Journal of Current Research and Review
Volume 13, Number 5; May-2022;
ISSN: 2836-5615 | Impact Factor: 6.19
https://zapjournals.com/Journals/index.php/jcrr/index
Published By: Zendo Academic Publishing

QUANTIFYING THE RELATIONSHIP BETWEEN FATHERS, INVOLVEMENT, AND RISKY BEHAVIORS IN ADOLESCENCE

[1]Goncy, E and van Dulmen, M[2]

Article Info

Keywords: organized crime, disorganized crime, security issue, societal problem, United Nations, European Union, Sweden, gang crime, conceptual confusion, definition issues, degree of organization, criminal organizations, prevention, combat.

Abstract

Organized crime is often perceived as a more serious problem than disorganized crime due to its repetitive nature and profit-seeking motives. The United Nations and the European Union have recognized organized crime as a significant security issue and have called for international cooperation to combat this phenomenon. Sweden, in particular, has experienced a rise in organized crime and violence related to it, leading the government to identify organized crime as a major threat to national security. The growth of gang crime, especially street gang-related crime, has been a concerning trend in Sweden. Despite the recognition of organized crime as a societal problem, there is a lack of consensus on its definition and conceptualization. Different approaches to understanding organized crime have contributed to conceptual confusion and varying assessments of the same situation. The focus on defining what is "organized" rather than the "crime" itself has been proposed as a solution to this issue. Researchers argue that studying the degree of organization in organized crime rather than relying on standardized definitions can provide a more comprehensive understanding of the phenomenon. This approach emphasizes the need for a nuanced examination of the structures, hierarchies, and coordination within criminal organizations. By exploring the complexity of organized crime, policymakers and researchers can develop more effective strategies to prevent and combat this multifaceted threat.

1. Introduction

The proportion of young offenders across England and Wales grows (see HM Government, 2018), and adolescent risky behaviours have an association with low educational attainment, future risks of adult morbidity and early mortality (Pound and Campbell, 2015). Investigations by scholars of links between child delinquency and their parents' behaviour have generated a sizeable body of research in multiple disciplines, although causal connections

[1]School of Social Sciences, The University of Manchester, Humanities Bridgeford Street, Manchester, M15 6FH, United Kingdom
[2]Leeds University Business [2] School, Maurice Keyworth Building, Woodhouse, Leeds, LS2 JTT, United Kingdom

remain unclear because of the multidimensional nature of both parenting and delinquency (Goetting, 1JJ4). Loeber and Stouthamer-Loeber (1J86) reported that families with children displaying problem behaviour had disturbed family relations, impaired child-rearing practices and negative perceptions of one another by par-ents and children. Scholars such as Amato and Rivera (1JJJ) and Ramchandani et al. (2013) posit that parent-child bonds play a key developmental role in formation of child behavioural patterns, but more research is required to clarify the differential effects of mothers and fathers in this respect. Our specific goal in this paper, is to establish whether the degree father-child involvement and closeness is associated with the development of adolescent risky behaviours above and beyond the effect of mother-child involvement and closeness.

In the last forty years, there has been an increase in research exploring the effects of fathers on their children. This has followed a societal shift in norms and expectations around what constitutes 'good' or involved fathering (Dermott and Miller, 2015; Norman, 2017), a rise in maternal employment after childbearing (Raley et al., 2012), and the mainstreaming of ideologies that support a more egalitarian division of labour (Cano et al., 201J). Research that explores the relationship between fathers' childcare involvement and child development shows that, in some cases, fathers' involvement has a positive effect above and beyond the mother's involvement (e.

g. Amato and Rivera, 1JJJ; Cabrera et al., 2007; Cano et al., 201J; Goncy and van Dulmen, 2010; McMunn et al., 2017). However, such studies either use simplistic regression or path analysis methods, small scale or cross-sectional data, or, with the exception of Amato and Rivera (1JJJ), do not sufficiently account for important mediating factors that might affect child outcomes such as the quality or closeness of the parentchild relationship. This paper addresses this shortfall by exploring the relationship between fathers' and mothers' childcare involvement and children's behaviour through a more sophisticated Structural Equation Modelling (SEM) framework that accounts for important mediating factors related to the quality of the parental-child relationship.

