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Exploring Behavioural Patterns in Youth Predisposed to Bipolar Disorder and the Role of Interpersonal Trauma Using the Adolescent Brain Cognitive Development (ABCD) Dataset

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ABSTRACT

Introduction: Bipolar disorder (BD) is a severe, persistent disorder that causes functional impairment. Besides heritability, environmental factors, such as traumatic experience, impact the development of BD. Little is known about the early developmental signs of this disorder; therefore, this study aims to look at the impact of interpersonal trauma on the early developmental signs of BD. Specifically, differences in psychopathological behaviours were investigated between (1) at-risk children and controls and (2) at-risk children who experienced an interpersonal traumatic event and those who did not.

Methods: Using the Adolescent Brain Cognitive Development (ABCD) dataset, participants with a first-degree relative with BD were identified ($N_{\text{at-risk}} = 625$) and matched on sex and age to a control group ($N_{\text{control}} = 625$). The Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS) was used to assess interpersonal trauma and psychopathological symptoms. The trauma ($N_{\text{trauma}} = 198$) and no-trauma sub-groups ($N_{\text{no-trauma}} = 428$) were built from the at-risk population. Group comparison was conducted on depressive, manic and anxiety symptoms.

Results: Compared to controls, at-risk children exhibited a significantly greater number of manic symptoms at baseline and 2-year follow-up, and anxiety symptoms at follow-up. No significant differences were found between the trauma and no-trauma groups at either baseline or follow-up.

Discussion: These results confirm the presence of early symptoms in at-risk children, in line with the staging model of BD. Extended longitudinal research is needed to further investigate the potential specific role of trauma on its early behavioural patterns.

Bipolar disorders (BD) are severe, persistent mental disorders characterised by fluctuations in mood, energy and activity levels (Nierenberg et al. 2023) and are marked by substantially reduced psychosocial functioning (Akers et al. 2019) and premature mortality (Kessing et al. 2015). The onset of BD typically occurs in adolescence and early adulthood (Faedda et al. 2019; McGrath et al. 2023). BD impairs people's lives, families, work and general functioning (American Psychiatric Association 2013). Its

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burden becomes substantially larger with unrecognised or misdiagnosed individuals (McIntyre et al. 2022). Misdiagnosis rates are high in BD, leading to inappropriate treatment and negative outcomes (Fritz et al. 2017; Wolkenstein et al. 2011). For instance, when misdiagnosed as unipolar depression, administering antidepressants to those with bipolar disorder tends to trigger manic episodes and lead to poorer prognosis (Awad et al. 2007; Goldman et al. 2022; McIntyre et al. 2022). Delayed diagnoses and treatment also lead to increased mortality (Duffy et al. 2019) and healthcare costs (Singh and Rajput 2006).

BD runs in families, as shown by its high heritability estimates (Algorta et al. 2015; Bienvenu et al. 2011; Birmaher et al. 2009). Concordance rates are higher in monozygotic than dizygotic twins, showing that BD is strongly dependent on genetics (Edvardsen et al. 2008; O'Connell and Coombes 2021). Further twin studies showed heritable estimates of 0.85–0.93 (Kieseppä et al. 2004; McGuffin et al. 2003). Therefore, children with a first-degree relative with BD are considered at extremely elevated risk of developing BD themselves.

Moreover, BD has recently been suggested to develop through progressive stages, suggesting that symptoms slowly develop before reaching the full-blown manifestation of the disorder (Vieta et al. 2018). Duffy et al. (2019) mapped out a potential trajectory of BD's emerging course: children with a familial risk of developing BD might first experience sleep and anxiety symptoms, then minor mood symptoms, before presenting a major depressive disorder and eventually develop a first full-blown BD episode (Duffy et al. 2019). Moreover, a review by Vieta et al. (2018) also endorsed sleep problems, anxiety and mood disorders as vulnerability markers of the development of bipolar disorder in the offspring of parents with BD.

