

Regular Article

Individual differences in the development of youth externalizing problems predict a broad range of adult psychosocial outcomes

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Abstract

This study examined how youth aggressive and delinquent externalizing problem behaviors across childhood and adolescence are connected to consequential psychosocial life outcomes in adulthood. Using data from a longitudinal, high-risk sample ($N = 1069$) that assessed children and their parents regularly from early childhood (ages 3–5) through adulthood, multilevel growth factors of externalizing behaviors were used to predict adult outcomes (age 24–31), providing a sense of how externalizing problems across development were related to these outcomes via maternal, paternal, teacher, and child report. Findings indicated strong support for the lasting connections between youth externalizing problems with later educational attainment and legal difficulties, spanning informants and enduring beyond other meaningful contributors (i.e., child sex, cognitive ability, parental income and education, parental mental health and relationship quality). Some support was also found, although less consistently, linking externalizing problems and later alcohol use as well as romantic relationship quality. Delinquent/rule-breaking behaviors were often stronger predictors of later outcomes than aggressive behaviors. Taken together, these results indicate the importance of the role youth externalizing behaviors have in adult psychosocial functioning one to two decades later.

Keywords: externalizing problems; delinquency; aggression; longitudinal outcomes; psychosocial development; assessment

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Youth externalizing problem behaviors are generally conceptualized as a combination of aggressive behaviors (e.g., temper tantrums, bullying, fighting, yelling, disobedience, attacking others) and delinquent behaviors (e.g., rule-breaking, truancy, lying, stealing, substance use, vandalism; Achenbach, 1991). Such behaviors can develop beginning in early childhood and have been associated with a host of negative concurrent and future youth outcomes (e.g., Broidy et al., 2003; Keiley et al., 2003; Moffitt et al., 2002). Models of mean levels of externalizing symptomatology over development have highlighted the importance of early versus later emergence of problems, as well as their chronicity. Problems that emerge earlier in development tend to be more consequential than problems that emerge later (e.g., Cicchetti & Toth, 1995; Moffitt, 1993; Barker et al., 2010), perhaps because problems during early developmental periods in which key psychological processes are developing may be more damaging than those first appearing after those psychological skills are already in place. The particular type of externalizing behavior likely also plays a role in later outcomes (Burt et al., 2011). Person-environment transactions between youngsters' dispositions and reactive processes in their social environment are a key driver of continuity of externalizing problems over time, highlighting the importance of understanding the developmental

context of these processes (Caspi et al., 1989; Hinde, 1992; Sameroff, 1983).

Early externalizing problems presage outcomes across important domains later in life (e.g., Bardone et al., 1996; Bongers et al., 2008; Essau, 2003; Moffitt et al., 2002). However, few studies have extended past the transition to adulthood (i.e., past age 21). Many notable adulthood outcomes are better established after this period, when assessments of educational attainment, income, legal infractions, timing of transitions, and difficulties in serious romantic relationships may yield more stable estimates. Thus, the current investigation can inform with greater confidence the degree to which early externalizing behaviors predict distal outcomes of adult psychosocial functioning.

Externalizing behaviors and trajectories

Estimates of continuity in children's externalizing behaviors vary by rater and assessment method, but most studies have found rank-order stability between persons is preserved, even while there are mean level changes across development (e.g., Broidy et al., 2003; Fergusson, 1998; Olweus, 1979; Reitz et al., 2005; Lynam et al., 2007). Externalizing problems have often been characterized into two distinct yet correlated behavioral subtypes (Frick et al., 1993; Loeber & Schmalzing, 1985; McConaughy & Achenbach, 1994): aggressive behaviors (e.g., attacking others, threatening, temper tantrums, bullying) and non-aggressive delinquent/rule-breaking behaviors (e.g., truancy, vandalism, lying, substance

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use, stealing). These behavioral subtypes typically exhibit different developmental trajectories reflecting variations in timing of behaviors, and several different approaches have been taken in examining externalizing behaviors by age-of-onset and more or less fine-grained behavioral subtypes.

Overall, most studies suggest that children's externalizing problems decrease from early childhood to preadolescence and somewhat increase during adolescence (e.g., Keiley et al., 2000; Leve et al., 2005; Sampson & Laub, 2003). Extending past young adulthood, Petersen et al. (2015) found that externalizing problems decreased from age 5 to preadolescence, increased during adolescence, and decreased from late adolescence to adulthood (i.e., up to age 27). However, the particular trajectories of aggression and delinquent behaviors may be quite distinct, and it is possible that aggregating these externalizing problems may cloud associated conclusions rather than clarify them. Aggressiveness typically peaks in early childhood, with most preschool-age children engaging in some physical aggression, followed by a progressive decrease over time for most, although not all, youth (Stanger et al., 1997; Côté et al., 2007; Tremblay, 2010). This is consistent with prior work done with the current sample, where averaged maternal and paternal ratings revealed a linear decline in boys' aggression from preschool to early adolescence (Loukas et al., 2003). On the other hand, many delinquent behaviors (e.g., truancy, vandalism, substance use) are atypical during childhood and increase in adolescence (Barker et al., 2007; Bongers et al., 2004). For example, Stanger et al. (1997) found that parent-reported aggressive behaviors and delinquent behaviors both decreased from age 4 to 10, at which point trajectories diverged, with aggressive behaviors continuing to decline but delinquent behaviors increasing on average from age 10 until age 17. This suggests the importance of distinguishing between aggressive and delinquent trajectories, which may also each hold differing predictions into later functioning (e.g., Achenbach et al., 1995). On the other hand, these subtypes are correlated, and children who demonstrate higher levels of aggressive behaviors earlier in childhood may also exhibit higher levels of delinquent behaviors subsequently (e.g., Miller et al., 2009), in which case examining total externalizing behaviors would also be useful (i.e., the degree to which aggressive behaviors and delinquent behaviors cumulatively relate to later outcomes). In addition, studies vary widely in terms of the number of measurement occasions used, the developmental aspects of times assessed vs. not, and the resulting conclusions drawn regarding shape and change in externalizing problems; for example, Petersen et al. (2015) utilized 20 annual measurement occasions from ages 5–27, while Huesmann et al. (1984) used 3 measurement occasions from age 8–30 and Kokko et al. (2009) used 4 measurement occasions for ages 8–42.

Other approaches have focused on identifying more fine-grained behavioral subtypes. For example, Bongers et al. (2004) found that aggressive behaviors, oppositional behaviors, and property violations decreased on average from age 4–18, while status violations increased. Identification of data-driven groups (e.g., through growth mixture modeling; e.g., Odgers et al., 2008) often reflect the *timing* of externalizing problems and typically map on to groups identified by Moffitt (1993), with a persistent/consistently-high-externalizing group (“life course persistent”), a consistently low-externalizing group, an increasing group (sometimes termed “adolescent-limited”) group, and, occasionally, a decreasing group (sometimes termed “childhood-limited”; Lacourse et al., 2003; Moffitt et al., 1996). Bongers et al. (2004) identified between 3 and 6 group-based pathways for each type of externalizing

behavior. However, not all theorized or previously-identified group types “show up” in all data; for example, multiple studies, including Bongers et al. (2004), have not identified the “adolescent-limited” externalizing problem group (e.g., Brame et al., 2001; Fergusson & Horwood, 2002; Lacourse et al., 2002; Nagin & Tremblay, 1999). Modeling of subgroups may result in illusory subgroups, and it assumes that individuals within a particular subgroup are meaningfully and qualitatively different from individuals in other subgroups (Bauer & Curran, 2003; Bauer & Reyes, 2010).

Assessments of externalizing behaviors often rely on reports from youths' parents, teachers, and self-report. These differences in informant perspectives likely provide at least somewhat disparate information based on the context in which they experience the youth, the observability of the behaviors, the extent to which they consider that behavior to be notable or problematic, their own sense of norms, and their own mental health history (e.g., De Los Reyes et al., 2015; De Los Reyes & Kazdin, 2005). Indeed, meta-analytic comparisons of between-informant correlations for youth externalizing behaviors have yielded a mean correlation of $r = .30$ for youth externalizing problems (De Los Reyes et al., 2015), suggesting significant non-overlapping information. In a review of studies using a variety of designs, De Los Reyes (2011) noted that informant discrepancies often exhibit stability over time, can predict outcomes in a way that individual informants' reports do not, and reveal important information about the role of context. Thus, consideration of the context in which externalizing problems arise as well as by whom they are noticed and subsequently reported is essential to understanding how individual differences in these problem behaviors across child and adolescent development unfold. Such understanding should also shed light on differences in the prediction of distal outcomes. Furthermore, informants' reports may also suggest different developmental trajectories of externalizing behaviors; for example, Tremblay et al. (1995) found that boys self-reported a decline in delinquent behaviors from age 10–12 followed by an increase from age 12–15, while teacher-reports suggested a decline in disruptive behaviors from age 10–15.

Examining informant types separately yields important advantages: While parent reports are most commonly obtained and parents often have a comprehensive understanding of children's behaviors, few studies have compared connections between both maternal and paternal reports to later functioning, which may inform future research efforts. Teachers have experience with a much larger number of children than parents, which provides a valuable set of norms to guide their perceptions, and they may be unique in their contextual appraisals (e.g., negative youth behaviors in a classroom setting as opposed to the home setting may carry a stronger connection to later educational attainment). Adolescents consistently report significantly more problems than their parents or teachers (Rescorla et al., 2013), and adolescents' privileged access to their own internal experiences may be quite important in understanding subsequent outcomes and functioning. By utilizing information from several informant types, researchers can have greater confidence the robustness of particular findings (e.g., if multiple informant perspectives each predict the same outcome) as well as insight into the role of context (e.g., if teacher perspectives are particularly predictive, this might suggest that teachers' increased knowledge of age-appropriate norms may be relevant, or that externalizing behaviors observed outside of the home environment may have a particularly strong signal to later out-of-home psychosocial functioning).

Mindful of the strengths and weaknesses of these varying prior approaches, in our study we chose to model externalizing behavior

trajectories as growth curves in order to explore inter- and intra-individual differences and change, with separate models for aggressive behaviors, delinquent behaviors, and a combined externalizing trajectory, with analyses separated by informant type (i.e., mothers, fathers, teachers, and children's self-reports). We modeled these behaviors by annual age with the goal that modeling trajectories with frequent measurement occasions provides a thorough picture of developmental continuity and change. Furthermore, by modeling informants separately, we aimed to speak to any unique trajectories and informant-specific contextual patterns of relations to later outcomes, as well as more closely map on to prior literature, which has typically relied on 1–2 informant types.

Development of externalizing behaviors

Multiple pathways have been identified that increase the risk of developing externalizing behaviors, such as (but not limited to) genetic predispositions, temperament, socioeconomic status, family factors, peer factors, pregnancy complications, language skills, cognitive skills, and child care quality (Dodge et al., 2006; Petersen et al., 2015). Farrington et al. (2001) reviewed six pathways that may contribute to intergenerational continuity in externalizing behavior development (e.g., Thornberry et al., 2003; Van Meurs et al., 2009; Farrington, 1998; Hagan & Palloni, 1990; Dumas et al., 1994). These included assortive mating of parents (i.e., tendency to select partners who are similar to us, in this case similar in high-externalizing profiles); influence of genetic mechanisms; direct familial influence (e.g., an older sibling's influence); impact of parent-to-child environmental mechanisms such as inconsistent or poor discipline or supervision; police/community bias and labeling against families known for antisocial behaviors; and intergenerational similarities in multiple risk factor exposure (e.g., poverty, neighborhood deprivation).

Significant parent mental health history (e.g., antisocial personality disorder, alcohol use disorder, depression) and poor marital functioning also have associations with youth externalizing problems (e.g., Brennan et al., 2003; Elgar et al., 2003; Kim-Cohen et al., 2005; Loeber et al., 1998; Fergusson & Horwood, 1998; Waldron et al., 2009). Parent characteristics may also influence their appraisal and report of children's externalizing problems (e.g., the depression-distortion hypothesis; Ohrt et al., 1999; Richters & Pellegrini, 1989; Richters, 1992; Chi & Hinshaw, 2002; Kroes et al., 2003). Child characteristics also play a role in externalizing problems; impulsivity appears related to increased delinquent behaviors, while emotional dysregulation and lower cognitive ability appear related to increased physical aggression (Barker et al., 2007; Burt & Donnellan, 2008; Pardini et al., 2003). Furthermore, with the current sample, prior work has highlighted the role of neighborhood communities, finding that the neighborhood residential instability in youths' childhood contributed to several externalizing disorders in late adolescence, including antisocial personality disorder and substance use disorders (Buu et al., 2009).