Paternal involvement can affect a variety of child developmental outcomes. For instance, Lamb et al. (1J85) refer to evidence that fathers' involvement has beneficial effects on children's cognitive performance, achievement motivation, social competence and psychological adjustment. Lamb (2010) argues that paternal involvement enhances children's cognitive development because of the exposure to differential influences of parenting behaviours of mothers and fathers. Cano et al.'s (201J) analysis of Australian longitudinal, timediary data found that total father-child time in educational activities was associated with considerable improvements in children's cognitive functioning. Goncy and van Dulmen (2010) analysis of the National Longitudinal Study of Adolescent Health in the United States found that father's involvement was a protective factor for children's engagement into risky behaviours and related delinquencies. How-ever, many scholars urge caution over whether father's involvement is causally related to variation in children's outcomes, as confounders of this causal relationship are difficult to account for (see, for example, Lamb, 2010; Cobb-Clark and Tekin, 2011). We note the difficulty in measuring causality although the use of an SEM modelling framework allows us to better explore some of the direct and indirect effects.

In this paper, we use Lamb et al.'s (1J85) operational definition of paternal involvement defined as direct engagement with, accessibility to and responsibility for the child. This definition provides an efficient and useful way to summarise and quantify a range of childcare activities (Norman, 2017). Of the three dimensions, engagement - defined as time spent in one-on-one interactions between a father and a child-speaks most directly to the father-child relationship and is also the most easily quantifiable with secondary data. This engagement component of the father-child relationship is utilised in our study but referred to hereafter as paternal involvement.

2. Father involvement and children's risky behaviour - what do we already know?

Some of the existing empirical literature reports that paternal involvement, is a significant protective factor against adolescent delinquency even after con-trolling for mother's involvement (see e.g. Flouri and Buchanan, 2002; Goncy and van Dulmen, 2010; Harris et al., 1JJ8; Hoeve et al., 200J; Yoder et al., 2016). However, this finding

is not universal. For example, Flouri and Midouhas's (2016) analysis of problem behaviour across early-to-middle childhood could not establish that father involvement consistently predicted reduced child problem behaviour across different age groups. Some scholars highlight that the quality of father-child relationshipmay be more important for child delinquency trajectories than the amount of time fathers spend engaged with their children (e.g. Cobb-Clark and Tekin, 2011; Yoder et al., 2016). This suggests that accounting for the quality or 'closeness' of the parental relationship is important when exploring the association between paternal involvement and child risky behaviour Notwithstanding these nuances, how might paternal involvement and child problem behaviour be connected? Theoretical positions expressed in Amato (1JJ8) assert that father-child interactions involving emotional support, caring, supervision and discipline have a positive influence on child outcomes (cited in Williamsand Kelly, 2005). Paternal engagement with children in, for exam-ple, play and educational activities may communicate and enhance a healthy relationship with their children, thus deterring children from forming bonds with deviant peers (Flouri and Midouhas, 2016). This theoretical perspective implies that children's disruptive behaviours may arise from suboptimal levels of father's involvement, but of course, other causal mechanisms are plausible. An-other explanation is that fathers and children do share the same genetic makeup and maybe this shared genotype leads to difficult behaviours in both father and child. Children's problem behaviours may also cause fathers' withdrawal from parenting. However, the absence or insufficient levels of paternal involvement leading to children's problem behaviour finds the most support in literature in this area (see Flouri and Midouhas (2016) for discussion).

