A Long-Term Look at "Early Starters": Predicting Adult Psychosocial Outcomes from Childhood Conduct Problem Trajectories

by

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Abstract

Current evidence suggests that multiple pathways of “early-starting” conduct problems exist, including persisting and declining trajectories. Since little is known about the early-onset-declining pathway, this study examined the long-term outcomes of different childhood conduct problem trajectories in a disproportionately high-risk sample (*n* = 754). Parents reported on children’s conduct problems at six time points (kindergarten to grade 7). At age 25, a broad range of psychosocial outcomes was assessed. Four childhood conduct problem trajectories were identified: low-decreasing (LD), moderate-decreasing (MD), high-stable (HS), and extremely-high-increasing (EHI). The EHI and HS groups displayed the poorest psychosocial functioning at age 25, whereas the LD group exhibited the most positive adjustment. Although individuals in the MD group displayed relatively positive adjustment on some outcomes, they displayed more psychopathology, more risky sexual behaviour, and lower well-being in adulthood than the LD group. These findings suggest that all early starters are at risk for later maladjustment.

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Introduction

Conduct problems refer to a broad range of "acting out" behaviours, which vary considerably in terms of severity (e.g., temper tantrums versus physical violence) and type (e.g., covert versus overt; Kimonis, Frick, & McMahon, 2014). As a result, youth who display conduct problems are highly heterogeneous with respect to their etiologies, clinical presentations, and prognoses, making subtyping an empirical and clinical necessity. One oft-cited scheme for subtyping youth with conduct problems is Moffitt's (1993) *developmental taxonomy,* which posits that a meaningful distinction exists between youth whose conduct problems emerge in childhood as opposed to adolescence. Specifically, Moffitt proposed two prototypes of antisocial youth based on age of onset: (1) *life-course-persistent* (LCP) and (2) *adolescence-limited* (AL). According to this theory, LCP individuals constitute a relatively smaller group – Moffitt estimated approximately 5-10% of youth – who are characterized by childhood-onset antisocial behaviour that persists into adulthood. These individuals are believed to have antisocial personality styles that develop due to the interaction of neurological deficits (e.g., impairments in verbal and executive functions) and criminogenic environments (e.g., high-risk neighbourhoods, parental antisocial behaviour, inconsistent parenting practices). Moffitt contended that LCP individuals' antisocial behaviour is maintained because they (1) develop restricted behavioural repertoires (i.e., fail to learn prosocial alternatives) and (2) tend to become "ensnared" by the cumulative consequences of antisocial behavior (p. 683). Therefore, she predicted that they would be responsible for the majority of crimes conducted in adulthood, despite their lower prevalence.

In contrast, AL youth constitute a much larger group of individuals who exhibit antisocial behaviour that both emerges and desists in adolescence. Moffitt (1993) proposed that the AL pathway represented a developmentally normative reaction to the "maturity gap" that occurs in the adolescent years, wherein youth possess the biological characteristics of adults but do not benefit from the associated societal privileges (p. 687). Consequently, she argued that these youth begin to mimic the antisocial behaviour of their LCP peers as a means of asserting their independence. Unlike their LCP counterparts, however, AL youths' antisocial behaviour was *not* believed to be the product of individual or family risk factors, but rather contingent upon the motivation to gain access to adult privileges. Thus, Moffitt theorized that AL individuals' antisocial

behavior would often desist upon entry to adulthood, as gaining adult status would serve to reduce the reinforcing properties of their antisocial behaviour.

Since the time of its original publication, Moffitt's developmental taxonomy has greatly influenced both research and clinical practice (Frick & Nigg, 2012; Moffitt et al., 2008). Numerous studies across different research groups, countries, and cultures have been conducted over the past 25 years to test the validity of Moffitt's theory, and consistent evidence has been found for LCP (also referred to as early-onset persistent [EOP]) and adolescence-onset antisocial behaviour (Jennings & Reingle, 2012; Moffitt, 2008, 2017). Indeed, the substantial empirical support for the *age-of-onset* component Moffitt's theory has led to the distinction between childhood-onset (i.e., prior to age 10) and adolescence-onset (i.e., 10 and above) conduct disorder in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; American Psychiatric Association [APA], 1994, 2013). Despite the taxonomy's far-reaching impact in this regard, however, accumulating evidence has called into question some of Moffitt's original ideas about the *continuity* of antisocial behaviour among youth. For example, in contradiction to Moffitt's hypothesis that the emergence of antisocial behaviour in adolescence was developmentally normative and transient, individuals who develop conduct problems in adolescence have been found to be at increased risk for a host of negative outcomes in adulthood – including persistent antisocial behaviour (see Fairchild, van Goozen, Calder, & Goodyer, 2013, for a review). For this reason, this trajectory is now commonly referred to as adolescence-onset (AO; i.e., versus AL) in the literature. Furthermore, in terms of childhood-onset antisocial behaviour, it seems that Moffitt's original theory also failed to predict an additional subtype that is now gaining more empirical attention: the *childhood-limited* (CL) pathway.

A Previously Unrecognized Subtype: Childhood-Limited Conduct Problems

Even though early-onset conduct problems are an established risk factor for antisocial behavior in adolescence and adulthood (hence the empirically supported LCP pathway; e.g., Jennings & Reingle, 2012; Moffitt et al., 2008, 2017), accumulating evidence suggests that not all *early starters* show persistent antisocial behaviour. Indeed, some have called for a revision of Moffitt's taxonomy to account for a CL pathway, which describes a subgroup of youth who exhibit conduct problems in

childhood that steadily decline prior to adolescence (e.g., Fairchild et al., 2013; Moffitt et al., 2008). Empirical support for a CL-like subgroup came from Moffitt's original empirical investigation of the developmental taxonomy among males from a birth cohort in Dunedin, New Zealand (Moffitt, Caspi, Dickson, Silva, & Stanton, 1996). Using longitudinal data on conduct problems from early childhood to age 18, Moffitt and colleagues identified the hypothesized LCP and AL groups as well as a sizeable group (8% of the sample) of males who displayed high rates of conduct problems in childhood but did not show serious offending patterns in adolescence. They optimistically labeled this group of males as *recoveries*, which sparked empirical interest in conduct problem desistence among children.

Since that time, a CL-like subgroup – sometimes referred to as *decliners* or *desisters* – has also been identified by independent research groups in numerous North American (e.g., Aguilar, Sroufe, Egeland, & Carlson, 2000; Cote, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006; Nagin & Tremblay, 1999), European (e.g., Barker & Maughan, 2009; Reef, Diamontopoulou, van Meurs, Verhulst, & van der Ende, 2010; Sentse, Kretschmer, de Haan, & Prinzie, 2017), and Australian (e.g., Bor, McGee, Hayatbakhsh, Dean, & Najman, 2010) samples. In a review of research relevant to Moffitt's developmental taxonomy, Fairchild and colleagues (2013) stated that "childhood-limited antisocial behaviour is actually the most common outcome of childhood-onset conduct problems" (p. 926), citing population-based studies showing that 50-70% of early starting children desist from acting antisocially before reaching adolescence. According to Russell and Odgers (2016), however, this subgroup has not been consistently identified across studies that have employed more sophisticated person-centered statistical approaches, which are used to identify latent subgroups within a population based on individuals' patterns of conduct problems over time. This is partly due to the different samples and measurement procedures used to identify conduct problem trajectories across studies (see Jennings & Reingle, 2012, for a discussion). To further complicate matters, some of the findings that have been cited as evidence for a CL-like trajectory come from studies that relied upon assessments of conduct problems that began in late childhood (e.g., ages 10 through 12; Jennings, Rocque, Fox, Piquero, & Farrington, 2016; Maughan, Pickles, Rowe, Costello, & Angold, 2000; Miller, Malone, Dodge, & the Conduct Problems Prevention Research Group [CPPRG], 2010; Shaw, Hyde, & Brennan, 2012; Veenstra, Lindenberg, Verhulst, & Ormel, 2009). This is problematic,

given that the age of 10 is commonly used as a cut-off for distinguishing early-onset conduct problems (APA, 2013).

From a developmental psychopathology perspective, the confirmation of a CL trajectory would pose some important questions. Specifically, what distinguishes CL children from their LCP counterparts, who continue to display antisocial behaviour throughout adolescence and adulthood? In addition, what are the long-term implications of belonging to the CL subgroup (i.e., do these individuals truly recover as Moffitt and colleagues' [1996] original study suggested)? In a comprehensive review of the evidence base for conduct disorder, Moffitt and colleagues (2008) called for more research on the CL subtype, suggesting that the clinical utility of subtyping conduct disorder based on age-of-onset depends on a better understanding of CL individuals. Given the potential to elucidate factors related to risk and resilience in the early development of antisocial behaviour, such research could prove critical to early identification and intervention efforts.

What Distinguishes Children on CL versus LCP Pathways?

While a wealth of research has investigated childhood predictors of conduct problem trajectories in general, only a small number of researchers have directly compared characteristics of individuals who follow LCP and CL pathways using formal statistical tests (Russell & Odgers, 2016). To date, there is preliminary evidence that certain family and child characteristics may increase the likelihood that childhood conduct problems will persist as opposed to desist. In particular, it has been shown that LCP individuals are more likely than CL individuals to experience the following family characteristics: lower family income (Cote et al., 2006; Maughan et al., 2000; Odgers et al., 2007); higher levels of family stress (Kjeldsen, Janson, Stoolmiller, Torgersen, & Mathiesen, 2014); lower maternal education (Cote et al., 2006; Nagin & Tremblay, 2001); lower maternal age (Kjeldsen et al., 2014; Nagin & Tremblay, 2001); maternal anxiety during pregnancy (Barker & Maughan, 2009); family histories of externalizing disorders (Odgers et al., 2007); parental criminality (Maughan et al., 2000; Odgers et al., 2007); and exposure to domestic abuse (Barker & Maughan, 2009), maltreatment (Odgers et al., 2007) and negative parenting practices (e.g., hostile/harsh parenting, poor supervision, maternal rejection; Barker & Maughan, 2009; Maughan et al., 2000; Shaw, Gilliom, Ingoldsby, & Nagin, 2003). In terms of child characteristics, there is some

evidence that children on the LCP pathway are significantly more likely than CL individuals to: be male (Cote et al., 2006), have ADHD (Odgers et al., 2007), and display severe childhood conduct problems (Pitzer, Esser, Schmidt, & Laucht, 2009) as well as distinct temperamental characteristics like fearlessness (Shaw et al., 2003) and a high activity level (Barker & Maughan, 2009). Notably, for some of these family and child characteristics (e.g., low family income, lower maternal education, exposure to negative parenting, maltreatment, ADHD diagnosis, fearlessness), there is preliminary evidence that CL individuals score somewhere in between individuals with stable low conduct problems and those with persistently high conduct problems (e.g., Cote et al., 2006; Odgers et al., 2007; Shaw et al., 2003).