The continuity of externalizing problems, in combination with the cumulative or cascading impact of youth externalizing problems (e.g., embeddedness in delinquent peer networks, decreased opportunities for growth in social and financial capital, school failure precluding subsequent academic advancement), may have longer-lasting associations with psychosocial outcomes in youths' late 20s to early 30s. Family- and child-centered factors (e.g., family socioeconomic status, child internalizing problems, child sex, child cognitive ability) undoubtedly also play a role in these outcomes. For example, one study found the effect of maternal depression on

aggressive behavior in early adulthood was fully mediated by youth depression in mid-adolescence (Keenan-Miller et al., 2010). Higher parental income predicts fewer later legal infractions and arrests (e.g., Hsieh & Pugh, 1993; Kingston & Webster, 2015), and males are more likely to experience arrest, commit legal infractions, and have higher alcohol use as well as alcohol-related problems than females (e.g., Heimer et al., 2009; Nolen-Hoeksema, 2004; Steffensmeier et al., 2005). In the current study, the estimated growth factors of aggressive, delinquent, and combined externalizing behaviors were first examined for their connections to later outcomes through zero-order correlations. Then, to better understand the impact of key childhood characteristics on these connections, general and informant-specific covariates were included. Specifically, child internalizing behaviors, child sex, child cognitive ability, and maternal and paternal income and education level were included in all informant prediction models. Maternal and paternal report models additionally contained informant-specific reports of marital quality as well as mental health history of antisocial personality disorder, alcohol use disorder, and major depressive disorder. These covariates were selected based on their previously established connections to youth externalizing behaviors as well as their theorized or previously identified impacts on later outcomes. Additionally, focusing these explorations on a high-risk sample maximizes the diversity and breadth of psychosocial outcomes in late 20s/early 30s, which allows for better understanding of the connections between earlier externalizing problems and later outcomes. Prior literature on the outcomes of interest are reviewed below.

Transition timing

Many normative transitions occur in the decades following the teenage years, such as moving out of their caregivers' home, establishing romantic relationships including cohabitation and marriage, and becoming a parent. The timing of these transitions can be a reflection of overall adjustment in line with societal expectations, and may signal "faster" or "slower" life course trajectories (e.g., Chisholm et al., 2005; Griskevicius et al., 2013). The current study explores the ages of three transitions: first cohabitation with a long-term romantic partner, marital age, and birth of first child.

In 2011, the average age of first marriage in the U.S. was 26.5 for women and 29 for men, and the average age of cohabitation was 22 (Child Trends, 2006; U.S. Census Bureau, 2011). While approximately 21% of women experience their first birth by age 20, nearly 10% do so after age 35, indicating wide variation in timing (Mathews & Hamilton, 2009). Earlier marriage and earlier age at first child have been linked to poorer economic and physical functioning, including lower educational attainment and income, higher rates of lifetime poverty, and poorer health (Amato et al., 2008; Carroll et al., 2007; Coyne & D'Onofrio, 2012; Gaughan, 2002; Raley et al., 2007; Uecker & Stokes, 2008). For women, greater educational attainment has been related to slower timing of marriage and first birth, lower likelihood of divorce, and greater marital satisfaction (Isen & Stevenson, 2010), indicating some overlap in domains of later functioning.

Substantial prior literature has connected childhood externalizing problems to adolescent risky sexual behavior, earlier onset of sexual intercourse, and/or adolescent pregnancy (Achenbach et al., 1998; Capaldi et al., 1996; Fergusson & Woodward, 2000; Timmermans et al., 2008; Woodward & Fergusson, 1999). When comparing boys with many versus few externalizing problems in

early adolescence to outcomes at age 19–21, almost twice as many boys with high externalizing problems had been involved in a pregnancy (39% vs. 23%) and had fathered a child (23% vs. 9%; Capaldi & Stoolmiller, 1999). Similarly, girls with elevated externalizing problems at age 15 were 4.5 times more likely to have given birth by age 21 than girls without conduct problems at age 15, and 5 times more likely to have cohabitated with a partner by age 21 (Bardone et al., 1996).

Age of first drink, one aspect of delinquent behaviors, has been strongly predictive of earlier sexual intercourse (Doran & Waldron, 2017), which may signal subsequent earlier timing of transitions. There is also some indication that problematic alcohol use in adolescence predicts a fourfold increase in earlier childbearing (i.e., through age 16) as well as *delayed* childbearing (i.e., a 23% reduced likelihood of childbearing from age 25 onward), with earlier childbearing potentially attributable to other correlated risk factors (Waldron et al., 2020). Problematic parent substance use has also been linked to earlier sexual behaviors (Chandy et al., 1994; Malo & Tremblay, 1997; Mylant et al., 2002).

Intimate partner relationship quality

Several longitudinal studies have identified connections between earlier externalizing problems and later difficulties in intimate partner relationships, which may be variously due to acquisition of dysfunctional interpersonal skills based on parental modeling and parent mental health concerns (e.g., Hammen & Brennan, 2001); traits such as impulsivity linked to both externalizing problems and dysfunctional intimate relationship functioning (e.g., Buitelaar et al., 2020; Swogger et al., 2012); and assortative mating/self-selection that may begin in the adolescent years, where romantic partners may mutually reinforce each other's behaviors, supporting the continuity and exacerbation of externalizing problems (Rhule-Louie & McMahan, 2007).

The majority of investigations connecting earlier externalizing problems to later close relationship functioning have focused on identifying predictors of intimate partner violence (IPV) and abuse. For example, Huesman and colleagues (1984) found some indications that high aggressiveness for boys, although not girls, at age 8 was linked to committing spousal abuse at age 30; similarly, Bardone et al. (1996) found that girls with conduct problems at age 15 were more likely to have experienced IPV victimization at age 20 than girls without conduct problems at age 15. Problematic adolescent alcohol and drug use (a subset of delinquent behavior) has been linked to IPV (Chen & White, 2004; Fergusson et al., 2008; Theobald & Farrington, 2012).

Some evidence suggests that women with significant childhood externalizing problems may have more impairment in later close relationships than men, possibly due to higher levels of relational aggression in women (for a review, see Crick & Zahn-Waxler, 2003). For example, Bongers et al. (2008) found that females with higher levels of externalizing behaviors (age 4–18) had a greater risk for difficulties in close relationships in early adulthood (age 18–30) than men, particularly for females who exhibited high and persistent oppositional behaviors or increased in status violations across adolescence. In the Dunedin study (Odgers et al., 2008), almost half of women identified as falling in the early-onset/persistent externalizing behavior class from age 7 to 15 had engaged in physical violence towards their partner at age 32, compared with almost a quarter of men in the parallel class. Controlling partner abuse, on the other hand, occurred at relatively similar rates for men and women and were related to youth

externalizing behaviors, with 20.7% of women and 23.3% of men belonging to the persistent class committing two or more controlling abuse acts against their partners. Between 2.9% and 11.5% of men and women in the remainder of classes committed controlling partner abuse, indicating lower, but nonzero, levels of abuse for these adults who did not have persistent externalizing problems across childhood and adolescence.

The finding that children who exhibit the most persistent externalizing problems also experience the greatest impairment in later social relationships was also found in the Christchurch Health and Development Study (Woodward et al., 2002), where childhood onset and persistent externalizing problems from age 8–21 predicted the highest likelihood of conflict, ambivalence, and violence with an intimate partner at age 21, even above family socioeconomic status, parent-child relationship, interparental conflict, and children's cognitive ability. Young adults falling into less severe externalizing trajectories also exhibited more problems in such relationships than those who exhibited consistently low levels of externalizing behaviors across childhood and adolescence, suggesting that less severe/mild levels of externalizing behaviors also convey risk for later interpersonal difficulties.

Educational attainment

Several studies have identified connections between externalizing problems in the adolescent period and decreased educational outcomes in young adulthood, including decreased likelihood of receiving a high school degree, enrolling in college, and college degree completion, particularly for males (Achenbach et al., 1998; Capaldi & Stoolmiller, 1999; King et al., 2006). Specifically, Capaldi & Stoolmiller (1999) found that boys without externalizing problems were about twice as likely to have graduated from high school (i.e., 63%, compared to 29% of boys with high externalizing problems) by age 18–20 and 5 times more likely to have entered higher education in the year following high school (i.e., 35%, compared to 7% of boys with high externalizing problems).

Fewer studies identifying connections between externalizing difficulties and academic attainment have examined externalizing problems earlier in childhood or educational attainment after the young adulthood period. A notable exception, Bongers et al. (2008), found that parent-reported trajectories of both oppositional behaviors and status violations from age 4–18, but not aggressive behaviors or property violations, predicted age 32 self-reported low educational attainment and increased likelihood of being expelled from school, with status violations (i.e., a subgroup of delinquent behaviors) providing the stronger prediction. Similarly, McLeod and Kaiser (2004) also found that parent-reported externalizing problems at age 6–8 significantly lowered the probability of having received a high school degree by age 20–22; for youth who received a high school degree, externalizing problems also subsequently lowered the likelihood of enrolling in college by age 20–22.

Contextual factors (e.g., low family of origin income) and familial norms/expectations impact both the availability of and perception of education, from completing paperwork for education, providing advice regarding educational choices, to real or perceived affordability of options. Furthermore, person-environment processes that result in expansion or winnowing of environmental options are at work with education, as a youth who does not graduate from high school has limited further educational options.

Income

Educational attainment is often a gateway to later occupational status and income (Day & Newburger, 2002), but few studies have explicitly examined the connection between youth externalizing behaviors and later income. Bongers et al. (2008) found that high-level trajectories of both oppositional behaviors and status violations from age 4–18 predicted lower age 32 job attainment and increased expulsion from work. In a similar study that focused on the delinquent and aggressive problems of adolescent boys, boys with high levels of externalizing problems in early adolescence were twice as likely to have been fired from employment by age 18–20 as boys with low levels of externalizing problems (i.e., 18% compared to 9%, respectively; Capaldi & Stoolmiller, 1999). In the Dunedin study (Odgers et al., 2008), men and women at age 32 who had the most persistent externalizing problems across childhood and adolescence had the highest levels of income below the median (i.e., 85% of women and 71% of men, compared to 42% of women and 38% of men who had persistently low levels of earlier externalizing problems).

Alcohol use

Use of alcohol and other substances tends to emerge as a delinquent aspect of externalizing problems throughout adolescence. Significant substance use in adolescence is reasonably prevalent (e.g., 19.7% of girls aged 15–16 and 16.6% of boys reported having been drunk at least 10 times in the past year; Miettunen et al., 2014), and given the overall continuity of externalizing behaviors in childhood to externalizing behaviors in adolescence, it is not unsurprising that childhood externalizing concerns predate adolescent substance use (e.g., Chassin et al., 2002; Fergusson et al., 2005; Hawkins et al., 1992; Lynskey & Fergusson, 1995; Miettunen et al., 2014). This has also been found within the current sample, in a study that extended to ages 15–17 (Jester et al., 2008), with the finding that aggressive, inattentive/hyperactive, and combined latent classes had significantly earlier age of onset of drinking and drunkenness than the latent healthy class. In addition, early externalizing behaviors predicted early adult (age 18–23) diagnosis of alcohol use disorder (Zucker et al., 2007), and adolescent antisocial symptoms were linked to the most severe alcohol use trajectories for both men and women (Jester et al., 2016).

There is comparatively less evidence regarding connections between youth externalizing behaviors and later alcohol use problems past this early adulthood period. Notable exceptions include Bongers et al. (2008), who found that earlier elevations in status violations across childhood and adolescence were related to age 32 alcohol use, as well as Petersen et al. (2015), who found that childhood externalizing problems was moderately predictive of age 27 drunk driving.

The current study sought to extend and build on these studies through the significant family history of alcohol use disorder of participants as well as two unique but related measures of alcohol use, including the number of drinks consumed within 24 hrs and alcohol-use problems.

Legal infractions and arrest

A large literature has highlighted the effect of earlier externalizing problems on later legal difficulties (e.g., Darney et al., 2013; Hämäläinen & Pulkkinen, 1996; Petersen et al., 2015). Disruptive behaviors and substance use in adolescence are particularly strong predictors of trouble with law enforcement in

emerging adulthood (Bardone et al., 1996; Grella et al., 2005; Miettunen et al., 2014; Vander Stoep et al., 2002). In his discussion of the key results from the first several decades of the Cambridge Study in Delinquent Development, which focused on English boys from childhood (approximately age 8) to age 31, Farrington (2003) identified that the key predictors of later offending fell into 6 categories. These included childhood externalizing problems; symptoms related to ADHD; low intellectual functioning and low school achievement; family criminality and antisocial behaviors; family poverty; and parenting difficulties such as parental conflict.