Environmental factors, such as the experience of traumatic stressful events in youth, are also implicated in the development of psychopathology (Gur et al. 2019). Although many studies emphasise the importance of considering familial and developmental factors when diagnosing children at risk for BD, some have specifically investigated the impact of traumatic experience on the clinical course of this disorder. Traumatic experiences can be differentiated into interpersonal (i.e., consequences of other people's direct actions) and non-interpersonal (i.e., other life-threatening events, such as severe accidents or illness) (Hughesdon et al. 2021). Interpersonal traumatic experiences, such as abuse and neglect, are particularly correlated with the development of BD (Li et al. 2023a). These traumatic events are more likely to occur in individuals diagnosed with BD compared to control groups (Li et al. 2023a; Palmier-Claus et al. 2016; Yang et al. 2024). Additionally, the frequency of childhood adversity among individuals with BD is relatively high, ranging from 45% to 68% (Daruy-Filho et al. 2011; Li et al. 2023a). Therefore, examining the impact of interpersonal traumatic events on the early stages of development of BD, rather than only its course, may be crucial for recognising it early and potentially preventing its onset.

Therefore, the aim of this study was to observe the development of early psychopathological behaviours (e.g., mood disorders and anxiety) that are considered to illustrate the emergent course of BD, in children at risk of developing BD and more specifically those who experienced an interpersonal traumatic event. The Adolescent Brain Cognitive Development (ABCD) longitudinal dataset was used to compare, at both baseline and 2-year follow-up, the psychopathological behaviours between (1) at-risk children and controls and between (2) at-risk children who experienced an interpersonal traumatic event and those who did not. The hypotheses were that (1) at-risk children would present more anxiety and mood symptoms than the control group and (2) these symptoms would be more frequent in children at risk who have experienced a traumatic event when compared to those who did not.

1 | Methods

1.1 | Participants

1.1.1 | Dataset

The Adolescent Brain Cognitive Development (ABCD) study is the largest longitudinal study ongoing in the United States on brain development and child mental health (Garavan et al. 2018). At baseline, 11880 participants aged 9–10, and their families, were recruited through schools. The ABCD study ensured that participants were representative of the U.S. population with regard to gender, ethnicity, education, income level and living environment. The study has been designed to take place over 10 years, where every year participants are tested on multimodal assessments such as physical, social, emotional, environmental, behavioural and neuroimaging measures.

1.1.2 | Family History

The main inclusion criterion for this study's at-risk group was for participants to have at least one first-degree relative with BD. Familial history was identified using the 'ABCD Parent Family History Summary Scores' data which utilised the Family History Assessment Module Screener (FHAM-S; Barch et al. 2021; Rice et al. 1995). The ABCD's Family History includes a summary score of all that was reported by the caregiver on lifetime occurrences of different psychological issues in first- and second-degree biological relatives of the participants. Variables of interest were those that assessed whether 'mania problems' were experienced by the father, mother or siblings (e.g., 'Have any of your relatives ever had a period of time when others were concerned because they suddenly became more active day and night and seemed not to need any sleep and talked much more than usual for them?'). In total, 626 participants were considered at risk at baseline and 566 were identified at the 2-year follow-up. Adopted children were not uniformly excluded from this study since these assessments specifically referred to biological first-degree relatives.

1.2 | Measures

The ABCD study used the Kiddie Schedule for Affective Disorders and Schizophrenia–Lifetime Version (Kaufman et al. 1997) to assess mental health diagnoses and symptoms in children. The K-SADS-PL is a highly reliable semi-structured

interview that assesses the manifestation of past and current psychopathological disorders in children, according to the *Diagnostic and Statistical Manual for Mental Disorders Fifth Edition* (*DSM V*) criteria. These interviews were administered both with the parent and the child, and a total score was calculated. Each symptom was rated present or absent, and present symptoms were summed for each syndrome. Of interest to this study were the syndromes relating to mania/hypomania, depression and anxiety.

1.3 | Procedures

At baseline, children with at least one first-degree relative who was reported to have experienced mania problems were classified into the at-risk group. This at-risk group was matched by sex and age to a control group with no first-degree relatives with mania problems. Within the at-risk group, participants were further divided into trauma and no-trauma sub-groups based on whether they had experienced at least one of the nine interpersonal traumatic events according to the KSADS PTSD measure.

