



Original article

Early childhood aggressive behaviour: Negative interactions with paternal antisocial behaviour and maternal postpartum depressive symptoms across two international cohorts



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ABSTRACT

Background: Early childhood aggressive behaviour is a predictor of future violence. Therefore, identifying risk factors for children's aggressive behaviour is important in understanding underlying mechanisms. Maternal postpartum depression is a known risk factor. However, little research has focused on the influence of paternal behaviour on early childhood aggression and its interaction with maternal postpartum depression.

Methods: This study was performed in two cohorts: the Fathers Project, in the United Kingdom ($n = 143$) and the Generation R Study, in The Netherlands ($n = 549$). In both cohorts, we related paternal antisocial personality (ASP) traits and maternal postpartum depressive (PPD) symptoms to childhood aggressive behaviour at age two (Fathers Project) and age three (Generation R Study). We additionally tested whether the presence of paternal ASP traits increased the association between maternal PPD-symptoms and early childhood aggression.

Results: The association between paternal ASP traits and early childhood aggressive behaviour, corrected for maternal PPD-symptoms, was similar in magnitude between the cohorts (Fathers Project: standardized $\beta = 0.12$, $p = 0.146$; Generation R: $\beta = 0.14$, $p = 0.001$), although the association was not statistically significant in the Fathers Project. Strikingly, and in contrast to our expectations, there was evidence of a negative interaction between paternal ASP traits and maternal PPD-symptoms on childhood aggressive behaviour (Fathers Project: $\beta = -0.20$, $p = 0.020$; Generation R: $\beta = -0.09$, $p = 0.043$) in both studies. This meant that with higher levels of paternal ASP traits the association between maternal PPD-symptoms and childhood aggressive behaviour was less and vice versa.

Conclusions: Our findings stress the importance of including both maternal and paternal psychopathology in future studies and interventions focusing on early childhood aggressive behaviour.

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1. Introduction

Aggression and violence are a worldwide major health concern [1]. Childhood aggressive behaviour is one of the strongest predictors of adverse outcomes in adolescence, including school dropout, substance abuse, crime and unemployment [2,3]. Children who show early onset and life-course-persistent

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aggressive behaviour are at highest risk for serious violent acts in adulthood, compared to late-onset (early adulthood) aggressive behaviour [4,5]. Therefore, identifying risk factors for early childhood aggressive behaviour is important for understanding underlying mechanisms and to inform the development of preventive interventions. Neurobiological and environmental risk factors that have been associated with early child aggressive behaviour include: exposure to maternal prenatal substance use (tobacco, alcohol, drugs), birth complications, malnutrition, lead exposure, childhood head injury, maternal psychopathology and adverse parent-child interactions (e.g. abuse, neglect) [6,7].

With respect to the influence of parental psychopathology on early child aggressive behaviour, more attention has been paid to maternal psychopathology, and in particular maternal depression, compared to paternal psychopathology [6]. This focus might be explained by the high prevalence of maternal postpartum depression, with prevalence rates between 5–20% in the first 3 months after delivery [8], and the fact that in many societies women still are the primary care givers for children suggesting that they have a more crucial role in early child development than men. Indeed, previous research showed that maternal postpartum depression strongly predicts early childhood aggressive behaviour [9]. However, the potential influence of paternal antisocial behaviour on early childhood aggressive behaviour is of particular interest, because antisocial behaviour is more prevalent in men compared to women, has a strong heritability [10] and is likely to be transmitted to the child independently from maternal depression and through other mechanisms. For example, previous research showed that 40–70% of the variance in children's aggressive behaviour could be explained by genetic factors [11,12]. In addition to genetic factors other related environmental influences may be important, including harsh parenting, increased couple conflict, poverty and substance use [13].

Therefore, it is important to consider the role of paternal antisocial behaviour in the development of childhood aggressive behaviours, alongside the established association with maternal depression. As well as individual effects, these different risk factors may interact. For example, the presence of paternal antisocial behaviour might modify the effect of maternal postpartum depression on early childhood aggressive behaviour. A meta-analysis showed preliminary evidence that paternal psychopathology does increase the risk of externalizing behaviour in school-aged children of mothers with depression [14].