Significant efforts have taken place to identify, predict, and measure who persists in committing illegal behaviors and who desists (e.g., Bushway et al., 2003; Sampson & Laub, 2003). These efforts have largely focused on men; for example, Sampson & Laub (2003), who followed boys from ages 7 to 70, found that legal infractions desist eventually for all people with age, across all offender classes, but that prognoses determined in childhood do not account well for the diversity of long-term offending trajectories, despite substantial continuity in offending. Farrington (2003) identified that 73% of boys convicted between ages 10–16 were re-convicted between ages 17–24 and 45% between ages 25–32; for boys without convictions between ages 10–16, 16% were convicted between age 17–24 and 8% between ages 25–32. There is also evidence of continuity between earlier, pre-adolescent externalizing problems and later legal infractions; Huesmann et al. (1984) found that 8-year-old boys (but not girls) with higher levels of aggression were not only more likely to engage in criminal offenses by age 30, but were also more likely to have traffic violations. Peer nominations of aggression at age 8 also significantly predicted both being convicted of a crime by age 30 and the seriousness of that crime (Huesmann et al., 2002).

Comparatively less work has been done with girls and women, perhaps due to the overall lower likelihood for women to experience arrest (e.g., Petersen et al., 2015). However, there is some evidence that although externalizing problems occur at lower levels of severity for girls than for boys, that when externalizing problems *do* occur at higher levels for girls, they tend to be more severely affected with worse co-occurring difficulties than boys. Females with significant externalizing problems tend to have a higher confluence of risk factors, such as parent-reported psychopathology, family-based risk factors, and adverse childhood experiences (e.g., McCabe et al., 2002; Loeber & Keenan, 1994; Robins, 1986). In the Dunedin sample, Odgers et al. (2008) found that girls with high (versus low) levels of disruptive behaviors reported more acts of violence by age 32, and women with early-onset and persistent externalizing problems were more likely than men on the parallel trajectory to report engaging in physical violence. In a study spanning 24 years, Reef et al. (2011) found that girls age 4–16 with conduct/destructive problems, but not oppositional/non-destructive, externalizing problems were five times more likely to engage in adulthood (age 28–40) violent acts compared to girls without childhood conduct problems; however, there was no similar association found for boys.

The benefits and drawbacks of the appropriateness of using self-report methods when assessing legal infractions has been debated, but most work supports its use. Farrington (2003) found that using either court-recorded convictions or self-reports resulted in similar conclusions, and other work has found that the most significant offenders are captured similarly by official records and self-reports (Huizinga & Elliott, 1986; Farrington & West, 1993; Thornberry et al., 2003). However, Shaw et al. (2012) found that 60% of boys falling into the high-decreasing trajectory of externalizing

problems actually had court involvement, despite having low levels of self-reported delinquent behavior endorsement at age 15 and 17. Therefore, in efforts to capture the full range of externalizing and delinquent behavior earlier in life (i.e., not only those with court involvement), reliance on informant reports may be more successful in identifying low-level delinquency. By utilizing multiple informant reports across childhood and adolescence, it is possible to capitalize on parental and school-based knowledge of youth behaviors as well as youth self-report. In addition to capitalizing on multiple informant data for externalizing problems across childhood and adolescence, the current study aims to extend prior findings through targeting not only experience of arrest but also self-reported legal infractions to provide a dimensional understanding of legal infractions, ranging from traffic violations to resisting arrest.

Method

Participants and procedure

This study is part of the multi-wave Michigan Longitudinal Study (Zucker et al., 1996; Zucker et al., 2000). In the initial enrollment process, all men in a 4-county area who had drunk-driving convictions, at least one son age 3–5, and were living with the boy and his biological mother, were recruited. Thereafter, all other children in the family within ± 8 years of the original male child were also recruited. The men were required to have a blood alcohol concentration (BAC) of at least .15% if the conviction was their first drinking-related infraction or .12% if any prior drinking-related legal infractions had occurred. The effectiveness of this behavioral criterion was confirmed by the fact that all men with these characteristics also met a Feighner criterion (Feighner et al., 1972) diagnosis for probable or definite alcoholism even though this was not a criterion for their selection. Following recruitment, participants were re-diagnosed using DSM-IV alcohol-use disorder (AUD) criteria. Mother's AUD diagnosis was free to vary. A fetal alcohol syndrome diagnosis in any child was exclusionary for her/his participation. Recruitment took place over three successive cohorts. General recruitment criteria were identical across cohorts with two additional stipulations for the third cohort: Recruitment for this cohort was specifically targeted at a geographic area with a higher density of families of color given that prior cohorts included predominantly White participants. Because it was the last cohort, in order to approximately equalize child ages across cohorts, this subsample began with the male target child at age 6–8.

As a control/contrast lower-risk sample, families with age-matched children living in the same neighborhoods were also recruited. Beginning at age 18, youths' romantic partners were invited to participate if they had been cohabitating with the study participant for at least 9 months. Approximately 90–95% of participants were from a four-county area in Michigan, including Ingham County, Clinton County, Eaton County, and Shiawassee County, with the remainder of participants from Jackson, Detroit, and Flint, MI. Based on census tract data and as reported elsewhere (Buu et al., 2009), neighborhoods on average had 7 (SD = 4)% adult residents who were unemployed, 10 (SD = 8)% residents who were in poverty, 18 (SD = 8)% residents who did not have a high school diploma, 46 (SD = 10)% residents who lived in different residence 5 years ago, 4 (SD = 2)% households that were vacant, and 29 (SD = 16)% housing units that were rented. For additional details on study characteristics and sample, see Zucker et al. (2000).

In-person data collection occurred at three year intervals, supplemented by annual child and teacher report assessments beginning at age 11. Trained project staff was blind to diagnostic and recruitment status, and conducted primarily in-home assessments every three years. In total, 1,069 children (70% boys; approximately 89% White, 8% Black, 0.3% Native American, and 4% Biracial; 6% identified as Hispanic/Latino) from 482 families were included in analyses. A total of 978 parents or stepparents (479 mothers, 499 fathers) reported on their children at least once (greater than the number of families due to stepparents). Of biological parents reporting at least once on their children, 479 mothers and 475 fathers participated. All parent-focused variables reflect biological parents, given the initial recruitment demands. Children began reporting on their own problem behaviors at age 11; between age 11 and 17, 993 children reported on their own problem behaviors at least once. For distal outcomes, assessed at ages 24–32, 565 participants completed at least one measure.

Measures: predictor variables

Children's externalizing behaviors

Maternal and paternal ratings of children's externalizing problems were measured with the 113 item Child Behavior Checklist (CBCL; Achenbach, 1991). The CBCL is designed to identify problem behaviors, and for the current study, the aggression scale, rule-breaking/delinquency scale, and total externalizing problem behavior composite were used. Mothers and fathers completed the CBCL at approximately 5 assessment waves between youth ages 3–17. Teachers completed the Teacher-Report Form of the CBCL (TRF; Achenbach, 1991) from youth at two assessment waves between ages 6–11, and then approximately yearly beginning at age 11. Finally, children began completing the parallel Youth Self-Report (YSR; Achenbach, 1991) at age 11 approximately yearly. Reliability as determined by omega coefficients (Rodriguez et al., 2016) was good: The average reliability across time points for delinquent behaviors was $\omega = .93$ for maternal report, $\omega = .92$ for paternal report, $\omega = .91$ for teacher report, and $\omega = .85$ for youth self-report. For aggressive behaviors, the average reliability across time points was $\omega = .94$ for maternal report, $\omega = .95$ for paternal report, $\omega = .99$ for teacher report, and $\omega = .92$ for youth self-report. Finally, for total externalizing problems, the average $\omega = .96$ for mothers, $\omega = .97$ for fathers, $\omega = .99$ for teachers, and $\omega = .95$ for youth self-report.

Measures: control variables

Children's internalizing behaviors

Maternal, paternal, teacher, and child report of internalizing problems on the CBCL, TRF, and YSR, respectively, were obtained during the same assessment points as described for externalizing problems (Achenbach, 1991). Omega estimates of reliability were similarly good: maternal average ω across time points = .94; paternal $\omega = .94$; teacher $\omega = .97$; youth $\omega = .95$.

Children's cognitive ability

Children were administered a measure of cognitive functioning in middle childhood (age 6–8) and early adolescence (age 12–14). For children in Cohort 1, the Wechsler Intelligence Scale for Children – Revised (WISC-R; Wechsler, 1974) was administered; for children in Cohorts 2 and 3, the measure was no longer available so the comparable replacement measure, the Wechsler Intelligence Scale for Children – 3rd Edition (WISC-III; Wechsler, 1991) was administered. An abbreviated measure was administered to

all participants in early adolescence that included Information, Block Design, Vocabulary, and Symbol Search subtests. Each measure provided a normed full-scale IQ (FSIQ), which was used, with a higher FSIQ score indicating greater cognitive ability. When data from both waves was available, an average FSIQ was used as this was considered the most reliable estimate.

Parental education level and income

Biological maternal and paternal number of years of education as well as household income was obtained from the earliest available wave of a parent-demographics questionnaire. Parent income was categorized as the following: 1 = under \$4,000; 2 = \$4,001–7,000; 3 = \$7,001–10,000; 4 = \$10,001–13,000; 5 = \$13,001–16,000; 6 = \$16,001–20,000; 7 = \$20,001–30,000; 8 = \$30,001–50,000; 9 = \$50,001–75,000; 10 = \$75,001–100,000; 11 = over \$100,000.

Parental mental health history

At each in-person assessment, assessors administered the Diagnostic Interview Schedule, Version III (DIS-III; Robins et al., 1981) to both biological mothers and fathers. Parents were characterized as meeting or not meeting criteria for an active disorder within the past year (i.e., 0 = no or 1 = yes). Disorders of interest included Alcohol Use Disorder, Antisocial Personality Disorder, and Major Depressive Disorder. If the parent ever met full criteria at any of the assessment waves occurring from youth's early childhood up to youth age 18, the disorder was characterized as present.

Parental marital quality

Biological mothers and fathers completed the Dyadic Adjustment Scale (DAS; Spanier, 1976), which is a 32-item measure of relationship quality. Cohort 1 completed the DAS at in youths' late adolescence, while Cohorts 2 and 3 completed the DAS at across youths' childhood and adolescence. The total score was used and then averaged across time points, with a higher score indicated better marital quality; reliability was good, $\omega = .84$.

Measures: outcome variables

To determine outcome variables, information provided from young adult self-reports from several later waves of data collection that spanned ages 24–32. This in many instances provided multiple scores on the same measure over time. However, our goal was to provide an overarching estimate of early adulthood functioning, with one value for each distal outcome. While for some measures the variable value would not change (e.g., age at birth of first child), others would (e.g., legal infractions in the prior 3 years). The specific approach used to assess each of these variables has been detailed below.

Timing of normative transitions

Age at cohabitation, marital age, and age at birth of first child were assessed through a demographic questionnaire.

Intimate partner relationship quality

Partners living with the target adult offspring for at least 9 months were recruited to participate in the study and completed the Dyadic Adjustment Scale (DAS; Spanier, 1976). As for parent data, the total summed DAS score was used as an overall measure of agreement, satisfaction, cohesion, and emotional connectedness, with a higher DAS score indicating better relationship quality. The lowest total sum provided by an offspring's partner at any time point was utilized to provide a maximized estimate of risk.

Educational attainment

Educational attainment was defined through total number of years of education as well as by degree obtainment ($r = .84$ between these two measures). For both, the highest value was utilized. Degree attainment was treated as a continuous variable (0 = high school diploma/GED or no degree; 1 = vocational/technical degree; 2 = bachelor's degree; 3 = master's degree; 4 = PhD, MD, or equivalent). Paired-sample t-tests were conducted to determine if increased educational attainment varied between participants whose protocols ended at earlier vs. later assessment waves at time of study ending. For degree obtainment, no differences were observed between the earliest time point (i.e., age 24–26) and later assessments. However, for number of years of education, participants who provided data at both age 24–26 and age 27–29 had slightly more average years of education at age 27–29 ($M = 14.14$, $SD = 2.26$ at age 24–26; $M = 14.40$, $SD = 2.54$ at age 27–29), $t(307) = -3.67$, $p < .001$. Similarly, participants who had age 24–26 and age 30–32 data reported slightly more average education years at age 30–32; participants with age 27–29 and age 30–32 data did not differ significantly.