Consequently, at the 2-year follow-up, two separate comparisons were conducted. For children who experienced a traumatic event exclusively before ages 9–10, symptoms were summed across both past and current occurrences. For children who endorsed at least one interpersonal traumatic event before ages 11–12, both current symptoms and symptoms that emerged between the ages of 9–10 and 11–12 were compared to ensure that symptoms preceding follow-up trauma were not included in the analysis. The different traumatic events experienced by the children at baseline and follow-up are shown in Figure S1. The KSADS-PL was used to assess whether participants experienced manic, depressive and/or anxious symptoms. Anxiety disorders of interest were social anxiety disorder (SAD) and generalised anxiety disorder (GAD) because all others (panic disorder [PD], agoraphobia and separation anxiety disorder) were not endorsed. The ABCD dataset included a summary score of the different psychopathologies' symptoms with a Boolean scoring method. Scores were divided into 'past' and 'current' time points indicating the time at which the KSADS-PL was administered within the ABCD study. All retained participants had completed assessments for mood and anxiety.

1.4 | Statistical Analysis

Statistical analyses were conducted using the R studio software (R version 4.4.1: 2024-06-14; RStudio Team 2024). The at-risk and control groups were matched on sex and age using the MatchIt package and these were compared using the chi-square and Mann–Whitney *U* test, respectively, to confirm the matching procedure and compare the trauma sub-groups (Ho et al. 2011).

Two statistical tests were conducted to compare depression, mania, SAD and GAD symptomatology between the at-risk and control groups and between the trauma and no-trauma sub-groups. First, a Mann–Whitney *U* test assessed differences in the number of symptoms experienced across the various syndromes. This test was chosen for its ability to handle non-normally distributed data. Second, a chi-square test was conducted to determine if there was a significant difference in the proportion of children experiencing at least one symptom across the syndromes, depending on their group classification. These analyses were performed at both baseline and at a 2-year follow-up. At baseline, we calculated a composite score of past and current symptoms for all psychopathologies and reported the number of children who experienced at least one symptom at ages 9–10. At the 2-year follow-up, we calculated symptoms as the sum of past and current symptoms reported at ages 11–12. We also examined the additional number of children who experienced at least one new symptom between the baseline and follow-up time points (i.e., between ages 9–10 and 11–12).

2 | Results

Demographic characteristics are outlined in Table S1.

At baseline, 626 children met the inclusion criteria for the at-risk group, and when matched control participants on age and sex, 625 remained for the at-risk/control comparisons. Subsequently, 198 children were classified in the trauma sub-group and 428 in the no-trauma sub-group. Due to loss to follow-up, only 566 children from the at-risk group were included in the 2-year follow-up, consisting of 205 children in the trauma sub-group and 361 in the no-trauma sub-group. However, after matching the at-risk group to a control group on sex and age, only 555 children remained for the at-risk/control comparisons. At the 2-year follow-up, comparisons assessed children who experienced a traumatic event on either of two occasions: before 9–10 years old or before 11–12 years old.

2.1 | At-Risk Versus Control

As shown in Table 1, at 9–10 years old, the at-risk group reported a significantly greater number of manic symptoms compared to the control group ($p = 0.04$). At 11–12 years old, the at-risk group experienced a significantly greater number of manic ($p = 0.02$) and SAD ($p < 0.01$) symptoms. Although there was a trend towards a greater number of depressive symptoms at follow-up in the at-risk group compared to the control group, this difference was not statistically significant ($p = 0.08$).

As per Table 2, there was no statistical significance in any of the syndromes when comparing the number of at-risk children who experienced at least one symptom at 9–10 years old. Between 9–10 and 11–12 years old, the number of children in the at-risk group who experienced at least one depressive, manic and SAD symptom was significantly greater than the control group ($p < 0.01$). There was also a trend in a greater number of children experiencing GAD symptoms ($p = 0.08$).