This research is certainly promising, but the reality is that most of the predictors identified above have not been replicated – and in some cases, inconsistent findings have emerged. For example, the roles of maternal depression and child ADHD symptoms in predicting persisting versus desisting conduct problems are currently unclear. While Shaw and colleagues (2003) reported that depression was similarly high among mothers of boys who displayed chronic and high-declining conduct problems from ages 2 to 8, Kjeldsen and colleagues (2014) found that depressive symptoms were more common among mothers of children who followed a high-declining (versus high-stable) pathway from 18 months to 14 years. Similarly, Odgers and colleagues (2007) found that a diagnosis of ADHD was more common among males who followed a LCP (versus CL) pathway from ages 7 to 26, yet Nagin and Tremblay (1999) reported that high hyperactivity did *not* distinguish between boys who exhibited chronic and high-declining aggression between the ages of 6 and 15. Clearly, the different assessment methods and varying age ranges used across these studies complicates the interpretation of their findings. That said, the fact remains that a systematic pattern of differences between the predictors of LCP and CL conduct problems has yet to be identified. On a practical level, this means that clinicians are not currently able to reliably distinguish between children whose early-onset conduct problems are likely to persist versus desist for the purposes of diagnosis and treatment planning (Moffitt et al., 2008). Nevertheless, this may only pose a problem if it is determined that children on the CL pathway are not at significant risk for negative outcomes later in development.

What Are the Long-Term Outcomes of CL Conduct Problems?

When used to describe conduct problem trajectories, the terms 'childhood-limited' and 'desisting' imply a certain degree of prognostic optimism. While it may be tempting to assume that these children adapt well because their conduct problems decline before adolescence, one could argue that displaying conduct problems at *any* point in childhood could potentially disrupt subsequent development. To illustrate, *developmental cascade theory* posits that certain childhood events or experiences (e.g., the onset of psychopathology) have the potential to set a 'snowball effect' in motion, whereby different levels of development are affected in complex ways over time (Masten & Cicchetti, 2010). In line with this theory, research shows that early-onset conduct problems increase children's risk for poor adaptation during school years (e.g., academic failure, peer rejection), which further predicts poorer adjustment later in development (e.g., Dodge, Greenberg, Malone, & CPPRG, 2008; Moilanen, Shaw, & Maxwell, 2010). Furthermore, it is possible that CL individuals' core psychopathology may not desist, but rather display *heterotypic continuity* (i.e., manifest differently throughout development; Cicchetti & Rogosch, 1996). Heterotypic continuity could explain why CL children's conduct problems decline over the course of childhood: Their clinical presentations may simply change as they approach the transition to adolescence. In either case, the implication would be that CL children are potentially at elevated risk for poorer outcomes – at least as compared to peers who never display conduct problems. Therefore, the long-term adjustment of CL youth is an empirical question that needs to be formally tested.

To date, a relatively small number of studies have examined the developmental outcomes of children who follow the CL pathway. These studies can be placed into two general categories, based on the methodology used to identify conduct problem trajectories. The first category includes studies that utilized cut-off scores to classify antisocial children/youth, which typically involves manually assigning conduct problem trajectory labels based on the severity of antisocial behavior at different time points (e.g., Aguilar et al., 2000; Bor et al., 2010; Hyatbakhsh et al., 2008; Jennings, Rocque, Fox, Piquero, & Farrington, 2016; Moffitt, Caspi, Harrington, & Milne, 2002; Roisman, Aguilar, & Egeland, 2004). For example, Moffitt and colleagues followed up on the previously described *recovery group* identified among males in the Dunedin birth cohort, which

consisted of individuals who were found to display severe conduct problems in childhood but non-serious offending behaviours in adolescence. Based on data collected at age 26, they determined that 'recovery' was a misnomer, as 28% of these males had been convicted of crimes as adults. In addition, the so-called recovery group was found to be at increased risk for neurotic personality traits, depressive episodes, anxiety disorders, and social isolation in adulthood.

Using similar methodology in an Australian birth cohort study, Bor and colleagues (2010) found that the CL subtype (defined as aggressive behaviour greater than one standard deviation above the mean at age 5 but not at age 16) was *not* associated with self-reported antisocial behavior at age 21. However, CL aggression was found to predict other adverse adult outcomes in this sample – albeit differently for males and females. Specifically, males on the CL pathway were found to be at increased risk for heavy cigarette smoking, delusional symptoms, and physical health problems at age 21, whereas CL females were found to be at increased risk for symptoms of anxiety and depression. Clearly, these studies highlight the importance of investigating the long-term outcomes of this particular conduct problem pathway. However, the cut-off approach has been criticized, primarily due to its over-reliance on theoretically derived categorization rules to define different subgroups of youth with conduct problems (Nagin & Odgers, 2010). Since the subjectivity of this approach reduces confidence in the identified subgroups, researchers have turned to using group-based statistical modeling techniques.

Indeed, the second category includes a small but growing number of studies that have used latent class growth analysis (LCGA; Nagin, 1999) and growth mixture modeling (GMM; Muthén & Muthén, 2000; Muthén & Shedden, 1999) to examine the long-term outcomes of CL conduct problems. While these two methods have important differences (for a discussion, see Nagin & Odgers, 2010), they both assume that individuals within a given population show heterogeneous patterns of behaviour over time, and aim to characterize this population heterogeneity by identifying latent (i.e., unobserved) subgroups of individuals who share similar pathways. Unlike the cut-off approach described above, these data-driven approaches *model* the number and shapes (e.g., growth slopes) of different developmental trajectories using formal statistical methodology – that is, as opposed to *imposing* them with theoretically-derived yet subjective categorization rules (Nagin & Odgers, 2010). As described by Nagin and

Odgers, they are thus capable of both (a) identifying distinct developmental trajectories that might otherwise be missed and (b) distinguishing between real versus chance variation across individuals. While these group-based modeling techniques carry their own set of disadvantages (e.g., the risk for over-extraction of trajectory groups; see Bauer & Curran, 2003), they are nevertheless widely recognized as important methodological advances in developmental and clinical research.

So far, a wide range of long-term outcomes of the CL trajectory has been investigated using this approach, including various indicators of psychopathology, physical health, and antisocial behaviour, with much of the existing evidence pertaining to adjustment in adolescence and emerging adulthood (i.e., ages 13 to 21; e.g., Fontaine et al., 2008; Heron et al., 2013; Kjeldsen et al., 2014; Kretschmer et al., 2014; Sentse et al., 2017). At these stages of development, the evidence regarding the relative adjustment of CL individuals is inconsistent. For example, in the UK-based AVON Longitudinal Study of Parents and Children, Heron and colleagues modelled conduct problem trajectories using five items from the Strengths and Difficulties Questionnaire (Goodman, 2001) from ages 4 to 13 and then examined associations with alcohol misuse in mid to late adolescence. The researchers reported that, compared to youth with consistently low conduct problems (the 'Low' group; 64.3% of the sample), early-onset persistent youth (9.2%) were significantly more likely to engage in (a) high-frequency drinking between the ages of 13 to 15 and (b) hazardous drinking at age 16; however, there were no differences between CL (14.7%) and Low adolescents on either of these indicators of alcohol misuse. In a follow-up study of this sample at age 18, Kretschmer and colleagues found that males and females on the CL pathway were significantly *less* likely than their early onset-persistent counterparts to report alcohol use, smoking, cannabis use, criminal involvement, and anxiety. Furthermore, these researchers only found one significant difference between CL individuals and those on the Low conduct problem trajectory at age 18: CL individuals were somewhat more likely to engage in smoking. In contrast to these results, using data on the DSM-oriented Conduct Problems subscale of the Child Behavior Checklist (CBCL; Achenbach, 1991; Achenbach, Dumenci, & Rescorla, 2003) from ages 4 to 17 in the Flemish Study on Parenting, Personality, and Development, Sentse and colleagues found that, compared to individuals with stable low conduct problems (48% of the sample), CL (12%) and LCP (25%) individuals were more likely to display internalizing symptoms, thought problems,

aggression, and rule-breaking behaviour by the time they were 17 to 20 years old. Importantly, the researchers reported that the LCP and CL groups did *not* significantly differ on any of these outcomes. Given their disparate clinical implications, these inconsistent findings clearly point to the need for further research on the long-term outcomes of the CL trajectory, including studies that extend beyond adolescence and emerging adulthood.

To date, group-based trajectory modelling has only been used to examine the predictive validity of the CL trajectory beyond the age of 21 in a few samples, most notably the Dunedin birth cohort (Odgers et al., 2007, 2008) and a population-based sample in Zuid-Holland (e.g., Bongers, Koot, van der Ende, & Verhulst, 2008; Reef et al., 2010). When GMM was used to formally analyze conduct problem trajectories from age 7 to 26 among males in the Dunedin birth cohort, Odgers and colleagues (2007, 2008) reported that CL males (24.3% of the sample) were faring relatively well in terms of both mental and physical health at age 32 compared to their LCP counterparts (10.5%). However, the CL group significantly differed from males who had never displayed significant conduct problems (i.e., the 'Low' group; 45.6%) in terms of anxiety disorders, informant-rated internalizing problems, informant-rated violence, official convictions of violent crimes, smoking, lung function, untreated tooth decay, and financial problems. For example, 6% of CL males had been convicted of violent crimes between the ages of 26 and 32, whereas virtually no males in the Low group had received such convictions (i.e., 0.4%). In addition, 24.8% of males in the CL subgroup were found to suffer from an anxiety disorder (i.e., generalized anxiety disorder, OCD, panic disorder, agoraphobia, social phobia, or specific phobia) at age 32, compared to only 10.2% of males in the Low group. These findings need to be interpreted in light of the fact that LCP males were found to be at highest risk for all negative adult outcomes, but it is notable that the rates of anxiety disorders found in LCP (32.7%) and CL (24.8%) males at age 32 were not significantly different. In contrast, when Odgers and colleagues (2008) investigated outcomes among females in the Dunedin birth cohort, they found that CL females (20.0% of the female sample) resembled females on the Low (55.1%) pathway on virtually all mental health, physical health, and economic outcomes at age 32.

