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OFFENDERS IN EMERGING ADULTHOOD

Offenders in Emerging Adulthood: School Maladjustment, Childhood Adversities and Prediction of Aggressive Antisocial Behaviors

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Abstract

Early psychosocial adversities and maladjustment, such as childhood maltreatment and school adjustment problems, have been linked to an increased risk of aggressive antisocial behaviors. Yet, clinical studies of subjects at the highest risk of persistence in such behaviors are rare, especially during the life-changing transition years of emerging adulthood. This study describes early predictors of aggressive antisocial behaviors in a large, nationally representative cohort of Swedish, male violent offenders in emerging adulthood (18-25 years of age, N = 270). First, data on psychosocial background characteristics and aggressive antisocial behaviors (including age at onset) are provided. Second, early predictors of aggressive antisocial behaviors are tested in bivariate and multivariate, interactive models. The offenders demonstrated a diversity of early onset adversities and disruptive behaviors, in line with established risk factors for subsequent criminality and adverse outcomes in a variety of life domains. Severe school adjustment problems, especially bullying others and early onset truancy, were important and interrelated predictors of aggressive antisocial behaviors over the lifetime, while childhood adversities such as parental substance or alcohol abuse and repeated exposure to violence at home during childhood were interrelated predictors of aggressive antisocial behaviors, albeit with less statistical importance. The findings stress the importance of early identification of individuals in the risk zone of developing severe and persistent aggressive antisocial behaviors, and of early preventive interventions directed towards families with high-risk profiles. The findings also provide initial guidelines on which psychosocial background risk factors that need to be considered first-hand in early interventions.

Keywords: aggressive antisocial behavior, violence, childhood adversities, school, offenders

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Aggressive antisocial behaviors, e.g., violence, remain a fundamental challenge to modern society, and its prevention has been proclaimed a global public health priority (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). A minority is responsible for the majority of violent crimes in society (Elonheimo et al., 2009; Falk et al., 2014; Krug et al., 2002; Loeber, Farrington, & Waschbush, 1999). This minority is generally males with an early onset and wide variety of aggressive antisocial or externalizing behaviors and substance abuse (Falk et al., 2014; Vaughn et al., 2011). In fact, children who present with preadolescent antisocial behaviors are approximately two to three times more likely to develop persistent aggressive antisocial behaviors compared to those with a later onset (Loeber & Farrington, 2000), suggesting a continuity of aggressive antisocial behaviors over the life course (Farrington, Ttofi, & Coid, 2009; Huesmann, Dubow, & Boxer, 2009; Loeber, 1982; Moffitt, 1993), even if a majority of affected children will not persist over the life course (Robins, 1966; Rutter, Kim-Cohen, & Maughan, 2006; Domburgh, Loeber, Bezemer, Stallings, & Stouthamer-Loeber, 2009). It has even been proposed that children who do not learn to regulate aggression during the preschool years are at the highest risk of continuing with serious aggressive antisocial behaviors (Broidy et al., 2003). Thus, early and specific identification of those in highest risk of developing severe and persistent aggressive antisocial behaviors is warranted.

Although a behavioral continuity of aggressive antisocial behaviors has been demonstrated, it is not linear. A distinct increase can be seen in mid-adolescence, with a peak in late adolescence, and a decrease during early adulthood (Blonigen, 2010; Blumstein, Cohen, & Farrington, 1988; Moffitt, 1993). Several developmental behavioral pathways have been suggested, e.g., life-course-persistent offenders/chronic offenders/early starters,

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childhood-limited antisocials, adolescence-limited offenders, and adult-onset offenders (Fergusson, Horwood, & Nagin, 2000; Kratzer & Hodgins, 1999; Moffitt, 1993; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996; Patterson, Reid, & Dishion, 1992). When followed up over longer periods, those who were hypothesized to be on the more adverse developmental pathway, i.e., the early onset and persistent offenders, indeed showed negative outcomes in many life domains (Bergman & Andershed, 2009; Kretschmer et al., 2014; Pulkkinen, Lyyra, & Kokko, 2009). However, a limited period of transient aggressive antisocial behaviors may also lead to persisting problems with, for example, psychosocial adjustment and mental health (Moffitt, Caspi, Harrington, & Milne, 2002).

Early psychosocial adversities and maladjustment, such as parental abuse, parental absence (e.g., due to imprisonment), and mental health problems in the family, have previously been linked to a number of negative outcomes over the life time, including aggressive antisocial behaviors (af Klinteberg, Almquist, Beijer, & Rydelius, 2011; Linnoila, De Jong, & Virkkunen, 1989; Murray, Farrington, Sekol, & Olsen, 2009; Schilling, Aseltine, & Gore, 2007). Parenting factors (e.g., poor parental monitoring, negative support, and psychological control) have also been associated with delinquent behavior in children (Shaw, Hyde, & Brennan, 2012). Childhood maltreatment, especially when persisting into the adolescent years, has been linked not only to an increased risk of aggressive antisocial behaviors (Elklit, Karstoft, Armour, Feddern, & Christoffersen, 2013; Gardner, Moore, & Dettore, 2014; Murray & Farrington, 2010; Topitzes, Mersky, & Reynolds, 2012), but also to its early onset and persistence (Maxfield & Widom, 1996, 2001; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001) as well as to increased risk of suicides (Bruffaerts et al., 2010), psychopathology (Kessler et al., 2010; Lansford et al., 2002; McLaughlin et al., 2010; Norman et al., 2012; Widom, DuMont, & Czaja, 2007), and psychosocial maladjustment (Lansford et al., 2007) over the life course. This has been described as a “cycle of violence”,

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where childhood experiences of physical abuse and maltreatment is associated with aggressive antisocial behaviors in adolescence and adulthood (Widom, 1989). There is also evidence of an additive effect of childhood maltreatment on adult outcome, where exposure to multiple types of adversities, or frequent and more repetitive abuse, is associated with persistence of psychopathology (McLaughlin et al., 2010) and aggressive antisocial behaviors (Currie & Tekin, 2012; Maas, Herrenkohl, & Sousa, 2008) in a dose-response relationship. However, the potential role of mediators, e.g., school commitment in adolescence and genetic confounding, in this cycle of violence needs to be considered (Frisell, Lichtenstein, & Långström, 2011; Herrenkohl, Huang, Tajima, & Whitney, 2003).

The knowledge on aggressive antisocial behaviors is far from complete, especially on their development over time. Developmental pathways have previously been studied both in cross-sectional analyses, using post-hoc classifications of individuals based on their development of characteristics over time, and in prospective, longitudinal studies applying growth modeling techniques. Both models present with problems, as cross-sectional studies might lead to over- or underclassification of cases on different developmental trajectories, while the small number of individuals who have severe and persistent aggressive antisocial behaviors in longitudinal general population studies does not permit in-depth analyses of aggressive antisocial behaviors (Hill & Nathan, 2008).

The Present Study

A key period for studying the development of aggressive antisocial behaviors is the “emerging adulthood” between ages 18 and 25 (Arnett, 2000). This period is characterized by major, life-changing transitions in most areas of life, and also corresponds to the period when differences in trajectories of aggressive antisocial behaviors become apparent as some offenders persist in criminality while some desist (Moffitt, 1993). Further knowledge on vulnerabilities among offenders in emerging adulthood is needed to direct interventions that

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take not only previous criminality but also the current developmental challenges into consideration. This paper is the first to describe aggressive antisocial behaviors and psychosocial background in a nationally representative cohort of imprisoned violent offenders in emerging adulthood, the Development of Aggressive Antisocial Behavior Study (DAABS). This study is unique in many aspects. First, it considers a large, consecutively recruited cohort of violent offenders in emerging adulthood, a group which seldom is large enough for detailed analyses in population-based research. In international crime victim surveys, Sweden report both general and violent crimes on an average level, compared to other countries (Dijk, Kesteren, & Smit, 2007), and reoffence rates are similar to other, western countries with approximately two in five offenders reoffending within three years after prison release (Swedish National Council for Crime Prevention, 2015). Second, it combines state-of-the-art specialized clinical methods with self-report assessments, file reviews, and prospective follow-up in order to diminish possible bias due to methods of information extraction. Third, parental interviews were performed whenever possible, to get more information on early onset problem behaviors and disorders as to assure correct assessments and diagnostics. Fourth, we present detailed information on age at onset of different behaviors, adversities, and disorders. Lastly, we use statistical models that visualize not only the importance of predictors, but also how they interrelate. These models are rarely encountered within this research area, but can be of use for clinical decision making. Studies such as the current could give further direction for the much needed treatment and prevention of aggressive antisocial behaviors (Cohn, Domburgh, Vermeiren, Geluk, & Doreleijers, 2012).

As a first aim, this paper provides baseline data on psychosocial background characteristics and lifetime aggressive antisocial behaviors among the violent offenders in emerging adulthood. We expect elevated levels of early psychosocial adversities including childhood maltreatment, in line with the “cycle of violence” hypothesis (Widom, 1989).

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Furthermore, we expect the majority of the offenders to have problematic school backgrounds, in line with previous research indicating school adjustment problems (Bergman & Andershed, 2009; Falk et al., 2014) and high educational needs (McCorkle, 1995; Ronis & Borduin, 2007) among offenders. Due to inclusion criteria (convicted violent offenders in emerging adulthood) for the study, we expect high levels of self-reported aggressive antisocial behaviors over the lifetime. As a second aim, we will determine early psychosocial background predictors of aggressive antisocial behaviors, and explore interrelations among predictors in decision tree models. In this, we anticipate to find important predictors among early onset school problems and violent home environments during childhood.

