



Original article

The mediating role of borderline personality features in the relationship between childhood trauma and psychotic-like experiences in a sample of help-seeking non-psychotic adolescents and young adults

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ABSTRACT

Objective: Psychotic-like experiences (PLEs) often occur across different non-psychotic disorders in adolescent and young adult population and are related to early trauma. However, the mechanisms of how exposure to early trauma shapes the risk of PLEs are unclear. In our study, we investigated whether borderline personality features and further non-psychotic symptoms, i.e. factors related to both PLEs and childhood trauma, may mediate the relationship between childhood trauma and PLEs.

Methods: Two hundred inpatients aged 16–21 years who were treated due to non-psychotic disorders were included. PLEs were assessed with the Prodromal Questionnaire (PQ-16). Childhood Trauma was assessed with the Adverse Childhood Experience Questionnaire (ACE). Borderline personality features were assessed by using the Borderline-Symptom Checklist (BSL-23). Presence and frequency of depressive symptoms and anxiety were assessed by Patient Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder Questionnaire (GAD-7).

Results: A significant relationship between childhood trauma (ACE total score) and PLEs was found ($\beta = 0.30$, 95% CI 0.247–0.659). In particular, emotional neglect ($r = 0.298$, $p < 0.001$) and sexual abuse ($r = 0.264$, $p < 0.001$) were significantly associated with PLEs. Borderline personality features fully mediated the relationship of childhood trauma and PLEs ($\beta = 0.12$, 95% CI: -0.019–0.370). Anxiety and Depression showed a significant, but partial mediation of the relationship.

Conclusion: Borderline personality features seem to be an important mediator of the relationship between childhood trauma and PLEs in adolescent patients with different non-psychotic psychiatric disorders. Theoretical and clinical implications are discussed.

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1. Introduction

Psychotic-like experiences (PLEs) can be defined as subclinical psychotic phenomena like perceptual anomalies and delusion-like experiences in the absence of manifest psychotic illness [1–3]. PLEs are common and mostly transient in the general population, with the highest prevalence being observed among children and adolescents [4–7]. Although PLEs often occurs in children and adolescents without impairments or pathological significance, if persisting over time these symptoms may become a source of functional impairment, an increased risk for a wide range of

nonpsychotic psychopathology, tendency to self-injurious behavior, and higher stress [6,8–12].

Approximately 80% of the 13 to 16-year-old non-help seeking adolescents from community reported PLEs had a non-psychotic Axis-I disorder [12]. The presence of PLEs in community samples was associated with an increased severity of non-psychotic symptoms characterized by multiple co-occurring diagnoses [12], a significantly lower psychosocial function level and a poorer course of the illness [3,13]. This also holds for clinical samples. A study conducted on 108 adolescent outpatients (12–16 years) showed that 78% of those who reported PLEs also met the criteria for two or more non-psychotic psychiatric disorders [11] and the presence of PLEs were associated with poorer social and role functioning and increased severity of non-psychotic symptoms [14–16]. The occurrence of PLEs in adolescents seems closely linked to various psychiatric symptoms [12,13,17–19]. For example,

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the lifetime diagnosis of a major depressive or an anxiety disorder was associated with a significantly higher prevalence of PLEs [17].

In particular, Borderline Personality Disorder (BPD) or BPD features seem to be a risk factor for the development of PLEs; recent studies showed that up to 50% of the patients with BPD reported psychotic experiences, especially if they were exposed to childhood trauma [20–26]. In a recent study [27], more than a third of patients with BPD presented a variety of PLEs that particularly included alterations of perception. In the early days the term borderline reflected the idea that patients with borderline specific pathology were on the border to psychosis [28]. It was observed that patients with BPD tend to develop psychotic symptoms which would assume as the expression of a pathognomonic feature of the disorder [29]. Within psychodynamic perspective reality testing in patients with BPD is usually unimpaired, but may lose this ability under the influence of severe stress (particularly interpersonal difficulties) [30].