In a recent follow-up study, Rivenbark and colleagues (2018) combined the male and female samples in the Dunedin birth cohort to examine adult service use outcomes associated with different conduct problem trajectories. The researchers found that LCP

individuals (9.0% of the combined sample) had the greatest service utilization between the ages 26 and approximately 38. However, compared to participants on the Low conduct problem trajectory (50.3%), males and females with CL conduct problems (22.1%) were significantly more likely to receive criminal convictions, make injury claims, and use social welfare benefits in adulthood. CL individuals were also significantly more likely than Low individuals to display high service use across multiple domains (i.e., criminal justice, social welfare, and health). These findings suggest that early-onset conduct problems can have long-term costs for society, even when they decrease before adolescence.

In the Zuid-Holland population-based sample, researchers have examined the adult outcomes of the CL trajectory separately for different forms of conduct problems (Bongers et al., 2008; Reef et al., 2010, 2011). Using the Child Behavior Checklist for ages 4 to 18 (CBCL; Achenbach & Rescorla, 2001), conduct problem trajectories were modelled separately for four types of externalizing behaviour (aggression, oppositionality, property violations, status violations). Groups of individuals on CL trajectories (labeled “high-decreasers”) were identified for aggression and oppositionality, and they were compared to individuals who followed “near zero” trajectories of these conduct problems on a host of psychosocial outcomes in adulthood (i.e., between the ages of 18 and 30, with slight variations across studies). With respect to aggression, high decreasers were found to be at significantly greater risk for later disruptive behaviour disorders (Reef et al., 2011); greater number of job changes (Bongers et al., 2008); and self-reported symptoms of anxiety, depression, somatic problems, thought problems, attention problems, aggression, rule-breaking behaviour, and intrusive thoughts (Reef et al., 2010). In terms of oppositionality, ‘high decreasers’ were found to be at greater risk for any DSM-IV disorder (Reef et al., 2011); poorer social functioning (e.g., less intimate relationships, lower quality of spare time activities, lower levels of education and job attainment; Bongers et al., 2008); and self-reported symptoms of anxiety, depression, somatic problems, thought problems, attention problems, aggression, rule-breaking behaviour, and intrusive thoughts (Reef et al., 2010). Interestingly, when compared to their respective ‘near zero’ trajectories, CL oppositionality was associated with more problems with social functioning in adulthood than CL aggression (Bongers et al., 2008). This suggests that the long-term prognoses

of CL individuals may depend on the type of the conduct problems they originally engage in and subsequently desist from.

Overall, despite early assumptions that the CL trajectory represented recovery (Moffitt et al., 1996), there is evidence that individuals who display CL conduct problems are at elevated risk for later internalizing problems, antisocial behaviour, health and financial problems, social difficulties, higher service use, and lower life satisfaction (e.g., Bongers et al., 2008; Kjeldsen et al., 2016; males in Odgers et al., 2007, 2008; Reef et al., 2010, 2011; Sentse et al., 2017). Indeed, based on a meta-analysis of 13 studies examining psychosocial outcomes associated with conduct problem trajectories, Belvilacqua and colleagues (2017) proposed that "full recovery from conduct problems rarely occurs," since CL individuals experience some maladjustment in adulthood relative to typically developing individuals (p. 11). That said, inconsistent findings have been reported across the small number of existing studies (e.g., Kretschmer et al., 2014; females in Odgers et al., 2008), such that the nature and degree of later maladjustment of CL individuals remains unclear. Given the current state of the research base, it is therefore imperative to further investigate the long-term developmental outcomes of this pathway.

The Present Study

The aim of the study was to use data from the Fast Track project (Conduct Problems Prevention Research Group [CPPRG], 1992, 2000) – a large-scale, multisite investigation of the development and prevention of conduct problems in children living in four U.S. communities – to investigate trajectories of childhood conduct problems and their associations with long-term developmental outcomes. The project proceeded in two general steps. First, LCGA was used to examine childhood conduct problem trajectories. Because the Fast Track recruiting procedure selected for a disproportionately high-risk sample of children (described in detail below), it was hypothesized that different trajectories of early-onset conduct problems, including both a persistent and a declining pathway, would emerge. Given that the present sample also included a subset of typically developing children, however, it was hypothesized that a trajectory characterized by stable-low conduct problems would be identified as well. Second, a broad range of distal (i.e., age 25) outcomes were entered into the model to examine the long-term prognoses associated with the identified childhood conduct problem

trajectories. In light of previous research (e.g., Bongers et al., 2008; Kjeldsen et al., 2016; Odgers et al., 2007, 2008, 2018; Reef et al., 2010, 2011; Sentse et al., 2017), it was hypothesized that a CL-like trajectory, if identified, would be associated with some adverse adult outcomes; however, no specific predictions were made due to the inconsistency of existing evidence. This study contributes to the research base by being one of the first to explicitly examine desistance of early-onset conduct problems and associated developmental outcomes using group-based trajectory modelling in a geographically and ethnically diverse U.S. sample.

Method

Participants

As stated above, the proposed study utilized data from the Fast Track Project, which began with the selection of 55 elementary schools deemed to be high risk based on neighbourhood crime and poverty in four geographical locations in the United States: Seattle, Washington (*n* = 15); Nashville, Tennessee (*n* = 10); Durham, North Carolina (*n* = 13); and rural Pennsylvania (*n* = 17). Schools within these sites were then matched based on size, ethnic composition, and poverty rates, and randomly assigned to either intervention or control conditions. Within these schools, 9,594 kindergarten children (approximately 6 years of age) across three cohorts (1991–1993) participated in a multiple-gating screening procedure (Lochman & the CPPRG, 1995). The procedure began with a screening for classroom conduct problems that utilized teacher ratings on items from the Teacher Observation of Child Adjustment – Revised (e.g., “stubborn,” “breaks rules,” “harms others”; Werthamer-Larsson, Kellam, & Wheeler, 1991). Children found to be in the top 40% of their cohort and site were then screened for externalizing behaviour problems at home using parent ratings on 24 items drawn from existing behaviour checklists (i.e., the Child Behavior Checklist, Achenbach, 1991; and the Revised Problem Behavior Checklist, Quay & Peterson, 1987). Next, a “total severity-of-risk” screen score was created by summing standardized scores on the parent and teacher screens, and children with the highest total risk scores were selected for inclusion in the study until desired sample sizes were reached across sites, schools, and groups. Children were not included in the study if they refused to participate or failed to enroll in first grade at 1 of the 55 core schools. Deviations from the selection procedure were also made to ensure that no child would be the only girl in an intervention group.

Ultimately, 891 children participated in the randomized controlled trial, with 445 and 446 children being assigned to the intervention and high-risk control groups, respectively. In addition, a normative comparison sample (*n* = 387) was selected from children in the first cohort from the control schools (i.e., approximately 100 children from each site). This longitudinal comparison group, which was randomly selected after participants had been stratified according to race, sex, and teacher-rated conduct problems scores, was used to represent the population-normative range of conduct

problems within the schools. After initial recruitment in kindergarten, children assigned to the intervention group participated in a multiple-phase prevention program until the end of grade 10. Annual assessments of all children took place post-kindergarten through 2 years post-high school, with the entire sample being assessed again at age 25.

In the current project, only data from the high-risk control and normative comparison groups were utilized – that is, children who received the Fast Track preventive intervention were not included in the analyses. Since the normative comparison group included a portion of children from the high-risk control group (*n* = 79), the final sample consisted of 754 children. The sample was 58% male, 50% Caucasian, 46% African American 1.6% Hispanic, 0.4% Asian, 0.3% Native American, and 1.7% other race.

Measures

At the outset of the Fast Track project, parents reported on child sex, child race, and family socioeconomic status (SES). In addition, cohort and geographic site were recorded for each participant. Consistent with previous studies (e.g., CPPRG, 2002), a race/urban status composite variable was created to account for the strong association between race and site in the Fast Track sample. Specifically, the only rural site, Pennsylvania, was primarily European American, whereas African American participants were more likely to come from urban sites. Race/urban status included three categories: urban African American (45.5% of the sample), urban European American (24.5%), and rural European American (25.5%).

Childhood conduct problems were measured using parent report on the CBCL (Achenbach, 1991). The CBCL is widely used to assess child behaviour problems and has good reliability and validity (Achenbach, 1991). These checklists require parents to rate the applicability of a series of statements (e.g., “Bullies others”) to a target child over the past 6 months using a 0-1-2 response scale (0 = *not true*; 1 = *somewhat or sometimes true*; 2 = *very true or often true*). Reponses are then used to calculate eight syndrome scale scores (e.g., aggression, delinquency, anxious-depression, thought problems, etc.) as well as broadband Externalizing, Internalizing, and Total Problem scores. In the Fast Track Project, parents completed the CBCL in the summer following the children’s kindergarten year as well as in the summers following grades 1, 2, 4, 5,

and 7. Raw (sum) scores on the CBCL Externalizing broadband scale were used to identify childhood conduct problem trajectories. Raw scores (as opposed to *T* scores standardized by age and sex) were chosen to maximize the amount of developmental change in conduct problems that could be examined. The Externalizing scale is comprised of 33 items, from the aggression and delinquency syndrome scales of the measure.

The present study examined five areas of psychosocial functioning at age 25: psychopathology, substance use, risky sexual behaviour, antisocial behaviour, and adaptive outcomes. The same outcome measures were previously employed in a follow-up study published by the CPPRG (Dodge et al., 2015).

Psychopathology was assessed using self- and peer-report on the Adult Self-Report (ASR) and the Adult Behavior Checklist-Friend (ABCL-F) (Achenbach & Rescorla, 2003). Fast Track participants completed the ASR and nominated one peer to complete the ABCL-F. Both of these 132-item instruments have been demonstrated to have good reliability and validity (Achenbach & Rescorla, 2003). They require respondents to report on the applicability of various statements regarding the participant's symptoms on a 3-point scale (0 = *not true*; 1 = *somewhat or sometime true*; 2 = *often true*). The ASR and ABCL-F provide DSM-oriented scales, which were based on criteria recommended by an international panel of judges to be consistent with DSM-IV criteria. Binary diagnostic indicators (1 = *present*; 0 = *absent*) were used for the following clinical problems: adult *ADHD*, *antisocial personality disorder* (APD), *avoidant personality disorder* (AvPD), *somatic problems, anxiety problems*, and *depressive problems*. Participants' symptoms were considered to be in the clinical range if peer- *or* self-ratings indicated that individuals met criteria for a given disorder.