2.2 | Trauma Versus No Trauma

To assess the potential association of traumatic experiences and the emergence of symptoms, three different analyses were

TABLE 1 | Comparing, by syndrome, at-risk and control groups on number of cumulative symptoms experienced.

	At risk		Control			
Syndrome	**Mean [min, max]**		**Mean [min, max]**		**W**	***p***
Depression						
at 9–10 y/o	2.44	[0, 26]	2.22	[0, 26]	191 381	0.77
at 11–12 y/o	4.80	[0, 52]	3.87	[0, 44]	143 872	*0.08*
Mania						
at 9–10 y/o	2.12	[0, 25]	1.52	[0, 23]	182 100	**0.04**
at 11–12 y/o	4.26	[0,50]	3.03	[0, 48]	142 199	**0.02**
SAD						
at 9–10 y/o	0.42	[0, 13]	0.31	[0, 14]	188 270	0.08
at 11–12 y/o	1.15	[0, 18]	0.54	[0, 14]	134 182	**< 0.01**
GAD						
at 9–10 y/o	0.37	[0, 13]	0.41	[0, 14]	193 228	0.97
at 11–12 y/o	0.88	[0, 20]	0.74	[0, 19]	144 278	0.17

Note: At baseline, when 9–10 y/o: $N_{\text{at risk}} = 625$ and $N_{\text{control}} = 625$; at follow-up, when 11–12 y/o: $N_{\text{at risk}} = 555$ and $N_{\text{control}} = 555$. Bold: significant ($ps < 0.05$) and italic: trend ($0.05 < p < 0.09$). SAD: social anxiety disorder; GAD: generalised anxiety disorder; y/o: years old; at-risk group: participants with at least one first-degree relative diagnosed with bipolar disorder (BD); control group: participants with no first-degree relatives with a history of mania problems.

TABLE 2 | Comparing, by syndrome, at-risk and control groups on number of children who experienced at least one symptom.

	At risk		Control			
Syndrome	***N***	**%**	***N***	**%**	**χ^2 (df)**	***p***
Depression						
at 9–10 y/o	370	59.20	382	61.12	0.55 (1)	0.46
between 9–10 and 11–12 y/o	144	25.95	94	16.94	12.55 (1)	**< 0.01**
Mania						
at 9–10 y/o	214	34.24	186	29.76	2.50 (1)	0.11
between 9–10 and 11–12 y/o	121	21.80	84	15.14	7.54 (1)	**< 0.01**
SAD						
at 9–10 y/o	52	8.32	36	5.76	2.67 (1)	0.10
between 9–10 and 11–12 y/o	63	11.35	22	3.96	20.17 (1)	**< 0.01**
GAD						
at 9–10 y/o	41	6.56	41	6.56	2.67 (1)	1.00
between 9–10 and 11–12 y/o	51	9.19	34	6.13	3.17 (1)	*0.075*

Note: At baseline: $N_{\text{at risk}} = 625$ and $N_{\text{control}} = 625$; at follow-up: $N_{\text{at risk}} = 555$ and $N_{\text{control}} = 555$. Bold: significant ($ps < 0.05$) and italic: trend ($0.05 < p < 0.09$). SAD: social anxiety disorder; GAD: generalised anxiety disorder; y/o: years old; at-risk group: participants with at least one first-degree relative diagnosed with bipolar disorder (BD); control group: participants with no first-degree relatives with a history of mania problems.

conducted with the traumatic experience preceding the symptoms: for children who experienced trauma before ages 9–10, symptoms were analysed (1) at ages 9–10 and (2) between ages 9–10 and 11–12 and for those who experienced trauma before ages 11–12, symptoms were analysed (3) at ages 11–12. The third analysis focused solely on symptoms manifested in the current time point at 11–12 years of age. Figures S2–S4 illustrate the distribution of symptoms across different psychopathologies, comparing the trauma and no-trauma groups for these three analyses. No statistically significant differences were observed in the number of symptoms experienced between the trauma and no-trauma sub-groups across the four syndromes (Table 3). Furthermore, there was no significant difference in the number of children who experienced at least one symptom in any of the syndromes between the two groups (Table 4).