An important factor that may contribute both to the development of PLEs and BPD features is childhood exposure to traumatic life events. Indeed, studies consistently show a link between childhood trauma such as physical, sexual and emotional abuse and neglect and the development of psychotic-like experiences [31–33]. Adolescents who presented PLEs were more frequently exposed to physical abuse, neglect and domestic violence in their childhood or experienced discrimination such as bullying [34–36]. Similarly, the development of BPD is strongly related to childhood trauma [37] and it was suggested that childhood trauma could constitute an etiological factor for the development of BPD [25,38]. However, the interplay between exposure to childhood trauma, BPD features, anxiety, depression, and PLEs among adolescents and young adults has not yet been investigated.

The primary aim of the study was to fill this gap in our knowledge on the mechanisms related to personality features of the relationship between childhood trauma and PLEs in non-psychotic adolescents and young adults referring to psychiatric service. Considering the findings that childhood trauma is putatively involved in the pathogenesis of both BPD and PLEs, we hypothesized that the presence of borderline personality features in adolescent patients with various non-psychotic psychiatric disorders serve as a mediator of the relationship between childhood trauma and PLEs in a sample of non-psychotic adolescent help-seekers. As mentioned above, individuals with depression and anxiety also often report PLEs [17]. Moreover, some studies emphasized the particular role of anxiety and depression regarding the relationship of traumatic experiences and PLEs [35,39]. Hence, based on the diagnostic heterogeneity of our sample and the existence of indices that symptoms of depression and anxiety could have an influence on the relationship between childhood trauma and PLEs as well, we performed additional analysis to prove their influence.

2. Method

2.1. Participants

The study cohort was obtained from 200 inpatients (133 women and 67 men) with a mean age of 18.7 years ($SD=1.85$) who presented to the adolescent ward at University Medical Centre Hamburg Eppendorf, Department for Psychiatry and Psychotherapy (Germany) due to non-psychotic psychiatric disorders. All consecutive new inpatients were included in the study during 2015 and 2017. Patients with psychotic disorders were excluded from this study. A history of drug use or one or more comorbid disorders were not an exclusion criterion.

It was part of the general diagnostic approach of the ward to examine patients while enrollment with different diagnostic

interviews and self-reporting questionnaires to verify their diagnosis and it will be during the treatment which takes mostly 8–10 weeks carefully proved till discharge. Ethical approval for the study was received from local ethics commission.

2.2. Measures

2.2.1. Diagnostic instruments

To assess current and lifetime Axis-I diagnosis and exclude patients with psychotic disorders all patients were routinely administered the Structured Clinical Interview for the Diagnostic and statistical manual of mental disorders, 4th edition (DSM-IV) [40] at the point of beginning their inpatient treatment. For the assessment of personality disorders, we used the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II) [41].

2.2.2. Clinical measures/Questionnaires

Psychotic-like experiences were assessed using the Prodromal Questionnaire 16-item Scale (PQ-16) [42], which is the short version of 92-item Prodromal Questionnaire [43] to screen for the presence of PLEs and associated distress. The German translation was conducted by two clinical psychologists both fluent in English. A back-translation was performed by a native English-speaking translator. The self-rating questionnaire captures perceptual abnormalities (9 items), unusual thought content and paranoia (5 items) and negative symptoms (2 items). Each item can be marked true/false. For every item marked with true, patients have to rate the distress scale ranging from 0 (no distress) to 3 (severe). Scoring can be produced by summing all positive screened items (range 0–16) as well as by a sum of the distress score (range 0–48). Cronbach's alpha for the PQ-16 is 0.77.

Traumatic life events were assessed by using the Adverse Childhood Experience Questionnaire (ACE) [44], a 10 item questionnaire developed for the assessment of adverse life events in childhood and youth until the age of 18 years. Every item can be answered yes/no and can be summed to a general score which shows the quantity of burden. The items captured emotional, physical and sexual abuse as soon as emotional and physical neglect, separation from a parent, violence against the mother, substance abuse or dependence, mental illness and/or imprisonment of a member of the household. ACE has satisfactory psychometric characteristics, with Cronbach's alpha 0.75.

