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Letter to the Editor

Evidence that self-reported psychotic experiences in children are clinically relevant

Self-rated psychotic experiences (PE-S) are more common than psychotic experiences assessed in clinical interviews (PE-I) (van Os et al., 2009). In childhood, prevalence estimates of PE-S vary between studies and instruments (Kelleher et al., 2012), ranging from 21%–66% in 7–13 year-olds (Gundersen et al., 2018). In adult populations, PE-S that are not confirmed in clinical interviews are often referred to as 'false-positive' PE, but they are nevertheless clinically relevant and associated with mental health problems and help-seeking behavior (Bak et al., 2003; van der Steen et al., 2018; van Nierop et al., 2012). In this study, we examined the association between PE-S and concurrent mental disorders and elevated familial risk of psychotic disorders (FR) in childhood, both of which we have previously found associated with PE-I in this sample of the Copenhagen Child Cohort 2000 (CCC2000) (Jeppesen et al., 2015a; Jeppesen et al., 2015b). We also estimated the prevalence and clinical correlates of false-positive PE-S and the possible influence of a greater number of reported false-positive PE-S.

Our study is based on 1571 11 to 12-year-old children from the CCC2000, a general population birth-cohort encompassing 6090 children born in the year 2000 in Copenhagen, Denmark. We have previously described the socioeconomic characteristics of this sub-sample and the recruitment procedure in detail (Gundersen et al., 2018).

PE-I were assessed by trained professionals using the psychosis section of the Kiddie Schedule of Affective Disorders and Schizophrenia – Present and Lifetime Version. PE-I were defined as either present (score of likely/definitely present) or not present (Jeppesen et al., 2015a). PE-S were assessed by 10 questions that cover "strange experiences that are surprisingly common" from the Development and Well-Being Questionnaire (DAWBA). The interview and its wording has been published previously (Gundersen et al., 2018). PE-I were assessed in all children regardless of PE-S status, and PE-I raters were blinded to preceding PE-S assessment, which is unique compared to previous studies.

DSM-IV diagnoses of emotional and neurodevelopmental mental disorders were assessed by child and adolescent psychiatrists using the DAWBA diagnostic interview, including information from parents and the child itself, as detailed previously (Jeppesen et al., 2015a). FR was defined as a diagnosis of psychotic disorder of any 1st degree relative before the birth of the child (to avoid reverse causality), or until December 2010 for siblings. Diagnoses were obtained from the Danish registers, which include diagnoses given at public psychiatric hospitals or centers from 1969 onward. Details can be found elsewhere (Jeppesen et al., 2015b).

For the statistical analyses, we first used univariate logistic regression to estimate the odds ratio (OR) of having a mental disorder and FR for any PE-S vs. not having PE-S. Second, we used multinomial logistic regression to test the OR of the same associations of PE with mental disorders and FR for PE-I versus false-positive PE-S and no PE (i.e. neither PE-S or PE-I) versus false-positive PE-S. Third, using independent Mann-Whitney test, we tested whether the number of false-positive PE was greater in children with mental disorders compared to those without.

Out of the 1571 participants, 441 children (28.1%) reported PE-S, 160 children had PE-I (10.2%), and 118 (7.5% of the total sample) had both PE-S and PE-I. Individuals with PE-S more likely had mental disorders (OR = 2.60, 95%CI = 1.92–3.51) and FR (OR = 2.60, 95%CI = 1.07–6.29) compared to children with no PE-S ($N = 1130$), i.e. without excluding children who had PE-I without reporting PE-S. Table 1 depicts a comparison of false-positive PE-S with present PE-I and no PE whatsoever. Individuals with PE-I were statistically significantly more likely to have concurrent mental disorders and FR than individuals with false-positive PE-S. However, individuals with no PE were less likely to have mental disorders compared to individuals with false-positive PE-S. Furthermore, within the false-positive PE-S group, 185 children reported 1 PE, 71 reported 2 PE and 67 reported ≥3 PE (range 3–8). Those who had mental disorders reported a greater number of PE compared to those without ($Z = -2.55$, $p = 0.011$). The same analysis for FR was not possible given too few cases of FR within the false-positive PE-S group.

Valuable findings from the current study include that PE-S in children were associated with mental disorders and FR. A number of studies have shown that PE are associated with a genetic liability for psychosis, however, findings with regard to PE-S are inconsistent (Ronald and Pain, 2018). Furthermore, children with PE-I were significantly more likely to have mental disorders and FR compared to children with false-positive PE-S. Despite this, children with false-positive PE-S still had a statistically significantly higher likelihood of mental disorder compared to children with no PE, and the association with FR was directionally positive, albeit not statistically significant. Also, among children with false-positive PE-S, mental disorders were associated with a greater number of reported PE-S.

Our results are in line with conclusions of similar studies in adults, in which false-positive PE-S were associated with childhood adversities, emotional mental health problems and disorders, help-seeking (van der Steen et al., 2018; van Nierop et al., 2012), and psychotic disorder three years after PE-assessment (Bak et al., 2003).

In conclusion, from a viewpoint of psychosis as a transdiagnostic spectrum phenotype in the general population, our findings support the idea that PE-S in childhood can be considered as an unspecific and low grade expression of psychosis (van Os and Reininghaus, 2016). Even when not confirmed by interview, PE-S should not be simply dismissed as 'false-positives'.

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Contributors

Martin K. Rimvall, Lars Clemmensen, Anja Munkholm, Charlotte Ulrikka Rask, Anne Mette Skovgaard, Frank Verhulst, Jim van Os, and Pia Jeppesen designed the study.

Martin K. Rimvall and Pia Jeppesen wrote the protocol for the current study.

Martin K. Rimvall and Janne Tidselbak Larsen undertook the statistical analyses.

Martin K. Rimvall, Steffie V. Gundersen, Lars Clemmensen, Anja Munkholm, Janne Tidselbak Larsen and contributed to data collection and/or processing.

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Table 1
Odds ratios (OR) of having DSM-IV mental health disorder or a family history of psychotic disorder for a) interview based psychotic experiences (PE-I) versus false-positive psychotic experiences without interview verification (false-positive PE-S) and b) no PE versus false-positive PE-S respectively.

	PE-I ($N = 160$)	False-positive PE-S ($N = 323$) (reference)	No PE ($N = 1088$)
Any DSM-IV mental health disorder ($N = 203$)	OR 1.84 (95% CI 1.18–2.88)	OR 1.00	OR 0.46 (95% CI 0.32–0.65)
1st degree family history of psychotic disorder ($N = 20$)	OR 3.65 (95% CI 1.05–12.65)	OR 1.00	OR 0.67 (95% CI 0.20–2.17)

Martin K. Rimvall wrote the first draft for the manuscript.
All authors contributed to and have approved the final manuscript.

Declaration of interests
Dr. Verhulst publishes the Dutch translations of ASEBA materials from which he receives remuneration.
All other authors have nothing to disclose.

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