The association between father's involvement and children's problem behaviour may depend on factors such as child's sex and age. Some literature stresses the importance of parenting in the early years of child's life (e.g. see Hoeve et al., 200J; Pleck and Hofferth, 2008). For instance, Ramchandani et al. (2013) found that disengaged and remote interactions between fathers and children were associated with the onset of externalising disorders (i.e. disruptive, hyperactive and aggressive behaviours) in infants aged as young as one year old. However, others note that father's influence on externalising behaviours is not limited to child's early years and remains influential in adolescence (e.g. Liu, 2004; Williams and Kelly, 2005; Yoder et al., 2016). The period of adolescence is often marked by children distancing themselves from their parents, as they become more autonomous and start spending more time with friends than with family (e.g. see discussion in Collins and Russell, 1JJ1; Tacobson and Crockett, 2000 and Pleck and Hofferth, 2008). This distancing may be even more pronounced with fathers than mothers given some studies show that the father-child relationship involves less warmth compared to mother-child relationship (e.g. Pleck and Hofferth, 2008) as well as less support, mutuality and closeness (Collins and Russell, 1JJ1; Laible and Carlo, 2004). Pleck (1JJ7) refers to evidence that for female children, relationships with a father in adolescence may grow more distant than for boys. These changes may have implications on how father-child relationship contributes to adolescent risky behaviours. Scholars who find evidence of fathers' contributions to the aversion of children's risky behaviours advocate for the inclusion of fathers in delinquency prevention pro-grams. They suggest that such programs should include an agenda for encouraging fathers to actively engage in meaningful activities with their children (e.g. Goncy and van Dulmen, 2010; Yoder et al., 2016).

3. What influences risky behaviour in adolescence?

In adolescence, peer-relationships become especially important for children's development (Berndt, 1J7J; Brown, 1JJ0; Tacobson and Crockett, 2000; Larson and Richards, 1JJ1) as they spend more time with peers, unsupervised by their parents (Curtis, 2015; Dekovi'c et al., 2004; Pleck and Hofferth, 2008). Adolescents are inclined both to experiment and to alter their behaviour to conform with their perceptions of the expectations of their peers (Bosse et al., 2010), and so antisocial friends may foster child's engagement in delinquencies (Tose et al., 2016). Delinquent friends may provide an ethos of values and support reasoning that justifies risky behaviour, and introduce the adolescent to new (risky) behaviours (Dekovi'c et al., 2004). With a more nuanced perspective,

Thornberry's (1J87) interactional theory of delinquency states that antisocial behaviour develops iteratively, through mutual influence of societal and peer controls, delinquent learning and reinforcement of delinquent behaviour. Relatedly, Tose et al. (2016) provide evidence that the relationship between peer influence and antisocial behaviour is bi-directional; antisocial children also choose the company of antisocial peers.

Parental monitoring, defined as parents' knowledge about their children's activities, friends and whereabouts (Tacobson and Crockett, 2000), is widely dis-cussed as a buffer that prevents children from partaking in risky behaviours (e.g. Tacobson and Crockett, 2000; Dishion et al., 2004; Hoeve et al., 200J) and from building networks with antisocial peers (e.g. Dekovi'c et al., 2004). Parental knowledge may come from parents' active surveillance of children's activities and relationships or from children's voluntary disclosure of information to their parents (Donaldson et al., 2016). Parent-child closeness may promote children's voluntary disclosure, as 'closeness may act as a buffer in problematic discussions and arguments' (Goncy and van Dulmen, 2010). Tacobson and Crockett (2000) argue that between the ages of 14 and 16, parental monitoring can be especially important, as this is the time when direct parental involvement is declining, peer influence is peaking, and there are more opportunities for risky behaviour. Drawing on transactional theories that posit mutual influence of individuals and their environments, scholars also find that the relationship be-tween parental monitoring and child delinquency is bidirectional (Coley et al., 2008; Dishion et al., 2004). Thus, delinquent behaviour develops when there is a lack of parental control, but parental control and involvement ceases under pressure of child's delinquent behaviour and influence of antisocial peers (Dish-ion et al., 2004).