Substance use was assessed using the third version of the Tobacco, Alcohol, and Drugs (TAD) Survey (Bureau of Labor Statistics, 2002; Elliot, Huizinga, & Ageton, 1985) as well as an alcohol and drug interview module that was adapted from the National Institute of Mental Health Diagnostic Interview Schedule (self and peer report; Robins, Helzer, Croughan, & Ratcliff, 1981). Four binary indicators of self- *or* peer-reported substance use problems at age 25 were examined: (a) *regular binge drinking* (i.e., 5+ drinks on one or more occasion in the last month *and* 5+ drinks on 12 or more occasions in the last year); (b) *heavy marijuana use* (i.e., 27+ days of use in the past

month); (c) *serious substance use* (i.e., use of crack, cocaine, inhalants, heroin, LSD, phencyclidine, ecstasy, mushrooms, speed, or other pills not prescribed by a physician in the past month); and (d) a diagnostic indicator of *alcohol abuse* (i.e. created using DSM-IV diagnostic criteria assessed during the alcohol and drug interview module). Consistent with previous work (Dodge et al., 2015), a binary measure of *any self- or peer-reported problematic substance use* was also used, scored 1 if any of the four substance use problems were met and 0 otherwise.

Risky sexual behaviour was assessed using self-report on the 37-item Overview of Sexual Experiences (Capaldi, 2002), a self-report questionnaire developed to assess various characteristics of participants' sexual experiences over their lifetime and in the past 12 months (e.g., number of sexual partners; contraction of sexually transmitted diseases; contraceptive use). *Lifetime number of sexual partners* was assessed on a 0 to 7 scale (0 = *0*; 1 = *1-2*; 2 = *3-5*; 3 = *6-10*; 4 = *11-15*; 5 = *16-20*; 6 = *21-50*; 7 = *50 or more*). In addition, a variable for *risky sexual behaviour in the past 12 months* was previously created for the Fast Track project by multiplying the number of partners in the past year with the sum of two scales: new-partner condom non-use and regular partner condom-non-use (Dodge et al., 2015). Participants rated their new partner condom non-use from 0 (no new partner) to 5 (never use), and they rated their regular partner condom non-use from 1 (never non-use) to 5 (never use).

Adult antisocial behaviour was assessed using measures of *criminality* and *relationship violence*. Criminality was assessed using information on convictions and diversions from local court records as well as a national database. Severity weighted indices of *substance crimes*, *violent crimes*, and *property and public order* (POP) *crimes* were created for the Dodge et al. (2015) study by multiplying frequencies by severity across all lifetime adult convictions. Severity levels for substance crimes range from 1 to 2 (1 = possession; 2 = manufacturing and possession with intent to sell). For violent crimes, severity levels range from 1 to 3 (1 = DUI and carrying a concealed weapon; 2 = robbery and first-degree burglary; and 3 = aggravated/armed robbery, murder, rape, kidnapping, sex offenses, and first-degree assault; and). Severity levels for POP crimes range from 1 to 3 (Dodge et al., 2015).

Relationship violence was assessed using the General Violence Questionnaire (Holtsworth-Monroe, Rehman, & Herron, 2000). Participants and their self-nominated

peers reported on the number of times that participants had engaged in the following violent acts toward any romantic partner in the past year: threatened with a knife or gun; pushed, shoved, grabbed, slapped, or threw something; punched, hit, kicked, bit, or slammed against a wall, beat up or choked, strangled, burned, or scalded on purpose; or used a knife or gun. Items were rated on a scale of 0 to 3 (with 3 indicating 3 or more times) and item scores were summed for each reporter. The present project used the self- and peer-reported average.

Adaptive outcomes included education, employment, and well-being. Binary indicators (1 = *yes*; 0 = *no*) of *educational attainment* and *current employment* at age 25 were used to assess whether participants (a) had graduated high school or received a General Equivalency Diploma (GED) and (b) were currently employed full time or enrolled in post-secondary, respectively. These items were created from the Education Information and Employment History measures from the National Longitudinal Survey (Howe & Frazis, 1992). *General well-being* was assessed using self- and peer-report measures of happiness, personal strength, and general health. Happiness and personal strength were both assessed using select items from the ASR and the ABCL-F (Achenbach & Rescorla, 2003; described above). Participants and their self-nominated peers both also completed the 36-item Short-Form Health Survey (Ware & Sherbourne, 1992), which included four items assessing overall health status, presence of chronic conditions, magnitude of bodily pain, and presence of physical health issues that impacted work. A general well-being score was created by averaging scores across the standardized general health index, personal strength, and happiness scores, separately for self and peer report (Dodge et al., 2015). The self- and peer-reported average well-being score was used in the present analyses.

Analysis Plan

Statistical analyses proceeded in four steps. First, *SPSS 19.0* (IBM Corp., 2010) was used to conduct descriptive analyses. Frequencies were analyzed for dichotomous and categorical variables. In addition, descriptive statistics, including means, standard deviations, skewness, and kurtosis, were calculated for all continuous variables. Correlations between the main study variables were also examined.

Second, *Mplus version 7.31* (Muthén & Muthén, 1998-2012) was used to conduct LCGA in order to identify unique latent trajectories of childhood conduct problems from kindergarten to grade 7. LCGA involves fitting a series of models to determine the number of classes required to sufficiently capture sample heterogeneity (in this case, with respect to trajectories of conduct problems), and it assumes a finite number of distinct subgroups/classes showing similar patterns exist within the sample. The series of models were examined in a stepwise fashion (i.e., adding a class with each model) and a single model was selected by comparing fit indices. Linear and quadratic slopes were included. To avoid a local minimum, multiple random starting values were also used, and each class model was run 500 times. The following indices were considered in examining model fit at each time point: (a) information criteria, including the Akaike information criteria (AIC), the Bayesian information criteria (BIC), and the sample size-adjusted BIC (aBIC), with lower values reflecting better model fit (Nylund, Asparouhov, & Muthén, 2007); (b) entropy, a measure of class separation, with a value closer to 1.00 being preferred; and (c) likelihood ratio tests, including the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR-LRT: Lo, Mendell, & Rubin, 2001), the Vuong-Lo-Mendell-Rubin likelihood ratio text (VLMR-LRT; Lo, Mendell, & Rubin, 2001), and the parametric bootstrapped likelihood ratio test (BLRT). These tests are statistical comparisons of fit between a given model with *k* classes and a model with one fewer classes (i.e., *k*-1), with significant *p* values indicating improved model fit with the k-class model. In addition to these statistical indices of model fit, class size (i.e., prevalence) and the interpretability of identified classes were considered to ensure that the models made substantive sense in light of developmental theory.

Third, the three-step approach (Asparouhov & Muthén, 2012) was used to examine predictors of trajectory class membership (i.e., using the auxiliary variables feature in Mplus). In the three-step approach, latent trajectory classes are first identified in the manner described above. Next, individuals are assigned to their most likely class based on posterior probabilities obtained through model estimation. As described by Asparouhov and Muthén, a nominal variable is then created to represent each participants' most likely class membership. In the third step, auxiliary variables are included into the model and regressed on this nominal class membership variable, taking misclassification into account. In the present study, child age, cohort, sex, family SES, initial screen scores, and race/urban status were examined as possible predictors

of trajectory class membership, and categorical predictors (i.e., cohort, sex, race/urban status) were dummy coded. Predictors were controlled for in subsequent outcome analyses if they were found to have robust associations with trajectory class membership.

Finally, associations between class membership and age 25 outcomes were examined. Participants were assigned to their most likely class in the manner described above, and associations with distal outcomes were examined in SPSS. For continuous outcomes, analyses of covariance (ANCOVAs) were used to compare mean differences between identified trajectory classes. In the case of dichotomous outcomes, binary logistic regression was used to compare proportions between trajectory classes. In all analyses, alpha was pre-set to 0.05.

Missing Data

Missing data on childhood conduct problems increased over time, ranging from nearly 0% (*n* = 7) in kindergarten to 18% (*n* = 136) in grade 7. In the LCGA, missing data were accommodated using full information maximum likelihood estimation (FIML), which assumes data are missing at random (Rubin & Little, 2002). Thus, the full sample (*n* = 754) was used to identify childhood conduct problem trajectories. To test the associations between latent class membership and predictors/distal outcomes, however, only participants with available data were included in the analyses. Full information was available on predictors for 717 participants (95% of the sample). On age 25 outcomes, rates of missingness ranged from 7% (on adult drug convictions and educational attainment, both *n*'s = 698) to 28% (on romantic partner violence, *n* = 544).

Results

Descriptive Statistics

Descriptive statistics are presented in Table 1. Notably, skewness and kurtosis were high for five of the adult outcomes (i.e., risky sexual behaviour scale, drug convictions, violent convictions, POP convictions, and romantic partner violence), suggesting they were non-normally distributed in the sample. Because of this, these variables were log transformed for all subsequent analyses.

Table 1: Descriptives for main study variables

	Valid *N*	*M* (*SD*) or % of Yes	Range	Skewness	Kurtosis
Childhood Conduct Problems					
Kindergarten EXT	747	14.90 (8.69)	0-48	0.63	0.31
Grade 1 EXT	711	15.71 (9.50)	0-58	0.59	0.23
Grade 2 EXT	686	14.32 (8.97)	0-48	0.78	0.54
Grade 4 EXT	669	12.62 (9.64)	0-52	1.16	1.46
Grade 5 EXT	647	11.90 (9.42)	0-54	1.13	1.35
Grade 7 EXT	618	11.59 (9.51)	0-51	1.13	1.30
Predictors					
Age	754	5.89 (0.52)	5-8	-0.01	0.96
Cohort 2 indicator	754	21.4	-	-	-
Cohort 3 indicator	754	17.2	-	-	-
Male indicator	754	58.0	-	-	-
Family SES	754	25.66 (12.90)	4.5-66.0	0.54	-0.31
Initial screen score	751	1.01 (1.64)	-3.14-5.48	-0.20	-0.36
Urban Euro-American indicator	720	25.7	-	-	-
Rural Euro-American indicator	720	26.7	-	-	-
Age 25 Outcomes					
APD	621	17.2	-	-	-
Adult ADHD	622	11.4	-	-	-
AvPD	622	10.6	-	-	-
Somatic problems	622	18.0	-	-	-
Anxiety problems	622	9.3	-	-	-
Depression problems	622	14.0	-	-	-
Regular binge drinking	611	27.7	-	-	-
Heavy marijuana use	612	10.1	-	-	-
Serious substance use	620	15.3	-	-	-
Alcohol abuse	573	34.6	-	-	-
Any substance problem	563	52.0	-	-	-
Lifetime sexual partners	597	3.24 (1.86)	0-7	0.39	-0.67
Risky sexual behaviour scale	582	10.81 (23.12)	0-252	6.52	53.44
Adult drug convictions	698	0.45 (1.43)	0-17	5.11	36.45
Adult violent convictions	695	1.00 (3.23)	0-46	6.86	68.35

	Valid *N*	*M* (*SD*) or % of Yes	Range	Skewness	Kurtosis
Adult POP convictions	688	1.87 (4.49)	0-42	4.06	21.67
Romantic partner violence	544	0.82 (1.83)	0-15	3.29	13.58
High school or GED	698	76.4	-	-	-
FT employed or in post-sec.	615	55.1	-	-	-
General well-being	617	0.04 (0.73)	-3.06-1.29	-0.90	0.71

Note. EXT = CBCL Externalizing raw scores, SES = socioeconomic status, APD = antisocial personality disorder, ADHD = attention-deficit/hyperactivity disorder, AvPD = avoidant personality disorder, POP = property and public order, GED = General Equivalency Diploma, FT = full time.

