b to #5j (0=0; 1-9=1; 10-18=2; 19-27=3)	C5_____
Component 6	#6 Score	C6_____
Component 7	#7 Score + #8 Score (0=0; 1-2=1; 3-4=2; 5-6=3)	C7_____

Add the seven component scores together _____ **Global PSQI Score** _____

Reprinted from *Journal of Psychiatric Research*, 28(2), Buysse, D.J., Reynolds III, C.F., Monk, T.H., Berman, S.R., & Kupfer, D.J. The Pittsburgh Sleep Quality Index: A New Instrument for Psychiatric Practice and Research, 193-213, Copyright 1989, with permission from Elsevier Science.

Appendix F – ISS

ISS

For each of the following statements, please mark an "X" at the point on the line that best describes the way you have felt **over the past 24 hours**. While there may have been some change during that time, try to give a single summary rating for each item.

Today my mood is changeable

0 100

|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|

Today I feel irritable

0 100

|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|

Today I feel like a capable person

0 100

|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|

Today I feel like people are out to get me

0 100

|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|

Today I actually feel great inside

0 100

|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|

Today I feel impulsive

0 100

|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|

Today I feel depressed

0 100

|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|....I....|

Today my thoughts are going fast

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today it seems like nothing will ever work out for me

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today I feel overacti ve

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today I feel as if the world is against me

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today I feel “sped up” inside

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today I feel restless

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today I feel argumen tative

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today I feel energise d

0 100
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Today I feel:

Depressed/Down Normal Manic/High
-50 0 50
|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|

Appendix G – Participant Information Sheet

Exploring extreme beliefs and appraisals, sleep, and trauma in non-clinical populations.

PARTICIPANT INFORMATION SHEET

You are invited to take part in a research study. It is important for you to understand why the research is being done and what it will involve. The researcher who provided you with this information sheet will be happy to answer any questions you might have, so feel free to ask us if there is anything that is not clear or if you would like further information.

You may wish to read this sheet more than once. Please take time to decide whether you wish to take part.

What is the purpose of the study?

The current study aims to utilise the data gathered from an existing research project involving people who have been identified as being at high risk of developing bipolar disorder and comparing the data gathered from these individuals to a non-clinical control sample.

Whilst there is an extensive body of literature on bipolar disorder, the research focusing on individuals who may be susceptible to developing the condition is still expanding. The present study aims to compare the presence of extreme appraisals and beliefs, as well as the impact of sleep and trauma in a non-clinical population to a sample of people deemed to be at high risk of developing bipolar disorder.

It is hoped that the results of the research could inform the psychological support that is offered to support individuals who are at high risk of developing bipolar disorder in the future.

Why have I been asked to participate?

We are inviting people to take part in the study if they **have not** had previous experience of being diagnosed with a mood disorder and/or had a history of experiencing mood swings. Mood swings can be characterised by fluctuations in feeling very elevated in mood which can lead to an increase in energy, activation, and talkativeness, and experiencing low mood which can lead to sadness, fatigue, reduction in energy and enjoyment of activities that once brought you happiness.

Do I have to take part?

No. Your participation is voluntary, and it is entirely up to you to decide whether or not you wish to take part. You should not feel under any pressure to decide. If you do decide to take part in the study, you will be asked to sign a consent form. However, even after signing the consent form, you are still able to withdraw up to 2 weeks after meeting with the researcher for an assessment. You will not be required to provide a reason for the withdrawal.

What will happen if I decide to take part?

You will be invited to meet one of our researchers through an online video conferencing platform at a convenient date and time for you. Given the nature of some of the questions asked as part of the assessment, it is advised that you find a confidential space for the duration of the video call.

During this meeting, the researcher will provide you with further insight into the nature of the research and offer an opportunity to answer any questions you may have. If you are happy to partake in the study, the researcher will share with you a link to an electronic consent form for completion. The researcher will talk through the consent form with you and answer any queries you may have. If you require additional time to consider your participation, this will be accommodated, and a follow-up appointment can be arranged if needed.

Once consent has been obtained, the researcher will complete a detailed assessment with you. This may involve the researcher asking about any difficulties you may have experienced historically or currently regarding your mental health. The researcher may also ask you about the nature of these difficulties and how they impact your life. As part of this assessment, you will also complete some questionnaires with the researcher.