Methods

Participants

The study cohort consists of all male offenders in emerging adulthood (18-25 years of age) who served time between March 2010 to July 2012 at any of nine correctional facilities in the Western region of the Swedish Prison and Probation Service for committing violent (including “hands-on” sexual) offences. The region has the full range of prisons, from high-security to open facilities, and serves approximately one fifth of the total national cohort. As there is only one small, specialized women’s prison in the defined area, female offenders were not included in the study. Exclusion criteria were: poor knowledge in Swedish, defined as when an interpreter would have been needed for full participation, and duration of stay in the prison at or under four weeks.

Out of a total of 421 inmates, 23 (5%) were excluded due to weak language skills and 19 inmates (5%) due to placements of insufficient duration. Of the remaining 379 inmates, 109 (29%) declined participation in the study, leaving a final study group of 270 participants (71% of all who met inclusion criteria). Age ranged from 18 years and 7 months to 25 years and 11 months, with a mean age of 22.3 years ($SD=1.9$). To assess the

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representativeness of the included group, non-personal basic information was provided for individuals who were excluded or choose not to participate in the study. Those excluded due to insufficient skills in Swedish ($n = 23$) differed from the offenders by a higher rate of sexual index crimes ($n = 12$; 52%). Among those who declined participation ($n = 109$), 15 offenders (14%) had been sentenced for sexual violent crimes, and 94 offenders (86%) for non-sexual violent crimes. No significant differences in mean age or type of index crime (general violent or sexual violent) could be seen in comparison to the participants. The cohort is therefore considered representative for young male violent offenders within the Swedish Prison and Probation Service.

Procedure

After receiving oral and written information on the study, eligible inmates were asked for informed consent. A small monetary compensation for time spent in the study was provided (SEK 200, approximately \$25).

Participants were consecutively assessed according to the preset protocol, including self-rating questionnaires, semi-structured diagnostic instruments, and neuropsychological assessments. Questionnaires were completed by the participants prior to the clinical assessments, which were subsequently performed during a full day by a licensed psychologist with clinical experience from the field and special training in the instruments used. The assessor had read all file information, including prison health care journals, detailed reports on previous living circumstances and criminal history, and incidents during ongoing sanction, available from the Swedish Prison and Probation Service. All clinical data were assessed for quality and diagnoses were assigned in consensus between the assessor and a senior clinician and researcher with considerable experience from the field (EB or BH). Participants who showed signs of an autism spectrum disorder were later offered a specialized clinical, semi-structured diagnostic interview or observational assessment.

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Measures

Psychosocial background. Detailed information on family background (e.g., ethnicity, family stability, and economic provision), schooling, adverse childhood circumstances, institutionalization during childhood, and previous contacts with the mental health care system was collected by the assessor from file information and interviews by means of a structured protocol. Missing data was approximately 1.5% for psychosocial background variables, with somewhat more missing data (3-5%) on variables regarding parent's employment and certain childhood adversities such as interparental violence during childhood.

Lifetime aggressive antisocial behaviors. Data on criminal history was collected by a structured protocol that covered all previous criminality including the index offense, both self-reported (during the interviews) and noted in files. If the offender reported more criminal behaviors and a younger age of onset than what was noted in the files, the information from the interviews was used for the analyses, as long as it was considered credible by the assessor. This made it possible to include information on the onset of criminal behaviors before the age of 15, the age of criminal responsibility in Sweden. Criminal history was divided into six categories: violent offenses (murder/manslaughter, assault, unlawful threat, robbery, sexual offenses, and fire setting/arson), sexual offenses, drug-related offenses, property offenses (theft, breaking and entering, and vandalism), traffic violations (driving under the influence, and driving without a license), and fraud. All crimes included attempted and aggravated forms. A three-point scale was used as measure of self-reported criminal history: 0 = no occasion, 1 = single occasion, 2 = multiple occasions (≥ 2 occasions). Missing data was below 1% for all variables pertaining to lifetime aggressive antisocial behaviors except for number of previous convictions (4%).

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Lifetime aggressive antisocial behaviors were also measured by the Life History of Aggression (LHA; Brown et al., 1982), a questionnaire originally developed for research on neurobiological correlates to aggression. In the LHA, the frequency of 11 different types of aggressive and antisocial behaviors are rated on a 5-point scale based on the number of occurrences since adolescence (0 = “no events”; 5 = “so many events that they cannot be counted”), rendering a maximum total score of 55. Three subscales are defined in the LHA: Aggression, Self-directed aggression, and Antisocial behavior (Coccaro, Berman, & Kavoussi, 1997). The LHA total score equals the sum of the three subscales. The Aggression scale includes items that measure temper tantrums, physical fights, verbal aggression, physical assaults on people or animals, and assaults on property. Self-directed aggression is measured by items on self-injurious behavior and suicide attempts, and the Antisocial behavior scale contains items that describe school disciplinary problems, problems with supervisors at work, and antisocial behavior with or without police involvement. The LHA was administered as a clinician-rated instrument, where the assessor based the ratings on all available information from interviews and files. If the offender reported more aggressive antisocial behaviors than what was noted in the files, the information from the interviews was used for the analyses, as long as it was considered credible by the assessor. Similar to the procedure for clinical data, final LHA scores were assigned in consensus between the assessor and a senior clinician and researcher with considerable experience from the field (EB or BH). A LHA total score above 15 and/or an LHA Aggression score above 12 are considered to indicate an abnormally high life history of aggression. Complete LHA data was available for 268 offenders.

Ethical Considerations

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All offenders provided informed, written consent before participation, and were given the opportunity to receive feedback on the preliminary results from the assessments. Offenders showing indications of severe psychopathology were then given the opportunity to be referred to the prison doctor (a psychiatrist) for continued assessment and treatment. The study, including the monetary reward (which was low in order not to give an incentive that would compromise the free consent), was approved by the Research Ethics Committee at Lund University.

Statistical Analysis

Data were first anonymized and coded, and then analyzed with IBM SPSS Statistics 22 and R 3.1.1 (R Core Team, 2014) software. We used two-tailed p -values and a significance threshold of $p < .05$. Due to missing data for some variables, the percentages given in the results section are based on the valid percentages in the analyses.

Simple ordinary least squares regression models were employed to test the predictive ability of each possible predictor against the LHA scales: Total score, Aggression, and Antisocial behavior. Due to non-normal error distribution in several of the models, coefficients were bootstrapped using random- x substitution over 2000 replications. The mean and standard error of each bootstrapped coefficient estimate were used to calculate new t - and p -values. Bootstrapped estimates, inference tests and bias-corrected and accelerated (BC_a) confidence intervals (Efron, 1988) are reported.

To explore multivariate predictive models of aggressive antisocial behaviors and determine interrelations between predictors, regression trees were built using the R package `rpart` (Therneau & Atkinson, 1997), which implements an algorithm that closely resembles the original classification and regression tree (CART) developed by Breiman, Friedman, Stone and Olshen (1984). Minimum node size was set at 13, corresponding to approximately 5% of

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the sample, and the trees were pruned according the lowest cross-validated error that also afforded exploratory value. To compensate for the fact that regression trees select only the most mathematically important predictors at each node and thus excludes predictors that may be less strong mathematically, but nevertheless important in clinical settings, we built three separate regression trees; one using all predictors of interest, one with psychosocial background predictors only, and one with school predictors only.

Results

Characteristics of Violent Offenders in Emerging Adulthood

Psychosocial background. The majority of the offenders were born in Sweden, while many had parents where one ($n = 42$; 16%) or both ($n = 114$; 43%) were born outside of Sweden (Table 1). Unstable family situations, e.g., parental absence and placements outside of the family, were common during childhood. Among those placed in institutions, 66 offenders (51%) had several different placements, ranging from two to fifty separate placements ($M = 2.3$, $SD = 6.0$). Nineteen offenders (9%) were separated from their family already during their first year in life. The mean age for definitely moving to live outside of the family home was 15 years ($SD = 5.6$). Prior to incarceration, the majority of the offenders were single ($n = 187$; 70%) and unemployed ($n = 165$; 61%). Eighty-one offenders (30%) were working part- or full time at the time of their imprisonment, and fifty-six offenders (23%) had become parents to from one up to four own children.

Many offenders had substantial problems with schooling (Table 1). The majority of the offenders had not completed high school studies at the expected age. A few had completed elementary and middle school ($n = 18$; 7%) or high school ($n = 12$; 5%) studies in retrospect. Forty-nine offenders (18%) had not completed the mandatory elementary and

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middle school at all, while seven offenders (3%) had attended school for the intellectually challenged.

Table 1 about here

Many offenders described growing up in the presence of adverse circumstances (Table 2). Only 29 offenders (11%) reported no serious adverse circumstances during childhood or adolescence, while the most commonly reported adverse circumstances were parental absence (n = 180; 67%), having been exposed to violence at home (n = 159; 59%), and having a parent with some kind of substance or alcohol abuse (n = 109; 41%) or severe illness (n = 106; 40%). In many cases, the adversities had a preadolescent onset or an onset already in the early childhood years (Table 2). For instance, interparental violence and parental substance or alcohol abuse were in many cases present already at the birth of the offender.