TABLE 3 | Comparing, by syndrome, trauma and no-trauma groups on number of symptoms experienced.

Time point of Traumatic Experience	Syndrome	Trauma		No trauma		W	*p*
		Mean [min, max]		Mean [min, max]			
Depression							
Before ages 9–10	current at 9–10	1.01	[0, 10]	0.89	[0, 10]	41 788	0.89
	between 9–10 and 11–12	2.37	[0, 22]	1.90	[0, 28]	31 387	0.25
Before ages 11–12	current at 11–12	0.61	[0, 11]	0.41	[0, 14]	34 514	0.13
Mania							
Before ages 9–10	current at 9–10	0.53	[0, 13]	0.49	[0, 10]	42 114	0.97
	between 9–10 and 11–12	1.24	[0, 17]	1.39	[0, 20]	33 402	0.73
Before ages 11–12	current at 11–12	0.37	[0, 11]	0.18	[0, 10]	35 578	0.57
SAD							
Before ages 9–10	current at 9–10	0.04	[0, 6]	0.11	[0, 7]	42 716	0.21
	between 9–10 and 11–12	0.75	[0, 13]	0.72	[0, 14]	32 680	0.78
Before ages 11–12	current at 11–12	0.23	[0, 7]	0.22	[0, 7]	36 159	0.88
GAD							
Before ages 9–10	current at 9–10	0.13	[0, 7]	0.10	[0, 7]	41 780	0.59
	between 9–10 and 11–12	0.44	[0, 9]	0.62	[0, 13]	33 297	0.70
Before ages 11–12	current at 11–12	0.11	[0, 7]	0.18	[0, 7]	36 652	0.28

Note: Current at 9–10: $N_{\text{trauma}} = 198$ and $N_{\text{no-trauma}} = 428$; between 9–10 and 11–12: $N_{\text{trauma}} = 171$ and $N_{\text{no-trauma}} = 395$; current at 11–12: $N_{\text{trauma}} = 205$ and $N_{\text{no-trauma}} = 361$; trauma sub-group (within at-risk group): at-risk participants who endorsed experiencing at least one of nine interpersonal traumatic events as measured by the KSADS PTSD module at baseline. No-trauma sub-group (within at-risk group): at-risk participants who did not endorse any of the nine interpersonal traumatic events on the KSADS PTSD measure at baseline.

3 | Discussion

The broader aim of this study was to add to the body of literature exploring early signs of development of BD, to aid in increasing early detection of BD and improving preventative measures. Specifically, it aimed to investigate early psychopathological behaviours in children at risk of developing BD and to explore the association of interpersonal trauma with these behaviours. Using this large dataset, it was observed that the at-risk group experienced a higher number of manic symptoms at baseline and 2-year follow-up and SAD symptoms at follow-up. Additionally, between 9–10 and 11–12 years old, the number of children endorsing at least one depressive, manic or SAD symptom was significantly greater in the at-risk group than in the control group. Surprisingly, there was no statistically significant difference in the expression of psychopathological symptoms between the trauma and no-trauma sub-groups within the at-risk group.

3.1 | At-Risk Versus Control Groups

At both time points, the at-risk group had a significantly higher number of manic symptoms endorsed and a higher number of children who had experienced at least one manic symptom. This finding is somewhat surprising given previous literature has observed that manic symptoms usually manifest at later stages in life (Duffy et al. 2019), raising the question of whether this study accurately captured manic symptoms in this population. Some of the manic symptoms addressed in the semi-structured clinical interviews were irritability, decreased need for sleep, pressured speech, increased thoughts, flight of ideas, agitation and distractibility. These symptoms are commonly present in attention hyperactivity disorder (ADHD), a neurodevelopmental disorder characterised by inattention, hyperactivity and impulsivity (Li et al. 2023b). There is considerable overlap between these two disorders and studies have explored ways to distinguish between them (Barden et al. 2023). While this study focuses on the number of symptoms rather than diagnoses, it is possible that ADHD symptoms may have contributed to the observed statistically significant differences in manic symptoms between the at-risk and control groups at baseline and follow-up. That is, ADHD is much more frequent at the ages tested, with an estimated prevalence of 10%–10.5% among the US children and adolescents (Li et al. 2023b).