Some scholars suggest that parent-child closeness is an indicator for underlying relationship harmony (see Vazsonyi et al., 2003), which in turn plays a major role in the development of adolescent behaviour (see Dekovi'c et al., 2004), including avoidance of risky behaviour (see for example Goncy and van Dulmen, 2010). Meaningful emotional bonds are established through parents spending time, and being involved, with their children (Amato and Rivera, 1JJJ; Goncy and van Dulmen, 2010; Hsin and Felfe, 2014). Also, through the time spent together, parental knowledge, skills, attitudes and expectations are imparted to children (DavisKean, 2005; Hsin and Felfe, 2014). Formation of parent-child relationships and children's risky behaviours in adolescence can be moderated by parents' and children's individual characteristics (Goncy and van Dulmen, 2010). For instance, depending on the child's characteristics (e.g. sex, race or child's personality) and family context (e.g. the parents' employment statuses), parental monitoring and parent-child closeness may be constructed differently. Social control theory suggests that stronger parent-child bonds prevent children from engaging in delinquencies and from forming bonds with delinquent peers, either due to stronger parental control or family values internalised by children. On the other hand, perspectives from social learning theory (Bandura, 1J77) suggests that children may actually learn both risky behaviour and justifications of such behaviours from parents if the relationship is close and the parents own behaviour is also risky. For instance, Donaldson et al. (2016) find that parental alcohol and substance use increase the likelihood of children's alcohol and substance use. On the other hand, findings in Nielsen (201J) support social control theory, as their findings suggest the effect of parent-child bond and parental monitoring on adolescent offending is not moderated by parents' criminal convictions.

4. Current study

In this study, we develop a statistical model that takes account of the longitudinal effect of parental involvement by examining how the involvement of both parents in early adolescence (age 11) is associated with their children's subsequent risky behaviour (at age 14), controlling for the extent of prior parental involvement at age 7.

The model tests for parental involvement and parent-child attachment for both parents because the mother's and father's roles are co-evolving parts of a larger co-parenting/family system (Cabrera et al., 2014).

In our analysis, we use identical measures for mothers' and fathers' involvement. Our focus is on whether fathers' and mothers' engagement in (the same) childcare activities contributes to adolescent behaviour, and so we employ the same operationalisation.

Methods used in studies that attempt to link father's involvement with their children's externalising and adolescent risky behaviours are often limited to regression analysis (see for example Flouri and Buchanan, 2002; Goncy and van Dulmen, 2010; Ramchandani et al., 2013). Here, we use the more flexible tool of Structural Equation Modelling (SEM). The SEM approach allows us to infer values of latent constructs (e.g. mother's and father's involvement, adolescent risky behaviour) from multiple observed indicators, whereas commonly used techniques of regression analysis are only suitable for analysing directly observed variables (Kline, 2016). Further, SEM allows to examine complex relationships among variables beyond the capacity of multiple regression, such as an interplay of familial and peer influences on adolescent risky behaviour in a longitudinal design.

Our study adds to the body of parenting research that studies adolescent behaviour as shaped by both mothers and fathers. Using SEM allows us not only to measure and compare effects of maternal and paternal involvement, but also to incorporate mediators of the relationship between parental involvement and adolescent risky behaviour outlined in existing literature (i.e. mother- and father-child closeness, association with delinquent peers and parental knowledge). We base our modelling on the theoretical perspective that risky behaviour is a result of a sub-optimal amount of parental involvement. We present a model that suggests that the lack of parental involvement feeds into a more disconnected relationship between parents and their children. The latter consequently results in less parental knowledge and more association with delinquent peers, whereas parental knowledge and delinquent peers interact and shape adolescent risky behaviour. The analysis also controls for important covariates of risky behaviour such as parents' alcohol and drug use, and the child's sex.

4.1. Data

To examine the effects of involved fathering, we use data from the fourth (age 7), fifth (age 11) and sixth (age 14) sweeps of the Millennium Cohort Study (MCS). The MCS is a nationally representative cohort study of UK children born around the start of the new millennium. Families were initially surveyed when children were around nine months old with the latest, seventh sweep taken when children were aged 17 years. Following Curtis (2015), developmental classification, we define the period when the MCS data at age 11 (Sweep 5) was collected as early adolescence, and the period when data for age 14 (Sweep 6) was collected as adolescence.

This analysis uses data on adolescent risky behaviour from the MCS: Young Person Questionnaire which contains self-report data about children's activities, thoughts and feelings. Data on parenting activities and parents' characteristics were obtained from the MCS: Parent Questionnaires. The mothers' and fathers' questionnaires differ in terms of content. In a small proportion of cases, when one of the parents was temporarily away or incapacitated, the second parent completed their interview as a proxy. Data on child conduct problems was obtained from the Strengths and Difficulties Questionnaire (SDQ) - completed by main respondent.[3] The SDQ is a popular behavioural screening tool that measures psychopathology and prosocial behaviour in children and adolescents (Goodman, 2001).