Individual and family income

Income was operationalized as individual income as well as the combined income of the individual and their partner. A series of income categories were provided (ranging from *under \$4,000* to *over \$100,000*, parallel to above), and respondents indicated substantial spread in their income level that was relatively normally distributed. For both measures, the highest value (i.e., highest income) was utilized. Both income values (individual and family) were utilized due to the possibility that homemaker occupation income (individual income under \$4,000) would substantially underestimate family well-being, despite an elevated socioeconomic position (e.g., family income over \$100,000). However, while family income may be a more comprehensive assessment of socioeconomic standing than individual income, notably fewer participants provided information about family income relative to individual income; therefore, both variables were retained. As with education, due to the ordered nature and number of categories, these variables were treated continuously. Paired sample t-tests that were conducted to determine if participants had higher incomes as they aged were nonsignificant for both individual and family incomes.

Legal infractions

Two measures of legal infractions were obtained. First, a demographic questionnaire asked one yes/no question regarding experiencing arrest in the past three years. Respondents were divided based on consistently denied prior arrest in the last three years versus one affirmative response indicating prior arrest (i.e., across any time point, 0 = no arrest, 1 = arrest). Secondly, crime and legal infractions were assessed through a subset of items from the Antisocial Behavior Checklist (ASB; Zucker & Noll, 1980). This questionnaire asked each respondent to rate whether they had *never*, *rarely (once or twice)*, *sometimes (three to nine times)*, or *often (more than ten times)* done each behavior in the prior three years. Specific questions assessing direct interaction with law enforcement were used, with each response added together (0 = never, 1 = rarely, 2 = sometimes, 3 = often). Items included *Received a speeding ticket*, *Been arrested for a felony*, *Resisted arrest*, *Been arrested for any other non-traffic police offenses (except fighting or a felony)*, and *Been convicted of any non-traffic police offense*. Thus, each participant's score could range from zero (endorsed no

items) to 15 (endorsed all items as *often*). This highest ASB value from any time point was used to maximize risk, with good reliability ($\omega = .88$); paired sample t-tests indicated no significant differences across time.

Problem alcohol use

Maximum amount of alcohol use in one day, as well as a measure of specific alcohol problems were utilized as two measures of problem alcohol involvement ($r = .61$ between these measures). Alcohol use was assessed with a single item from the Drinking and Drug History Form that asked respondents to report the maximum number of drinks they had ingested within a 24-hr period within the last three years (Zucker et al., 1990). Participants who reported 30 or more drinks within a 24-hr period were considered to have ingested 30 (i.e., range = 0–30). Alcohol problems were assessed from a scale in the Drinking and Drug History Form that listed 31 potential problems as a result of alcohol use in the prior three years (e.g., *Restricted my drinking to certain times of day or week in order to control it or cut down, Been arrested for a drinking related offense*). Number of problems endorsed as occurring were added together to create a continuous variable ($\omega = .98$), with the highest value from any time point used to maximize risk; 71% of respondents endorsed at least one alcohol-use problem.

Data analytic strategy

A series of unconditional, three-level, multilevel growth curve models were fit to characterize the growth trends in externalizing across time and informant type. Externalizing scores at a given age (Level 1) were nested within participants (Level 2), in-turn nested within families (Level 3). Age was centered at age 11, as this was the earliest age at which all informants provided externalizing ratings; random intercepts thus specifically capture variability in scores at age 11. Linear and quadratic growth trends were both considered based on a preliminary examination of the mean trajectories across time. In the linear growth models age (in years) was entered as a predictor at Level 1, and in the quadratic growth model age² was entered along with age as a predictor at Level 1. No other covariates were included in these models. Intercepts, linear slopes, and when applicable quadratic slopes, were freed to vary across youth and family. All possible covariances between the random effects at levels 2 and 3 were estimated. Quadratic slope terms were retained if their inclusion notably improved fit over growth models with only a linear slope term. This was determined by considering the change in log-likelihood across models, and differences in the AIC, BIC, and SBIC; if more than two fit indices appeared to favor the quadratic term, it was retained.

Once adequate growth models were identified, random intercept and slope scores were generated for the subsequent analyses. Scores were generated from unconditional two-level, multilevel growth models (externalizing scores at a given age nested within participant), that is, the growth models identified in the previous stage, but without the third level. These scores thus effectively provide an aggregation of the variance in growth trends across levels 2 and 3. This was done to concisely yet holistically capture all of the variance in the growth trends. Furthermore, there was generally less variance in the slopes at the family level, and a wide range of family sizes were represented such that many families (around 25%) had only one youth in the study. These models were also able to correct standard errors and confidence intervals for family-based clustering.

Finally, the growth (i.e., intercept and slope) scores were examined as predictors of the distal outcomes in a series of multiple regression models. Notably, although quadratic slope scores were estimated they were not included in these analyses as there was so little variance in these scores that it often led to estimation problems. In the multiple regression models, one of the outcomes was regressed on an intercept score, a linear slope score, and a set of informant-specific covariates. The covariates included in these models were: Sex (all informants), Cognitive Ability (all informants), Maternal ASPD (mothers), Maternal AUD (mothers), Maternal MDD (mothers), Paternal ASPD (fathers), Paternal AUD (fathers), Paternal MDD (fathers), Maternal Years Education (mothers/teachers/youth), Maternal Income (mothers/teachers/youth), Paternal Years Education (fathers/teachers/youth), Paternal Income (fathers/teachers/youth), Maternal Marital Quality (mothers), Paternal Marital Quality (fathers), and informant-specific Internalizing Problems intercept and linear slope scores (derived via the same process described above for externalizing).

All major analyses were conducted in Mplus version 8.5 (Muthén & Muthén, 2021). The multilevel growth models were fit using robust full information maximum likelihood (MLR) estimation. Intercept and slope scores were generated using maximum a posteriori (MAP) scoring (MacCallum, 2009). The multiple regression models were fit using either full information maximum likelihood (for continuous outcomes) or mean and variance adjusted weighted least squares (for dichotomous outcomes) estimation. Confidence intervals in the multiple regression models were derived via clustered (by family) non-parametric percentile bootstrapping (1,000 random draws), which performs well under a variety of data conditions (Falk, 2018). Given the number of predictors and outcomes we report the 99% confidence intervals throughout the manuscript and use these intervals as the basis of determining statistical significance (effect sizes and consistency across analyses are also considered when interpreting the primary results). Analyses were also facilitated by the Mplus Automation Package (Hallquist & Wiley, 2018) in R (R Core Team, 2020).

Results

Means, standard deviations, and sample sizes at each age for Delinquency, Aggression, and Total Externalizing are presented in Tables 1–3, with observed mean trajectories available in Supplemental Figure 1 and descriptive statistics for Internalizing Problems available in Supplemental Table 1. In general, Delinquency scores initially decreased before increasing again in adolescence, Aggression and Total Externalizing scores gradually decreased, and Internalizing Problems scores appeared relatively stable. Youth ratings differed the most from the other informants such that youth tended to report more externalizing behavior over time; youth reported Delinquency and Total Externalizing scores both increased over time. Examination of the correlations between intercepts and slopes (Supplemental Table 7) indicated that youth with a higher intercept on delinquency (i.e., at age 11) tended to increase more in their delinquency over time across informants; on the other hand, youth with a higher intercept on aggression showed a sharper decline. The exception to this was for youth self-report, where youth who rated themselves as having more aggression initially tended to decrease slightly more slowly in their aggression. At any given age of assessment there were at least $N = 100$ ratings from each informant type (when applicable; teachers and youth were not initially included in data collection until age 6

Table 1. Descriptive statistics for delinquent behaviors

Age (years)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Mother															
M	1.53	1.75	1.75	1.72	1.68	1.54	1.49	1.53	1.43	1.58	1.62	1.91	2.01	2.04	2.32
SD	1.39	2.09	1.63	2	1.74	1.85	1.6	1.92	2	1.97	2.27	2.65	2.83	2.9	3.36
N	192	183	160	212	219	192	264	241	233	268	239	223	256	234	213
Father															
M	1.65	1.71	1.55	1.58	1.48	1.32	1.4	1.22	1.45	1.29	1.29	1.55	1.82	1.96	2.41
SD	1.31	1.53	1.81	2	1.57	1.74	1.71	1.64	1.81	1.68	1.49	2.3	2.61	2.61	3.72
N	188	178	151	199	198	182	223	208	185	231	206	188	213	181	173
Teacher															
M	–	–	–	0.76	1.19	1.1	0.97	0.91	0.91	1.01	0.88	1.04	1.1	1.13	1.24
SD	–	–	–	1.53	2.03	1.93	1.82	1.51	1.81	1.85	1.66	2.06	2.29	2.31	2.25
N	–	–	–	109	160	142	190	187	382	422	453	484	471	429	401
Youth															
M	–	–	–	–	–	–	–	–	1.68	1.92	2.37	2.8	3.13	3.38	3.66
SD	–	–	–	–	–	–	–	–	1.68	2.12	2.44	2.63	2.79	2.67	2.71
N	–	–	–	–	–	–	–	–	411	559	627	666	662	652	614

Note. M = mean; SD = standard deviation; N = number of reports at a specific age.

Table 2. Descriptive statistics for aggressive behaviors

Age (years)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Mother															
M	9.89	9.48	8.84	8.03	8.38	7.42	7.64	7.4	6.96	6.85	6.67	6.45	5.72	5.38	5.06
SD	5.81	5.96	6.08	6.24	5.77	5.79	5.76	6.12	6.36	5.88	5.11	6.58	5.92	5.66	5.99
N	192	183	160	212	219	192	264	241	233	268	239	223	256	234	213
Father															
M	9.33	9.92	7.93	7.3	7.07	6.83	6.68	5.87	6.61	6.11	5.92	5.69	5.05	4.58	5.04
SD	5.48	6.36	5.59	5.7	5.03	5.53	5.65	5.07	6	5.58	5.23	5.63	4.95	5.4	5.84
N	188	178	151	199	198	182	223	208	185	231	206	188	213	181	173
Teacher															
M	–	–	–	4.35	6.11	5.55	5.86	4.94	4.9	4.23	3.87	3.99	3.37	2.99	3.25
SD	–	–	–	6.36	9.04	8.04	8.26	6.93	8.05	7.11	6.7	7.45	6.49	5.83	6.13
N	–	–	–	109	160	142	190	187	382	422	453	484	471	429	401
Youth															
M	–	–	–	–	–	–	–	–	7.2	7.12	7.45	7.64	7.27	7.12	7.06
SD	–	–	–	–	–	–	–	–	5.16	5.13	5.41	5.36	5.38	4.93	4.83
N	–	–	–	–	–	–	–	–	411	559	627	666	662	652	614

Note. M = mean; SD = standard deviation; N = number of reports at a specific age.

for teachers and age 11 for youth), with an average Ns of 222 (maternal reports), 194 (paternal reports), 319 (teacher reports), and 600 (youth reports) across ages.

Means, standard deviations, and sample sizes for the outcomes and covariates are presented in Table 4. The sample sizes for the outcomes ranged from $N = 299$ (relationship quality) to $N = 532$ (arrest), with an average of $N = 414$; correlations between

outcomes can be found in Supplemental Table 14. Some of the missingness in the outcomes is partially by design such that many youth were not old enough at the follow-up assessments to provide data on these outcomes. Several outcomes require participants to have reached the milestone of interest (e.g., age at first child requires participants to have children). To better understand the nature of the valid missingness (i.e., participants were not just

Table 3. Descriptive statistics for total externalizing behaviors

Age (years)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Mother															
M	11.42	11.23	10.59	9.75	10.06	8.96	9.12	8.93	8.39	8.43	8.29	8.37	7.73	7.42	7.38
SD	3.38	3.35	3.25	3.12	3.17	2.99	3.02	2.99	2.9	2.9	2.88	2.89	2.78	2.72	2.72
N	192	183	160	212	219	192	264	241	233	268	239	223	256	234	213
Father															
M	10.98	11.63	9.47	8.88	8.55	8.15	8.08	7.09	8.06	7.4	7.21	7.24	6.87	6.54	7.46
SD	3.31	3.41	3.08	2.98	2.92	2.85	2.84	2.66	2.84	2.72	2.68	2.69	2.62	2.56	2.73
N	188	178	151	199	198	182	223	208	185	231	206	188	213	181	173
Teacher															
M	-	-	-	5.12	7.3	6.65	6.83	5.86	5.81	5.23	4.74	5.03	4.47	4.12	4.49
SD	-	-	-	2.26	2.7	2.58	2.61	2.42	2.41	2.29	2.18	2.24	2.11	2.03	2.12
N	-	-	-	109	160	142	190	187	382	422	453	484	471	429	401
Youth															
M	-	-	-	-	-	-	-	-	8.88	9.04	9.82	10.43	10.4	10.5	10.72
SD	-	-	-	-	-	-	-	-	2.98	3.01	3.13	3.23	3.22	3.24	3.27
N	-	-	-	-	-	-	-	-	411	559	627	666	662	652	614

Note. M = mean; SD = standard deviation; N = number of reports at a specific age.

too young) in the distal outcomes a brief examination of the correlates of missingness was conducted (i.e., those who had missing outcome data due to ineligibility removed from the missing data analysis). A series of bivariate logistic regression models were fit in which missingness in an outcome variable was predicted as a function of one of the growth scores, one of the covariates, or one of the other outcomes; all models were fit using robust full information maximum likelihood with clustered (by family) non-parametric percentile bootstrapping (1,000 random draws).