Tables 2 through 4 provide bivariate correlations between CBCL Externalizing raw scores, predictors, and age 25 outcomes. Externalizing scores were significantly correlated across time. In terms of potential predictors, Externalizing scores were robustly correlated with cohort, child sex, family SES, and initial screen scores at each time point. Externalizing scores were also robustly correlated with most age 25 outcomes. However, there were very few significant correlations between Externalizing scores and the substance use outcomes, with the only exception being the 'any substance problem' indicator.

Table 2: Bivariate correlations between CBCL Externalizing raw scores and predictor variables

	EXTK	EXT1	EXT2	EXT4	EXT5	EXT7	AGE	COH1	COH2	COH3	MALE	SES	ISS	UEA	REA	UAA
EXTK	-															
EXT1	.74**	-														
EXT2	.66**	.74**	-													
EXT4	.64**	.68**	.70**	-												
EXT5	.60**	.63**	.66**	.77**	-											
EXT7	.54**	.60**	.62**	.66**	.65**	-										
AGE	.05	.04	.02	.05	.04	.09*	-									
COH1	-.27**	-.37**	-.23**	-.23**	-.22**	-.20**	.05	-								
COH2	.13**	.24**	.10*	.13**	.15**	.14**	-.00	-.66**	-							
COH3	.21**	.22**	.20**	.16**	.11**	.10*	-.07	-.58**	-.24**	-						
MALE	.17**	.18**	.18**	.17**	.16**	.19**	.03	-.08*	.06	.03	-					
SES	-.19**	-.19**	-.15**	-.14**	-.14**	-.17**	-.06	.06	-.05	-.03	.03	-				
ISS	.56**	.57**	.51**	.46**	.45**	.47**	.02	-.45**	.29**	.26**	.29**	-.13**	-			
UEA	-.03	.01	.02	.06	.06	.02	.01	.03	-.01	-.03	-.01	.12**	-.02	-		
REA	-.01	-.01	-.01	.00	-.02	.00	.09*	.03	-.02	-.02	-.02	.10**	.00	-.36**	-	
UAA	.03	-.00	-.01	-.05	-.04	-.02	-.09*	-.06	.03	.04	.02	-.20**	.01	-.56**	-.58**	-

EXTK = Kindergarten Externalizing raw scores, EXT1 = Grade 1 Externalizing raw scores, EXT2 = Grade 2 Externalizing raw scores, EXT4 = Grade 4 Externalizing raw scores, EXT5 = Grade 5 Externalizing raw scores, EXT7 = Grade 7 Externalizing raw scores, AGE = age at study year 1, COH1 = cohort 1 indicator, COH2 = cohort 2 indicator, COH3 = cohort 3 indicator, MALE = male indicator, SES = family socioeconomic status at study year 1, ISS = initial screen score, UEA = Urban European American, REA = Rural European American, UAA = Urban African American.

* $p < .05$, ** $p < .01$.

Table 3: Bivariate correlations between CBCL Externalizing raw scores and age 25 psychopathology and substance use outcomes

	APD	ADHD	AvPD	SOM	ANX	DEP	BING	MARI	SSU	AA	ANY
EXTK	.26**	.18**	.08*	.15**	.13**	.23**	.03	.07	.04	.03	.08
EXT1	.23**	.18**	.12**	.16**	.15**	.17**	.02	.05	.08	.09*	.12**
EXT2	.23**	.20**	.09*	.18**	.12**	.20**	.05	.01	.08	.05	.10*
EXT4	.28**	.23**	.11**	.18**	.21**	.26**	.11*	.06	.12**	.07	.16**
EXT5	.24**	.22**	.08	.20**	.14**	.23**	.08	.05	.09*	.04	.11*
EXT7	.30**	.22**	.10*	.16**	.12**	.24**	.05	.05	.08	.11*	.13**

EXTK = Kindergarten Externalizing raw scores, EXT1 = Grade 1 Externalizing raw scores, EXT2 = Grade 2 Externalizing raw scores, EXT4 = Grade 4 Externalizing raw scores, EXT5 = Grade 5 Externalizing raw scores, EXT7 = Grade 7 Externalizing raw scores, APD = antisocial personality disorder, ADHD = attention-deficit/hyperactivity disorder, AvPD = avoidant personality disorder, SOM = somatic problems, ANX = anxiety problems, DEP = depression problems, BING = regular binge drinking, MARI = heavy marijuana use, SSU = serious substance use, AA = alcohol abuse, ANY = any substance problem.
* p < .05, ** p < .01.

Table 4: Bivariate correlations between CBCL Externalizing raw scores and age 25 risky sexual behaviour, antisocial behaviour, and adaptive outcomes

	LNP	RSB[1]	DRUG[1]	VIOL[1]	POP[1]	ROM[1]	HS	EMPL	WELL
EXTK	.19**	.13**	.15**	.19**	.22**	.11*	-.16**	-.18**	-.25**
EXT1	.18**	.11**	.15**	.17**	.18**	.11*	-.10*	-.20**	-.23**
EXT2	.11**	.12**	.11**	.21**	.20**	.10*	-.15**	-.25**	-.22**
EXT4	.19**	.15**	.15**	.21**	.18**	.10*	-.13**	-.20**	-.28**
EXT5	.16**	.14**	.15**	.20**	.17**	.12**	-.10*	-.19**	-.22**
EXT7	.23**	.10*	.15**	.32**	.26**	.15**	-.22**	-.29**	-.28**

EXTK = Kindergarten Externalizing raw scores, EXT1 = Grade 1 Externalizing raw scores, EXT2 = Grade 2 Externalizing raw scores, EXT4 = Grade 4 Externalizing raw scores, EXT5 = Grade 5 Externalizing raw scores, EXT7 = Grade 7 Externalizing raw scores, LNP = lifetime number of sexual partners, RSB = risky sexual behaviour scale, DRUG = lifetime index adult drug convictions, VIOL = lifetime index adult violent convictions, POP = lifetime index adult property and public order convictions, HS = graduated high school or obtained GED, WELL = general well-being score.
[1] Log-transformed.
* p < .05, ** p < .01.

Developmental Trajectories of Childhood Conduct Problems

Table 5 provides fit indices of 1- through 7-class models for childhood conduct problems. Entropy was satisfactory for all models, and the BLRT did not differentiate between solutions. For the 4-class model, the significant LMR-LRT (p = 0.00) and VLMR-LRT (p = 0.00) suggested better model fit over the 3-class model. The lower information criteria in the 4-class solution (AIC = 27161.13, BIC = 27258.26, aBIC = 27191.58) also suggested better model fit than the 3-class solution (AIC = 27445.30, BIC = 27523.94, aBIC = 27469.95). Despite the slightly lower information criteria in the 5-class solution (AIC = 27073.78, BIC = 27189.42, aBIC = 27110.03), the non-significant

LMR-LRT and VLMR-LRT suggested that including a fifth class did not significantly improve model fit. In light of these statistical indices, as well as parsimony and interpretability, the 4-class solution (entropy = 0.85) was selected.

Table 5: Model fit indices

Class #	LL	AIC	BIC	aBIC	LMR -LRT *p*	VLMR -LRT *p*	BLRT *p*	Entropy
1	-14870.05	-	-	-	-	-	-	-
2	-14010.76	28047.52	28107.65	28066.37	0.0000	0.0000	0.0000	0.87
3	-13705.65	27445.30	27523.94	27469.95	0.0049	0.0042	0.0000	0.85
4	**-13559.57**	**27161.13**	**27258.26**	**27191.58**	**0.0022**	**0.0019**	**0.0000**	**0.85**
5	-13511.89	27073.78	27189.42	27110.03	0.1798	0.1695	0.0000	0.81
6	-13473.64	27005.29	27139.42	27047.34	0.5370	0.5255	0.0000	0.78
7	-13433.51	26933.01	27085.65	26980.86	0.1074	0.1023	0.0000	0.79

Note. LL = log-likelihood, AIC = Akaike Information Criteria, BIC = Bayesian Information Criteria, aBIC = sample size-adjusted BIC, LMR-LRT = Lo-Mendell-Rubin adjusted likelihood ratio test, VLMR-LRT = Vuong-Lo-Mendell-Rubin likelihood ratio test, BLRT = bootstrapped likelihood ratio test. Best model bolded.

The observed and estimated developmental trajectories in the 4-class solution are depicted in Figures 1 and 2, respectively. The majority of children (38.8%) displayed moderately elevated conduct problems in kindergarten (intercept = 16.85, SE = 0.58, p = 0.00) that decreased through grade 7 (slope = -1.41, SE = 0.24, p = 0.00), labeled the *moderate decreasing* (MD) class. The next largest group (35.5%) had low levels of conduct problems in kindergarten (intercept = 7.74, SE = 0.44, p = 0.00) that decreased through grade 7 (slope = -0.90, SE = 0.16, p = 0.00), labeled the *low decreasing* (LD) class. Twenty two percent of the sample belonged to a group characterized by high conduct problems in kindergarten (intercept = 23.21, SE = 0.74, p = 0.00) that remained stable through grade 7 (slope = 0.07, SE = 0.37, p = 0.85), labeled the *high stable* (HS) class. Finally, the smallest group (3.7%) displayed very high levels of conduct problems in kindergarten (intercept = 30.61, SE = 1.71, p = 0.00) that increased through grade 7 (slope = 3.80, SE = 1.15, p = 0.00), labeled the *extremely high increasing* (EHI) class.