Your permission will be sought to audio-record the assessment. This is to allow another member of the research team to check that the researcher is completing the assessment the same way for each participant and reaching the same ratings. The recordings will be destroyed after they have been listened to. You do not have to agree to the recording and nothing will be recorded without your permission.

This assessment should take around 30-45 minutes to complete in total and you will be offered as many breaks as you may need. If required, the assessment can be spaced out across 2 video calls. In the event of technical difficulties arising, the researcher will endeavour to support you in resolving any issues.

Will taking part in the study cost me anything?

No. The study will only involve your time. You will need to make the time to attend the assessment with the researcher. However, please note that in order to complete the assessment with the researcher, you will need to have access to a stable internet connection for the duration of the video call.

You will be reimbursed with a £10 Amazon gift voucher for your time.

What if something goes wrong?

Taking part in the study should involve no particular risks to you. However, it is possible that the nature of some of the questions you are asked in the assessments may make you feel uncomfortable or distressed. You do not have to answer any questions that you do not wish to, and you will be offered a debrief at the end of the assessment.

If you have concerns or complaints about any aspect of this study, you can speak to the researchers who will do their best to answer your questions. Their details are at the end of this participant information sheet for your convenience.

If you wish to complain formally or to speak with the research supervisor, you can do so by contacting Professor Richard Bentall on 0114 222 6530 or email r.bentall@sheffield.ac.uk. You may also raise any complaints to the Head of Department by emailing psy-hod@sheffield.ac.uk or the University of Sheffield Ethics and Research Integrity Manager, Lindsay Unwin, at l.v.unwin@sheffield.ac.uk.

Who will have access to the information collected about me during the study?

Your records from the study will be confidential and only the research team will have access to them. All your data from the study will be stored digitally on a secure server used by the University of Sheffield.

Your information will not be shared with other people unless you give permission for us to do so. The only exception to this is if, during your assessment with the researcher, you provide us with information which indicates that either yourself or another person is at risk of harm or danger. In these exceptional circumstances, we may need to share this information with someone outside of the research team. However, wherever possible, we would always discuss this with you beforehand.

What will happen to the results of the study?

After the study is completed, the results will be analysed and used by the researchers to complete their thesis. This fulfils part of their doctoral training. The results of the study may also be submitted for publication in a scientific journal. Presentations may be given at scientific conferences as part of this dissemination. All the data that is made public will be anonymous, which means that it would not be possible to identify you as having been involved in the study.

Additional Information about your data

New data protection legislation came into effect across the EU, including the UK, on 25 May 2018. As a result, we need to provide you with some further information relating to how your personal information will be used and managed within this research project.

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly. In order to for us to collect and use your personal information as part of this research project, we must have a basis in law to do so. The basis that we are using is that the research is 'a task in the public interest'.

As some of the data that we will be collecting, will be defined in the legislation as more sensitive (e.g., information about your health), we also need to let you know that we are applying an additional condition in law: that the use of your data is 'necessary for scientific or historical research purposes'.

Further information, including details of how and why the University processes your personal information, how we keep your information secure, and your legal rights (including how to complain if you feel that your personal information has not been handled correctly), can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

Contact Information

Please find below the details of the researchers should you wish to make contact regarding the study:

Nikki Dehmahdi
Trainee Clinical Psychologist (Researcher)

Ndehmahdi1@sheffield.ac.uk

University of Sheffield
Department of Psychology
Floor F, Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT

Georgia Horne
Trainee Clinical Psychologist (Researcher)

Ghorne1@sheffield.ac.uk

University of Sheffield
Department of Psychology
Floor F, Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT

Appendix H – Participant Consent Form

Exploring extreme beliefs and appraisals, sleep, and trauma in non-clinical populations.

Please tick the appropriate boxes	Yes	No
Taking Part in the Project		
I have read and understood the participant information sheet dated 14/03/2024 or the project has been fully explained to me. (If you will answer No to this question please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)		
I have been given the opportunity to ask questions about the project.		
I agree to take part in the project. I understand that taking part in the project will include a video call with a researcher, which will involve an interview and completing some questionnaires.		
I am happy for the video call to be audio recorded.		
I understand that my taking part is voluntary and that I can withdraw from the study up to two weeks after completing the assessments; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.		
How my information will be used during and after the project		
I understand my personal details such as name, phone number, address and email address etc. will not be revealed to people outside the project.		
I understand and agree that my words may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs unless I specifically request this.		
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.		
I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.		
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.		