As seen in Table 2, exposure to violence in the home and physical/psychological abuse of the offender were rather common. Even though the frequencies presented in Table 2 were based on any occasion, the absolute majority of the offenders reported adversities on repeated occasions. For instance, 65 offenders (25%) reported repeated interparental violence compared to 74 (29%) reporting interparental violence at any occasion. The category “other domestic violence” mostly consisted of a parent’s spouse or acquaintance committing violence against a parent, while the most common perpetrator of physical violence against the offender (other than a parent) was a sibling. The most common perpetrator of sexual abuse against the offender was a temporary acquaintance or a spouse to a parent (data provided upon request). When childhood adverse experiences were categorized into six different categories and summed up to a total measure of early psychosocial adversities (placement outside of the family home, parent deceased, parents’ substance or alcohol abuse, exposure to violence at home, physical/psychological abuse by parent, and serious parental illness), the majority of

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the offenders displayed early psychosocial adversities within several different categories ($M = 2.3$, $SD = 1.5$). Fifty-six offenders (21%) displayed early psychosocial adversities within at least four different categories.

Table 2 about here

Lifetime aggressive antisocial behaviors. The great majority ($n = 231$; 86%) had previously been convicted of crimes, ranging from 1 to 32 convictions per offender ($M = 4.5$; $SD = 4.5$). Ninety-six offenders (37%) had previous prison sentences, generally one or two, but up to six. The overlap between different types of crimes in the offenders' criminal history was large (Table 3), with a majority of offenders ($n = 161$; 60%) reporting previous offenses within at least four out of six different crime categories. The most common, singular offenses were theft ($n = 217$; 80%) and assaults ($n = 216$; 80%). Only a minority had committed arson ($n = 35$; 13%), some kind of sexual offenses ($n = 31$; 12%), or some kind of lethal violence ($n = 15$; 6%) at any point during their lifetime.

The self-reported age at onset of criminality (any kind) varied between 5 and 24 years ($M = 13$, $SD = 4$). Among the different crime categories, property offenses had the lowest mean age at onset, while sexual offenses had the highest (Table 3). Seventy-one offenders (27%) reported onset of criminality at or before age 10, with a steep increase between ages 10 and 15. At age 15, the majority ($n = 198$; 74%) had already committed criminal acts. Age at onset of violent criminality was somewhat higher – only sixty offenders (23%) reported violent offenses before the age of 15. The greatest increase in onset of violent criminality occurred between ages 15 and 16. Only a few ($n = 11$; 4%) confessed to having committed violent acts at or before age 10. Fifty-one offenders (19%) reported own violence against a parent at repeated occasions, usually during mid-adolescence ($M = 14$ years, $SD = 4$ years).

Table 3 about here

Lifetime aggressive antisocial behaviors as measured by the LHA were highly prevalent, with the exception of self-directed aggression ($M = 0.71$, $SD = 1.6$). Two hundred and three offenders (76%) scored above the cut-off for abnormally high levels of lifetime aggressive behavior ($M = 17$, $SD = 6.1$), while the absolute majority ($n = 239$; 89%) scored above 15 points on the LHA total score ($M = 30$, $SD = 10$), indicating extremely high levels of lifetime aggressive antisocial behaviors. The offenders scored high also on Antisocial behavior ($M = 12$, $SD = 4.6$).

Early Predictors of Aggressive Antisocial Behaviors

Simple linear regression analyses using LHA Total score as dependent variable are reported in Table 4. Separate analyses on the LHA subscales Aggression and Antisocial behavior yielded slightly different results, with being born in Sweden and repeated exposure to violence at home during childhood not being significant predictors of Antisocial behavior, $F(1, 266) = 3.3$, $B = 1.2$ ($SE = 0.68$), 95% BC_a CI [-0.13, 2.6], and $F(1, 266) = 3.3$, $B = 1.0$ ($SE = 0.56$), 95% BC_a CI [-0.05, 2.1], respectively. Also, having two immigrant parents decreased the risk of higher Aggression scores, $F(1, 262) = 6.5$, $B = -1.9$ ($SE = 0.77$), 95% BC_a CI [-3.4, -0.38].

Regression trees with LHA Total score as dependent variable were created in order to investigate associations between school adjustment, psychosocial background, and aggressive antisocial behaviors (Figure 1). Panel A shows the tree containing all predictors presented in Table 4, and Panel B shows the tree that included psychosocial background predictors only. The outcome of the full model (Panel A) and the regression tree containing school variables only did not differ, thus the latter tree is not presented.

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In the tree containing all predictors, whether the offender had bullied others or not emerged as the primary classification variable. Offenders that had bullied others had a mean LHA Total score 25% higher than those that had not bullied others. Among those offenders that had not bullied others, truancy was the most important classification variable. Offenders who had not bullied others, but did have a history of truancy, scored an average 61% higher than offenders who had not bullied others nor had any history of truancy. For offenders who had bullied others, age at onset of truancy was determined to be the primary classification variable. Offenders who had bullied others and whose age at onset of truancy was below 13.5 years had a mean LHA Total score 12% higher than offenders that had bullied others, but whose age at onset of truancy was above 13.5 years. Taken together, offenders who had bullied others and whose age at onset of truancy was below 13.5 years had a mean LHA Total score 94% higher than offenders that had not bullied others and who had no history of truancy.

In the tree containing psychosocial predictors only, whether there was a history of parental substance or alcohol abuse or not, was the most important classification factor. Offenders who had experienced parental substance or alcohol abuse scored on average 16% higher than offenders who had not experienced such circumstances. Among those offenders who had not experienced any parental substance or alcohol abuse, whether they had been subject to repeated exposure to violence at home, was the most important classification variable. Those offenders who had not experienced any parental substance or alcohol abuse, but were repeatedly exposed to violence at home, scored an average 17% higher than offenders without parental substance or alcohol abuse, and without repeated exposure to violence at home. Thus, offenders who had experienced parental substance or alcohol abuse scored an average 25% higher on the LHA Total score than did offenders who had no experiences of neither parental substance abuse nor repeated exposure to violence at home.

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* Figure 1 about here *

Discussion

This investigation of early predictors of aggressive antisocial behaviors addressed two aims in a nationally representative cohort of Swedish violent offenders in emerging adulthood. First, we characterized the offenders in terms of psychosocial background and lifetime aggressive antisocial behaviors and found that many offenders grew up in the presence of childhood adversities, displayed severe school adjustment problems, and developed diverse aggressive antisocial behaviors from an early age on that persisted into emerging adulthood. Second, we analyzed early predictors of aggressive antisocial behaviors and found severe school adjustment problems, especially bullying behavior and early onset truancy, to be predominant, interrelated predictors. That is, an earlier onset of aggressive antisocial behavior predicts higher levels of the behavior over a life time.

Characteristics of Violent Offenders in Emerging Adulthood

Many offenders grew up in families struggling with several aspects of living, e.g., finances, occupation, domestic relationships, health, and aggressive antisocial behaviors. In short, they grew up in socially marginalized families with health problems. Probably adding to marginalization, almost half of the offenders were second generation immigrants, with even more having one immigrant parent. Childhood adversities were common, with a prevalence (89%) more than doubled compared to previous research on general populations (29-43%; Duke, Pettingell, McMorris, & Borowsky, 2010; Edwards, Holden, Felitti, & Anda, 2003; Kessler et al., 2010). The most commonly reported childhood adversities were parental absence, parental substance or alcohol abuse, and a violent home environment. The prevalence of parental substance or alcohol abuse during childhood was, in line with our expectations, elevated in this group (41%) compared to previous, population-based research

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(8-22%; Annerbäck, Wingren, Svedin, & Gustafsson, 2010; Janson, Jernbro, & Långberg, 2011; Schilling et al., 2007; Springer, Sheridan, Kuo, & Carnes, 2007; Sugaya et al., 2012). Witnessing interparental violence has previously been reported among 6-12% in Swedish population-based samples (Annerbäck et al., 2010), whereas this was more than doubled (29%), and with an early onset ($M = 2.9$ years), in this study. Maltreatment by parents was also common with 38% of the offenders being physically or psychologically abused by their parents. In comparison, Hosser, Raddatz and Windzio (2007) found that 20% of a sample of young male offenders had been maltreated by their parents during childhood, and that another 24% had been seriously physically punished during childhood. Overall, the findings are in line with the cycle of violence hypothesis (Widom, 1989) and previous research demonstrating more early adverse experiences among offenders than non-offenders or community samples (Abram et al., 2004; Elklit et al., 2013).

Considering the amount of childhood adversities reported in this study, the possibilities for the offenders to develop secure attachments to their parents in early childhood could be questioned. Even though many lived with both parents during at least parts of their childhood, many grew up with parents with substance or alcohol abuse or health problems, in a violent home environment, or with one parent absent during periods. One in four was placed in foster home during childhood, a strong indication of dysfunctional family life. Nineteen offenders were separated from their family already during their first year of life, and several of the parental adversities reported had an onset during the first years of the offender's life. One in four had become parents to own children at the time of their imprisonment, thus continuing a cycle of parental absence.