The most consistent, robust predictor of missingness across outcomes was Cognitive Ability in youth, which was statistically significantly associated with missingness on 11/12 outcomes (average $\beta = -.17$). Maternal history of antisocial personality disorder was also occasionally related to missingness (statistically significant effects for 7/12 outcomes, average $\beta = .15$), as were maternal and teacher reported slope scores on externalizing, but effects were inconsistent across outcome and type of externalizing behavior. Finally, missingness on the Arrest outcome was associated with a younger marriage age, younger age at first child, lower income, and lower educational attainment. Thus, although much of the missing data on the outcomes was due to assessment ineligibility, missingness was modestly (e.g., $\beta \sim .15$) associated with a few indicators of youth risk, such that those at higher risk were less likely to provide data at later ages.

Growth trajectories in externalizing and internalizing behaviors

Intraclass correlations (ICCs) for Delinquency, Aggression, Total Externalizing, and Internalizing Problems are presented in Table 5. This table includes the ICCs for level 2 (youth), level 3 (family), and the composite ICC from a two-level nesting structure (i.e., the total ICC across youth and family). The composite ICCs from a two-level nesting structure were moderate to large in size, ranging from ICC = .22 to ICC = .59 (average ICC = .48). The ICCs based on a three-level nesting structure suggested that around half of this

within-cluster variance was at the individual versus family level (i.e., on average the level 2 ICC was about 50% of the composite ICC). Together, this suggests a moderate to strong degree of consistency in scores across time, and that there is a similar degree of clustering across time by both individual and family.

Model fit for the linear and quadratic three-level growth models are presented in Supplemental Tables 2–5, and parameter estimates from the final growth models with accompanying 99% confidence intervals are presented in Supplemental Table 6. For every informant type except teachers model fit was consistently improved via the addition of the quadratic slope. For teachers, a linear slope appeared adequate for all behaviors. The model implied average trajectories across time are depicted graphically in Figure 1, and are broadly consistent with the observed means. The variance terms for the intercepts were consistently statistically significant on both levels 2 and 3, while significant slope variance was only identified on level 2, primarily for parental reports of externalizing problems. None of the parameters associated with the quadratic slopes were statistically significant, but the quadratic slopes were retained given the results from the aforementioned model comparisons, and the observed trajectories across time.

Growth trends in externalizing behaviors and distal outcomes

Intercept and slope scores were modestly to moderately correlated for Aggression, Total Externalizing, and Internalizing Problems (r s from $\pm .10$ to $.33$; average $r \pm .21$), with the one exception of the teacher reported Aggression growth scores ($r = -.64$). The Delinquency intercept and slope growth scores were strongly, positively correlated for all raters (r s from $.63$ to $.84$). Correlations between the growth component scores ranged in size from mild to moderate (r s from $\pm .00$ to $.38$; average r s of $\pm .13$ for intercept scores, and $\pm .09$ for slope scores); see Supplemental Tables 8–12 for all correlations between growth component scores and covariates. Correlations between the covariates and outcomes ranged in size from trivial to moderate (r s from $\pm .00$ to $.50$; average $r \pm .13$);

Table 4. Descriptive statistics for outcomes and covariates

	M	SD	N	% Yes / Range
Arrest	0.17	0.37	532	17%
Legal infractions	0.78	1.18	540	0–10
Max drinks	12.7	7.92	540	0–30
Alcohol use problems	3.91	4.56	542	0–23
Age at first child	22.62	3.27	167	14–30
Age at first cohabitation	22.78	2.75	231	15–31
Age at first marriage	23.94	2.42	201	18–29
Highest grade	14.39	2.26	530	7–20
Highest degree	1	1.11	514	–
Individual income	6.84	2.29	526	–
Family income	8.3	2.12	340	–
Relationship quality	11.9	18.23	299	42–148
FSIQ	104.7	13.66	835	62–145
Maternal ASPD	0.23	0.42	940	23%
Maternal AUD	0.17	0.38	940	17%
Maternal MDD	0.52	0.5	940	52%
Paternal ASPD	0.31	0.46	878	31%
Paternal AUD	0.58	0.49	1003	58%
Paternal MDD	0.37	0.48	878	37%
Maternal years education	13.38	2.07	977	7–20
Maternal income	6.99	2.2	1005	–
Paternal years education	13.67	2.29	935	7–20
Paternal income	7.11	2.13	978	–
Maternal relationship quality	106.35	19.1	823	44–145
Paternal relationship quality	109.3	16.26	802	51–143

Note. M = mean; SD = standard deviation; N = number of assessments; % Yes = percentage of respondents who endorsed an outcome/covariate (binary variables only).

see Supplemental Table 13 for all correlations between the covariates and outcomes.

Delinquency

The zero-order correlations between the Delinquency growth scores and outcomes are presented in Table 6. These correlations ranged in size from trivial to moderate (r s from ± 0.03 to $.44$; average $r \pm .18$). Correlations were, on average, similar in magnitude for intercept and slope scores, with average r s across raters of $\pm .19$ for the intercept scores, and $\pm .18$ for the slope scores. On average, correlations were largest in magnitude for teacher reported Delinquency (average $r \pm .24$), followed by maternal reported Delinquency (average $r \pm .19$), youth reported Delinquency (average $r \pm .16$), and then paternal reported Delinquency (average $r \pm .15$). Age at First Marriage (average $r \pm .08$), Age at First Cohabitation (average $r \pm .11$), and Alcohol Use Problems (average $r \pm .11$) were the weakest correlates of growth scores; Highest Grade Achieved (average $r \pm .32$), Arrest (average $r \pm .30$), and Age at First Child (average $r \pm .25$) were the most strongly related to the growth scores.

The results from the Delinquency multiple regression models can be found in Table 7. Standardized regression coefficients

ranged in magnitude from trivial to strong (β s from ± 0.01 to $.52$); the addition of the covariates reduced the average association between the growth scores and outcomes from $r \pm .18$, to $\beta \pm .12$. The largest regression coefficients were associated with youth reported Delinquency (average $\beta \pm .17$), followed by teacher reported Delinquency ($\beta \pm .13$), maternal reported Delinquency ($\beta \pm .10$), and paternal reported Delinquency ($\beta \pm .08$). Notably, most effects were modest, and the confidence intervals tended to be fairly wide, and so these coefficients were only sporadically statistically significant. Regression coefficients were the largest in magnitude, and the most consistently significant for youth Delinquency slope scores. Specifically, the youth slope was a significant predictor of Arrest ($\beta = .52$), Legal Infractions ($\beta = .33$), Max Drinks ($\beta = .35$), Alcohol Use Problems ($\beta = .36$), Highest Grade Achieved ($\beta = -.34$), Highest Degree ($\beta = -.27$), and Marital Quality ($\beta = -.30$). The maternal growth scores were associated with both arrest and legal infractions behavior such that the maternal intercept was a significant predictor of Arrest ($\beta = .30$) while the maternal slope was a significant predictor of Legal Infractions ($\beta = .18$).

Overall, youth reported increases in delinquency over time appeared to be the most strongly and reliably associated with long term functioning after accounting for covariates. The delinquency growth factor scores also tended to be the most strongly correlated within informant type.

Aggression

The zero-order correlations between the Aggression growth scores and outcomes are presented in Table 8. Correlations ranged in size from trivial to moderate (r s from $\pm <.01$ to $.33$; average $r \pm .11$). Correlations were, on average, larger in magnitude for intercept scores (average $r \pm .14$) compared to slope scores (average $r \pm .08$). On average, correlations were largest in magnitude for teacher reported Aggression (average $r \pm .13$), followed by maternal reported Aggression (average $r \pm .12$), paternal reported Aggression (average $r \pm .11$), and then youth reported Aggression (average $r \pm .09$). Age at First Cohabitation (average $r \pm .06$), Age at First Marriage (average $r \pm .08$), and Alcohol Use Problems (average $r \pm .08$) were the most weakly related to the growth scores; Arrest (average $r \pm .18$), Highest Grade Achieved (average $r \pm .16$), and Highest Degree Achieved (average $r \pm .15$) were the most strongly related to the growth scores.

The results from the Aggression multiple regression models can be found in Table 9. Standardized regression coefficients ranged in magnitude from trivial to strong (β s from $\pm <.01$ to $.50$); the addition of the covariates reduced the average association between the growth factors and outcomes from $r \pm .11$, to $\beta \pm .09$. The largest regression coefficients here were associated with teacher reported Aggression (average $\beta \pm .12$), followed by maternal reported Aggression ($\beta \pm .09$), youth reported Aggression ($\beta \pm .08$), and paternal reported Delinquency ($\beta \pm .08$). Most effects were modest in size, and the confidence intervals tended to be fairly wide, and so these coefficients were only sporadically statistically significant. Across informant type, regression coefficients were most consistently of non-trivial magnitude and statistically significant for the Arrest and Highest Grade Achieved outcomes. Specifically, maternal intercept scores ($\beta = -.18$), paternal slope scores ($\beta = -.13$), teacher intercept scores ($\beta = -.17$), and youth slope scores ($\beta = -.13$) were all statistically significant predictors of Highest Grade Achieved; maternal intercept scores ($\beta = .30$), teacher intercept scores ($\beta = .50$), and youth slope scores ($\beta = .22$) were all statistically significant predictors of Arrest.

Table 5. Intraclass correlations (ICCs) for externalizing and internalizing scores across time

	Delinquency		Aggression		Total Externalizing		Internalizing Problems	
	Level 2	Level 3	Level 2	Level 3	Level 2	Level 3	Level 2	Level 3
Mother	.23(.45)	0.22	.26(.56)	0.29	.28(.58)	0.29	.19(.46)	0.27
Father	.18(.42)	0.23	.20(.54)	0.34	.21(.57)	0.36	.11(.46)	0.35
Teacher	.13(.40)	0.28	.23(.45)	0.22	.22(.46)	0.25	.12(.22)	0.11
Youth	.34(.51)	0.17	.42(.57)	0.15	.42(.59)	0.17	.37(.51)	0.13

Note. Values outside parentheses represent ICCs with a three level nesting structure (occasion of assessment→youth→family); values inside the parentheses represent ICCs from two level nesting structure (occasion of assessment→youth).

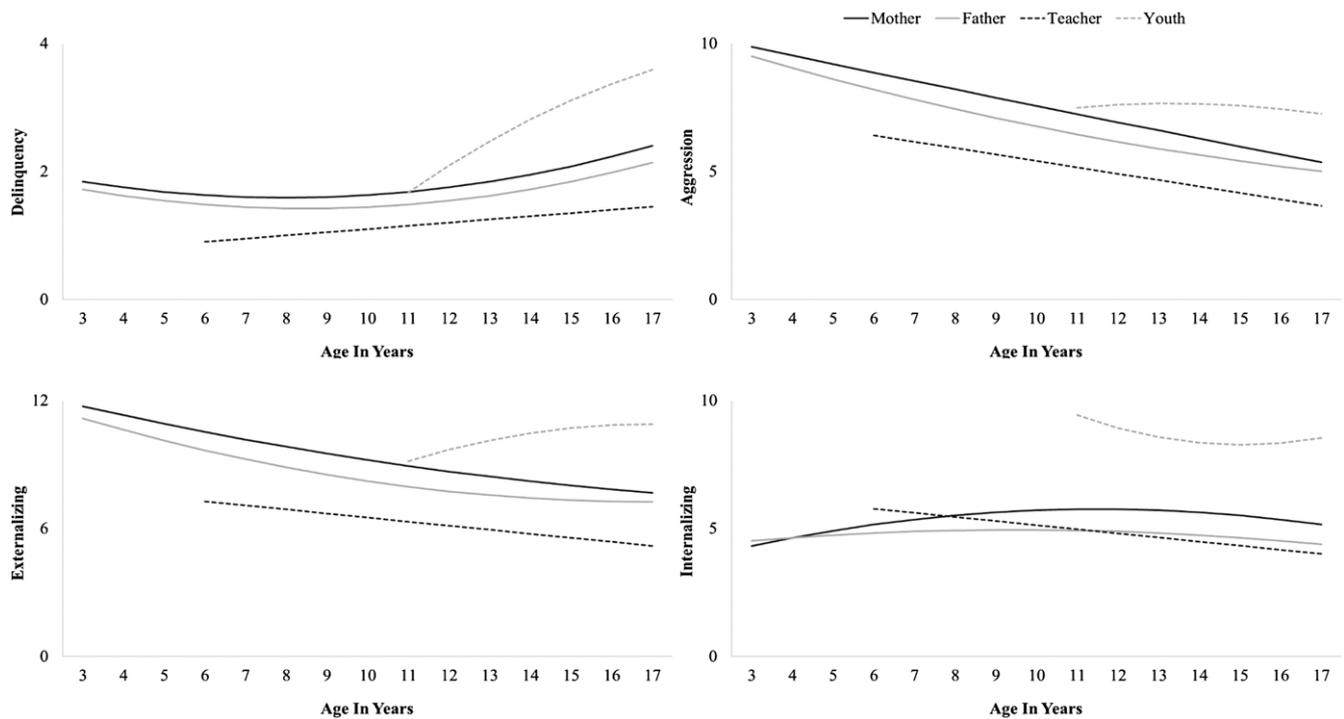


Figure 1. Observed mean trajectories across time.