The analysis sample was restricted to those cohort members living with both natural parents who were present in all three sweeps under consideration, i.e. between child's ages of 7 and 14. Lone and same-sex parents were excluded from the analysis as factors defining the sharing of care in such households are different. Between the fourth and the sixth sweeps, the sample of cohort children followed by the MCS reduced by 15% (i.e. from 14,043 to 11,884) due to dropout from the survey, with 10,44J children appearing in all three sweeps. By the sixth sweep,

[3] Mothers were selected to be main respondents in almost all cohort families.

there were 5,587 cohort children who had been consistently living with their biological parents interviewed during all three focal sweeps (either in person or by proxy). Data from these cohort members was considered in the analysis.

To understand the differences between the families in the analysed sample and the families that were excluded from the analysis, but which appeared in the survey between ages 7 and 14, we compared the two samples on a range of demographic and risky behaviour variables. This comparison did reveal significant differences between the analytic and non-analytic samples. Points of note are that the non-analytic sample had a much smaller proportion of two-parent families and a much larger proportion of families in lower income quintiles. Adolescent risky behaviours were also more prevalent in the non-analytic sample. These issues are picked up in the concluding sections of the paper.[4]

The analysis avoids introducing a single-source bias, which is a concern in similar studies (e.g. Amato and Rivera, 1JJJ), by using children's reports about their behaviours and relationships with parents, and parental reports regarding the levels of mother's and father's direct involvement with children.

The data on children's self-reports of delinquency might potentially be affected by social desirability bias, as adolescent's risky behaviours are not normally encouraged by parents, teachers or the wider society. Notwithstanding this limitation, measuring delinquent behaviour of young people through self-reports is a standard procedure in criminology as it is often the best available option. Bosse et al. (2010) posit that selfreports can be considered a reliable tool for capturing delinquent behaviour if the data collection is conducted anonymously. During data collection for the MCS, cohort members reported their own risky behaviours on an interviewer's tablet and were encouraged to answer questions in private (Centre for Longitudinal Studies, 2017). We might reasonably assume that any social desirability bias was mitigated by this procedure (although we have no way of assessing this directly).

4.2. Measures

A complete list of variables used for measuring constructs in our analysis is presented in Table A1 in the Appendices.

4.2.1. Focal variables

(a) Mother's and Father's Involvement (Age 7 and 11)

Following Lamb et al.'s (1J85) classification, parental involvement is measured in terms of engagement or interaction activities (e.g. playing indoor games or sports, telling stories or reading). The measure does not account for routine childcare or passive supervision (time spent with their children but without engaging in joint/shared activity). An identical set of activities was used for calculation of maternal and paternal involvement.

Continuous factor scores of parental involvement were generated using SEM. The factor scores represent parental involvement at age 7 ($\alpha = 0.71$ for mothers and 0.70 for fathers) and at age 11 ($\alpha = 0.51$ for both measures). Low alpha may be due to the low number of observed indicators (see Tavakol and Dennick, 2011), i.e. only three items at age 11. Despite the score reliability for measures at age 11 being somewhat lower than a recommended cutoff of 0.70 (Kline, 2016), we argue that the use of the score is justified as our choice of indicators of parental involvement is grounded in sociological theory.

(b) Parent-child Closeness (Age 14)

The degree of parent-child closeness was measured with a single questionnaire item, ranging from 'Not very close' to 'Very close', responded to by cohort members themselves in adolescence.

(c) Parental Monitoring (Age 14)

[4] Variable averages and corresponding p-values for the analytic and non-analytic samples are provided in Table A3 in the Appendices.

Information about parental monitoring was contained in three items describing how often parents knew about children's whereabouts, company and activities. This information was reported by the cohort children. A continuous latent score representing parental monitoring for each child in the sample was estimated using SEM ($\alpha = 0.7J$).

(d) Association with Delinquent Peers (Age 14)

A measure that reflects children's association with delinquent friends was developed based on adolescents' reports. Based on categorical responses, a continuous latent score of association with delinquent peers was estimated using SEM ($\alpha = 0.73$).