The majority of the offenders also displayed early adversities within several different categories. The findings highlight the aggregation of dysfunctional behaviors and adversities in some families and address the question of genetic confounding of aggressive

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antisocial behaviors. Forsman and Långström (2012) reported that much of the risk increase for aggressive antisocial behaviors from childhood maltreatment was confounded by genetic or family environment factors. Taken together, a pattern of severe and early onset psychosocial maladjustment and adversities is evident among violent offenders in emerging adulthood, and highlights the importance of early interventions directed towards families with high-risk profiles.

The educational background of the offenders was, in line with our expectations, problematic; truancy, school dropout, bullying, and – apparently non-functional – large amounts of special support from school, thus indicating severe school adjustment problems among offenders (Bergman & Andershed, 2009). This must be seen in the context of Sweden having a reasonably well-functioning educational system with 9 years of mandatory school, existing school health services and possibilities to receive special support during schooling, regardless of socioeconomic status. That is, despite availability of services, these individuals fall through the system. Previously, it has been reported that individuals with conduct disorder and juvenile delinquency have a higher likelihood of dropping out of, or being discharged from, school (Foster, Jones, & Conduct Problems Prevention Research Group, 2005). The high prevalence of ADHD and conduct disorder among the offenders (Billstedt, Anckarsäter, Wallinius, & Hofvander, submitted) could be part of an explanation for the school adjustment problems, as symptoms congruent with these disorders aggravate adaptive behavior in this area (Kooij et al., 2010). Nevertheless, the findings clearly demonstrate the need for a retake on school interventions directed towards individuals with severe school adjustment problems.

Despite their young age, most offenders had a considerable amount of previous criminality, characterized by diversity, persistence, and an early onset. This is in concordance with previous findings of youth offending being more versatile than specialized (Elonheimo, Sourander, Niemelä, & Helenius, 2011). The offenders also reported extremely high levels of

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lifetime aggressive antisocial behaviors as measured by the LHA in addition to their outright criminal behaviors and records, far exceeding what has previously been found in different samples of adult psychiatric outpatients, personality disordered individuals, violent offenders within forensic psychiatry, and normal controls (Coccaro et al., 1997; Hofvander et al., 2011). However, only a few had committed the most serious violent acts - lethal violence. Sexual offenses were also rare, which could indicate both an actual lower frequency as well as an underreporting of these crimes that are generally considered taboo, even within criminal contexts. Crimes of a more white-collar type, such as fraud, were also uncommon, while property offenses and drug-related offenses were common.

Most offenders reported adolescence as the onset of their aggressive antisocial behaviors. A criminal career starting with property offenses during the pre-adolescent or early adolescent years, proceeding into adolescence with a wider range of aggressive antisocial behaviors, could be discerned. Notably, the majority of the offenders reported having committed criminal acts prior to age 15, the age of criminal responsibility in Sweden, while one in four reported onset of criminality at or before age 10. This, including the steep increase in criminal behavior between ages 10 and 15, add to the established distribution of aggressive antisocial behavior over the ages (Blonigen, 2010; Blumstein et al., 1988; Hirschi & Gottfredson, 1983; Moffitt, 1993), and to the notion that official registers are not sufficient as sole source in research on aggressive antisocial behaviors. Based on the overall characteristics of the study group, it would seem reasonable to expect a pre-adolescent age at onset for many more offenders than what was reported. Even though an effect of recall bias cannot be ruled out, it is also possible that these results are due to discordance between the assessor and the offender in what is considered criminal behaviors, resulting in the offender reporting age at onset for what they consider to be criminal behavior.

Early Predictors of Aggressive Antisocial Behaviors

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The strongest, significant predictors of higher levels of aggressive antisocial behaviors as measured by the LHA total score were severe school adjustment problems, e.g., truancy, age at onset of truancy, bullying, and incomplete schooling. Such variables increased the LHA total score approximately 1 *SD* in the study group. This might seem as a small difference in the current study group but can be considered as clinically relevant as this corresponds to all variables measured in the LHA being increased one level in severity. The amount of variance in aggressive antisocial behaviors explained by the severe school adjustment problems mentioned above was about 10%. Thus, the current results indicate that although severe school adjustment problems might be valuable predictors of higher levels of lifetime aggressive antisocial behaviors, they are only a part of a larger picture. Also, severe school adjustment problems might also be seen as an expression of aggressive antisocial behaviors, explaining the associations. For instance, bullying behavior is part of the criteria for conduct disorder, which is seen as a precursor to antisocial personality disorder. Kjelsberg and Friestad (2009) showed that bullying is a strong risk marker for later aggressive antisocial behaviors, and proposed that early detection and prevention of bullying behavior can be important as part of the prevention of aggressive antisocial behaviors.

Childhood adverse experiences, e.g., repeated exposure to violence at home and parental substance or alcohol abuse, were also predictors of higher levels of aggressive antisocial behaviors. However, the increase in aggressive antisocial behaviors from these predictors were lower than for the school adjustment problems, as was the amount of variance explained by these adversities (3-4%). Having lived with a single caretaker at some point during childhood was also a significant, albeit marginal, predictor of higher levels of aggressive antisocial behaviors. This finding probably reflects the unstable conditions that many persons with severe aggressive antisocial behaviors grow up under, where one parent is absent during periods. Interestingly, age at onset of adversities was not a significant predictor

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in this study. Previously, it has been demonstrated that adversities constricted to the early childhood years are of less importance for the development of aggressive antisocial behaviors, compared to those adversities that prolongates into adolescence (Stewart, Livingston, & Dennison, 2008; Thornberry, Ireland, & Smith, 2001).

In the full regression tree model, only school adjustment variables were found to have predictive value and thus mathematically considered as stronger predictors of aggressive antisocial behaviors than childhood adversities. In line with the linear regression results, the most important predictor was bullying others, where those with a preadolescent onset of truancy showed a 94% increase in aggressive antisocial behaviors as measured by the LHA total score compared to those that neither bullied nor had a history of truancy. Those who neither bullied others nor played truant during the school years showed much less (62%; approx. 1 *SD*) aggressive antisocial behaviors compared to those that did not bully but played truant. The latter was influenced by age at onset of truancy, where preadolescent onset of truancy indicated higher levels of aggressive antisocial behaviors. Finally, those who played truant and did not finish high school at the expected age showed more aggressive antisocial behaviors than those who played truant but still managed to finish high school. The findings highlight the importance of school adjustment in the development of aggressive antisocial behaviors, and that bullying behavior needs to be taken seriously as it, aside from the obvious suffering of the victims, might indicate a more severe trajectory among children or adolescents with problem behaviors.

The regression tree on psychosocial background variables demonstrated parental substance or alcohol abuse as the predominant predictor of higher levels of aggressive antisocial behaviors. An interrelationship was found with repeated exposure to violence at home, where those with parents without substance or alcohol abuse but who repeatedly were exposed to violence at home during childhood evidenced more aggressive antisocial behaviors

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than those without such exposure. However, compared to school adjustment problems, the impact on aggressive antisocial behaviors was modest with a maximum increase of LHA total scores of 25%.

Overall, the findings are in line with the cycle of violence hypothesis (Widom, 1989), and provide support for a dose-response relationship between an increased numbers of childhood adversities and higher levels of aggressive antisocial behaviors (Currie & Tekin, 2012; Maas, Herrenkohl, & Sousa, 2008). However, Cohn et al. (2012) demonstrated that externalizing, childhood-onset psychopathology (ADHD and ODD/CD) predicted persistence in childhood offending beyond adverse family circumstances during childhood. Recently, it was also demonstrated that mental health problems mediated the association between childhood maltreatment and aggressive antisocial behaviors, especially reactive aggression (Hoeve et al., 2015). It is possible that the methodological limitations of the current study (e.g., cross-sectional study with retrospective reporting of childhood adversities) can explain the findings, since the methods also prevent more detailed analyses on potential mediators between childhood adversities and aggressive antisocial behaviors. Even though the influence of genetic confounding on aggressive antisocial behavior has been demonstrated as highly important (Sariasalan, 2015), the influence of environmental characteristics during childhood and phenotypical characteristics should always be considered as they contribute to the full picture of aggressive antisocial behavior, which is yet to be established.

Even if the current analyses cannot provide unequivocal evidence for this, it is reasonable to suggest, in line with suggestions by previous research and theory (Fairchild, Goozen, Calder, & Goodyer, 2013; Moffitt, 1993; Sugaya et al., 2012) that the relationship between childhood adversities and individual psychopathology and problem behaviors is bidirectional. That is, an underlying vulnerability (a “difficult child”) is exacerbated by the environment (a “difficult environment”; Ou & Reynolds, 2010). Lately, a population-based

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twin study investigated the cycle of violence hypothesis in delineating a possible causal effect of childhood maltreatment on violence in adulthood, displaying a moderate association and a possible causal relationship that seemed to be largely influenced by genetic or environmental circumstances (Forsman & Långström, 2012).

Limitations

There are several limitations that need to be considered in this study. First, all baseline data were collected retrospectively. Despite their limitations, retrospective studies can yield important results over a shorter period of time and be informative for future research (Widom, Raphael, & DuMont, 2004), especially on groups that are hard to target in prospective, population-based samples (Hill & Nathan, 2008). Previous research also indicate that the recall of serious childhood adversities and psychopathologies elicited through clinical interviews is quite robust, and in some cases possibly superior to prospectively gathered data (Hill & Nathan, 2008), even though a substantial rate of false negatives should be expected when examining adverse childhood experiences (Hardt & Rutter, 2004). In this study, effects of recall bias might have been diminished by the offenders' young ages and the use of extensive clinical assessments.

