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Externalising behaviour from infancy to mid-adolescence: Latent profiles and early predictors ☆

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ABSTRACT

The overall aim of the current study was to identify typical trajectory classes of externalising behaviour, and to identify predictors present already in infancy that discriminate the trajectory classes. 921 children from a community sample were followed over 13 years from the age of 18 months. In a simultaneously estimated model, latent class analyses and multinomial logit regression analyses suggested a five-class solution for developmental patterns of externalising problem behaviours: High stable (18% of the children), High childhood limited (5%), Medium childhood limited (31%), Adolescent onset (30%), and Low stable (16%). Six risk factors measured at 18 months significantly discriminated among the classes. Family stress and maternal age discriminated the High stable class from all the other classes. The results suggest that focusing on enduring problems in the relationship with the partner and partners' health may be important in preventive and early intervention efforts.

A moderate level of disruptive behaviour is normative in infancy and toddlerhood (Tremblay et al., 2004). Stable low or decreasing levels of externalising behaviour are the most typical developmental pathways, however, a smaller proportion of children are reported to have stable high scores of externalising problems (Campbell, Spieker, Vandergrift, Belsky, & Burchinal, 2010; Côté, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006). Discriminating normative high, but transient, externalising behaviours from high and stable externalising has important implications for prevention and early intervention (Wakschlag, Tolan, & Leventhal, 2010). There is a call for research aimed at better early differentiation between children with persistent high levels of externalising behaviour throughout childhood as opposed to those with transient high levels at an early stage (Moffitt et al., 2008). There is a need for more knowledge about typical developmental patterns and the contribution of child and contextual factors present in early life to the continuity and discontinuity of externalising problem behaviours. Such knowledge might best be gained from studies examining developmental trajectories over the entire childhood period starting from infancy.

The identification of developmental paths of externalising behaviour from infancy through childhood and adolescence, and better understanding of factors and processes contributing to externalising behaviour development, has been the focus of decades of research. Unfortunately, externalising behaviour in childhood has long-term significance beyond the strain and struggle it brings to daily life. The existence of an 'early starter' group with a diversity of negative outcomes both in the short and long term, with distinct predictors, has been postulated by a theory developed by Moffitt (1993). Moffitt also postulated a trajectory group with onset of externalising in adolescence. In addition, although not predicted by a priori theory, a 'childhood limited' group has been identified in several longitudinal studies (for a review, see Moffitt, 2006).

Latent class trajectory approaches involves identification of subpopulations that are similar in terms of developmental patterns (Muthén & Muthén, 2000). Studies have confirmed the importance of identifying varying developmental paths (Broidy et al., 2003; Odgers et al., 2008), and have been used to extend our understanding of factors discriminating transient and stable externalising behaviours (Nagin & Tremblay, 2001; Odgers et al., 2008). To our knowledge, however, only five studies (of which three used the same sample of children) have examined developmental trajectories over longer time periods with a starting point before the age of 3 years (Campbell et al., 2006; Côté et al., 2006; Fanti & Henrich, 2010; National Institute of Child Health and Human Development, ECCRN, 2004; Shaw, Lacourse, & Nagin, 2005). The NICHD ECCRN Study (2004) identified five distinct trajectory classes based on levels of physical aggression from age 2 to 9 years in a U.S. general population sample (Campbell et al., 2006; NICHD ECCRN, 2004). Later, Fanti and Heindrich (2010) found five trajectories of externalising from age 2 to 12 years in the same sample. Shaw et al. (2005) identified four typical trajectories of overt conduct problems from age 2 to 10 years in a U.S. high-risk sample of boys. Côté et al. (2006) identified three classes of

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children with distinct developmental trajectories of physical aggression from age 2 to 9 years in a nationally representative Canadian sample. In addition, a shorter-term study focused on disregard for rules, an aspect of externalising that is seldom studied separately, and identified four trajectories of disregard for rules between age 29 and 74 months (Petitclerc, Boivin, Dionne, Zoccolillo, & Tremblay, 2009). Stable high or chronic patterns of externalising problems over time were identified in each study, but the size of the groups varied in the different samples (between 3% and 17% across the studies). While these studies provide valuable insights, the results have limited generalisability for several reasons: the studies are all North American, three focused on a narrow construct of physical aggression only, one includes only high-risk boys, and they all stopped following the children before adolescence.

Theory (Bronfenbrenner & Morris, 2006; Moffitt, 1993; Reid, Patterson, & Snyder, 2002) suggests that it is important to focus on a wide range of intrinsic child and family factors that have been shown to predict externalising behaviours. A large research literature links 'difficult' child temperament characteristics such as emotional reactivity with the development of externalising problems (Janson & Mathiesen, 2008; Rothbart & Bates, 2006). Several cross-sectional and longitudinal studies have related a wide range of family factors to high levels of externalising problems. For instance, elevated levels of maternal depressive symptoms are related to child conduct problems (NICHD ECCRN, 2004; Shaw et al., 2005), as well as family demographic factors including low income (Côté et al., 2006; NICHD ECCRN, 2004), low maternal education (Côté et al., 2006; Nagin & Tremblay, 2001), lone mothers and non-intact families (Campbell et al., 2010; Nagin & Tremblay, 2001), early motherhood (Côté, Vaillancourt, Barker, Nagin, & Tremblay, 2007; Tremblay et al., 2004), and child gender (Côté et al., 2006). In addition, the presence of another young sibling in the household (Tremblay et al., 2004), large family size (Farrington, 1995), chronic family stress (Campbell, Pierce, Moore, Marakovitz, & Newby, 1996), and low social support (Mathiesen, Sanson, Stoolmiller, & Karevold, 2009; Shaw, Owens, Giovanelli, & Winslow, 2001) have also been found to predict development of externalising behaviour. Finally, high levels of shyness are a protective factor against the development of externalising behaviour (Sanson, Hemphill, & Smart, 2004).