The higher numbers of symptoms and incidences of depression and anxiety within the at-risk group at follow-up are in line with and contribute to previous literature (Duffy 2018; Duffy et al. 2019; Faedda et al. 2019; Vieta et al. 2018). Specifically, this research aligns with Duffy et al.'s (2019) results and hypothesised trajectory of emerging disorders, given at-risk participants showed a greater number of depressive and anxious symptoms when they were older (11–12) at 2-year follow-up, than at baseline (9–10). Furthermore, as per the literature, children with a predisposition to bipolar disorder seem to experience more depressive symptoms and episodes than healthy controls

TABLE 4 | Comparing, by syndrome, trauma and no-trauma groups on the number of children who experienced at least one symptom.

Time point of Traumatic		Trauma		No trauma			
Experience	**Syndrome**	***N***	**%**	***N***	**%**	**χ^2 (df)**	**p**
Depression							
Before ages 9–10	current at 9–10	106	53.54	234	54.80	0.02 (1)	0.41
	between 9–10 and 11–12	50	24.39	99	27.42	0.86 (1)	0.35
Before ages 11–12	current at 11–12	30	14.63	38	10.53	1.76 (1)	0.18
Mania							
Before ages 9–10	current at 9–10	27	13.64	59	13.82	0 (1)	1
	between 9–10 and 11–12	37	18.05	89	24.65	0.02 (1)	0.90
Before ages 11–12	current at 11–12	17	8.29	26	7.20	0.11 (1)	0.75
SAD							
Before ages 9–10	current at 9–10	2	1.01	11	2.58	0.94 (1)	0.33
	between 9–10 and 11–12	21	10.24	45	12.47	0.02 (1)	0.88
Before ages 11–12	current at 11–12	9	4.39	17	4.71	0.00 (1)	1
GAD							
Before ages 9–10	current at 9–10	5	2.53	8	1.87	0.06 (1)	0.81
	between 9–10 and 11–12	15	7.32	38	10.53	0.03 (1)	0.87
Before ages 11–12	current at 11–12	4	1.95	13	3.60	0.71 (1)	0.4

Note: Current at 9–10: $N_{\text{trauma}} = 198$ and $N_{\text{no-trauma}} = 428$; between 9–10 and 11–12: $N_{\text{trauma}} = 171$ and $N_{\text{no-trauma}} = 395$; current at 11–12: $N_{\text{trauma}} = 205$ and $N_{\text{no-trauma}} = 361$; trauma sub-group (within at-risk group): at-risk participants who endorsed experiencing at least one of nine interpersonal traumatic events as measured by the KSADS PTSD module at baseline. No-trauma sub-group (within at-risk group): at-risk participants who did not endorse any of the nine interpersonal traumatic events on the KSADS PTSD measure at baseline.

(Duffy 2018) and half of patients who eventually meet diagnostic criteria for BD have experienced mood symptoms or episodes of major depressive disorder in their youth (Faedda et al. 2019).

3.2 | Trauma Versus No-Trauma Groups

When comparing the trauma and no-trauma at-risk sub-groups, no statistically significant differences were found in the number of symptoms or incidences across all psychopathologies examined. However, this does not discount the potential role of trauma in the early developmental signs of BD. Existing literature provides substantial evidence linking interpersonal trauma and childhood trauma to the development, persistence and recurrence of BD (Hillegers et al. 2004; Li et al. 2023a; Nierenberg et al. 2023; Watson et al. 2014; Wrobel et al. 2023). Therefore, it was unexpected to observe that having experienced an interpersonal traumatic event did not appear to be associated with differential early developmental signs of BD in this study.