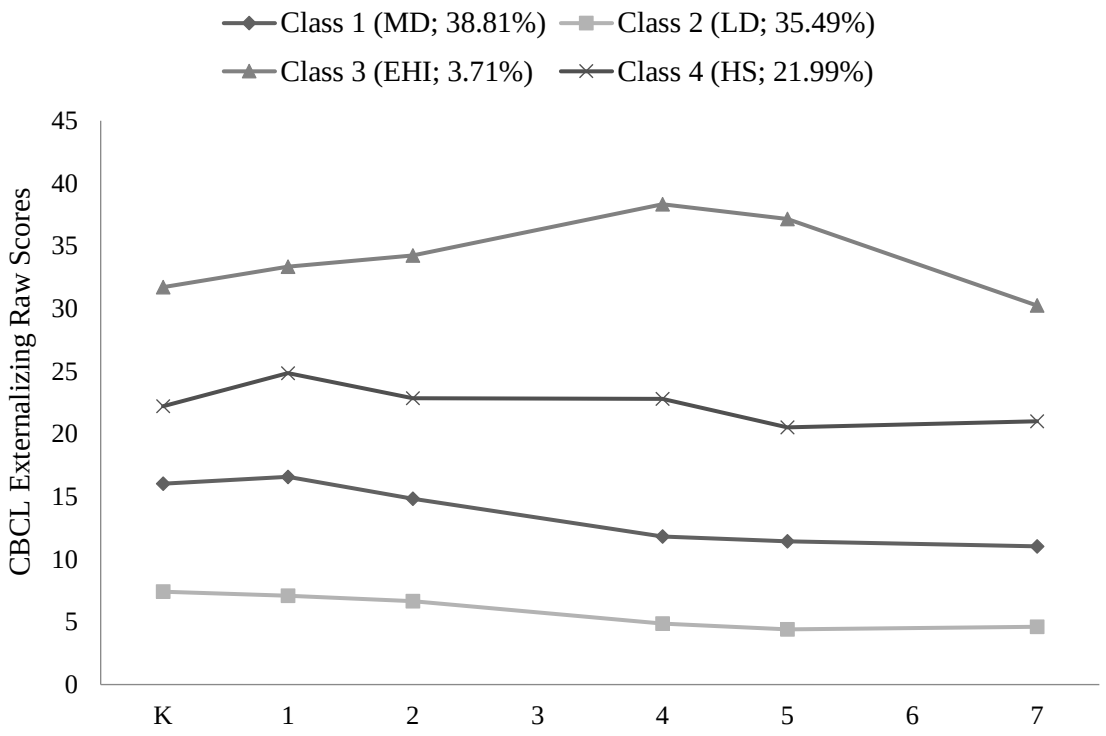

Figure 1: Observed developmental trajectories of childhood conduct problems (4-class solution; *N* = 754)

Note: MD = Moderate Decreasing, LD = Low Decreasing, EHI = Extremely High Increasing, HS = High Stable.

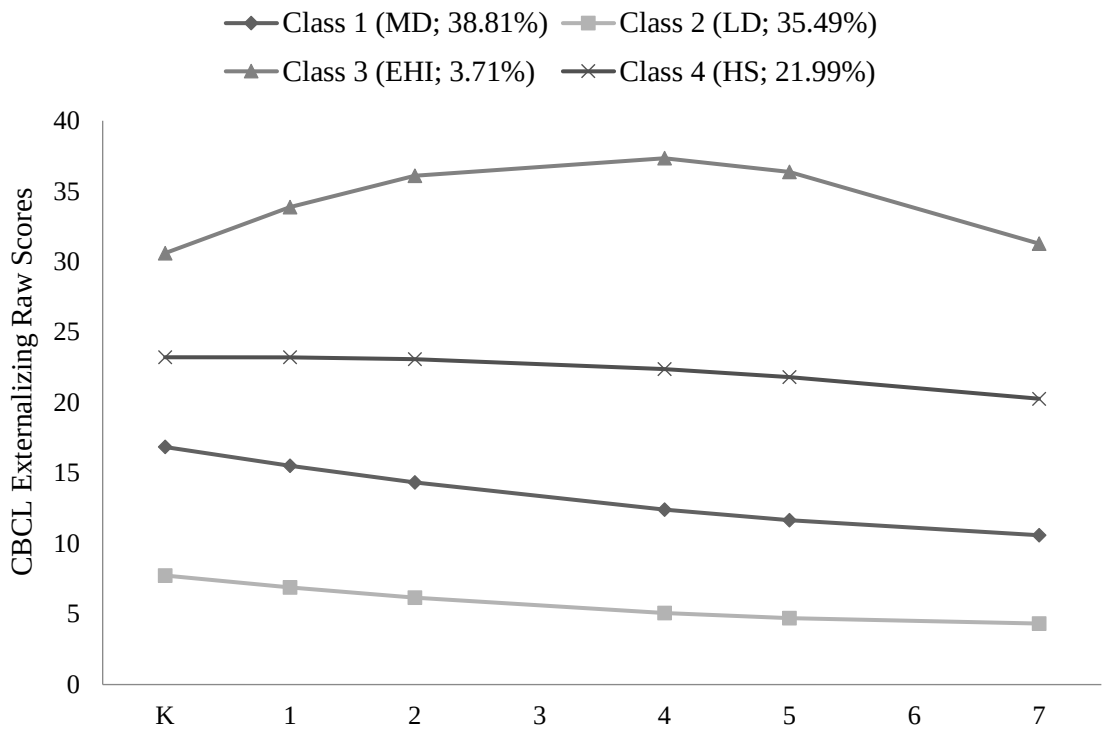

Figure 2: Predicted developmental trajectories of childhood conduct problems (4-class solution; *N* = 754)

Note: MD = Moderate Decreasing, LD = Low Decreasing, EHI = Extremely High Increasing, HS = High Stable.

Prediction of Childhood Conduct Problem Trajectories

Child age at study time 1 (i.e., post-kindergarten), cohort, child sex, family SES, initial screen scores, and race/urban status were examined as possible predictors of trajectory class membership (see Table 6). Class membership was not significantly predicted by initial child age or child sex. Cohort and race/urban status were modestly associated with class membership. Specifically, children in cohort 3 were significantly more likely to be in the MD (*B* = 1.02, SE = 0.45, *p* = 0.02) and HS (*B* = 1.09, SE = 0.46, *p* = 0.02) groups, compared to the LD group. With respect to race/urban status, Urban European American children were more likely to belong to the EHI group than the LD group (*B* = 1.19, SE = 0.59, *p* = 0.04), and Rural European American children were more likely to be in the HS group than the LD group (*B* = 0.75, SE = 0.35, *p* = 0.04).

Table 6: Trajectory group membership prediction with logistic regression (*n*=717)

	EHI[1]		HS[1]		MD[1]		EHI[2]		HS[2]		EHI[3]	
	B (*SE*)	OR	B (*SE*)	OR	B (*SE*)	OR	B (*SE*)	OR	B (*SE*)	OR	B (*SE*)	OR
Age[a]	0.35 (0.51)	1.42	0.38 (0.27)	1.47	0.04 (0.23)	1.04	0.31 (0.47)	1.36	0.34 (0.23)	1.40	-0.03 (0.48)	0.97
Cohort 2[b]	0.40 (0.64)	1.49	0.04 (0.38)	1.04	0.48 (0.35)	1.62	-0.09 (0.57)	0.92	-0.44 (0.30)	0.64	0.36 (0.59)	1.43
Cohort 3[b]	1.31 (0.73)	3.70	1.09 (0.46)*	2.97	1.02 (0.45)*	2.77	0.29 (0.62)	1.34	0.07 (0.30)	1.07	0.22 (0.63)	1.25
Male	-0.17 (0.58)	0.84	0.42 (0.30)	1.52	0.06 (0.25)	1.07	-0.24 (0.55)	0.79	0.36 (0.27)	1.43	-0.59 (0.57)	0.55
Family SES[a]	-0.07 (0.03)**	0.93	-0.04 (0.01)**	0.96	-0.02 (0.01)	0.98	-0.05 (0.02)*	0.95	-0.02 (0.01)*	0.98	-0.03 (0.03)	0.97
Screen score	2.06 (0.27)**	7.81	1.14 (0.14)**	3.13	0.73 (0.11)**	2.06	1.33 (0.25)**	3.78	0.42 (0.11)**	1.51	0.92 (0.26)**	2.50
Urban Eur-Am[c]	1.19 (0.59)*	3.28	0.53 (0.34)	1.71	0.25 (0.30)	1.28	0.94 (0.55)	2.57	0.29 (0.30)	1.34	0.65 (0.56)	1.92
Rural Eur-Am[c]	0.65 (0.63)	1.92	0.75 (0.35)*	2.11	0.49 (0.31)	1.63	0.17 (0.58)	1.18	0.26 (0.29)	1.29	-0.09 (0.59)	0.91

Note. EHI = Extremely High Increasing, HS = High Stable, MD = Moderate Decreasing, OR = odds ratio, SES = socioeconomic status, Eur-Am = European American.

[a] At time 1 (kindergarten).

[b] Contrasted with largest cohort (Cohort 1).

[c] Contrasted with largest race/urban status group (Urban African American).

[1] Low Decreasing as reference group.

[2] Moderate Decreasing as reference group.

[3] High Stable as reference group.

* $p < .05$, ** $p < .01$.

In contrast, family SES and initial screen scores were robustly associated with trajectory class membership. Children from families of lower SES were significantly more likely to be in the EHI and HS groups, as compared to both the MD group (EHI vs MD: *B* = -0.05, SE = 0.02, *p* = 0.04; HS vs MD: *B* = -0.02, SE = 0.01, *p* = 0.02) and the LD group (EHI vs LD: *B* = -0.07, SE = 0.03, *p* = 0.01; HS vs LD: *B* = -0.04, SE = 0.01, *p* = 0.00). In terms of screen scores, children with lower screen scores were more likely to be in the LD group than the MD (*B* = -0.73, SE = 0.11, *p* = 0.00), HS (*B* = -1.14, SE = 0.14, *p* = 0.00) and EHI (*B* = -2.06, SE = 0.27, *p* = 0.00) groups. Among the three trajectory groups with elevated conduct problems, children with higher screen scores were significantly more likely to be in the EHI group than the HS (*B* = 0.92, SE = 0.26, *p* = 0.00) and MD (*B* = 1.33, SE = 0.25, *p* = 0.00) groups, and significantly more likely to be in the HS group than the MD group (*B* = 0.42, SE = 0.11, *p* = 0.00). Given these findings, family SES and screen scores were included as covariates in all subsequent outcome analyses.