Name of participant [printed]:…….. **Signature**:…….. **Date**:……

Email address of participant:……..

Name of researcher [printed]:…… **Signature**:…… **Date**:……

Project contact details for further information

Lead Researchers: Georgia Horne (Trainee Clinical Psychologist, ghorne1@sheffield.ac.uk)
Nikki Dehmahdi (Trainee Clinical Psychologist, ndehmahdi1@sheffield.ac.uk)

Research Supervisor: Professor Richard Bentall (r.bentall@sheffield.ac.uk)

Address:
University of Sheffield
Department of Psychology
Floor F, Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT

In the event of a complaint, please contact the Head of Psychology at psy-hod@sheffield.ac.uk or the University of Sheffield Ethics and Research Integrity Manager, Lindsay Unwin, at l.v.unwin@sheffield.ac.uk.

Appendix I – Debrief Sheet

Exploring extreme beliefs and appraisals, sleep, and trauma in non-clinical populations

DEBRIEF SHEET

This study aimed to compare the presence of extreme appraisals and beliefs, as well as the impact of sleep and trauma in a non-clinical population to a sample of individuals deemed to be at risk of developing bipolar disorder. You were asked questions about any difficulties that you may have experienced currently, or historically, with your mental health. You also completed some questionnaires with the researcher. Having this information will allow the researchers to look at the presence of these different factors in the two groups, and to make comparisons. By doing so, it is hoped that the research could help to inform the psychological support that is offered to individuals at risk of developing bipolar disorder in the future.

We would like to thank you for participating in this research. Your time and thoughtful responses are greatly appreciated.

If participating in this study has raised any concerns for you, please contact:

- Your GP
- Samaritans on 116 123 (free 24-hour helpline)
- SHOUT via text on 85258
- NHS 111
- In an emergency, please call 999

If you wish to withdraw your data, you can do so without reason by emailing one of the researchers listed below and providing details of your email address that was registered in the study. You can withdraw your data up to two weeks after completing the entire study.

Project contact details for further information

Lead Researchers:

Georgia Horne (Trainee Clinical Psychologist, ghorne1@sheffield.ac.uk)

Nikki Dehmahdi (Trainee Clinical Psychologist, ndehmahdi1@sheffield.ac.uk)

Research Supervisor: Professor Richard Bentall (r.bentall@sheffield.ac.uk)

In the event of a complaint, please contact the Head of Psychology at psy-hod@sheffield.ac.uk or the University of Sheffield Ethics and Research Integrity Manager, Lindsay Unwin, at l.v.unwin@sheffield.ac.uk.

Appendix J – Ethical Approval

Downloaded: 15/04/2024
Approved: 15/04/2024

Nikki Dehmahdi
Registration number: 220237871
Psychology
Programme: Doctorate in Clinical Psychology

Dear Nikki

PROJECT TITLE: The role of extreme beliefs and appraisals, sleep, and trauma in an at-risk population for bipolar disorder: A comparison with non-clinical controls
APPLICATION: Reference Number 057637

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 15/04/2024 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 057637 (form submission date: 04/04/2024); (expected project end date: 01/05/2025).
- Participant information sheet 1132160 version 4 (14/03/2024).
- Participant consent form 1132161 version 1 (19/01/2024).
- Participant consent form 1134828 version 1 (14/03/2024).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Department Of Psychology Research Ethics Committee
Ethics Administrator
Psychology

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy: https://www.sheffield.ac.uk/research-services/ethics-integrity/policy
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

Appendix K - SPSS Demographic Output

Gender

Group * Gender Crosstabulation

			Gender		
			Male	Female	Total
Group	Control	Count	11	53	64
		% within Group	17.2%	82.8%	100.0%
		% within Gender	34.4%	49.1%	45.7%
		% of Total	7.9%	37.9%	45.7%
	BAR	Count	21	55	76
		% within Group	27.6%	72.4%	100.0%
		% within Gender	65.6%	50.9%	54.3%
		% of Total	15.0%	39.3%	54.3%
Total		Count	32	108	140
		% within Group	22.9%	77.1%	100.0%
		% within Gender	100.0%	100.0%	100.0%
		% of Total	22.9%	77.1%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.149[a]	1	.143		
Continuity Correction[b]	1.598	1	.206		
Likelihood Ratio	2.185	1	.139		
Fisher's Exact Test				.162	.103
Linear-by-Linear Association	2.134	1	.144		
N of Valid Cases	140				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.63.