Borderline personality features were assessed by using the Borderline Symptom List (BSL-23) [45], a short version of the origin 95-item questionnaire [46] for the assessment of typical borderline symptomatology. This 23 item self-rating instrument contains those items from the long version that discriminate well between BPD and other disorders and had shown high levels of sensitivity. The items are quantitatively assessed on a 5-point Likert scale that ranges from 0 (not at all) to 4 (very strong) and assessed severity of Borderline personality disorder as well as sensitivity to change. Cronbach's alpha for the BSL-23 is 0.94.

Depressive and Anxiety Symptoms were assessed by submodules of the Patient Health Questionnaire, German version (PHQ-D) [47], a screening tool for the assessment of common mental disorders. The PHQ-9 [48] is a nine-item questionnaire used for the screening of presence and frequency of depressive symptoms. Its items are based on the DSM-IV criteria for depression and figure depressive symptoms over the past two weeks including mood symptoms (e.g. sadness or irritability, anhedonia, loss of interests, guilt feelings and worthlessness), cognitive symptoms (concentration disorders, impaired decision-making ability), physical symptoms (e.g. fatigue, sleep disturbances, changes in appetite) as soon as suicidal ideations. Anxiety was assessed using the Generalized Anxiety Disorder questionnaire (GAD-7) [49], this

Table 1
Clinical characteristics ($n = 200$).

	Mean (SD)
Male/female	67/133
Age	18.72 (1.85)
<i>Clinical diagnosis</i>	
Depressive disorder (F32.1, F32.2, F33.0, F33.1, F33.2)	167 (83.5%)
Anxiety disorder (F40.1, F41.0, F41.1, F41.2)	51 (25.5%)
<i>Comorbidities</i>	
PTSD	26 (13.0%)
Personality disorders (F60.30, F60.31, F60.4, F60.6, F60.7, F60.8, F61)	124 (66.5%)
Eating disorder (F50.0, F50.1, F50.2)	19 (9.5%)
Others (F42.1, F42.2, F45.1, F44.5, F90.0)	33 (16.5%)

Measures: The Structured Clinical Interview for the Diagnostic and statistical manual of mental disorders, 4th edition (DSM-IV) (SCID-I) and the Structured Clinical Interview for DSM-IV Axis II Personality Disorders II (SCID-II) were used to identify the clinical diagnoses.

7-item self-reported questionnaire can be used to detect individuals with generalized anxiety disorders and to estimate the severity of anxiety overall. On both scales, patients were asked to rate their symptoms for the last two weeks on a 4 point scale (0 - Not at all; 1 - Several days; 2 - More than half the days; 3 - Nearly every day), which can be calculated to a total sum within a range from 0 to 27 for depressive symptoms and 0 to 21 for anxiety. Cronbach's alpha for GAD-7 is 0.83 and for PHQ-9 - 0.80.

2.3. Analysis

Our main aim was to investigate the association between childhood trauma and PLEs and its mechanisms by considering BPD features, depression and anxiety as mediators of the relationship. The statistical analysis was conducted using Statistical Package for Social Sciences (SPSS) for Windows version 22 (IBM Statistics) and the Process macro [50] for SPSS. To investigate the relations between PLEs, childhood trauma and BPD features, as well anxiety and depression (psychopathologic variables) we first calculated Pearson's correlational coefficients. In addition, we performed multiple linear regression analysis to find out which variables of the ACE specifically predict the total number of PLEs (PQ-16 total score). To find out conditions that mediate the prevalence of PLEs in our subgroup, we carried out multiple regression analyses to test for associations between the independent variable (childhood trauma), mediators (BPD features, depression and anxiety) and the dependent variable (PLEs). Regarding the assumptions of multiple regressions analysis distributions of residuals were normal at every value of the dependent variables. Based on the tolerance value and the variance inflation factor (VIF) there were no problems with multicollinearity. Mediation analyses were conducted separately for BPD features, anxiety and depression using Model 4 from the Process tool [50]. To test whether the indirect effect of the independent variable on the outcome through the mediator is significant, we used bias-corrected bootstrap confidence intervals as suggested by Preacher and Hayes [51]. The Process macro generated 5000 bootstrap samples to obtain 95% bias-corrected bootstrap confidence intervals for the indirect effects. The indirect effect will be significant if the 95% confidence interval does not contain zero. To confirm the results we used the Sobel test as well [52,53]. Due to the low number of men in our subgroup we controlled for gender in all analysis.

