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Original article

Childhood trauma and psychotic experiences in a general population sample: A prospective study on the mediating role of emotion regulation

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ABSTRACT

Background: The causal role of childhood trauma for psychosis is well established, but the mechanisms that link trauma to psychosis are largely unknown. Since childhood trauma is known to cause difficulties in emotion regulation (ER) and patients with psychosis show impaired ER, we hypothesize that impaired ER explains why people with a background of trauma are prone to psychotic experiences.
Methods: The study used a longitudinal cohort design based on a community sample ($N = 562$) from Germany, Indonesia, and the United States. Childhood trauma was assessed at baseline. ER and psychotic experiences (defined as positive symptom frequency and related distress) were measured repeatedly at a 4-, 8-, and 12-month follow-up. Cross-lagged panel and longitudinal mediation analyses with structural equation modeling were used to test the predictive value of ER on psychotic experiences and its mediating role in the association of childhood trauma and psychotic experiences.
Results: The cross-lagged paths from impaired ER to symptom distress (but not frequency) were significant. However, there was also evidence for the reverse causation from symptom frequency and distress to impaired ER. ER partially mediated the significant prospective paths from childhood trauma to symptom distress.
Conclusion: The findings demonstrate that ER plays a role in translating childhood trauma into distressing psychotic experiences in later life. Moreover, the findings point to a maintenance mechanism in which difficulties in ER and symptom distress exacerbate each other. Thus, ER could be a promising target for interventions aimed at prevention of psychosis.

The risk of psychosis is almost threefold for people with a background of childhood trauma (CT) [1]. About 26% to 34% of the people diagnosed with a psychotic disorder have experienced CT [2] that commonly includes sexual abuse [3,4], emotional abuse [5–8] and physical abuse [9]. CT is associated with frequency and severity of positive symptoms [10–12] and with a ten-fold increase in symptom related distress [13]. Moreover, it has been found to predict transition to psychosis in high risk samples [14]. The increasingly clear evidence for a causal role of CT in the development of psychosis has begun to inspire research on the putative mediating mechanisms. Knowing these mechanisms is not only crucial to a comprehensive understanding of how psychosis develops, it can also help us to intervene earlier and more effectively.

Several studies have found negative affect, such as anxiety and depression, to link different types of trauma to positive symptoms [4,15–17]. It seems intuitive to assume that persistent negative affect might result from difficulties in emotion regulation (ER), which has been defined as the "processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals." [18]. Building on this definition and synthesizing established ER theories [19], Berking and colleagues [20] conceptualized adaptive ER as the ability to consciously process emotions, to support oneself in emotionally distressing situations, to actively modify negative emotions, to accept and tolerate emotions and to confront emotionally distressing situations in order to attain important goals.

Developmental and attachment theories point to various mechanisms underlying the development of ER, including

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observational learning, modeling and social referencing [21], parenting style [22] and attachment relationships [23]. For instance, parental punishment or neglect of a child's emotional displays have been linked to maladaptive ER [24]. Prospective studies show that early attachment predicts effective regulation strategies [25] and CT has been found to fundamentally disrupt attachment to the maltreating caregiver [26]. Unsurprisingly, thus, there is a bulk of research showing that CT compromises an individual's ability to regulate emotions effectively [27,28]. However, the causal inferences of these findings are limited due to the cross-sectional designs used.

Psychosis has repeatedly been found related to difficulties in ER [29]. "Several studies have found psychosis to be associated with difficulties in being aware of [30,31], understanding, tolerating and accepting one's emotions [32–34], with using less functional strategies, such as reappraising the situation in a functional manner [30,31,35,36] and with more avoidance or suppression of emotions [33,34]. Moreover, difficulties in ER have also been associated with increased frequency of symptoms as well as exacerbated symptom distress [29,37]. It is noteworthy that these difficulties are also prevalent in people at risk of psychosis, who have found to be characterized by lower emotion awareness [38,39], less use of reappraisal strategies [39,40] and more suppression of emotions [39]. This indicates that difficulties in ER seem to precede the disorder and might contribute to its development. However, only few studies have looked into the temporal relationship between ER and psychosis. A small community based study found maladaptive ER to prospectively predict psychotic symptoms from baseline to a 1-month follow-up assessment [36]. Moreover, ER-skills have been found to predict increases in subjective distress and psychotic symptoms following a stressor in individuals with psychosis [41]. Thus, there is preliminary evidence for a causal role of ER in the development of psychosis, but longitudinal studies are needed to further corroborate the postulated causal direction.