Second, no female offenders were included in the study as this would have altered the cohort from regional to national in order to achieve enough power. Also, due to methodology, no assumptions on causality between the variables can be made. A longitudinal design would be preferable in the study of development of aggressive antisocial behaviors. Notwithstanding their limitations, cross-sectional studies applying comprehensive clinical assessments can still provide important information over shorter periods of time, and therefore be informative for violence-preventive strategies in society.

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The statistical models applied also restrict possible conclusions from the results. The regression trees provide an easy-to-interpret visualization of interrelations between predictors of aggressive antisocial behaviors, but it must be kept in mind that the predictors and their respective splits presented in these models are solely based on mathematical importance according to the applied algorithm, and does not account for the potential impact of clinically important variables that are not included in the model. Furthermore, due to limitations in sample size, we did not divide the dataset into training and testing sets. This is a procedure that is used to split data into two halves, where the training set is used to estimate the model (i.e., the regression tree) and the testing set is subsequently used to validate the model. However, the results from the simple regressions testing all potential predictors support the regression tree structure. As such, regression trees may be thought of as complementary to regression analyses when identifying high-risk population subgroups (King & Resick, 2014). Also, the amounts of variance explained by the predictors were low - generally $\leq 10\%$. However, in research on human behavior it is not uncommon with lower amounts of explained variance, since human behavior is complex in its nature.

In summary, generalizations from the results should be made with care, and preferably to male violent offenders in emerging adulthood in countries with similar rates of aggressive antisocial behaviors as Sweden.

Clinical Implications

It is obvious that the antecedents to severe aggressive antisocial behaviors in emerging adulthood are evident early in childhood and adolescence, during the school years if not previously. Thus, the early identification of individuals in the risk zone of developing severe and persistent aggressive antisocial behaviors is crucial as a public health intervention. Preventive interventions should be initiated as early as during pregnancy and the early childhood years in families with high-risk profiles, such as a history of aggressive antisocial

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behavior, poverty/low income, relationship problems, maladaptive family functioning, and early parenthood, in order to prevent or buffer the development of aggressive antisocial behaviors (Wallinius, 2012). In early prevention strategies, child maltreatment, especially a violent home environment, also needs to be considered as part of a larger intervention program. It is essential to break the cycle of violence, as persons that have been exposed to interparental violence during childhood are at higher risk of own domestic violence and child maltreatment (Roustit et al., 2009). This break should occur early, as children learn to regulate their use of violence during the early childhood years (Broidy et al., 2003).

The current study support previous findings of school adjustment problems and high educational needs among offenders (Bergman & Andershed, 2009; Falk et al., 2014; McCorkle, 1995; Ronis & Borduin, 2007). The offenders in this study had received massive amounts of support during the school years, and still had problems getting through school, indicating that the given support was not sufficient – or sufficiently tailored. Severe school adjustment problems, especially bullying and early onset of truancy, must be followed-up and prevented early, given that a certain amount of false positives must be accepted in this procedure according to the principle “intervene, not ignore”. No doubt, these individuals constitute major challenges to the school system, and interventions cannot depend solely on the school system, but must be performed in cooperation with child health agencies and the social support system. In emerging adulthood, these individuals have a possibility to redirect into another trajectory, where previous school failures might hamper the possibilities to change the direction of their lives and form a non-criminal identity. Thus, interventions for these individuals in emerging adulthood need to consider not only their previous criminality, but also what challenges that lie ahead in tackling adulthood, e.g., conforming to societal norms, taking responsibilities for their own actions, and forming important, interpersonal relationships (Nelson, Springer, Nelson, & Bean, 2008). Finally, the results from the

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regression trees should be tested in further studies to see if the current results could provide guidance for clinical practice (including school) as to where to direct the most intensive interventions to diminish a troublesome development, i.e., children that show bullying behavior in combination with early onset truancy.

References

- Abram, K. M., Teplin, L. A., Charles, D. R., Longworth, S. L., McClelland, G. M., & Dulcan, M. K. (2004). Posttraumatic stress disorder and trauma in youth in juvenile detention. *Archives of General Psychiatry*, *61*(4), 403–410.
doi:10.1001/archpsyc.61.4.403
- Af Klinteberg, B., Almquist, Y., Beijer, U., & Rydelius, P-A. (2011). Family psychosocial characteristics influencing criminal behaviour and mortality – possible mediating factors: A longitudinal study of male and female subjects in the Stockholm Birth Cohort. *BMC Public Health*, *11*:756. doi:10.1186/1471-2458-11-756
- Annerbäck, E. M., Wingren, G., Svedin, C. G., & Gustafsson, P. A. (2010). Prevalence and characteristics of child physical abuse in Sweden – Findings from a population-based youth survey. *Acta Paediatrica*, *99*(8), 1229–1236. doi:10.1111/j.1651-2227.2010.01792.x
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*(5), 469–480. doi:10.1037//0003-066X.55.5.469 469
- Bergman, L. R., & Andershed, A. K. (2009). Predictors and outcomes of persistent or age-limited registered criminal behavior: A 30-year longitudinal study of a Swedish urban population. *Aggressive Behavior*, *35*(2), 164–178. doi:10.1002/ab.20298
- Billstedt, E., Anckarsäter, H., Wallinius, M., & Hofvander B. (submitted).
Neurodevelopmental disorders in young violent offenders: Overlap and background characteristics.

OFFENDERS IN EMERGING ADULTHOOD

- Blonigen, D. M. (2010). Explaining the relationship between age and crime: Contributions from the developmental literature on personality. *Clinical Psychology Review, 30*(1), 89–100. doi:10.1016/j.cpr.2009.10.001
- Blumstein, A., Cohen, J., & Farrington, D. P. (1988). Criminal career research: Its value for criminology. *Criminology, 26*(1), 1–35. doi:10.1111/j.1745-9125.1988.tb00829.x
- Breiman, L., Friedman, J. H., Stone, C. J., & Olshen, R. A. (1984). *Classification and regression trees*. Belmont, CA: Wadsworth International Group.
- Broidy, L. M., Nagin, D. S., Tremblay, R. E., Bates, J. E., Brame, B., Dodge, K. A., . . . Vitaro, F. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology, 39*(2), 222–245. doi:10.1037/0012-1649.39.2.222
- Brown, G. L., Ebert, M. H., Goyer, P. F., Jimerson, D. C., Klein, W. J., Bunney, W. E., & Goodwin, F. K. (1982). Aggression, suicide, and serotonin: Relationships of CSF amine metabolites. *The American Journal of Psychiatry, 139* (6), 741–746. doi:10.1176/ajp.139.6.741
- Bruffaerts, R., Demyttenaere, K., Borges, G., Haro, J. M., Chiu, W. T., Hwang, I., . . . Nock, M. K. (2010). Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *The British Journal of Psychiatry, 197*(1), 20–27. doi:10.1192/bjp.bp.109.074716
- Coccaro, E. F., Berman, M. E., & Kavoussi, R. J. (1997). Assessment of life history of aggression: Development and psychometric characteristics. *Psychiatry Research, 73*(3), 147–157.
- Cohn, M., Domburgh, L. V., Vermeiren, R., Geluk, C., & Doreleijers, T. (2012). Externalizing psychopathology and persistence of offending in childhood first-

OFFENDERS IN EMERGING ADULTHOOD

time arrestees. *European Child & Adolescent Psychiatry*, 21(5), 243–251.

doi:10.1007/s00787-012-0257-x

Currie, J., & Tekin, E. (2012). Understanding the cycle: Childhood maltreatment and future crime. *Journal of Human Resources*, 47(2), 509–549. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3817819/>

Dijk, J. V., Kesteren, J. V., & Smit, P. (2007). *Criminal victimisation in international perspective. Key findings from the 2004-2005 ICVS and EU ICS*. Retrieved from http://unicri.it/services/library_documentation/publications/icvs/publications/ICVS2004_05report.pdf

Domburgh, L. V., Loeber, R., Bezemer, D., Stallings, R., & Stouthamer-Loeber, M. (2009). Childhood predictors of desistance and level of persistence in offending in early onset offenders. *Journal of Abnormal Child Psychology*, 37(7), 967–980. doi:10.1007/s10802-009-9329-x

Duke, N. N., Pettingell, S. L., McMorris, B. J., & Borowsky, I. W. (2010). Adolescent violence perpetration: Associations with multiple types of adverse childhood experiences. *Pediatrics*, 125(4), e778–e786. doi:10.1542/peds.2009-0597

Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. F. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: Results from the adverse childhood experiences study. *American Journal of Psychiatry*, 160(8), 1453–1460. doi:10.1176/appi.ajp.160.8.1453

Efron, B. (1988). Bootstrap confidence intervals: Good or bad?. *Psychological Bulletin*, 104(2), 293. doi: 10.1037/0033-2909.104.2.293

Elklit, A., Karstoft, K. I., Armour, C., Feddern, D., & Christoffersen, M. (2013). Predicting criminality from child maltreatment typologies and posttraumatic stress