Note. Delinquency scores presented in top left panel; Aggression scores presented in top right panel; Total Externalizing Problems scores presented in bottom left panel; Internalizing Problems scores presented in bottom right panel. All informants are included within each panel. Maternal reports represented via the solid black line; Paternal reports represented via the solid gray line; Teacher reports represented via the dashed black line; Youth reports represented via the dashed gray line. Implied trajectories are based on the three-level growth model parameter estimates presented in Table 6 in the online supplement.

Overall, Aggression in childhood appeared to be most strongly and reliably associated with Arrest and certain aspects of educational attainment after accounting for covariates. Notably, it varied somewhat if, for a given informant, the effect of the intercept or slope scores were significant, which implies that heightened aggression in childhood at some point or points in general may be the most relevant to the outcomes here as opposed to aggression at one specific point, or a general rate of change.

Total externalizing

The zero-order correlations between the Total Externalizing growth scores and outcomes are presented in Table 10. Correlations ranged in size from trivial to moderate (*r*s from ±<.01 to .35; average *r* ± .14). Correlations were, on average, larger in magnitude for the intercept scores (average *r* ± .15) compared to the slope scores (average *r* ± .11). On average, correlations were largest in magnitude for maternal reported Total Externalizing (average *r* ± .16), followed by paternal reported Total Externalizing (average *r* ± .14), teacher reported Total

Externalizing (average *r* ± .13), and then youth reported Total Externalizing (average *r* ± .12). Age at First Cohabitation (average *r* ± .08), Age at First Marriage (average *r* ± .08), and Alcohol Use Problems (average *r* ± .08) were the weakest correlates of growth scores; Arrest (average *r* ± .23), Highest Grade Achieved (average *r* ± .22), and Highest Degree Achieved (average *r* ± .18) were the most strongly related to the growth scores.

The results from the Total Externalizing multiple regression models can be found in Table 11. Standardized regression coefficients ranged in magnitude from trivial to moderate (β s from ±<.01 to .32); the addition of the covariates reduced the average association between the growth scores and outcomes from *r* ± .14, to β ± .09. The largest regression coefficients were for maternal reported Total Externalizing (average β ± .10), followed by youth reported Total Externalizing (β ± .10), teacher reported Total Externalizing (β ± .09), and paternal reported Total Externalizing (β ± .08). Most effects were modest in size, and the confidence intervals tended to be fairly wide, and so these coefficients were only sporadically statistically significant. Across informants,

Table 6. Correlations between delinquency growth factor scores and outcomes

	Mother		Father		Teacher		Youth	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Arrest	0.37	0.26	0.29	0.18	0.38	0.34	0.23	0.31
Legal infractions	0.26	0.26	0.17	0.19	0.24	0.19	0.21	0.27
Max drinks	0.14	0.08	0.13	0.09	0.16	0.15	0.19	0.24
Alcohol use problems	0.15	0.04	0.06	0.06	0.09	0.05	0.18	0.24
Age at first child	-0.22	-0.21	-0.26	-0.27	-0.36	-0.39	-0.16	-0.15
Age at first cohabitation	-0.16	-0.18	-0.05	-0.12	-0.1	-0.08	-0.09	-0.1
Age at first marriage	-0.08	-0.18	0.02	-0.01	-0.15	-0.13	-0.04	-0.01
Highest grade	-0.33	-0.28	-0.29	-0.33	-0.44	-0.41	-0.18	-0.26
Highest degree	-0.27	-0.23	-0.25	-0.27	-0.34	-0.31	-0.15	-0.22
Individual income	-0.1	-0.11	-0.09	-0.09	-0.2	-0.14	-0.12	-0.12
Family income	-0.12	-0.17	-0.08	-0.12	-0.25	-0.15	-0.1	-0.1
Relationship quality	-0.16	-0.13	-0.14	-0.14	-0.3	-0.28	-0.03	-0.15

Note. Zero-order correlations between intercept and slope factor scores presented (i.e., no covariates were adjusted for in these associations). The correlation coefficients between factor scores and Arrest are Biserial correlations, the remaining coefficients are Pearson correlations. Correlations equal to or greater than $r \pm .15$ presented in **BOLD**.

Table 7. Standardized regression coefficients from delinquency growth factor scores to outcomes

	Mother		Father		Teacher		Youth	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Arrest	0.3	0.02	0.26	-0.05	0.18	0.1	-0.24	0.52
	[.07, .59]	[-.22, .21]	[-.22, 1.18]	[-1.07, .50]	[-1.27, 1.0]	[-.58, 1.41]	[-.58, .18]	[.11, .89]
Legal infractions	0.12	0.18	0.08	0.11	0.27	-0.05	-0.11	0.33
	[-.11, .30]	[.01, .38]	[-.10, .24]	[-.05, .31]	[-.23, .70]	[-.52, .43]	[-.37, .14]	[.11, .54]
Max drinks	0.08	0.04	0.05	0.01	0.13	0.04	-0.06	0.35
	[-.08, .28]	[-.14, .22]	[-.12, .25]	[-.16, .19]	[-.16, .45]	[-.23, .31]	[-.30, .16]	[.15, .53]
Alcohol use problems	0.16	-0.02	-0.04	0.08	0.21	-0.09	-0.08	0.36
	[-.03, .40]	[-.22, .14]	[-.25, .17]	[-.09, .24]	[-.09, .50]	[-.34, .18]	[-.31, .14]	[.14, .60]
Age at first child	-0.16	0.01	-0.11	-0.09	-0.06	-0.21	-0.14	-0.01
	[-.43, .08]	[-.29, .26]	[-.42, .22]	[-.33, .16]	[-.47, .35]	[-.67, .14]	[-.45, .23]	[-.39, .32]
Age at first cohabitation	-0.03	-0.17	0.12	-0.12	-0.11	0.08	-0.01	0.01
	[-.33, .29]	[-.42, .05]	[-.23, .47]	[-.40, .18]	[-.62, .51]	[-.43, .50]	[-.39, .39]	[-.37, .34]
Age at first marriage	-0.14	-0.11	0.06	-0.02	-0.18	0.03	-0.08	0.18
	[-.43, .21]	[-.42, .19]	[-.25, .40]	[-.38, .34]	[-.69, .42]	[-.45, .55]	[-.52, .31]	[-.25, .57]
Highest grade	-0.13	-0.1	-0.03	-0.19	-0.16	-0.08	0.21	-0.34
	[-.28, .03]	[-.26, .05]	[-.21, .13]	[-.32, -.04]	[-.36, .03]	[-.28, .11]	[.00, .40]	[-.50, -.15]
Highest degree	-0.15	-0.02	-0.05	-0.13	-0.09	-0.03	0.16	-0.27
	[-.29, .05]	[-.18, .11]	[-.22, .13]	[-.26, .01]	[-.26, .12]	[-.26, .15]	[.00, .37]	[-.45, -.08]
Individual income	0.01	-0.05	-0.02	-0.01	-0.23	0.16	-0.01	-0.02
	[-.16, .19]	[-.23, .11]	[-.23, .19]	[-.19, .18]	[-.51, .08]	[-.14, .40]	[-.25, .23]	[-.24, .19]
Family income	0.08	-0.13	0.1	-0.09	-0.26	0.21	0.03	-0.05
	[-.14, .31]	[-.37, .06]	[-.13, .35]	[-.29, .11]	[-.63, .17]	[-.26, .56]	[-.25, .31]	[-.31, .22]
Relationship quality	-0.03	-0.06	-0.03	0.01	-0.21	-0.01	0.24	-0.3
	[-.24, .19]	[-.34, .18]	[-.34, .24]	[-.25, .24]	[-.55, .15]	[-.42, .36]	[-.01, .47]	[-.52, -.05]

Note. Standardized regression coefficients presented. 99% Confidence intervals presented in brackets under estimates; **BOLD** denotes that confidence intervals do not include 0. Confidence intervals derived via clustered (by family) non-parametric percentile bootstrapping with 1,000 random draws. Each model included several of the following covariates: Sex (all raters), FSIQ (all raters), Maternal ASPD (mothers), Maternal AUD (mothers), Maternal MDD (mothers), Paternal ASPD (fathers), Paternal AUD (fathers), Paternal MDD (fathers), Maternal Years Education (mothers/teachers/youth), Maternal Income (mothers/teachers/youth), Paternal Years Education (fathers/teachers/youth), Paternal Income (fathers/teachers/youth), Maternal Relationship Quality (mothers), Paternal Relationship Quality (fathers), and the informant-specific Internalizing Problems intercept and slope factor scores.

Table 8. Correlations between aggression growth factor scores and outcomes

	Mother		Father		Teacher		Youth	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Arrest	0.31	0.08	0.26	0.06	0.33	-0.07	0.22	0.13
Legal infractions	0.19	0.11	0.13	0.05	0.17	-0.07	0.14	0.09
Max drinks	0.11	0.02	0.11	-0.01	0.16	-0.08	0.16	0.03
Alcohol use problems	0.11	-0.08	0.05	-0.04	0.09	-0.08	0.12	0.07
Age at first child	-0.17	-0.12	-0.24	-0.12	-0.21	-0.06	-0.01	-0.06
Age at first cohabitation	-0.13	-0.01	-0.05	-0.14	-0.02	0.01	-0.02	-0.09
Age at first marriage	-0.05	-0.17	-0.07	-0.06	-0.06	0.03	-0.07	-0.11
Highest grade	-0.27	-0.1	-0.22	-0.12	-0.3	0.07	-0.1	-0.12
Highest degree	-0.22	-0.11	-0.2	-0.11	-0.26	0.1	-0.08	-0.08
Individual income	-0.07	-0.04	-0.11	0	-0.18	0.09	-0.11	-0.07
Family income	-0.1	-0.08	-0.09	-0.09	-0.18	0.15	-0.05	-0.02
Relationship quality	-0.13	-0.09	-0.1	-0.1	-0.22	0.06	0.04	-0.2

Note. Zero-order correlations between intercept and slope factor scores presented (i.e., no covariates were adjusted for in these associations). The correlation coefficients between factor scores and Arrest are Biserial correlations, the remaining coefficients are Pearson correlations. Correlations equal to or greater than $r \pm .15$ presented in **BOLD**.