3. Results

3.1. Sample characteristics

Table 1 presents the clinical characteristics of the sample. Men were underrepresented in this study (33.5%). The majority of the

sample has 2 or more Axis-I diagnoses (79.5%) and 124 (66.5%) of the cohort fulfilled criteria for a personality disorder; 25 (12.5%) of the sample abuse cannabis, 16 (8.0%) were addicted to it. Alcohol abuse was shown by 15 (7.5%), and 13 (6.5%) consumed multiple substances.

3.2. Prevalence of PLEs and childhood trauma

Table 2 presents an overview of the psychopathological characteristics of the sample. Fifty-four percent of the sample ($n = 108$) reached the cutoff of 6 endorsed items in the PQ-16; on average the score amounted to 6.43 ($SD = 3.61$). The authors [42] suggest to perform standardized prodromal testing when six or more items are endorsed. Most reported items were item 1 - "I feel uninterested in things I used to enjoy" ($n = 159, 79.5%$), Item 2 - "I often seem to live through events exactly as they happened before (de'ja-vu)" ($n = 113, 56.5%$), item 5 - "I have been confused at times whether something I experiences was real or imaginary" ($n = 120, 60%$), item 7 - "I get extremely anxious when meeting people for the first time" ($n = 140, 70%$), Item 9 - "My thoughts are sometimes so strong that I can almost hear them" ($n = 100, 50%$), item 11 - "Sometimes I felt that I'm not in control of my own ideas or thoughts" ($n = 126, 63%$), item 14 - "I often feel that others have it in for me" ($n = 111, 55.5%$).

Regarding childhood trauma patients reported on average exposure to 3.02 ($SD = 2.40$) traumatic events in their childhood. Most reported experiences were emotional neglect (50.5%, $n = 101$), emotional abuse (50%, $n = 100$), grown up with a family member with mental illness (47.5%, $n = 95$), separation from a parent (41.0%, $n = 82$), physical abuse (29.0%, $n = 58$), substance abuse or dependence of a member of the household (25.5%, $n = 51$) and sexual abuse (23.5%, $n = 47$) in childhood (Table 3).

3.3. Correlational analysis

To find out correlations between specific traumatic experiences measured by the ACE and PLEs we first performed a correlational analysis between all ACE items with the PQ-16 total score. Our analysis considered data from the total sample due to the low number of men in this study. For an overview of correlational coefficients see Fig. 1.

Table 2
Psychopathological characteristics ($n = 200$).

	M (SD)
PLEs	6.43 ± 3.61
ACE	3.02 ± 2.40
BSL-23	40.21 ± 21.28
PHQ-9	16.23 ± 5.41
GAD-7	12.15 ± 4.80

Table 3
Correlational analysis ($n = 200$).

	<i>M</i>	<i>SD</i>	PQ-16 total	ACE total	GAD-7 total	BSL-23 total	PHQ-9 total
PHQ-9	16.33	5.43	0.48(**)	0.27(**)	0.72(**)	0.74(**)	–
BSL-23	40.59	21.47	0.56(**)	0.42(**)	0.69(**)	–	0.74(**)
GAD-7	12.22	4.88	0.42(**)	0.24(**)	–	0.69(**)	0.72(**)
ACE total	3.04	2.37	0.33(**)	–	0.24(**)	0.42(**)	0.27(**)
PQ-16 total	6.43	3.68	–	0.33(**)	0.42(**)	0.56(**)	0.48(**)

Measures: Psychotic-like experiences – Prodromal Questionnaire (PQ-16); Childhood trauma – Adverse Childhood Experience Questionnaire (ACE); Borderline personality features – Borderline Symptom List, short version (BSL-23); Depression – Patient Health Questionnaire (PHQ-9); Anxiety – Generalized Anxiety Disorder (GAD-7); ** $p < 0.001$.