b. Computed only for a 2x2 table

Age

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Age	Control	64	19.73	2.405	.301
	BAR	76	20.53	2.840	.326

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Age	Equal variances assumed	5.801	.017	-1.761	138	.040	.080	-.792	.450	-1.681	.097
	Equal variances not assumed			-1.786	137.993	.038	.076	-.792	.443	-1.669	.085

Ethnicity

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	19.906[a]	9	.019
Likelihood Ratio	24.995	9	.003
Linear-by-Linear Association	6.422	1	.011
N of Valid Cases	140		

a. 18 cells (90.0%) have expected count less than 5. The minimum expected count is .46.

Education

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	89.785[a]	1	<.001		
Continuity Correction[b]	86.597	1	<.001		
Likelihood Ratio	103.581	1	<.001		
Fisher's Exact Test				<.001	<.001
Linear-by-Linear Association	89.143	1	<.001		
N of Valid Cases	140				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.09.

b. Computed only for a 2x2 table

Employment

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	77.675[a]	3	<.001
Likelihood Ratio	96.925	3	<.001
Linear-by-Linear Association	26.969	1	<.001
N of Valid Cases	140		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .91.

IMD

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Significance				95% Confidence Interval of the Difference
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
CurrentIMDDecile	Equal variances assumed	3.878	.051	8.539	136	<.001	<.001	3.84253	.44997	2.95268	4.73238
	Equal variances not assumed			8.417	121.636	<.001	<.001	3.84253	.45650	2.93882	4.74624

Independent-Samples Mann-Whitney U Test Summary

Total N	138
Mann-Whitney U	785.500
Wilcoxon W	3711.500
Test Statistic	785.500
Standard Error	231.306
Standardized Test Statistic	-6.790
Asymptotic Sig.(2-sided test)	<.001

Appendix L – SPSS output for clinical data

PTSD

Group * PTSDDiagnosis Crosstabulation

			PTSDDiagnosis		
			No	Yes	Total
Group	Control	Count	62	0	62
		% within Group	100.0%	0.0%	100.0%
		% within PTSDDiagnosis	60.2%	0.0%	50.0%
		% of Total	50.0%	0.0%	50.0%
	BAR	Count	41	21	62
		% within Group	66.1%	33.9%	100.0%
		% within PTSDDiagnosis	39.8%	100.0%	50.0%
		% of Total	33.1%	16.9%	50.0%
Total		Count	103	21	124
		% within Group	83.1%	16.9%	100.0%
		% within PTSDDiagnosis	100.0%	100.0%	100.0%
		% of Total	83.1%	16.9%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	25.282[a]	1	<.001		
Continuity Correction[b]	22.931	1	<.001		
Likelihood Ratio	33.424	1	<.001		
Fisher's Exact Test				<.001	<.001
Linear-by-Linear Association	25.078	1	<.001		
N of Valid Cases	124				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.50.

b. Computed only for a 2x2 table

ReexperiencingMet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	56	40.0	88.9	88.9
	Yes	7	5.0	11.1	100.0
	Total	63	45.0	100.0	
Missing	444.00	1	.7		
	System	76	54.3		
	Total	77	55.0		
Total		140	100.0		

AvoidanceMet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	61	43.6	96.8	96.8
	Yes	2	1.4	3.2	100.0
	Total	63	45.0	100.0	
Missing	444.00	1	.7		
	System	76	54.3		
	Total	77	55.0		
Total		140	100.0		

HyperarousalMet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	61	43.6	98.4	98.4
	Yes	1	.7	1.6	100.0
	Total	62	44.3	100.0	
Missing	444.00	1	.7		
	888.00	1	.7		
	System	76	54.3		
	Total	78	55.7		
Total		140	100.0		

PSQI

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	19.444[a]	1	<.001		
Continuity Correction[b]	17.549	1	<.001		
Likelihood Ratio	22.876	1	<.001		
Fisher's Exact Test				<.001	<.001
Linear-by-Linear Association	19.271	1	<.001		
N of Valid Cases	112				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.00.