Prediction of Age 25 Outcomes by Childhood Conduct Problem Trajectories

Probability/mean differences in age 25 outcomes by class membership, controlling for family SES and initial screen scores, are presented in Table 7. Since three participants were missing data on initial screen scores, they were excluded from outcome analyses as necessary, depending on patterns of missingness on outcome variables (see valid *n*'s listed in Table 7).

Class membership significantly predicted all but one psychopathology outcome at age 25 (i.e., avoidant personality problems). The EHI group was significantly more likely to have symptoms of APD, ADHD, somatic problems, and depression by age 25 than both the LD and MD groups. The EHI group also had significantly more problems with anxiety than the LD group, as well as significantly more problems with adult ADHD and depression than the HS group. Notably, the HS and MD groups did not significantly differ on any of the age 25 psychopathology outcomes, and they both had significantly more problems with ADHD and depression at age 25 than the LD group. However, the MD and HS groups differed in several ways in their pairwise comparisons with the LD group. First, the HS group was significantly more likely to have APD and somatic problems at age 25 than the LD group, whereas the MD group was not. Second, the MD group was

significantly more likely to have anxiety problems at age 25 than the LD group, whereas the HS group was not.

With respect to substance use, the HS group was significantly more likely to have 'any substance problem' than the MD and LD groups (i.e., HS: 62.5% versus MD: 50.7% and LD: 46.0%). Individuals in the HS group were also significantly more likely to engage in binge drinking than the MD and LD groups (i.e., HS: 34.8% versus MD: 25.9% and LD: 25.2%). Trajectory groups did not significantly differ on heavy marijuana use, serious substance use, or alcohol abuse at age 25.

Class membership significantly predicted one of the risky sexual behaviour outcomes at age 25: Individuals in the HS and MD groups reported having significantly more lifetime sexual partners by age 25 than the LD group. There were no significant differences between trajectory groups on risky sexual behaviour scale scores at age 25.

In terms of adult antisocial behaviour, EHI and HS groups had significantly more index adult violent and POP convictions by age 25 than both the MD and LD groups. There was no significant difference between the EHI and HS groups on adult violent convictions, but the EHI group had significantly more adult POP convictions by age 25 than the HS group. Trajectory group membership did not significantly predict adult drug convictions or romantic partner violence.

Regarding adaptive outcomes, at age 25, the EHI group was significantly less likely than all other groups to be employed full-time or enrolled in post-secondary education (i.e., only 7.5% of the EHI group). The LD group was significantly more likely than the HS group to be employed full-time or in post-secondary (LD: 68.4% versus HS: 44.1%), but the MD group did not significantly differ from the LD or the HS group on this outcome (MD: 52.5%). The LD group showed the greatest well-being at age 25, but the MD group also had significantly higher general well-being scores than the EHI and HS groups. Although the omnibus test for high school/GED completion was significant, family SES was the only significant predictor in the model. In other words, controlling for SES, trajectory group membership did not predict high school-level education attainment.

Table 7: Probability/mean differences in age 25 outcomes by class membership, controlling for SES and screen scores

	Outcome *N*/Valid *N*[1]	Overall % of Yes or *M (SD)*	Class Membership				Overall F test (continuous) or χ^2 test (dichotomous)	Significant class differences
			EHI	HS	MD	LD		
			% of Yes or *M* (*SE*)	% of Yes or *M* (*SE*)	% of Yes or *M* (*SE*)	% of Yes or *M* (*SE*)		
Psychopathology								
APD	621/619	17.2	51.3	30.3	16.4	7.3	$\chi^2(5)=58.95$, $p=0.00$	EHI,HS>LD; EHI>MD
Adult ADHD	622/620	11.4	42.4	18.6	11.5	4.1	$\chi^2(5)=34.08$, $p=0.00$	EHI>HS,MD>LD
AvPD	622/620	10.6	23.2	16.6	7.5	9.2	$\chi^2(5)=8.22$, $p=0.15$	None
Somatic problems	622/620	18.0	46.4	25.6	18.0	10.6	$\chi^2(5)=27.47$, $p=0.00$	EHI,HS>LD; EHI>MD
Anxiety	622/620	9.3	28.3	12.6	10.7	4.1	$\chi^2(5)=22.27$, $p=0.00$	EHI,MD>LD
Depression	622/620	14.0	49.0	20.6	15.2	5.2	$\chi^2(5)=38.00$, $p=0.00$	EHI>HS,MD>LD
Substance Use								
Regular binge drinking	611/609	27.7	28.7	34.8	25.9	25.2	$\chi^2(5)=17.60$, $p=0.00$	HS>MD,LD
Heavy marijuana use	612/610	10.1	16.2	9.8	11.8	7.9	$\chi^2(5)=2.96$, $p=0.71$	None
Serious substance use	620/618	15.3	21.0	19.0	17.6	10.2	$\chi^2(5)=8.66$, $p=0.12$	None
Alcohol abuse	573/572	34.6	38.1	40.2	31.6	34.1	$\chi^2(5)=4.02$, $p=0.55$	None
Any substance problem	563/562	52.0	62.2	62.5	50.7	46.0	$\chi^2(5)=13.06$, $p=0.02$	HS>MD,LD
Risky Sexual Behaviour								
Lifetime no. partners	597/595	3.24 (1.86)	3.21 (0.50)	3.81 (0.21)	3.41 (0.14)	2.76 (0.11)	$F_{3,589}=4.07$, $p=0.01$	HS,MD>LD
RSB scale[2]	582/580	0.79 (0.46)	0.82 (0.17)	0.89 (0.06)	0.81 (0.03)	0.70 (0.03)	$F_{3,574}=1.62$, p=0.19	None
Antisocial Behaviour								
Drug convictions[2]	698/695	0.08 (0.21)	0.14 (0.05)	0.12 (0.02)	0.09 (0.02)	0.05 (0.01)	$F_{3,689}=0.38$, $p=0.77$	None
Violent convictions[2]	695/692	0.14 (0.29)	0.35 (0.10)	0.24 (0.03)	0.12 (0.02)	0.09 (0.02)	$F_{3,686}=5.63$, $p=0.00$	EHI,HS>MD,LD
POP convictions[2]	688/685	0.22 (0.38)	0.53 (0.11)	0.33 (0.04)	0.22 (0.03)	0.14 (0.02)	$F_{3,679}=5.70$, $p=0.00$	EHI>HS>MD,LD
Rom. part. violence[2]	544/543	0.15 (0.27)	0.31 (0.09)	0.17 (0.03)	0.16 (0.02)	0.12 (0.02)	$F_{3,537}=1.50$, $p=0.22$	None
Adaptive Outcomes								
High school or GED	698/695	76.4	51.2	71.0	74.9	83.4	$\chi^2(5)=54.72$, $p=0.00$	None
FT Employed/post-sec.	615/613	55.1	7.5	44.1	52.5	68.4	$\chi^2(5)=67.77$, $p=0.00$	LD,MD,HS>EHI; LD>HS
General well-being	617/615	0.04 (0.73)	-0.58 (0.18)	-0.20 (0.08)	0.01 (0.05)	0.26 (0.05)	$F_{3,609}=5.95$, $p=0.00$	LD>MD>HS,EHI

Note. EHI = Extremely High Increasing, HS = High Stable, MD = Moderate Decreasing, LD = Low Decreasing, APD = antisocial personality disorder, ADHD = attention-deficit hyperactivity disorder, AvPD = avoidant personality disorder, RSB = risky sexual behaviour, POP = property and public order, GED = General Equivalency Diploma, FT = full-time.

[1] A maximum of 3 participants were excluded from each set of outcome analyses, depending on patterns of missingness on one covariate (initial screen scores) and age 25 outcomes.
[2] Log-transformed.

Discussion

Moffitt's (1993) developmental taxonomy has led to great advances in our understanding of the developmental course of antisocial behaviour throughout the lifespan. Indeed, the original distinction Moffitt made between childhood- and adolescence-onset conduct problems has been supported by decades of research (Jennings & Reingle, 2012; Moffitt, 2008, 2017), and is now being regularly utilized in clinical practice (APA, 2013). More recently, however, empirical attention has been directed towards a previously unrecognized subgroup of children, whose early-onset conduct problems steadily decline before adolescence. Given the current lack of consensus in the research literature on this CL pathway (Moffitt, 2017), the present study examined the long-term outcomes of different childhood conduct problem trajectories in a disproportionately high-risk sample. Using the Fast Track sample, which contained a substantial number of participants identified as being at high risk for behaviour problems in kindergarten, trajectories of parent-rated conduct problems were modeled from kindergarten to grade 7 using LCGA. Once latent trajectory groups were identified, their differential associations with a broad range of psychosocial outcomes at age 25 were investigated.

Consistent with hypotheses and previous research (Brennan & Shaw, 2013; Jennings & Reingle, 2012; Moffitt, 2017), a trajectory group characterized by consistently low childhood conduct problems was identified. The LD group (approximately 35% of the sample) displayed low levels of conduct problems in kindergarten that decreased through grade 7. Also consistent with hypotheses, multiple "early starting" conduct problem trajectories were identified, including both persistent and decreasing pathways. First, in line with Moffitt's (1993) taxonomy and the preponderance of research on developmental trajectories of antisocial behaviour (see Jennings & Reingle, 2012 for a review), a group characterized by high-stable (HS) conduct problems was identified. The HS class comprised approximately 22% of the sample and exhibited high levels of conduct problems in kindergarten that remained stable through grade 7. Second, the largest group identified, the MD class (approximately 39% of the sample), displayed initially moderate levels of conduct problems that steadily decreased throughout childhood. These findings suggest that the MD group represents a CL-like trajectory in

this sample. That said, it is important to note that the level of conduct problems in the MD group did not decrease to the level of the LD group.

In addition, a third, unanticipated subgroup of “early starters” was identified in this study. The EHI group comprised approximately 4% of the sample, and displayed the highest levels of conduct problems in kindergarten, which increased through grade 7. Such a group has not consistently emerged in the literature (Jennings & Reingle, 2012), but may reflect the fact that the present sample was disproportionately high risk. Of note, the CPPRG (2007, 2011) previously found that some effects of the Fast Track preventive intervention were most evident among participants with the highest initial levels of risk. Specifically, they found that children in the top 3rd percentile of initial screen scores were particularly likely to develop externalizing disorders between grades 3 and 12 if they did not receive the intervention. For example, among those at highest initial risk, the ‘lifetime’ prevalence rates for parent-rated conduct disorder (CD) and oppositional defiant disorder (ODD) were significantly higher in the control group (CD: 40.6%; ODD: 56.0%) than the intervention group (CD: 20.4%; ODD: 37.0%). These findings lend support to the existence of a small but extremely antisocial subgroup of “early starters” in the Fast Track sample, whose conduct problems exacerbated over time in the absence of treatment.