(e) Adolescent Risky Behaviour (Age 14)

The continuous measure of adolescents' risky behaviours was derived using SEM ($\alpha = 0.72$) based on selfreported data on whether the child partook in 24 activities that are considered either dangerous (e.g. taking drugs), illegal (e.g. shoplifting) or antisocial (e.g. online bullying).

4.2.2. Additional controls

(a) Parents' Risk Drinking (Age 14)

In the MCS, risk drinking[5] was assessed using Alcohol Use Disorders Identification Test (AUDIT). The AUDIT is an alcohol screening tool used by the World Health Organization (WHO) (Centre for Longitudinal Studies, 2017). Suggested AUDIT cutoffs for diagnostics of risk drinking and alcohol disorders vary by countries, population groups and circumstances (Nadkarni et al., 201J). Our analysis uses a cutoff of five points and above to define 'risk drinking' on the AUDIT scale, as stipulated in the MCS User Guide (Centre for Longitudinal Studies, 2017).

(b) Parental drug use (Age 14)

An indicator of parent's consumption of recreational drugs was assigned a value of 1 if a parent reported that they had used any recreational drugs such as cannabis, cocaine or ecstasy in the past year, either occasionally or regularly. Our analysis accounted for mothers' and fathers' drug use separately (i.e. one indicator of drug use per parent).

(c) Child's Race

Variation of race in the analysis was captured by a binary indicator that took a value of 1 if a child was of white background, and 0 otherwise.

(d) Child's Sex

A binary indicator of sex that split the sample into male and female cohort children was based on a biological sex assigned at birth.

(e) Child's impulsivity (Age 14)

Risk-taking was evaluated by a score reflecting adolescents' propensity to gamble in Cambridge Gambling Task (CGT) (Centre for Longitudinal Studies, 2017).

(f) Child's conduct problems (Age 14)

To capture conduct problems we used a conduct problems score from the Strengths and Difficulties Questionnaire (SDQ). As part of the SDQ, mothers reported whether their children had such conduct problems as temper tantrums, frequent fighting with and bullying other children, lying and cheating, stealing from home or elsewhere, and being generally disobedient.

4.3. Data analysis

[5] *Risk drinking* is defined as 'drinking at levels or in patterns that increase the risk of alcohol-related harm' (Dawson, 2011).

In this study, we test whether paternal involvement in childcare during early adolescence is associated with adolescent risky behaviour, accounting for important mediators. Drawing on theoretical perspectives and empirical findings discussed above, our analysis tests the following three hypotheses:

H1. Paternal involvement with their child at age 11 is associated with adolescent risky behaviour at age 14, above and beyond the effect of maternal involvement.

H2. Paternal involvement at age 11 has a positive association with father-child closeness at age 14. **H3**. Fatheradolescent closeness at age 14 is associated with parental monitoring, delinquent friends and partaking in risky behaviours at age 14.[6]

A graphical representation of the theoretical model is shown in Fig. 1, which illustrates the relationships between the explanatory and outcome variables of interest but omits additional controls.

The model describes how parent-child relationships in adolescence change the system of equations that links parental involvement in childhood and early adolescence to adolescent risky behaviour. We do not expect a major direct statistical effect of parental involvement in early adolescence on adolescent risky behaviour due to the temporal lag, and the influence of ever-changing, extrinsic characteristics of child's environment. However, it is plausible that parental involvement may still have a significant indirect effect on adolescent risky behaviours. The model also accounts for adolescents' closeness with parents, parental monitoring, and the presence of delinquent peers. We account for child's closeness with each parent and control for mother's and father's involvement separately to allow comparisons. We control for parents' alcohol and drug use in our model in order to estimate the effect of parents' own risky behaviour on parent-child bonds, children's relationships with peers and adolescent risky behaviour.

Our analysis uses Structural Equation Modelling (SEM) in the statistical package R. SEM is a widely used statistical tool for estimating structural relationships and measuring latent constructs. We apply a two-stage approach to SEM. In the first stage, we estimate a measurement model that infers values of latent constructs (i.e. mother's and father's involvement, parental monitoring, association with delinquent peers and adolescent risky behaviour) from their observed indicators. Based on a covariance matrix between the indicator variables, values of a latent trait are generated and assigned to each individual in the sample. In order to synthesize latent trait values, we use a Graded Response Model (GRM), which calculates continuous factor values based on ordered categorical observed responses (Samejima, 1J6J). In the second stage, we estimate a structural model that reflects structural relationships among latent and observed constructs. The structural model uses inferred scores of unobserved variables calculated in the measurement model.