b. Computed only for a 2x2 table

Descriptive Statistics

Dependent Variable: Total score

ThreeGroups	UpdatedEducation	Mean	Std. Deviation	N
Control	Not reached higher education	4.6000	2.40832	5
	Reached higher education	5.6842	2.67367	57
	Total	5.5968	2.65169	62
BAR with PTSD	Not reached higher education	11.8182	3.15652	11
	Reached higher education	9.0000	.	1
	Total	11.5833	3.11764	12
BAR without PTSD	Not reached higher education	9.4800	3.41711	25
	Reached higher education	9.2500	2.21736	4
	Total	9.4483	3.24682	29
Total	Not reached higher education	9.5122	3.81525	41

	Reached higher education	5.9677	2.78148	62
	Total	7.3786	3.65716	103

Tests of Between-Subjects Effects

Dependent Variable: Total score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	546.133[a]	6	91.022	10.681	<.001	.400
Intercept	779.015	1	779.015	91.414	<.001	.488
CurrentIMDDecile	.042	1	.042	.005	.944	.000
ThreeGroups	170.101	2	85.050	9.980	<.001	.172
UpdatedEducation	2.223	1	2.223	.261	.611	.003
ThreeGroups * UpdatedEducation	12.363	2	6.181	.725	.487	.015
Error	818.100	96	8.522			
Total	6972.000	103				
Corrected Total	1364.233	102				

a. R Squared = .400 (Adjusted R Squared = .363)

Estimates

Dependent Variable: Total score

ThreeGroups	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Control	5.149[a]	.687	3.785	6.512
BAR with PTSD	10.406[a]	1.525	7.378	13.433
BAR without PTSD	9.353[a]	.803	7.759	10.948

a. Covariates appearing in the model are evaluated at the following values: CurrentIMDDecile = 6.3010.

Pairwise Comparisons

Dependent Variable: Total score

(I) ThreeGroups	(J) ThreeGroups	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
Control	BAR with PTSD	-5.257*	1.675	.007	-9.339	-1.175

	BAR without PTSD	-4.205*	1.071	<.001	-6.814	-1.596
BAR with PTSD	Control	5.257*	1.675	.007	1.175	9.339
	BAR without PTSD	1.052	1.719	1.000	-3.137	5.242
BAR without PTSD	Control	4.205*	1.071	<.001	1.596	6.814
	BAR with PTSD	-1.052	1.719	1.000	-5.242	3.137

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

ISS

ThreeGroups * Hypomanic, mixed, euthymic, depressed Crosstabulation

			Hypomanic, mixed, euthymic, depressed				
			Hypomania	Mixed state	Euthymic	Depression	Total
ThreeGroups	Control	Count	6	0	54	4	64
		% within ThreeGroups	9.4%	0.0%	84.4%	6.3%	100.0%
		% within Hypomanic, mixed, euthymic, depressed	28.6%	0.0%	88.5%	28.6%	59.3%
		% of Total	5.6%	0.0%	50.0%	3.7%	59.3%
	BAR with PTSD	Count	3	5	3	1	12
		% within ThreeGroups	25.0%	41.7%	25.0%	8.3%	100.0%
		% within Hypomanic, mixed, euthymic, depressed	14.3%	41.7%	4.9%	7.1%	11.1%
		% of Total	2.8%	4.6%	2.8%	0.9%	11.1%
		Count	12	7	4	9	32

	BAR without PTSD	% within ThreeGroups	37.5%	21.9%	12.5%	28.1%	100.0%
		% within Hypomanic, mixed, euthymic, depressed	57.1%	58.3%	6.6%	64.3%	29.6%
		% of Total	11.1%	6.5%	3.7%	8.3%	29.6%
Total		Count	21	12	61	14	108
		% within ThreeGroups	19.4%	11.1%	56.5%	13.0%	100.0%
		% within Hypomanic, mixed, euthymic, depressed	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	19.4%	11.1%	56.5%	13.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	59.403[a]	6	<.001
Likelihood Ratio	64.831	6	<.001
Linear-by-Linear Association	8.683	1	.003
N of Valid Cases	108		

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is 1.33.