OFFENDERS IN EMERGING ADULTHOOD

symptoms. *European Journal of Psychotraumatology*, 4.

doi:10.3402/ejpt.v4i0.19825

Elonheimo, H., Sourander, A., Niemelä, S., & Helenius, H. (2011). Generic and crime type specific correlates of youth crime: A Finnish population-based study. *Social Psychiatry and Psychiatric Epidemiology*, 46(9), 903–914. doi:10.1007/s00127-010-0260-9

Elonheimo, H., Sourander, A., Niemelä, S., Nuutila, A. M., Helenius, H., Sillanmäki, L., . . . Parkkola, K. (2009). Psychosocial correlates of police-registered youth crime. A Finnish population-based study. *Nordic Journal of Psychiatry*, 63(4), 292–300. doi:10.1080/08039480902727058

Fairchild, G., Goozen, S. H., Calder, A. J., & Goodyer, I. M. (2013). Research review: Evaluating and reformulating the developmental taxonomic theory of antisocial behaviour. *Journal of Child Psychology and Psychiatry*, 54(9), 924–940. doi:10.1111/jcpp.12102

Falk, Ö., Wallinius, M., Lundström, S., Frisell, T., Anckarsäter, H., & Kerekes, N. (2014). The 1% of the population accountable for 63% of all violent crime convictions. *Social Psychiatry and Psychiatric Epidemiology*, 49(4), 559–571. doi:10.1007/s00127-013-0783-y

Farrington, D. P., Ttofi, M. M., & Coid, J. W. (2009). Development of adolescence-limited, late-onset, and persistent offenders from age 8 to age 48. *Aggressive Behavior*, 35(2), 150–163. doi:10.1002/ab.20296

Fergusson, D. M., Horwood, L. J., & Nagin, D. S. (2000). Offending trajectories in a New Zealand birth cohort. *Criminology*, 38(2), 525–552. doi: 10.1111/j.1745-9125.2000.tb00898.x

OFFENDERS IN EMERGING ADULTHOOD

- Forsman, M., & Långström, N. (2012). Child maltreatment and adult violent offending: Population-based twin study addressing the 'cycle of violence' hypothesis. *Psychological Medicine, 42*(09), 1977–1983. doi:10.1017/S0033291711003060
- Foster, E. M., Jones, D. E., & Conduct Problems Prevention Research Group. (2005). The high costs of aggression: Public expenditures resulting from conduct disorder. *American Journal of Public Health, 95*(10), 1767. doi:10.2105/AJPH.2004.061424
- Frisell, T., Lichtenstein, P., & Långström, N. (2011). Violent crime runs in families: A total population study of 12.5 million individuals. *Psychological Medicine, 41*(01), 97–105. doi:10.1017/S0033291710000462.
- Gardner, F. L., Moore, Z. E., & Dettore, M. (2014). The relationship between anger, childhood maltreatment, and emotion regulation difficulties in intimate partner and non-intimate partner violent offenders. *Behavior Modification, 38*(6), 779–800. doi:10.1177/0145445514539346.
- Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry, 45*(2), 260–273. doi:10.1111/j.1469-7610.2004.00218.x
- Herrenkohl, T. I., Huang, B., Tajima, E. A., & Whitney, S. D. (2003). Examining the link between child abuse and youth violence: An analysis of mediating mechanisms. *Journal of Interpersonal Violence, 18*(10), 1189–1208. doi:10.1177/0886260503255558
- Hill, J., & Nathan, R. (2008). Childhood antecedents of serious violence in adult male offenders. *Aggressive Behavior, 34*(3), 329–338. doi:10.1002/ab.20237
- Hirschi, T., & Gottfredson, M. (1993). Age and the explanation of crime. *American Journal of Sociology, 98*, 552–584. doi:10.1086/227905

OFFENDERS IN EMERGING ADULTHOOD

- Hoeve, M., Colins, O. F., Mulder, E. A., Loeber, R., Stams, G. J. J., & Vermeiren, R. R. (2015). The association between childhood maltreatment, mental health problems, and aggression in justice-involved boys. *Aggressive Behavior, 41*(5), 488–501. doi:10.1002/ab.21586
- Hofvander, B., Ståhlberg, O., Nydén, A., Wentz, E., Degl'Innocenti, A., Billstedt, E., . . . Anckarsäter, H. (2011). Life History of Aggression scores are predicted by childhood hyperactivity, conduct disorder, adult substance abuse, and low cooperativeness in adult psychiatric patients. *Psychiatry Research, 185*(1), 280–285. doi:10.1016/j.psychres.2010.05.008
- Hosser, D., Raddatz, S., & Windzio, M. (2007). Child maltreatment, revictimization, and violent behavior. *Violence and Victims, 22*(3), 318–333. doi:10.1891/088667007780842829
- Huesmann, L. R., Dubow, E. F., & Boxer, P. (2009). Continuity of aggression from childhood to early adulthood as a predictor of life outcomes: Implications for the adolescent-limited and life-course-persistent models. *Aggressive Behavior, 35*(2), 136–149. doi:10.1002/ab.20300
- Janson, S., Jernbro, C., & Långberg, B. (2011). *Kroppslig bestraffning och annan kränkning av barn i Sverige - en nationell kartläggning 2011 [Physical punishment and other types of violation of children in Sweden – A national survey 2011]*. Stockholm: Stiftelsen Allmänna Barnhuset.
- Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., . . . Williams, D. R. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *The British Journal of Psychiatry, 197*(5), 378–385. doi:10.1192/bjp.bp.110.080499

OFFENDERS IN EMERGING ADULTHOOD

- King, M. W., & Resick, P. A. (2014). Data mining in psychological treatment research: A primer on classification and regression trees. *Journal of Consulting and Clinical Psychology, 82* (5), 895–905. doi:10.1037/a0035886
- Kjelsberg, E., & Friestad, C. (2009). Exploring gender issues in the development from conduct disorder in adolescence to criminal behaviour in adulthood. *International Journal of Law and Psychiatry, 32*, 18–22. doi:10.1016/j.ijlp.2008.11.004
- Kooij, S. J., Bejerot, S., Blackwell, A., Caci, H., Casas-Brugué, M., Carpentier, P. J., . . . Asherson, P. (2010). European consensus statement on diagnosis and treatment of adult ADHD: The European Network Adult ADHD. *BMC Psychiatry, 10*(1), 67. doi:10.1186/1471-244X-10-67
- Kratzer, L., & Hodgins, S. (1999). A typology of offenders: A test of Moffitt's theory among males and females from childhood to age 30. *Criminal Behaviour and Mental Health, 9*(1), 57–73. doi: 10.1002/cbm.291
- Kretschmer, T., Hickman, M., Doerner, R., Emond, A., Lewis, G., Macleod, J., . . . Heron, J. (2014). Outcomes of childhood conduct problem trajectories in early adulthood: Findings from the ALSPAC study. *European Child & Adolescent Psychiatry, 23*(7), 539–549. doi:10.1007/s00787-013-0488-5
- Krug, E. G., Mercy, J. A., Dahlberg, L. L., Zwi, A. B., & Lozano, R. (2002). *The world report on violence and health*. Geneva: The World Health Organization.
- Lansford, J. E., Dodge, K. A., Pettit, G. S., Bates, J. E., Crozier, J., & Kaplow, J. (2002). A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Archives of Pediatrics & Adolescent Medicine, 156*(8), 824–830. doi:10.1001/archpedi.156.8.824

OFFENDERS IN EMERGING ADULTHOOD

- Lansford, J. E., Miller-Johnson, S., Berlin, L. J., Dodge, K. A., Bates, J. E., & Pettit, G. S. (2007). Early physical abuse and later violent delinquency: A prospective longitudinal study. *Child Maltreatment, 12*(3), 233–245.
doi:10.1177/1077559507301841
- Linnoila, M., De Jong, J., & Virkkunen, M. (1989). Family history of alcoholism in violent offenders and impulsive fire setters. *Archives of General Psychiatry, 46*(7), 613–616. doi:10.1001/archpsyc.1989.01810070039006
- Loeber, R. (1982). The stability of antisocial and delinquent child behavior: A review. *Child Development, 53*, 1431–1446.
- Loeber, R., & Farrington, D. P. (2000). Young children who commit crime: Epidemiology, developmental origins, risk factors, early interventions, and policy implications. *Development and Psychopathology, 12*(04), 737–762.
doi:10.1017/S0954579400004107
- Loeber, R., Farrington, D. P., & Waschbusch, D. A. (1999). Serious and violent juvenile offenders. In: R. Loeber & D. P. Farrington (Eds.), *Serious & violent juvenile offenders: Risk factors and successful interventions* (pp. 13–29). Thousand Oaks, CA: Sage Publications.
- Maas, C., Herrenkohl, T. I., & Sousa, C. (2008). Review of research on child maltreatment and violence in youth. *Trauma, Violence, & Abuse, 9*(1), 56–67.
doi:10.1177/1524838007311105
- Maxfield, M. G., & Widom, C. S. (1996). The cycle of violence: Revisited 6 years later. *Archives of Pediatrics & Adolescent Medicine, 150*(4), 390–395.
doi:10.1001/archpedi.1996.02170290056009
- Maxfield, M. G., & Widom, C. S. (2001). *An Update on the Cycle of Violence*. Research in Brief. Washington, DC: US Department of Justice, National Institute of Justice.