Further, we performed correlational analyses for the total sample to examine the connections between symptoms of depression and anxiety, borderline personality features, childhood trauma and PLEs (see Fig. 1). All three symptom dimensions as well as childhood trauma were associated significantly with PQ-16 total, but the association with Borderline personality features (BSL-23) was strongest ($r = 0.56$, $p < 0.001$).

3.4. Mediation

To find out which variables mediate the relation between PLEs and childhood trauma we initially performed mediation analysis using Hayes' Process macro in SPSS with one mediator (Model 4). The results confirmed a significant association between childhood trauma with PLEs ($\beta = .30$, $p < 0.001$), which was attenuated and changed into a non-significant association when taking into account the mediator borderline personality features ($\beta = 0.12$, n.s.). A bootstrapped confidence interval (CI) for the indirect effect (ACE→BSL-23→PQ-16) based on 5000 bootstrap samples did not contain zero, thus indicating the significance of the indirect effect (CI [0.17, 0.43]). The result indicates a full mediation effect, because after including borderline personality features in the model, the association between childhood trauma and PLEs became insignificant. The Sobel test also confirmed that the indirect path was significant ($Z = 4.47$, $p < 0.001$).

Additionally, we repeated the mediation analysis and operationalized Borderline personality features by the SCID-II-Screening score to confirm the result that Borderline personality features are mediating the relationship between childhood trauma and PLEs. The analysis again demonstrated a full mediation. The inclusion of the mediator into the model attenuated the effect to non-significance ($\beta = 0.15$, n.s.). A bootstrapped confidence interval (CI) for the indirect effect (ACE→SCID-II→PQ-16) based on 5000 bootstrap samples did not contain zero, thus indicating the significance of the indirect effect (CI [0.18, 0.43]). Sobel test confirmed the result ($Z = 2.06$, $p < 0.05$).

Furthermore, the inclusion of depression in the model showed a partial effect. Depression attenuates the association between childhood trauma and PLEs significantly ($\beta = 0.22$, $p < 0.001$;

CI [0.07, 0.26]; $Z = 3.00$; $p < 0.01$). Equally, Anxiety could show a partial mediation after inclusion in the model ($\beta = 0.22$, $p < 0.001$, CI [0.05, 0.23]; $Z = 2.74$; $p < 0.01$). Both results are indicating a significant reduction of the effect of childhood trauma on PLEs. Fig. 2 shows an overview of the three separate mediation analysis we performed to examine the influence of each mediator on the relation between childhood trauma and PLEs.

4. Discussion

The present study aimed at investigating the relationship between PLEs and psychopathological features and childhood trauma among non-psychotic adolescent help-seekers. In particular, we were interested in the mechanisms of the well-established relationship between exposure to childhood trauma and PLEs among non-psychotic adolescents seeking for psychiatric care. Based on the existing literature [39,54–56] we hypothesized that borderline personality features may mediate the relationship. In addition, we considered also mediating role of other psychopathological symptoms – depression and anxiety. To our knowledge, this is the first study examining the mechanisms of the relation of self-reported PLEs and childhood trauma with reference to the mediating role of borderline personality features, depression, and anxiety in a clinical sample of adolescents with non-psychotic psychiatric disorders.

In line with previous studies [11,14], our findings showed that self-reported PLEs are highly prevalent among adolescents with non-psychotic psychiatric disorders treated in inpatient psychiatric setting. More than half of the sample (54%) reported six or more positive PLEs and reached the cutoff for performing further examinations of the risk states of psychosis as recommended by the authors [42]. At the same time, PLEs were significantly related to exposures to childhood trauma, which corroborate prior studies [32,34–36]. We observed that emotional neglect and sexual abuse were particularly associated with PLEs suggesting that the type of trauma could be relevant for the development of psychotic-like experiences [39,57–59].