ISS – Activation Subscale

Descriptive Statistics

Dependent Variable: Sum of items 6,8,10,12,13

ThreeGroups	UpdatedEducation	Mean	Std. Deviation	N
Control	Not reached higher education	112.0000	50.69517	5
	Reached higher education	68.5965	69.08687	57
	Total	72.0968	68.50002	62
BAR with PTSD	Not reached higher education	232.2727	125.88415	11
	Reached higher education	160.0000	.	1
	Total	226.2500	121.82560	12
BAR without PTSD	Not reached higher education	208.2143	134.75255	28
	Reached higher education	101.7500	92.44232	4
	Total	194.9062	133.87292	32
Total	Not reached higher education	203.2955	128.55269	44
	Reached higher education	72.2097	70.69518	62
	Total	126.6226	117.82582	106

Tests of Between-Subjects Effects

Dependent Variable: Sum of items 6,8,10,12,13

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	508194.959[a]	6	84699.160	8.831	<.001	.349
Intercept	207914.235	1	207914.235	21.678	<.001	.180
CurrentIMDDecile	2433.419	1	2433.419	.254	.616	.003
ThreeGroups	55659.024	2	27829.512	2.902	.060	.055
UpdatedEducation	33071.146	1	33071.146	3.448	.066	.034
ThreeGroups * UpdatedEducation	7969.690	2	3984.845	.415	.661	.008
Error	949511.947	99	9591.030			

Total	3157236.000	106				
Corrected Total	1457706.906	105				

a. R Squared = .349 (Adjusted R Squared = .309)

Pairwise Comparisons

Dependent Variable: Sum of items 6,8,10,12,13

(I) ThreeGroups	(J) ThreeGroups	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
Control	BAR with PTSD	-107.823	56.151	.173	-244.569	28.923
	BAR without PTSD	-69.148	35.850	.170	-156.455	18.159
BAR with PTSD	Control	107.823	56.151	.173	-28.923	244.569
	BAR without PTSD	38.675	57.663	1.000	-101.754	179.104
BAR without PTSD	Control	69.148	35.850	.170	-18.159	156.455
	BAR with PTSD	-38.675	57.663	1.000	-179.104	101.754

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Univariate Tests

Dependent Variable: Sum of items 6,8,10,12,13

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	55659.024	2	27829.512	2.902	.060	.055
Error	949511.947	99	9591.030			

The F tests the effect of ThreeGroups. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

ISS – Depression Index Subscale

Descriptive Statistics

Dependent Variable: Sum of items 7,9

ThreeGroups	UpdatedEducation	Mean	Std. Deviation	N
Control	Not reached higher education	4.0000	8.94427	5
	Reached higher education	10.8772	17.95637	57
	Total	10.3226	17.45887	62
BAR with PTSD	Not reached higher education	89.0909	63.51449	11
	Reached higher education	200.0000	.	1
	Total	98.3333	68.50127	12
BAR without PTSD	Not reached higher education	64.7500	56.53096	28
	Reached higher education	126.7500	69.08147	4
	Total	72.5000	60.65662	32
Total	Not reached higher education	63.9318	59.43274	44
	Reached higher education	21.4032	43.41506	62
	Total	39.0566	54.63399	106

Tests of Between-Subjects Effects

Dependent Variable: Sum of items 7,9

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	154367.166[a]	6	25727.861	16.015	<.001	.493
Intercept	82602.974	1	82602.974	51.418	<.001	.342
CurrentIMDDecile	274.555	1	274.555	.171	.680	.002
ThreeGroups	88422.691	2	44211.345	27.520	<.001	.357
UpdatedEducation	20476.568	1	20476.568	12.746	<.001	.114
ThreeGroups * UpdatedEducation	11514.201	2	5757.101	3.584	.031	.068

Error	159044.494	99	1606.510			
Total	475106.000	106				
Corrected Total	313411.660	105				

a. R Squared = .493 (Adjusted R Squared = .462)

Pairwise Comparisons

Dependent Variable: Sum of items 7,9

(I) ThreeGroups	(J) ThreeGroups	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Control	BAR with PTSD	-136.440*	22.981	<.001	-192.406	-80.474
	BAR without PTSD	-86.812*	14.672	<.001	-122.544	-51.080
BAR with PTSD	Control	136.440*	22.981	<.001	80.474	192.406
	BAR without PTSD	49.628	23.600	.114	-7.845	107.102
BAR without PTSD	Control	86.812*	14.672	<.001	51.080	122.544
	BAR with PTSD	-49.628	23.600	.114	-107.102	7.845

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Univariate Tests

Dependent Variable: Sum of items 7,9

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	88422.691	2	44211.345	27.520	<.001	.357
Error	159044.494	99	1606.510			

The F tests the effect of ThreeGroups. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.