Table 9. Standardized regression coefficients from aggression growth factor scores to outcomes

	Mother		Father		Teacher		Youth	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Arrest	0.3	0.11	0.22	0.05	0.5	0.38	0.2	0.22
	[.06, .59]	[-.10, .28]	[-.01, .51]	[-.91, 1.05]	[.01, .76]	[-.16, .74]	[-.02, .44]	[.01, .42]
Legal infractions	0.16	0.14	0.16	0.07	0.14	0.02	0.08	0.07
	[-.02, .34]	[.03, .28]	[-.01, .31]	[-.06, .19]	[-.08, .37]	[-.28, .30]	[-.08, .25]	[-.08, .22]
Max drinks	0.1	0.07	0.02	0.03	0.14	0.01	0.17	0.09
	[-.06, .25]	[-.05, .18]	[-.12, .19]	[-.11, .18]	[-.05, .33]	[-.16, .21]	[.04, .31]	[-.06, .24]
Alcohol use problems	0.1	-0.02	0.01	0	0.09	-0.04	0.11	0.08
	[-.08, .26]	[-.18, .11]	[-.18, .19]	[-.14, .15]	[-.08, .27]	[-.20, .13]	[-.04, .25]	[-.07, .22]
Age at first child	-0.11	-0.01	-0.27	-0.01	-0.27	-0.2	0.02	-0.05
	[-.30, .13]	[-.24, .19]	[-.53, .00]	[-.28, .21]	[-.57, .01]	[-.50, .07]	[-.22, .27]	[-.33, .18]
Age at first cohabitation	-0.14	-0.06	0.04	-0.11	0.07	0.04	0.08	-0.05
	[-.40, .13]	[-.28, .13]	[-.25, .32]	[-.33, .09]	[-.21, .30]	[-.26, .30]	[-.19, .39]	[-.28, .17]
Age at first marriage	-0.11	-0.13	-0.16	-0.04	-0.03	0.03	-0.01	-0.13
	[-.39, .18]	[-.38, .10]	[-.46, .16]	[-.28, .20]	[-.50, .33]	[-.34, .34]	[-.40, .36]	[-.39, .21]
Highest grade	-0.18	-0.1	-0.13	-0.13	-0.17	-0.07	-0.05	-0.13
	[-.31, -.05]	[-.21, .00]	[-.28, .04]	[-.25, -.01]	[-.30, -.03]	[-.20, .05]	[-.18, .07]	[-.24, -.01]
Highest degree	-0.16	-0.07	-0.13	-0.11	-0.1	0	-0.04	-0.08
	[-.29, -.03]	[-.20, .05]	[-.30, .02]	[-.23, .01]	[-.22, .02]	[-.13, .11]	[-.16, .08]	[-.20, .05]
Individual income	-0.02	-0.02	-0.1	0.04	-0.09	0.01	-0.07	-0.01
	[-.17, .13]	[-.14, .11]	[-.26, .05]	[-.13, .17]	[-.24, .06]	[-.19, .17]	[-.22, .07]	[-.14, .13]
Family income	-0.01	-0.06	-0.05	-0.05	0.07	0.12	-0.01	0.01
	[-.19, .16]	[-.20, .07]	[-.23, .15]	[-.19, .09]	[-.13, .25]	[-.11, .31]	[-.19, .19]	[-.19, .21]
Relationship quality	-0.02	-0.06	-0.02	-0.03	-0.16	-0.04	0.04	-0.21
	[-.26, .18]	[-.24, .11]	[-.24, .17]	[-.19, .13]	[-.42, .10]	[-.27, .19]	[-.14, .23]	[-.40, .00]

Note. Standardized regression coefficients presented. 99% Confidence intervals presented in brackets under estimates; **BOLD** denotes that confidence intervals do not include 0. Confidence intervals derived via clustered (by family) non-parametric percentile bootstrapping with 1,000 random draws. Each model included several of the following covariates: Sex (all raters), FSIQ (all raters), Maternal ASPD (mothers), Maternal AUD (mothers), Maternal MDD (mothers), Paternal ASPD (fathers), Paternal AUD (fathers), Paternal MDD (fathers), Maternal Years Education (mothers/teachers/youth), Maternal Income (mothers/teachers/youth), Paternal Years Education (fathers/teachers/youth), Paternal Income (fathers/teachers/youth), Maternal Relationship Quality (mothers), Paternal Relationship Quality (fathers), and the informant-specific Internalizing Problems intercept and slope factor scores.

Table 10. Correlations between total externalizing growth factor scores and outcomes

	Mother		Father		Teacher		Youth	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Arrest	0.34	0.18	0.28	0.15	0.35	0.08	0.22	0.23
Legal infractions	0.22	0.2	0.15	0.13	0.19	-0.01	0.17	0.18
Max drinks	0.12	0.06	0.12	0.03	0.17	-0.02	0.18	0.11
Alcohol use problems	0.13	-0.04	0.05	-0.01	0.09	-0.06	0.14	0.15
Age at first child	-0.19	-0.18	-0.25	-0.23	-0.25	-0.18	-0.06	-0.07
Age at first cohabitation	-0.14	-0.09	-0.05	-0.16	-0.04	0	-0.04	-0.09
Age at first marriage	-0.06	-0.21	-0.05	-0.07	-0.08	0	-0.07	-0.07
Highest grade	-0.3	-0.2	-0.25	-0.25	-0.34	-0.06	-0.13	-0.19
Highest degree	-0.25	-0.18	-0.23	-0.22	-0.29	-0.01	-0.1	-0.14
Individual income	-0.08	-0.08	-0.11	-0.05	-0.19	0.04	-0.12	-0.09
Family income	-0.11	-0.14	-0.09	-0.13	-0.2	0.1	-0.07	-0.05
Relationship quality	-0.14	-0.12	-0.11	-0.14	-0.24	-0.02	0.03	-0.22

Note. Zero-order correlations between intercept and slope factor scores presented (i.e., no covariates were adjusted for in these associations). The correlation coefficients between factor scores and Arrest are Biserial correlations, the remaining coefficients are Pearson correlations. Correlations equal to or greater than $r \pm .15$ presented in **BOLD**.

Table 11. Standardized regression coefficients from total externalizing growth factor scores to outcomes

	Mother		Father		Teacher		Youth	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Arrest	0.32	0.1	0.24	0.04	0.27	0.1	0.12	0.31
	[.08, .56]	[-.10, .26]	[-.13, .68]	[-1.21, .78]	[.02, .47]	[-.23, .34]	[-.11, .36]	[.09, .53]
Legal Infractions	0.15	0.19	0.14	0.1	0.16	0.03	0.07	0.17
	[-.03, .32]	[.06, .33]	[-.04, .28]	[-.01, .23]	[.01, .34]	[-.23, .27]	[-.09, .24]	[.01, .30]
Max drinks	0.09	0.08	0.03	0.03	0.15	0.02	0.16	0.17
	[-.07, .25]	[-.05, .20]	[-.14, .19]	[-.12, .19]	[-.01, .31]	[-.12, .18]	[.01, .32]	[.03, .31]
Alcohol use problems	0.14	-0.01	0	0.02	0.11	-0.03	0.11	0.17
	[-.06, .31]	[-.17, .12]	[-.21, .18]	[-.13, .17]	[-.04, .26]	[-.16, .11]	[-.05, .27]	[.00, .33]
Age at first child	-0.13	-0.03	-0.23	-0.05	-0.23	-0.19	-0.05	-0.04
	[-.35, .09]	[-.27, .18]	[-.54, .05]	[-.31, .18]	[-.48, -.01]	[-.46, .05]	[-.31, .23]	[-.29, .20]
Age at first cohabitation	-0.12	-0.11	0.08	-0.12	0.04	0.03	0.06	-0.03
	[-.40, .18]	[-.31, .08]	[-.27, .37]	[-.34, .09]	[-.19, .24]	[-.23, .24]	[-.22, .39]	[-.28, .20]
Age at first marriage	-0.1	-0.17	-0.11	-0.02	-0.07	0.01	-0.02	-0.02
	[-.36, .20]	[-.45, .10]	[-.43, .19]	[-.27, .25]	[-.45, .27]	[-.28, .26]	[-.39, .32]	[-.34, .35]
Highest grade	-0.17	-0.12	-0.09	-0.17	-0.17	-0.07	-0.02	-0.18
	[-.30, -.04]	[-.24, -.01]	[-.24, .05]	[-.30, -.05]	[-.30, -.05]	[-.18, .03]	[-.16, .11]	[-.29, -.05]
Highest degree	-0.16	-0.06	-0.1	-0.14	-0.11	-0.01	-0.01	-0.13
	[-.29, -.02]	[-.20, .05]	[-.27, .03]	[-.25, -.03]	[-.21, -.01]	[-.12, .09]	[-.14, .10]	[-.25, -.01]
Individual income	-0.02	-0.03	-0.1	0.04	-0.1	0.02	-0.07	-0.01
	[-.17, .16]	[-.16, .11]	[-.26, .07]	[-.12, .18]	[-.23, .02]	[-.14, .16]	[-.23, .09]	[-.14, .14]
Family income	0.02	-0.1	-0.01	-0.05	0.01	0.1	0	-0.01
	[-.16, .20]	[-.24, .04]	[-.17, .19]	[-.20, .09]	[-.18, .19]	[-.13, .27]	[-.21, .21]	[-.22, .20]
Relationship quality	-0.01	-0.06	-0.01	-0.02	-0.17	-0.04	0.12	-0.28
	[-.26, .20]	[-.28, .13]	[-.25, .22]	[-.20, .14]	[-.39, .04]	[-.25, .15]	[-.06, .30]	[-.45, -.09]

Note. Standardized regression coefficients presented. 99% Confidence intervals presented in brackets under estimates; **BOLD** denotes that confidence intervals do not include 0. Confidence intervals derived via clustered (by family) non-parametric percentile bootstrapping with 1,000 random draws. Each model included several of the following covariates: Sex (all raters), FSIQ (all raters), Maternal ASPD (mothers), Maternal AUD (mothers), Maternal MDD (mothers), Paternal ASPD (fathers), Paternal AUD (fathers), Paternal MDD (fathers), Maternal Years Education (mothers/teachers/youth), Maternal Income (mothers/teachers/youth), Paternal Years Education (fathers/teachers/youth), Paternal Income (fathers/teachers/youth), Maternal Relationship Quality (mothers), Paternal Relationship Quality (fathers), and the informant-specific Internalizing Problems intercept and slope factor scores.

regression coefficients were most consistently of non-trivial magnitude and statistically significant for the education (Highest Grade Achieved and Highest Degree Achieved) and law-breaking (Arrest and Legal Infractions) outcomes. Specifically, maternal intercept scores ($\beta = -.17$), maternal slope scores ($\beta = -.12$), paternal slope scores ($\beta = -.17$), teacher intercept scores ($\beta = -.17$), and youth slope scores ($\beta = -.18$) were all statistically significant predictors of Highest Grade Achieved; maternal intercept scores ($\beta = -.16$), paternal slope scores ($\beta = -.14$), teacher intercept scores ($\beta = -.11$) and youth slope scores ($\beta = -.13$) were all statistically significant predictors of Highest Degree Achieved. On the other hand, maternal intercept scores ($\beta = .32$), teacher intercept scores ($\beta = .27$), and youth slope scores ($\beta = .31$) were all statistically significant predictors of Arrest; maternal slope scores ($\beta = .19$), teacher intercept scores ($\beta = .16$), and youth slope scores ($\beta = .17$) were then all statistically significant predictors of Legal Infractions.

Overall, Total Externalizing appeared to be most strongly and reliably associated with educational attainment and law-breaking behaviors after accounting for the covariates. Notably, it varied somewhat here if, for a given informant, the effect for the intercept or slope scores was significant, which implies that heightened externalizing problems in childhood at some point or points in general may be the most relevant to the outcomes here as opposed to at one specific point, or a general rate of change (i.e., these effects may tap into more chronologically non-specific trends whereby youth who demonstrate consistently more externalizing problems across childhood and adolescence are more likely to report the outcomes here, with the exact trajectory of change across time being less relevant).

Discussion

This study established the presence of several lasting and robust connections between externalizing problems across childhood and adolescence with several later adult psychosocial outcomes, spanning informant perspectives and enduring above and beyond other meaningful explanatory factors. It extends our knowledge of the long-term effects of early patterns of externalizing problems beyond those of other studies with shorter time frames and more circumscribed life outcomes.

For the most part, adult-reported trajectories (i.e., as reported by mothers, fathers, and teachers) of youth delinquent behaviors were similar in their overall shape, generally decreasing from early and middle childhood and then increasing in adolescence; youth self-reports were generally similar, increasing over time beginning at age 11. Adult-reported trajectories for aggressive behaviors differed from delinquent behaviors in that they gradually decreased over time, while youth-reported aggressive behaviors did not. Whereas youth-reported total externalizing behaviors from age 11–17 increased over time, adult-reported total externalizing behaviors followed the same trajectory as aggressive behaviors and again gradually decreased over time from early and middle childhood. This is largely consistent with previously established findings (e.g., Keiley et al., 2000; Leve et al., 2005; Sampson & Laub, 2003; Petersen et al., 2015). By examining delinquent behaviors separately from aggressive behaviors, particular trends were elucidated; for instance, almost universally, delinquency intercept and slope factor scores yielded higher correlations to later adulthood outcomes than aggression factor scores, with total externalizing correlations falling between these estimations. For both delinquent behaviors and aggressive behaviors, the strongest

zero-order correlations between informant reports and later adulthood outcomes were found for teacher reports, with $r \pm .15$ between both externalizing types and later arrest, legal infractions, maximum number of drinks, age at first child, highest grade achieved, highest degree achieved, individual income, family income, and marital quality. These findings also suggest the possibility that as youth become older, parent awareness of aggressive and externalizing behaviors generally becomes less informed as their children's lives become more independent. Under those circumstances, the better informed – self reported – data may provide a more reliable indicator of what is in actuality taking place. Likewise, teacher observations are gleaned from the behavioral repertoire being shown outside the home, and therefore may more strongly relate to youth behavioral reports.