OFFENDERS IN EMERGING ADULTHOOD

- McCorkle, R. C. (1995). Gender, psychopathology, and institutional behavior: A comparison of male and female mentally ill prison inmates. *Journal of Criminal Justice*, 23(1), 53–61. doi: 10.1016/0047-2352(94)00044-1
- McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood adversities and adult psychiatric disorders in the national comorbidity survey replication II: Associations with persistence of DSM-IV disorders. *Archives of General Psychiatry*, 67(2), 124–132. doi:10.1001/archgenpsychiatry.2009.187
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100(4), 674–701.
- Moffitt, T. E., Caspi, A., Dickson, N., Silva, P., & Stanton, W. (1996). Childhood-onset versus adolescent-onset antisocial conduct problems in males: Natural history from ages 3 to 18 years. *Development and Psychopathology*, 8(02), 399–424. doi: 10.1017/S0954579400007161
- Moffitt, T. E., Caspi, A., Harrington, H., & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. *Development and Psychopathology*, 14(01), 179–207. doi:10.1017/S0954579402001104
- Murray, J., & Farrington, D. P. (2010). Risk factors for conduct disorder and delinquency: Key findings from longitudinal studies. *Canadian Journal of Psychiatry. Revue canadienne de psychiatrie*, 55(10), 633–642.
- Murray, J., Farrington, D. P., Sekol, I., & Olsen, R. F. (2009). Effects of parental imprisonment on child antisocial behaviour and mental health: A systematic review. *Campbell Systematic Reviews*, 4. doi:10.4073/csr.2009.4

OFFENDERS IN EMERGING ADULTHOOD

National Council for Crime Prevention. (2015). *Crime statistics 2014. Report 2015:16*.

Stockholm: National Council for Crime Prevention.

Nelson, D. A., Springer, M. M., Nelson, L. J., & Bean, N. H. (2008). Normative beliefs regarding aggression in emerging adulthood. *Social Development, 17*(3), 638–660. doi:10.1111/j.1467-9507.2007.00442.x

Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and meta-analysis. *PLoS Medicine, 9*(11), e1001349. doi:10.1371/journal.pmed.1001349

Ou, S. R., & Reynolds, A. J. (2010). Childhood predictors of young adult male crime. *Children and Youth Services Review, 32*(8), 1097–1107. doi:10.1016/j.chilyouth.2010.02.009

Patterson G. R., Reid J. B., & Dishion T. J. (1992). *A social interactional approach: Vol. 4: Antisocial boys*. Eugene: Castalia.

Pulkkinen, L., Lyyra, A. L., & Kokko, K. (2009). Life success of males on nonoffender, adolescence- limited, persistent, and adult-onset antisocial pathways: Follow-up from age 8 to 42. *Aggressive Behavior, 35*(2), 117–135. doi:10.1002/ab.20297

Robins, L.N. (1966). *Deviant children grown up*. Baltimore: Williams & Wilkins.

Ronis, S. T., & Borduin, C. M. (2007). Individual, family, peer, and academic characteristics of male juvenile sexual offenders. *Journal of Abnormal Child Psychology, 35*(2), 153–163. doi:10.1007/s10802-006-9058-3

Roustit, C., Renahy, E., Guernec, G., Lesieur, S., Parizot, I., & Chauvin, P. (2009). Exposure to interparental violence and psychosocial maladjustment in the adult life course: Advocacy for early prevention. *Journal of Epidemiology and Community Health, 63*(7), 563–568. doi:10.1136/jech.2008.077750

OFFENDERS IN EMERGING ADULTHOOD

- Rutter, M., Kim-Cohen, J., & Maughan, B. (2006). Continuities and discontinuities in psychopathology between childhood and adult life. *Journal of Child Psychology and Psychiatry*, *47*(3-4), 276–295. doi:10.1111/j.1469-7610.2006.01614.x
- Sariasalan, A. (2015). *Exploring the causal nature of neighborhood influences on violent criminality, substance misuse and psychiatric morbidity* (Doctoral dissertation). Karolinska Institute, Stockholm.
- Schilling, E. A., Aseltine, R. H., & Gore, S. (2007). Adverse childhood experiences and mental health in young adults: A longitudinal survey. *BMC Public Health*, *7*(1), 30. doi:10.1186/1471-2458-7-30
- Shaw, D. S., Hyde, L. W., & Brennan, L. M. (2012). Early predictors of boys' antisocial trajectories. *Development and Psychopathology*, *24*(03), 871–888. doi:10.1017/S0954579412000429
- Springer, K. W., Sheridan, J., Kuo, D., & Carnes, M. (2007). Long-term physical and mental health consequences of childhood physical abuse: Results from a large population-based sample of men and women. *Child Abuse & Neglect*, *31*(5), 517–530. doi:10.1016/j.chiabu.2007.01.003
- Stewart, A., Livingston, M., & Dennison, S. (2008). Transitions and turning points: Examining the links between child maltreatment and juvenile offending. *Child Abuse & Neglect*, *32*(1), 51–66. doi:10.1016/j.chiabu.2007.04.011
- Stouthamer-Loeber, M., Loeber, R., Homish, D., & Wei, E. (2001). Maltreatment of boys and the development of disruptive and delinquent behavior. *Development and Psychopathology*, *13*(04), 941–955.
- Sugaya, L., Hasin, D. S., Olfson, M., Lin, K. H., Grant, B. F., & Blanco, C. (2012). Child physical abuse and adult mental health: A national study. *Journal of Traumatic Stress*, *25*(4), 384–392. doi:10.1002/jts.21719

OFFENDERS IN EMERGING ADULTHOOD

- Therneau, T. M., & Atkinson, E. J. (1997). *An introduction to recursive partitioning using the RPART routines* (p. 452). Technical Report 61. Retrieved from <http://www.mayo.edu/hsr/techrpt/61.pdf>.
- Thornberry, T. P., Ireland, T. O., & Smith, C. A. (2001). The importance of timing: The varying impact of childhood and adolescent maltreatment on multiple problem outcomes. *Development and Psychopathology, 13*(04), 957–979.
doi:10.1017/S0954579415000905
- Topitzes, J., Mersky, J. P., & Reynolds, A. J. (2012). From child maltreatment to violent offending: An examination of mixed-gender and gender-specific models. *Journal of Interpersonal Violence, 27*(12), 2322–2347.
doi:10.1177/0886260511433510
- Vaughn, M. G., DeLisi, M., Gunter, T., Fu, Q., Beaver, K. M., Perron, B. E., & Howard, M. O. (2011). The severe 5%: A latent class analysis of the externalizing behavior spectrum in the United States. *Journal of Criminal Justice, 39*(1), 75–80.
doi:10.1016/j.jcrimjus.2010.12.001
- Wallinius, M. (2012). *Aggressive antisocial behavior-clinical, cognitive, and behavioral covariates of its persistence* (Doctoral dissertation). Lund University, Lund.
- Widom, C. S. (1989). The cycle of violence. *Science, 244*(4901), 160–166.
- Widom, C. S., DuMont, K., & Czaja, S. J. (2007). A prospective investigation of major depressive disorder and comorbidity in abused and neglected children grown up. *Archives of General Psychiatry, 64*(1), 49–56.
doi:10.1001/archpsyc.64.1.49
- Widom, C. S., Raphael, K. G., & DuMont, K. A. (2004). The case for prospective longitudinal studies in child maltreatment research: Commentary on Dube,

OFFENDERS IN EMERGING ADULTHOOD

Williamson, Thompson, Felitti, and Anda (2004). *Child Abuse & Neglect*, 28(7), 715–722. doi:10.1016/j.chiabu.2004.03.009

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Table 1

Psychosocial Background Characteristics of Violent Offenders in Emerging Adulthood

Characteristic	n	%	Age at onset <i>M (SD)</i>
Family background			
Born in Sweden	196	73	-
Both parents born in Sweden	110	41	-
Adopted	4	1.5	-
Lived with both parents	217	81	-
Parent partly absent during childhood	180	67	-
Placement outside of family	129	48	12 (5.4)
Foster home	70	26	-
Institution ^a	107	40	15 (2.5)
Family on welfare	92	35	-
Parents unemployed/sick leave ^b	124	49	-
Educational experiences			
Elementary & middle school ^c	203	75	-
High school ^c	54	20	-
Higher education ^c	1	0.4	-
Truancy	241	90	13 (2.4)
School absence (illness/family reasons)	49	18	-
Special support	202	75	-
Small group	165	63	-
Remedial teaching	155	59	-
Adapted teaching	107	41	-
Personal assistant	85	32	-
Bullied others	122	46	-
Was bullied	67	25	-

Note. ^aMost commonly due to severe behavioral disturbances. ^bOne or both parents.

^cCompleted at the expected age.

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Table 2

Childhood Adverse Experiences among Violent Offenders in Emerging Adulthood

Adversity	n	%	Age at onset ^a <i>M (SD)</i>
Parental adversities			
Drug use problems	50	19	2.8 (5.1)
Alcohol use problems	92	35	2.8 (4.8)
Severe illness	106	40	7.9 (6.3)
Deceased	27	10	15 (7.2)
Exposure to violence at home^b			
Interparental violence ^b	74	29	2.9 (4.0)
Other domestic violence ^b	43	17	8.5 (5.6)
Sexual violence against parent ^b	6	2.2	9.2 (9.6)
Violence against sibling ^b	30	11	7.9 (4.8)
Sexual violence against sibling ^b	3	1.1	9.8 (5.9)
Physical/psychological abuse of participant^b			
Parent perpetrator	102	39	7.3 (4.0)
Other perpetrator in family	67	25	8.9 (4.4)
Sexual abuse of participant^b			
	11	4.1	9.2 (3.7)

Note. ^aRefers to offender's age. ^bAny occasion.