In the model, levels of parent-child closeness when the child is 14 are predicted by the levels of parental involvement when the child is both aged 11 and aged 7 so that the effect of earlier parental involvement on the development of parent-child relationships in adolescence is explored. The model also allows for correlation between mother-child and father-child closeness at age 14. The levels of parent-adolescent closeness are, in turn, used to predict the extent of parental monitoring and adolescents' associations with delinquent peers. Then, direct effects of parental monitoring, delinquent friends and parent-adolescent closeness on child's risky behaviour are estimated.

Finally, the model accounts for the effects of children's and parents' individual characteristics on both parent-child relationships and on adolescent risky behaviours. Child-related additional controls include children's sex

[6] We further discuss these associations in the context of mediation analysis. However, we acknowledge that constructs related to H3 are measured at the same time point (i.e. at age 14), while mediation requires the cause to precede the effect. Thus, our analysis heavily relies on a strong assumption that similar results would be obtained if the measurement of fatherchild closeness preceded the measurement of parental monitoring and peer risky behaviour, and the latter two preceded the measurement of adolescent risky behaviour.

and race, conduct problems and risk- taking. Parent-related controls comprise parents' use of drugs and risk drinking, in order to control for parental deviance.

Missing data was observed in all variables used in the analysis. Almost all of the focal constructs had lower than 10% of missing

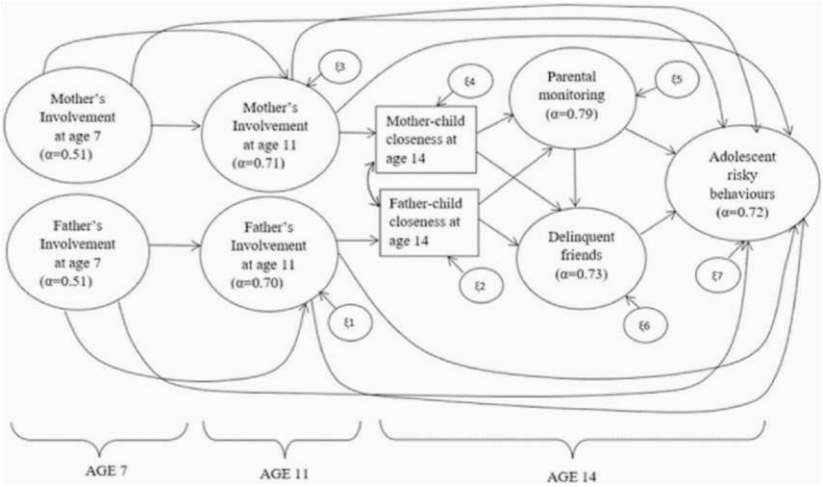

Fig. 1. Path diagram for structural model for the mediated effect of parental involvement on the risky behaviours of adolescents.

Note: Ellipses denote calculated factor scores; rectangles represent directly observed constructs. Single-headed arrows connect independent variables with outcome variables in regressions, and double-headed arrows represent covariance. values, including father's involvement (J.67% at age 7 and 5.J6% at age 11) and mother's involvement (0.32% at age 7 and 0.45% at age 11), parent-child closeness (2.0J% at age 14), parental monitoring (2.17% at age 14) and risky behaviour (6.37% at age 14). The only focal construct with a considerable proportion of missing values was the construct of delinquent friends (36.J0% at age 14). Missing data was imputed using Fully Conditional Specification (FCS) in R with the use of package mice. FCS is a suitable approach for imputing missing multivariate categorical data where missing values occur in more than one variable (Van Buuren and Groothuis-Oudshoorn, 2011). The imputation of items was based on responses to all variables from the model and some additional relevant variables.[7]

5. Results

5.1. General estimation results

Overall, the estimated model had good fit (i.e. Robust CFI = 0.J51, Robust TLI = 0.J07, RMSEA = 0.045 and SRMR = 0.025). This suggests that hypothesised relationships between variables appear to be very similar to actual relationships observed in the analysed data.