To sum up: As CT appears to have a significant influence on ER and difficulties in ER are evidently related to psychosis it seems reasonable to postulate that the ability to effectively regulate emotions could at least partially explain the relationship between CT and psychosis, especially as ER has been shown to mediate the association between CT and other psychopathologies (e.g. eating disorder [42] and depression [43]). Using a longitudinal design with four assessment time-points we hypothesized that (1) CT will significantly predict ER and psychotic experiences (defined as frequency of positive symptoms and related distress), (2) that the inability to regulate emotions at one time-point will predict psychotic experiences at the following time-point, (3) and that the relationship between CT and psychotic experiences will be at least partially mediated by ER.

1. Method

1.1. Participants and procedure

To enable an interpretation of the findings free of issues inherent to clinical populations (e.g. small samples, medication effects) the data for this study was collected in a community sample that covered the continuum of psychotic experiences including those that would be considered clinically relevant. Moreover, the sample was recruited from three different continents to increase the generalizability of findings beyond the western societies.

Participants from Germany, Indonesia, and the United States were requested to complete a 30-minute online survey anonymously (T0). Subsequently, they were invited via e-mail to complete a follow-up survey after 4 (T1), 8 (T2), and 12 months (T3). The follow-up surveys were protected by password to ensure that only participants who completed the baseline survey at T0 received the invitation for further participation. Recruitment was conducted through Crowdflower and other websites (e.g. internet forums and social networking websites). Crowdflower is a crowdsourcing Internet marketplace, similar to Amazon MTurk, on which people complete paid jobs. Participants recruited from Crowdflower received 0.50 US$ for completing the baseline survey analog to the median hourly wage in Amazon MTurk [44]. In order to motivate participants to complete the follow-up surveys, the payment increased with each survey (T1, 0.60 US$; T2, 0.80 US$; T3, 1.00 US$). Participants recruited from other websites were not given compensation for reasons of data security. Participants had to be at least 18 years old and provide written informed consent before entering the study. This study received ethical approval from the ethical commission of the German Psychological Society (DGPs, TL062014_2).

There were 2501 completed baseline survey entries of which 151 were excluded due to duplicate entries ($n = 98$), longstring (i.e. providing the same answer consecutively for 50 items, $n = 46$ [45]), and inconsistent answers ($n = 7$). The baseline sample thus consisted of 2350 participants of whom 720 completed the English, 786 the German and 844 the Indonesian version of the survey. Of those participants, 432 completed first the follow-up (response rate = 18.4%), 300 completed the second follow-up (response rate = 12.8%), 256 completed the third follow-up (response rate = 10.9%) and 139 completed all follow-ups (response rate = 5.9%). A detailed participant flowchart following the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guideline is available in Supplementary Fig. 1.

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In total, 562 participants completed at least one follow-up survey, fulfilled the inclusion criteria (i.e. complete entry, no longstring, and ID match) and were included in the analyses.

1.2. Measures

The back-translation procedure and cultural adaptation of measures was conducted with a native German or Indonesian.

1.2.1. Childhood trauma

Childhood trauma at T0 was assessed via a brief questionnaire adapted from "The Netherlands Mental Health Survey and Incidence Study" (NEMESIS) [46]. The questionnaire assesses any kind of emotional, physical, psychological or sexual abuse before age 16 years according to the definition presented (e.g. sexual abuse, "How often were you sexually approached against your will? This means: were you ever touched sexually by anyone against your will or forced to touch anybody? Were you ever pressured into sexual contact against your will?"). Frequency of abuse is indicated on a six-point scale ranging from 1 = never to 6 = very often.