In this study, family SES and initial screen scores were the only robust predictors of trajectory class membership. In terms of SES, individuals in the EHI and HS groups were more likely than those in the LD or MD groups to come from economically disadvantaged families, which is in line with Moffitt’s (1993) original hypotheses as well as the current evidence base regarding individuals with EOP (or LCP) conduct problems (Moffitt et al., 2008). Notably, in the present study, family SES was not differentially associated with MD and LD group membership, as both groups were more likely than HS and EHI groups to come from families of higher SES. This finding is not surprising given unclear evidence regarding how SES relates to the CL pathway (e.g., Maughan et al., 2000; Odgers et al., 2007, 2008). With respect to initial levels of risk, individuals in the EHI group had the highest kindergarten screen scores, followed by the HS, MD, and LD groups. This suggests that early measures of risk – such as the multiple-gate screening procedure used in the Fast Track project (see Lochman & CPPRG, 1995) – can be relatively good indicators of the developmental course of conduct problems throughout childhood.

Importantly, child sex did not significantly predict trajectory class membership. This is notable, since some have contended that females follow different trajectories of antisocial behaviour than males (as discussed in Brennan & Shaw, 2013). For example, Silverthorn and Frick (1999) have proposed that severe and persistent conduct problems are more likely to emerge in early adolescence (as opposed to early childhood) among girls, suggesting the existence of a unique 'delayed-onset' pathway in females. Alternatively, others have argued that childhood-onset conduct problems are more likely to desist in females, implying that "early-starting" girls might be more likely to follow a CL, as opposed to an EOP/LCP, pathway (Denno, 1994; Elliot, 1994). That said, when Brennan and Shaw (2013) reviewed the literature on this issue, they found consistent evidence for an EOP (or LCP) pathway among females. Moreover, when a CL pathway was identified among females, they determined that it had most often been *in addition to* (versus in the place of) a LCP pathway. Indeed, in summarizing the literature on early-starting conduct problems in females, the authors concluded that "the results are consistent with the taxonomies that have been well validated in males" (p. 49). This suggests that the lack of association found between child sex and childhood conduct problem trajectories in the present study is in line with the existing evidence base.

With respect to long-term outcomes at age 25, the EHI and HS groups were associated with the poorest psychosocial functioning. Compared to all other groups, the EHI group fared the worst at age 25 in terms of adult POP convictions, employment, and most measures of psychopathology. The EHI and HS groups also had the lowest well-being and had more index adult convictions for violent and POP crimes than the MD and LD groups. Furthermore, the HS group was found to be at greater risk for later substance use problems (i.e., binge drinking and 'any substance problem') than the MD and LD groups. In direct contrast, the LD group exhibited the greatest psychosocial adjustment. Compared to the conduct problem groups, the LD group had the lowest levels of psychopathology, the fewest lifetime number of sexual partners, and the greatest general well-being in adulthood.

The MD group had a more complicated picture at age 25. On one hand, the MD group resembled the LD group in adulthood on antisocial outcomes (i.e., adult violent and POP convictions, APD), substance use (i.e., binge drinking, 'any substance problem'), employment, and somatic problems, suggesting more positive psychosocial adjustment in these domains. However, the MD group reported a greater number of

lifetime sexual partners and was more likely to have ADHD, anxiety, and depression at age 25 than the LD group. Indeed, in terms of risky sexual behaviour and some measures of psychopathology, individuals in the MD group more closely resembled those in the HS group. Moreover, although individuals in the MD group displayed higher well-being scores than those in the EHI and HS groups, they still had lower overall well-being than the LD group at age 25.

These results are generally consistent with the existing evidence base. For example, in a meta-analysis of 13 studies examining psychosocial outcomes associated with conduct problem trajectories, Bevilacqua and colleagues (2017) concluded that EOP, AO, and CL trajectories were all linked with poorer longer-term outcomes than the Low trajectory; however, they found "a consistent hierarchy of risk" among these conduct problem subgroups, with the EOP trajectory being associated with the worst outcomes, followed by the AO trajectory, and then the CL trajectory (p. 11). A similar hierarchy of risk was observed in the present study: EOP conduct problems (i.e., EHI and HS trajectories) predicted the worst psychosocial outcomes, but early-onset-declining conduct problems (i.e., the MD trajectory) also predicted some problems in adulthood. One important finding of this study is that EHI and HS pathways were associated with poorer antisocial outcomes in adulthood (i.e., greater risk for violent and POP convictions, and APD), whereas the MD trajectory was not. Rather, the relative maladjustment of MD individuals at age 25 took the form of elevated psychopathology (i.e., anxiety, depression, and ADHD), heightened risky sexual behaviour (i.e., lifetime number of sexual partners), and lower well-being. This suggests that early-starting conduct problems can pose a risk for later maladjustment, even when there is apparent recovery from antisocial behaviour.

This study had several strengths. First, unlike other studies which have focused on males and/or predominantly European American samples, the sample was mixed-sex and ethnically diverse. Given that the primary aim of the present study was to add to the research base on CL conduct problems, the use of a disproportionately high-risk sample was also advantageous, since it increased the probability of identifying multiple subgroups of "early starters." Second, the present study used a group-based trajectory modeling technique, LCGA, to identify childhood conduct problem trajectories. In contrast to the method of manually assigning participants to trajectory groups using classification rules, with which novel or rare trajectories (e.g., the EHI pathway identified

in this study) may be missed, the use of LCGA allowed the number and shapes of trajectories to be determined largely by the data. Third, this study examined a broad range of psychosocial outcomes at age 25, across five domains of functioning (psychopathology, substance use, risky sexual behaviour, antisocial behaviour, and adaptive outcomes). Few existing studies utilizing group-based trajectory modeling have examined psychosocial outcomes beyond the age of 21, particularly in U.S. samples (see Bevilacqua et al., 2017). Moreover, unlike existing studies that have relied exclusively on self-report (e.g., Kretschmer et al., 2014; Sentse et al., 2017), bias was reduced in the assessment of adult outcomes with the use of official records (for adult convictions) and multiple informants (participant *and* peer ratings).

Nevertheless, the findings also need to be interpreted in light of several limitations. The present study measured childhood conduct problems using parent report on the CBCL Externalizing scale from kindergarten to grade 7. Although the sole use of parent report allowed for consistency of raters across time points, it limited the ability to assess the pervasiveness of childhood conduct problems throughout childhood (e.g., across home and school settings). Moreover, conduct problem trajectories were only examined until participants were in grade 7, or approximately 13 years old. In the absence of information on conduct problems later in adolescence, it is impossible to draw conclusions about whether conduct problems in the MD group were truly 'limited' to childhood. While the finding that MD and LD individuals had similar rates of antisocial behaviour in adulthood *lends support* to the idea that conduct problems desisted in the MD group, it is still possible that MD individuals displayed some level of conduct problems in adolescence.

Furthermore, in the outcome analyses, power to detect significant effects was limited by sample size. This was particularly an issue in pairwise class comparisons involving the smallest trajectory class, the EHI group (3.7% of the sample). For example, looking at prevalence rates alone, the EHI group was clearly more likely than the HS group to experience anxiety problems at age 25 (EHI: 28.3% vs HS: 12.6%). Although there was a trend for a difference between these two groups on anxiety problems in the binary logistic regression (B = -0.98, SE = 0.58, p = 0.09), the pairwise comparison was not statistically significant. Indeed, descriptive data suggested that trajectories were differentially associated with age 25 outcomes in expected ways, but not all apparent class differences were supported in follow-up analyses.

Finally, the use of a disproportionately high-risk sample limits the generalizability of the present findings. Four hundred and forty six (or 59% of) participants in this study were recruited because their teachers and parents rated them as having elevated conduct problems in kindergarten. In addition, all the children in this study were initially recruited from schools characterized by higher than average rates of neighbourhood crime and poverty. Therefore, while the present findings undoubtedly contribute to the evidence base on "early starters," they may not be directly comparable to results from studies using population-based or normative community samples.

With these limitations in mind, the present findings have several implications. Importantly, this study provides further evidence for a declining pathway of early-onset conduct problems. In this disproportionately high-risk sample, the MD pathway not only characterized most "early starters" (i.e., approximately 60% of EHI, HS, and MD individuals), it was the largest group overall (i.e., 39% of the entire sample). This supports the contention that a declining trajectory of childhood conduct problems not only exists, but it is relatively common (Fairchild et al., 2013). Moreover, despite inconsistent findings to date, it may be possible to distinguish between "early starters" whose conduct problems are likely to persist versus decline over the course of childhood. In this study, the MD group had higher family SES and lower initial levels of risk than the EHI and HS groups. In addition, conduct problems in the early-onset declining (MD) trajectory were initially moderate, whereas conduct problems in both early-onset persisting (HS, EHI) trajectories were initially more severe. While this suggests that individuals with early-onset-declining conduct problems may need less intensive support than their early-onset persisting counterparts, findings from this study indicate that they nevertheless require intervention. Indeed, EHI and HS groups were found to have the worst psychosocial functioning at age 25, but the MD group still experienced some problems relative to typically developing individuals (the LD group). In particular, the present findings indicate that childhood conduct problems increase risk for negative mental health outcomes (particularly internalizing disorders and adult ADHD), risky sexual behaviour, and compromised well-being, even when the conduct problems are relatively moderate and decline over time.

Moving forward, research should continue to examine the developmental outcomes associated with different childhood conduct problem trajectories. As stated above, very few studies have examined psychosocial outcomes beyond the age of 21,

so longitudinal research that spans childhood to adulthood is particularly needed (Bevilacqua et al., 2017). Once some consistency has been established in the differential outcomes of childhood conduct problem trajectories, research should then turn to investigating the mechanisms by which these different pathways incur risk for later maladjustment. Ideally, such research would illuminate the developmental processes involved in persistent versus declining childhood conduct problems. For example, what developmental cascades might be set in motion with declining childhood conduct problems such that they pose a risk for certain mental health problems, but not antisocial behaviour, in adulthood? Are they unique from the processes involved with persistent childhood conduct problems, or simply more circumscribed? Empirical answers to these questions would allow for the identification of more individualized treatment targets for “early-starters,” which could enhance the efficacy and cost-effectiveness of interventions.

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