While there is reasonably consistent evidence of the predictive importance of the above factors when assessed in childhood, less is known about their long term impact if they are present from infancy. Moreover, the relative importance of each of these risk factors is unclear. Further clarification of the most influential early risk factors for externalising pathways appears to be necessary, and has the potential to inform early intervention and preventive efforts.

Several definitions of externalising behaviours have been used in the research to date, varying from narrow (i.e. one single dimension such as physical aggression, see Broidy et al., 2003; Côté et al., 2006; Tremblay et al., 2004), to broader definitions corresponding to the DSM-5 definition of conduct disorder (Odgers et al., 2008). This diversity adds complexity to the interpretation of the body of evidence (Campbell et al., 2010). Factor analytic studies (e.g. Achenbach & Edelbrock, 1978) and diagnostic schemes (American Psychiatric Association, 2013) identify externalising behaviour problems as a multi-faceted developmental phenomenon with differing indicators across time. Since prevention and early intervention efforts aim to address this broad and developing constellation of behaviours, it seems most valuable to employ measures that capture the breadth of the phenomenon; however, such an approach may imply shifting indicators corresponding to shifts in modal externalising behaviours with increasing child age.

The overall aim of the current study was to identify typical trajectory classes of externalising behaviours, and to identify predictors already present in infancy that discriminate among the trajectory classes. More specifically, we employed a simultaneously estimated latent class model with predictors, to (1) identify the number and nature of latent classes of mother-reported externalising behaviour in a representative sample of Norwegian children followed longitudinally from 18 months to 14.5 years, and (2) identify intrinsic child and family factors assessed at age 18 months that predict membership in the different latent classes. Based on earlier findings we expected to identify stable high, stable low, childhood limited, and adolescent onset trajectory classes. We also expected that the early child and family factors would uniquely discriminate a stable high class from all other classes.

Method

Sample and procedure

We used data from the Tracking Opportunities and Problems Project (TOPP), a population-based prospective longitudinal study focusing on development of well-being, good mental health, and mental disorders in children, adolescents, and their families. More than 95% of Norwegian families with children attend public health services in infancy, which include 8–12 health screenings during the first 4 years of the child's life. Every family who visited a child health clinic within six select municipalities in eastern Norway (comprising 19 different health care regions) in 1993 for the scheduled 18 month vaccination visit, were invited to complete a questionnaire. Of the 1081 eligible families, the parents of 939 children (87%) participated at Time 1 (t1). These parents received a similar questionnaire when the children were 2.5 years of age (Time 2: $n = 804$, 86% of t1), 4.5 years (Time 3: $n = 760$, 81%), 8.5 years (Time 4: $n = 535$, 57%), 12.5 years (Time 5: $n = 610$, 65%) and 14.5 years (Time 6: $n = 481$, 51%). The questionnaires were administered by health-care workers at t1 to t3. In subsequent waves questionnaires were sent by mail. The parents chose whether the mother or father completed the questionnaire at t1–t4, at t5 the mothers were encouraged to answer, and at t6 separate maternal and paternal questionnaires were sent. The number of questionnaires completed by mothers at each wave included 921 (t1), 784 (t2), 737 (t3), 512 (t4), 594 (t5) and 481 (t6). Since so few fathers participated across time, the paternal questionnaires were not included in the current study.

The 19 health care regions were chosen on the basis of their overall representativeness of the diversity of social environments in Norway: 28% of the families lived in large cities, 55% in small towns or other densely populated areas, and 17% in rural areas. The gender of the children in the sample was nearly evenly divided, with 48.9% ($n = 450$) boys. Maternal age ranged from 19 to 46 years at t1, with a mean of 30 years ($SD = 4.7$). At t1, 49% of the families had only one child, 37% had two, and 15% had three to ten children. The participating families were predominantly ethnic Norwegian. In 1993 only 2.3% of the Norwegian population came from non-Western cultures, therefore, this sample was largely representative of ethnicity in Norway at the time of data collection (Statistics Norway, 2013).

Data from the child health clinics showed that nonparticipants at t1 did not differ significantly from the study participants with respect to maternal age, education, employment status, number of children, or marital status. Analyses of sample attrition from t1 to t7 (i.e., child age 16.5 years) showed that the families who had dropped out were not significantly different at t1 from the families who completed questionnaires at t7 in terms of child externalising behaviour, maternal depression, maternal age, financial status, number of children, negative life events, chronic stress, or social support. However, the dropout sample was significantly different from the remaining sample at t1, in that a greater proportion of mothers with low education had left the study. This is commonly found in longitudinal studies (Gustavson, Soest, Karevold, & Røysamb, 2012). Steps taken to minimize the impact on statistical analyses of this non-random attrition are addressed in the analyses section.

Measures

Externalising behaviour problems

Core aspects of mother-reported child and adolescent externalising behaviours were measured at all six waves with items rated on