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Table 3

Criminal History among Violent Offenders in Emerging Adulthood

Criminal history	Age at onset <i>M (SD)</i>	n (%)		
		No occasion	Single occasion	Multiple occasions
Violent offenses	17 (3.5)	0 (0.0%)	46 (17%)	224 (83%)
Sexual offenses	21 (2.4)	238 (89%)	26 (9.7%)	5 (1.9%)
Drug-related offenses	17 (2.7)	69 (26%)	27 (10%)	172 (64%)
Property offenses	13 (3.5)	35 (13%)	16 (5.9%)	219 (81%)
Traffic violations	17 (2.9)	96 (36%)	21 (7.8%)	152 (57%)
Fraud	18 (1.8)	200 (74%)	20 (7.4%)	49 (18%)

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Table 4
Early Predictors of LHA Total Scores

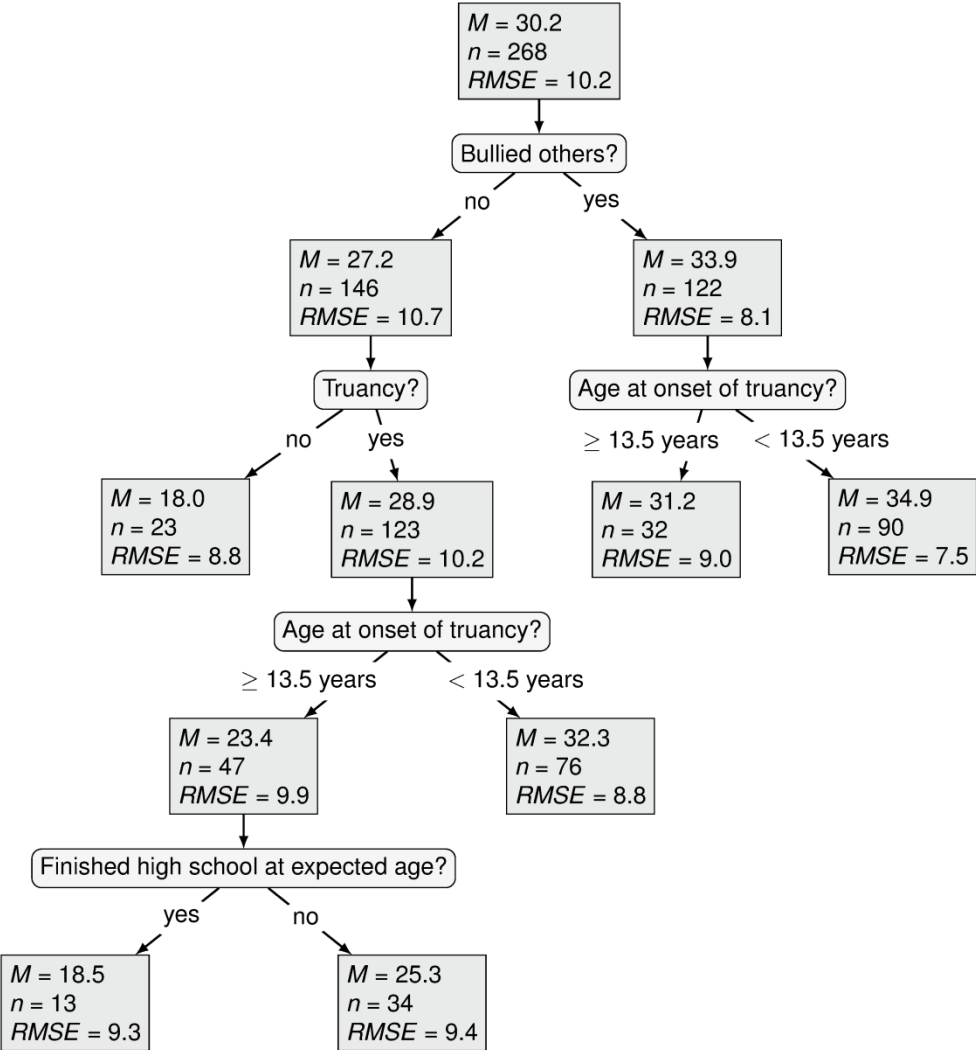
Predictor	Model Summary			Coefficient		
	<i>F</i>	<i>df</i>	Adj. <i>R</i> ²	<i>B</i> (Std. Er.)	95% BC _a CI	<i>t</i>
Born in Sweden ^a	6.0*	1, 266	.02	3.4 (1.5)	0.57, 6.5	2.3*
Both parents immigrants ^a	3.7	1, 262	.01	-2.5 (1.3)	-5.1, 0.06	-1.9
Finished elementary and middle school at expected age ^a	9.7**	1, 266	.03	-4.4 (1.4)	-7.0, -1.5	-3.2**
Finished high school at expected age ^a	22.4****	1, 265	.07	-7.1 (1.6)	-10.4, -4.2	-4.5****
Truancy ^a	31.5****	1, 264	.10	11.1 (2.1)	5.9, 14.8	5.1****
Age at onset of truancy ^b	30.1****	1, 236	.11	-1.3 (0.25)	-1.8, -0.84	-5.3****
Was bullied ^a	0.28	1, 264	0	0.7 (1.6)	-2.5, 3.7	0.48
Bullied others ^a	32.3****	1, 265	.11	6.68 (1.2)	-4.5, 9.3	5.6****
Repeated exposure to violence at home ^a	9.6**	1, 266	.03	3.8 (1.2)	1.5, 6.2	3.1**
Age at first exposure to violence at home ^b	1.7	1, 93	.01	-0.30 (0.26)	-0.81, 0.21	-1.2
Parental substance/alcohol abuse ^a	12.8****	1, 261	.04	4.4 (1.2)	2.0, 6.7	3.6****
Age at onset of parental substance/alcohol abuse ^b	0.1	1, 97	0	0.07 (0.2)	-0.31, 0.39	0.4
Lived with one caretaker only during some period ^a	5.7*	1, 264	.02	3.2 (1.4)	0.5, 5.7	2.3*
Sum of childhood adversities ^b	20.4****	1, 262	.07	1.9 (0.4)	0.95, 2.7	4.2****

Note. ^aCategorical predictor. ^bContinuous predictor. Only unstandardized coefficients are reported.

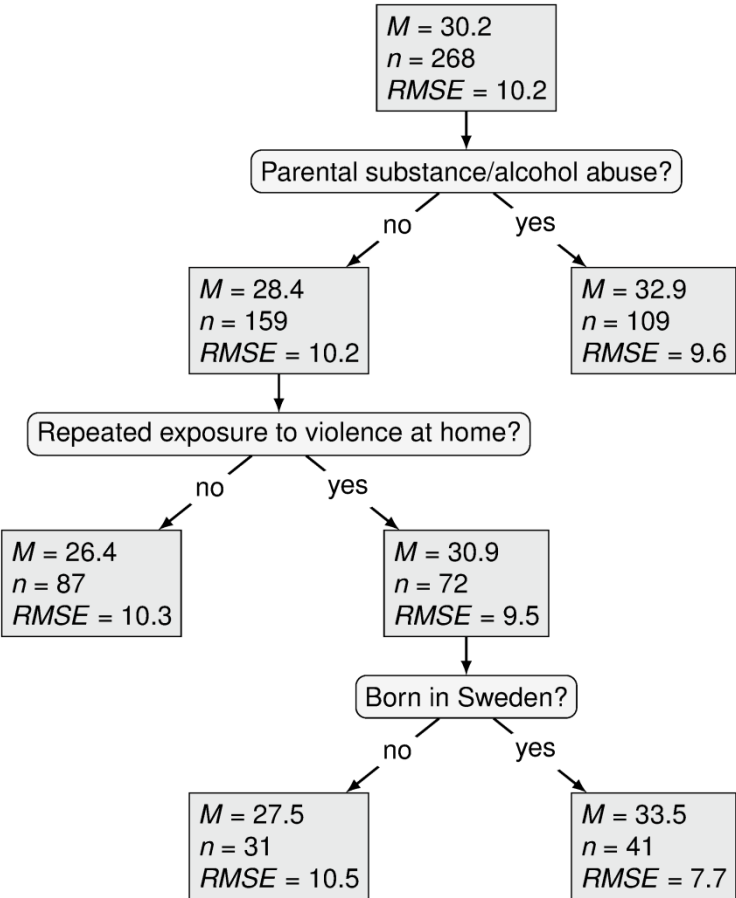
* $p < .05$, ** $p < .01$, *** $p < .001$

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A



B



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Figure 1. Regression trees for early predictors of aggressive antisocial behaviors.

Note. Panel A shows the regression tree using all predictors of interest. Panel B shows the regression tree using psychosocial background predictors only. Each node presents mean LHA Total score, number of subjects, and root mean squared error (RMSE) of that particular node.