However, little is known about the interaction between maternal depression and paternal antisocial behaviour on aggressive behaviour in preschool children. We are aware of one relatively small study ($n=101$), which showed that paternal psychopathology (67% mood and/or anxiety disorder and 23% substance use and/or antisocial behaviour disorders) moderated the association between a history of maternal depression on toddlers' externalizing behaviour problems [15]. In this study maternal depression was significantly associated with toddlers' externalizing behaviour problems only when paternal psychopathology was also present. This finding requires replication.

The aim of our study was to investigate whether paternal antisocial personality (ASP) traits are associated with early childhood aggressive behaviour and to which extent this association is influenced by the occurrence of maternal postpartum depressive (PPD) symptoms. We hypothesised that, after adjustment for maternal PPD-symptoms, paternal ASP traits would be associated with early childhood aggressive behaviour. Additionally, we tested the hypothesis that there would be a positive interaction between paternal ASP traits and maternal PPD-symptoms on early childhood aggressive behaviour, assuming that presence of paternal ASP traits would increase the association between maternal PPD-symptoms and early childhood aggressive

behaviour. We used data from two different European cohorts to investigate cross-cohort consistency of any observed associations.

2. Materials and methods

2.1. Design and participants

This study uses data from the Fathers Project and the Generation R Study. The Fathers Project is a longitudinal study of fathers and their families. Participants were recruited from the postnatal maternity wards of hospitals in Oxford and Milton Keynes, UK. They were assessed at home at 3 months, 1 year and 2 years postpartum. The initial recruitment process has been described in more detail elsewhere [16]. Children were required to have been born at no less than 37 weeks, to have a birth weight of at least 2,500 g and to have no severe illness or abnormalities. In total 192 families were included. In 143 families complete data was available on all variables and at least a father or a mother report of early childhood aggressive behaviour at age two.

The Generation R Study is a longitudinal population-based study conducted in Rotterdam, The Netherlands, and follows children and their family from foetal life onwards. It has been described in detail elsewhere [17,18]. To make the study population more comparable with the Fathers Project, we excluded families with children born less than 37 weeks and a birth weight of less than 2,500 g ($n=42$). In 542 families complete data were available on all variables and at least a father or a mother report of early childhood aggressive behaviour at age three.

Both studies were approved by the local Medical Ethics Committees, and informed consent was obtained from all participants.

2.2. Paternal antisocial behaviour

Fathers Project: Fathers' antisocial personality traits were measured at inclusion (3 months postnatally) with the Antisocial Personality Problems scale from the Adult Self-Report DSM-oriented scales [19]. The scale consists of 20 items, with a response scale from 0= not true to 2= very true or often true (range 0–40).

Generation R: Fathers' antisocial personality traits were measured with the National Institute of Mental Health Diagnostic Interview Schedule (DIS), which included antisocial personality [20]. Trained interviewers conducted the interview in a home visit around 30 weeks of pregnancy. We used the number of fulfilled A criteria of the DSM-IV antisocial personality disorder as a continuous measure (range 0–7).

2.3. Maternal postpartum depressive symptoms

In both the Fathers Project and the Generation R Study maternal PPD-symptoms were assessed with the Edinburgh Postnatal Depression Scale (EPDS) a 10 item widely used self-report questionnaire (range 0–30), that has also been validated in Dutch [21,22]. In the Fathers Project the EPDS was measured at 3 months after childbirth and in the Generation R Study the EPDS was assessed at 2 months after childbirth.

2.4. Early childhood aggressive behaviour

In both studies the Child Behavior Checklist/1 $\frac{1}{2}$ -5 (CBCL/1 $\frac{1}{2}$ -5) was used for parental reports of child behaviour problems [19]. This questionnaire contains 99 items, which are scored on a three-point scale from 0= not true to 2= very true or often true, based on the 2 preceding months. The CBCL/1 $\frac{1}{2}$ -5 was filled out by both parents at children's age of 2 years in the Fathers Project and at age of 3 years in the Generation R Study. For this study we used the

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