Despite the convincing evidence showing a relationship between childhood adversities and PLEs [32–36], the mechanisms

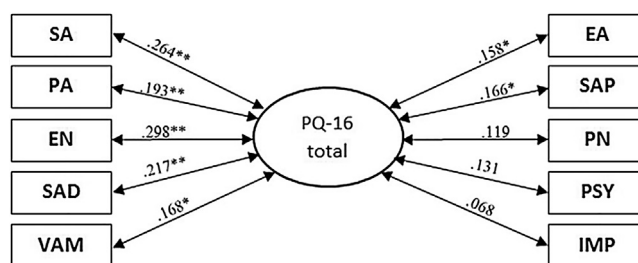


Fig. 1. $n = 200$. ACE-Scales: SA=Sexual abuse; PA=Physical abuse; EN=Emotional neglect; SAD=Substance abuse or dependence of a member of the household; VAM=Violence against mother; EA=Emotional abuse; SAP=Separation from a parent; PN=Physical neglect; PSY=Mental illness our suicide attempt of a member of the household; IMP=Imprisonment of a member of the household.

** $p < .0001$. * $p < 0.01$.

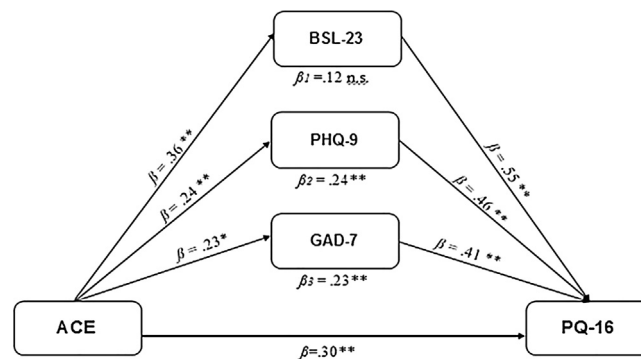


Fig. 2. $n = 200$. Measures: Prodromal Questionnaire (PQ-16); Adverse Childhood Experience Questionnaire (ACE); Borderline Symptom List, short version (BSL-23); Patient Health Questionnaire (PHQ-9); Generalized Anxiety Disorder (GAD-7). Values are standardized coefficients. β 1-3 represents the results after including the three different mediators. All variables were controlled for gender.

** $p < 0.001$ * $p < 0.01$.

for this remain poorly understood. In particular, there is still a limited number of studies investigating the mechanisms of the relationship among adolescent help-seekers. Our study, for the very first time, showed that borderline personality features fully mediate the relationship between childhood trauma and PLEs among non-psychotic adolescent help-seekers. At the same time, other psychopathological domains, depression and anxiety, mediated the relationship only partially. Hence, our findings confirm the significant role of dysfunctional personality features, in particular, borderline traits, in the development of PLEs [60,61]. Hence, in the context of mechanisms of the relationship between childhood trauma and PLEs, our results suggest borderline personality features as an important factor. For being more specific in the examination of borderline personality features and to include subthreshold features of a BPD without fulfilling entire diagnostic categories we decided to use the BSL-23 questionnaire. To confirm the effect of the mediation analysis we repeated the analysis with borderline personality features operationalized by SCID-II Screening questionnaire which showed full mediation effect equally (see supplement).