However, teachers' strength in connections to later adulthood outcomes was only observed in the total externalizing scale, rather than the delinquency or aggression scales; this pattern was also true, although to a lesser extent, for maternal and paternal reports. Indeed, while the zero-order correlations for total externalizing problems fell between the higher delinquency and lower aggression correlations, the combined total externalizing scale yielded the most robust predictions to later outcomes over and above covariates, particularly for later likelihood of arrest (predicted by 3 out of 4 informants), legal infractions (3/4 informants), highest grade achieved (4/4 informants), and highest degree achieved (4/4 informants). These were significant after accounting for child cognitive ability, child sex, informant-specific child internalizing problems, maternal and paternal income and education, and in the case of parent-report models, parental mental health (MDD, ASPD, and AUD) and marital quality. The educational attainment findings, which are less well-established than the impact of youth externalizing on law-breaking behaviors, suggest that academic progress may be especially impacted by experiential canalization, such that externalizing problems compound to make children "break off" the track earlier.

Other predictions emerged as well, although with more idiosyncrasy; for example, teacher-reported total externalizing behaviors at age 11 predicted an earlier age at first child. Youth self-report, particularly the slope trend from age 11 to 17, also predicted additional aspects of functioning above and beyond covariates, suggesting that youths' insight into their own behavior may provide additional understanding of later functioning. These included increased maximum number of drinks (via delinquency and total externalizing scales), increased alcohol use problems (via delinquency scale), and decreased partner-reported relationship quality (via delinquency and total externalizing scales). The last finding is particularly notable given the lack of shared informant variance (i.e., youth reporting on externalizing behaviors and a partner reporting on relationship quality). Overall, however, the overall severity and type of externalizing problems, rather than the particular intercept or slope that reflects age-related change, appeared most related to later outcomes, consistent with Burt et al. (2011).

Connections to later outcomes

Transition ages

Overall, there were relatively weak connections between youth externalizing behaviors and adulthood transition age variables (i.e., age at first cohabitation, marriage, and birth of first child). An exception was the zero-order correlation between delinquent behaviors and age at birth of first child, which yielded some of the strongest zero-order correlations across all informants (average

$r = -.25$ across intercept and slope factors; range = $-.16$ for youth self-report slope to $-.39$ for teacher report slope). While youth report of aggression was uncorrelated with age at first child, adult informant report intercept scores (i.e., aggression at age 11) yielded an average of $r = -.21$ (range = $-.17$ for mothers to $-.24$ for fathers). In general, earlier transition ages appeared slightly more linked to delinquent behaviors than aggressive behaviors. However, the only prediction observed over and above covariates was found with the intercept of teachers' reports, where fewer total externalizing behaviors at age 11 predicted a later age of first child. Of note, later age at first child was more related to several child covariates (e.g., higher cognitive ability, lower parental ASPD, and higher childhood socioeconomic status). It appears that earlier transition ages may be weakly related to increased earlier externalizing problems, but cannot be predicted from the presence of externalizing problems once childhood factors are taken into account.

While the connections between earlier externalizing problems and risky adolescent sexual behavior is well-established (e.g., Achenbach et al., 1998; Capaldi et al., 1996; Fergusson & Woodward, 2000; Timmermans et al., 2008) and adolescent risky sexual behaviors are often considered a manifestation of externalizing behaviors, some studies have also found connections between youth externalizing problems and earlier age at first child (e.g., Bardone et al., 1996; Capaldi & Stoolmiller, 1999; Woodward & Fergusson, 1999). The current findings extend these studies through utilizing a longer age range (i.e., past age 21), and predictions may be discrepant in part due to methodological differences (i.e., creation of an explicit "high externalizing" group in each of these studies to compare with other groups, as opposed to treating youth externalizing behaviors as a dimensional continuum); furthermore, these findings are consistent with Waldron et al. (2020) who found that earlier childbearing appears to be related to other correlated risk factors. Thus far, age at cohabitation and marriage have received less attention in the literature, with the exception of Bardone et al. (1996) who found that girls with high externalizing problems ($n = 37$) were more likely to have cohabitated with a partner by age 21; the current study suggests that with a wider age range, larger sample size, and continuum of externalizing problems, youth externalizing problems may be less related to these transition ages.

Intimate partner relationship quality

Adulthood relationship functioning, as reported by participants' long-term romantic partners, was weakly correlated with the relationship functioning of youths' parents during childhood ($r = .12$ and $r = .17$ with maternal- and paternal-reported marital quality, respectively). Overall, adulthood romantic relationship quality was positively related with increased socioeconomic status in childhood as well as decreased parental mental health difficulties (especially maternal MDD, paternal AUD, and paternal ASPD). Zero-order correlations between romantic relationship quality and externalizing growth factor scores were strongest for teacher reports (e.g., teacher intercept $r = -.30$ for delinquency and $r = -.22$ for aggression), although only youth-reported delinquency and total externalizing behaviors significantly predicted later decreased relationship quality above and beyond covariate inclusion. The connections observed here, however, are consistent with prior literature, which have largely identified children with the most persistent externalizing problems as later having the most impaired social relationships (e.g., Bardone et al., 1996; Odgers et al., 2008; Woodward et al., 2002). The findings here further support evidence that youth with lower-level externalizing

behaviors – that is, not only the most chronic or highest-level externalizing problems – are also at increased likelihood of later romantic relationship functioning challenges.

Educational attainment and income

While there were robust connections between earlier externalizing problems and later educational attainment (both number of years and degree achievement) in line with prior studies (e.g., Bongers et al., 2008; McLeod & Kaiser, 2004), there was little connection to later income. Zero-order correlations between teacher reports and later income were nearly twice as high as the correlations between other informants' reports and later income, yet still fairly weak. Somewhat stronger correlations were found between childhood covariates and income, although correlations were stronger for education (i.e., higher education and income were correlated with higher child cognitive ability, lower parental history of ASPD, lower parental history of AUD, and higher parental income and years of education). This difference, where educational attainment is robustly linked to youth externalizing problems but income is essentially unrelated, may be due in part to increased variability in income prospects and job/career trajectories than educational systems (i.e., educational tracks may be comparatively more prescribed and linear). Thus, it may be possible that the subset of youth with the highest levels of externalizing problems face more employment and income challenges (e.g., Capaldi & Stoolmiller, 1999; Odgers et al., 2008), but this does not appear to be true when examining the full dimensional span of externalizing problems.

Alcohol use

Consistent with expectations given that substance use is a component of the delinquent behaviors, correlations with adulthood alcohol use were stronger for delinquent behaviors than aggressive or total externalizing problems. The average zero-order intercept correlation between delinquency and maximum number of drinks in a 24 hr period was similar to the connection between delinquency and alcohol use problems ($r = .16$ vs. $r = .12$, respectively). Youth self-report of problems, but not other informant types, predicted increased later problematic alcohol use above and beyond covariates, such that higher levels of youth delinquency and total externalizing problems predicted a greater number of maximum drinks and higher levels of delinquency also predicted more alcohol use problems. Bongers et al. (2008) found similar predictions across a similar age range but through parent-reported externalizing problems (other informants were not collected); it is possible that the covariate set used in the current study, which controlled for parent AUD and ASPD in the connections between parent-report and later outcomes, accounted for this difference in findings.

Legal infractions

The current study strengthened the rich literature on the connections between earlier externalizing problems on later criminal behaviors and interactions with the legal system. Mother, teacher, and child reports – although not father reports – were predictive of arrest and legal infractions, above and beyond covariates. Specifically, maternal report and youth self-report of delinquency, aggression, and total externalizing problems predicted increased likelihood of later arrest, along with teachers' reports of aggression and total externalizing problems. Later legal infractions were predicted by mother- and youth-reported delinquency; mother-reported aggression; and mother-, teacher-, and child-reported

total externalizing problems. Consistent with Farrington et al. (2001) and similar work seeking to explain intergenerational continuity of antisocial behaviors, maternal and paternal history of ASPD was correlated, although relatively modestly, with later arrest ($r = .23$ and $r = .11$ for father and mother ASPD, respectively). Interestingly, however, maternal history of ASPD was more strongly correlated with the delinquent, aggressive, and total externalizing growth factor scores than paternal history of ASPD, suggesting that maternal ASPD symptoms may play a nontrivial role in the development of youth externalizing problems. Greater maternal and paternal years of education and income were also associated with decreased likelihood of adulthood arrest, and to a lesser extent, legal infractions, which may be attributable to the wider variety of behaviors captured by legal infractions (i.e., receiving a speeding ticket to being convicted of a non-traffic police offense).

There are several notable advantages to the current study. First, the high-risk and unique characteristics of the study population provided greater variability in subsequent aspects of later functioning than would be expected from a traditional community sample. This sample was then followed through multiple decades of assessment, providing remarkably detailed information into participants' lives over time from multiple perspectives. In addition, this study utilized a thorough set of covariates, which represented a far more comprehensive set of explanatory variables than is conventional. In addition, the data utilized for this study were collected at many measurement occasions across childhood and adolescence, rather than relying on retrospective reports, enhancing confidence in data quality.

There are also several limitations that warrant attention. As with any non-experimental design, we must use caution in concluding that earlier problem behaviors "cause" the later outcomes, and rather focus on the idea that these earlier problem behaviors can *tell us something* about later outcomes through conceptualization of earlier issues as risk factors or indicators. Youth are situated in particular social, cultural, and economic systems that influence developmental outcomes. While it is certainly possible that childhood problem behaviors make it more difficult or "get in the way" of youth functioning optimally later in life, potentially through experiential canalization and person-environment transactions, the present analyses do not allow for causal inferences. Second, while following participants to age 32 encompasses the initial years of adulthood, participants will undoubtedly continue to grow and change in ways that are not captured here but may be important (e.g., participants who have children after age 32 vs. those who never have children were both categorized in the current study as without children, but these groups may be quite different). Third, the identity of youths' teachers presumably changed yearly, which makes any conclusions drawn from teacher-report inherently the result of many different perspectives in a way that is distinct from maternal, paternal, or self-reports. Fourth, aside from standardized clinical interviews to assess parent psychopathology and cognitive testing to assess child cognitive ability, all other data was based on questionnaire report. Fifth, covariates about parents (i.e., marital functioning, mental health history, income, education) was restricted to biological parents given initial recruitment approach and efforts for parsimony, and this ignores potentially important contributions of stepparents; of note, marital quality inherently does not fully capture any post-divorce relationship functioning between biological parents, which may be an important factor in many youths' lives. Sixth, our missing data analysis suggests that youth with lower cognitive ability, more externalizing

problems, and more parental psychopathology were less likely to provide outcome data at follow-up. The missing data in adulthood from particularly at-risk youth is unideal, and could bias estimates of the main effects of interest. Notably, however, the associations between these early variables and missingness tended to be modest in magnitude, and predictors of missingness were typically included in models, which can help attenuate missingness-induced bias when full-information estimation techniques are used. Seventh, compared to the other scales, intercept and slope factor scores for delinquent behaviors were quite strongly associated ($r_s > .60$), which raises potential concerns regarding multicollinearity. However, though this may have contributed to the width of the confidence intervals, the magnitude and precision of regression coefficients was not notably different compared to the other externalizing scales.

We encourage future longitudinal studies of children's externalizing behaviors to include multiple informants, particularly from different contexts (i.e., adult at home, adult at school, and self-report), as these reports at times yield overlapping findings but also often appear to provide unique associations, particularly self-report (e.g., the connection between earlier delinquent behaviors and later decreased romantic relationship quality). Future studies may also benefit from considering that mother, father, and teacher reports of total externalizing problems (i.e., combined delinquent and aggressive behaviors, rather than delineated) most robustly predicted later outcomes above and beyond covariate inclusion, indicating that the additive impact of all externalizing behaviors may be most relevant for understanding later outcomes. On the other hand, this pattern was not observed in youth report, such that youths' delinquent behaviors in particular, although often weaker, were related to more challenging outcomes later on. Thus, potential interventions that rely on informant reports to assess effectiveness are recommended to examine a cumulative externalizing problem scale as well as its subcomponents. Finally, given that externalizing problems were particularly robustly linked to later challenges in educational attainment and legal challenges, interventions that target youth referred with elevated externalizing concerns should consider including components that support academic progress, thoughtful decision-making in behaviors, and transition planning as youth age.

Taken together, these results add to the body of literature signifying the importance of youth externalizing problem behaviors on later adulthood functioning, particularly with regard to educational attainment and legal infractions, and further indicate the need to understand the assessment, emergence, maintenance, and potential interventions that may be used to address these behaviors. They likewise suggest that the appropriate timing for initiation of such interventions, as well as how intervention success is operationalized and measured, need to be considered carefully.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S0954579421001772>

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Conflicts of interest. None.

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