It is also important to address that offspring, children and adolescents of parents with BD are susceptible to the development of not only BD, but also other psychopathologies, such as depression and anxiety (DelBello and Geller 2001). That is, even the no-trauma group is still susceptible to developing BD and other psychopathologies, which might account for why there was no statistically significant difference between the trauma and no-trauma sub-groups.

Previous research has typically investigated childhood trauma using retrospective cohorts (Li et al. 2023a; Palmier-Claus et al. 2016; Watson et al. 2014), which rely on individuals' recollections of their experiences. It is interesting to consider how a person's lived experience and personal history might shape their perceptions of trauma and its impact, potentially influencing clinical trajectories over time. Factually, patients with BD seem to have higher emotional memory, which is associated with the high recall of traumatic or emotionally adverse events in those populations (Fijtman et al. 2020). This study investigated the *prospective* effects of traumatic events on early developmental signs of BD.

Furthermore, previous studies often used the Childhood Trauma Questionnaire (CTQ), which assesses emotional abuse, physical abuse, sexual abuse, emotional neglect and physical neglect. Specifically, BD's clinical course has been most strongly correlated with trauma related to emotional abuse and emotional neglect (Li et al. 2023a; Rowe et al. 2024; Watson et al. 2014). It is important to note that the traumatic events assessed using the PTSD measure in this study do not overlap with these categories. This discrepancy may largely account for the unexpected result of no statistically significant differences in the number of symptoms or incidences of psychopathologies between the trauma and no-trauma groups.

Interestingly, the rate of participants who self-reported having experienced a childhood traumatic event was as high as 78% in

previous studies (Rowe et al. 2024). In this study, the percentage of children who claimed they had experienced a traumatic event was only 30% at baseline and 37% at the 2-year follow-up. Children may have been reluctant to share their traumatic experiences, particularly since five of the nine interpersonal traumatic events inquired about involved their family or home environment, to which they would be returning. Therefore, this study might not have an accurate representation of children who actually experienced trauma.

3.3 | Limitations

This study had a few limitations. First, the at-risk group was primarily chosen to have at least one first-degree relative with a history of mania. However, the assessment of mania for first-degree relatives was based on self- or other report and not confirmed by a structured interview. Second, as discussed, this ABCD study is collecting prospective data and the children's report on their recent traumatic experiences might be underestimated. Third, as this study did not explore all potential diagnoses and used symptoms rather than diagnostic criteria, the overlap between manic and ADHD symptoms warrants caution when interpreting the results. Finally, although psychotic symptoms are more commonly observed in later life stages rather than childhood (Pavuluri et al. 2005), it is important to acknowledge the lack of investigation into psychotic symptoms within this context. Another limitation of this study is the follow-up period, which only extended to ages 11–12. Some children may have developed symptoms later, beyond the typical onset age for adolescence and early adulthood (Faedda et al. 2019). This could help explain the lack of observed differences. A longer follow-up period might reveal differences not captured in this study.

3.4 | Future Directions

This study contributes to the growing body of literature investigating early onset signs of bipolar disorder (BD). It aligns with previous research suggesting that BD has a progressive nature, with psychopathological symptoms appearing before the first full-blown manic episode (Duffy et al. 2019; Vieta et al. 2018). Even though this study bore non-significant results in the comparison of the trauma and the no-trauma sub-groups, research must be conducted to investigate the impact of interpersonal trauma on early developmental signs of BD. Retrospectively, childhood interpersonal traumatic events have been shown to lead to earlier development and worse prognosis of BD (Li et al. 2023b; Palmier-Claus et al. 2016). Therefore, more longitudinal studies are necessary to further explore the progression of BD in at-risk children and to investigate the effect of interpersonal trauma on its development.

Sustaining this line of inquiry is crucial because it provides insight on early developmental signs of BD. Clinicians will need to exercise caution when diagnosing at-risk children or adolescents with depression or anxiety. Furthermore, adapted care, such as psychoeducative and psychosocial interventions, should be administered in such scenarios (Cotton et al. 2020). This could potentially reduce misdiagnoses of individuals manifesting BD and lead to improved prognoses.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.