Our results may be interpreted in the way that development of a borderline personality constitution resulting from exposure to childhood trauma [25,37,38] may contribute to a higher risk of PLEs under stress [62,63]. Previous results indicated that patients with BPD often suffer from multiple trauma [64,65] and that in particular cumulative exposure to traumatic experiences were associated with significantly higher levels of PLEs in BPD [20,66] and in general population [59,67–70]. Exposure to multiple early-life trauma could lead to a sensitization in sense of a higher physiological sensitivity, based on neurodevelopmental changes like a dysfunction within the midbrain dopaminergic system [71,72] which could lead to an increased sensitivity to minor stresses in daily life and a higher susceptibility to subtle psychotic-like reactions in response to stress [73,74]. Thus, it could be assumed that neurodevelopmental sensitization associated with childhood trauma can make individuals with BPD or borderline personality features more prone for psychotic-like reactions especially in consequence of stress [20,66,74]. Previous studies confirmed that patients with BPD presented the strongest psychotic reactivity to daily life stress in comparison to patients with cluster C personality disorder, patients with psychotic disorder or healthy controls and particularly interpersonal stress increase the prevalence of PLEs in patients with BPD [25,62]. Further, longitudinal studies with multiple assessment points will likely foster our understanding of the interplay between childhood trauma, borderline personality features, and PLEs.

As mentioned above, depression and anxiety mediated the relationship between childhood trauma and PLEs partially. Some

studies emphasized the particular role of anxiety and depression regarding the relationship of traumatic experiences and PLEs [35,39]. Moreover, our sample was heterogeneous regarding the diagnosis therefore we verified the influence of these symptom dimensions as well. Furthermore, the scale we used to assess borderline personality features was very specific and does not cover for anxiety and depression. The results could be interpreted against the backdrop of childhood trauma. It could be assumed that the emerging of depression and/or anxiety can influence the development of PLEs independently from a borderline personality constitution. Further studies should examine the role of anxiety and depression regarding childhood trauma and PLEs in adolescent patients.

The results should be interpreted in light of some limitations. First, the cross-sectional design of our study precludes firm causal inferences. Further longitudinal studies are required to establish causal relationships. It should be however noted that the causality in psychiatry is often circular [75]. Second, the prevalence of PLEs was based on a self-report questionnaire and not verified by a clinical interview. Studies suggesting that the measurement of PLEs in community samples using self-report scales generally showed higher rates than in interview-based studies, however, there are no differences regarding validity or reliability [76], self-report instrument rather accurately predict interview recorded psychotic experiences [1]. However, the absence of a clinical interview to validate the PQ-16 can lead to some misinterpretations of the variables because some of them could be interpreted in the light of patients' current symptoms then to PLEs which could falsify the total score. For example item 7 -"I get extremely anxious when meeting people for the first time" would also be affirmed by patients with social phobia. This clarified the necessity to the rather use of interview based studies.

Third, we did not perform further investigations if patients reached the cutoff (≥ 6 endorsed items) [42] to verify a current ultra-high-risk for psychosis (UHR).

The previous study showed that borderline personality features did not increase the risk of psychosis among those patients who fulfilled criteria for UHR state [60]. Our results rather suggested that the prevalence of borderline personality features, even if they are sub-clinical could indicate different origin and course of UHR symptoms and should be taking into account in patients with UHR to improve diagnostic accuracy and prognostic estimation. Equally symptoms of depression and anxiety shall be valued in the evaluation of ultra-high-risk states. Furthermore, men were distinctly underrepresented in our study. This is reflected in a German health monitoring of public attitudes toward psychiatric and psychotherapeutic treatment which shows a lesser claim by men than by women [77].

Finally, we did not capture dissociative symptoms separately, and they may confound with PLEs. We were particularly interested in the role of borderline personality features in the relationship between childhood trauma and PLEs, and thus we did not include some of the important factors that have been shown to play a role in previous studies [55,78,79]. For instance, recent studies suggest that cognitive biases may also be an important factor that mediates the relationship between exposures to trauma and PLEs [31,78]. Of importance, cognitive biases related to psychosis have been observed also among patients with BPD [21]. Following investigations would benefit from considering these factors and limitations of our study.

To conclude, our study suggests borderline personality features as an important factor in the relationship between childhood trauma and PLEs among non-psychotic adolescent help-seekers. These findings may have important theoretical and clinical implications. For instance, considering the interplay between borderline personality features and exposure to traumatic events among those who report PLEs may have a potential to increase sensitivity of prediction of the risk states for developing psychosis, as well as lower social functioning or higher risk of suicidality and non-suicidal self-injury [27,80]. However, further investigations are warranted.

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