In Fig. 2, estimated path coefficients are shown graphically. The additional covariates are omitted from Fig. 2 for clarity.

Table A2 in the Appendices gives a complete list of standardised coefficients in the structural model and their corresponding p- values.

The results show that adolescent risky behaviours were predicted by parental monitoring and friendships with delinquent friends.[8]

[7] Further details about the missing data analysis and imputation can be obtained from the authors upon request.

[8] Additionally estimating a linear regression showed that parental monitoring and delinquent peers accounted for 41% of variation in adolescent risky behaviour.

The effects are intuitive with delinquent friends being associated with higher levels of risky behaviour and parental monitoring being associated with lower levels. Parental monitoring and delinquent peers were negatively associated.

Closeness with each of the parents predicted higher levels of parental knowledge, possibly suggesting that children are willing to disclose more to parents if parent-child bonds are strong. Higher levels of closeness with parents also predicted lower association with delinquent peers, which agrees with propositions of social control theory. In confirmation of H3, father-child closeness at age 14 had a significant association with contemporaneous parental monitoring, delinquent peers and risky behaviour.

The data confirms that father-child closeness had significant effect on the dis-cussed constructs, above and beyond the effect of mother-child closeness. Close relationships in adolescence between a father and a child lowered association with delinquent peers and boosted parental monitoring. Moreover, father-child closeness had a significant direct negative (reducing) effect on risky behaviour.

Mothers' and fathers' closeness with children had a differential effect on risky behaviour. Mother-child closeness affected risky behaviour only indirectly, through increasing parental monitoring and decreasing association with delinquent peers. Father-child closeness was more strongly associated with fewer delinquent friends, whereas mother-child closeness was more strongly associated with more parental monitoring. The results further showed that closeness with one parent was strongly positively associated with closeness with the other parent (the covariance between mother-child and father-child closeness was 0.648).

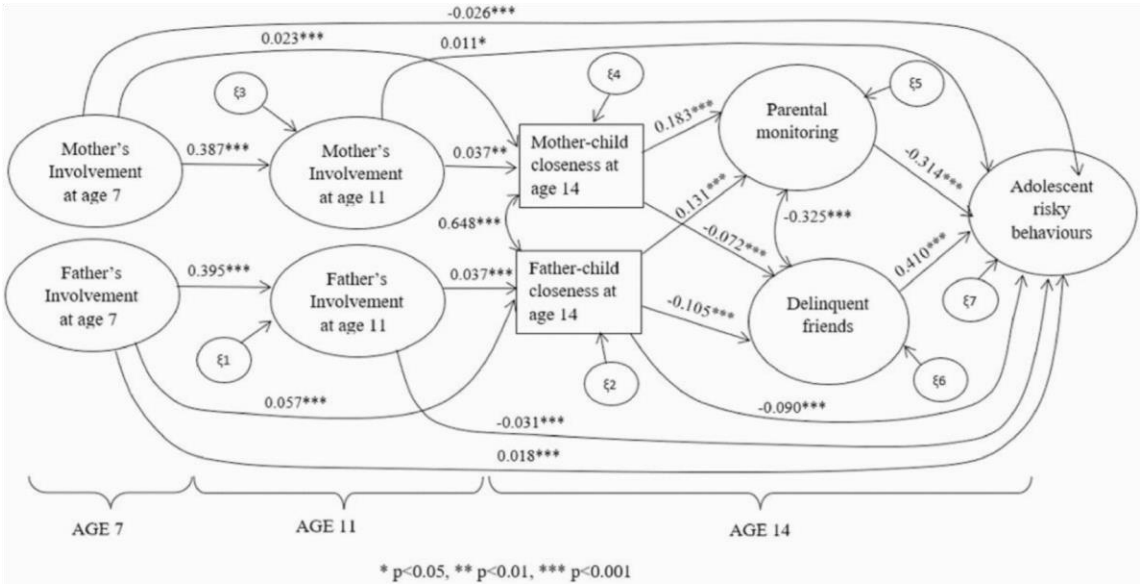

Fig. 2. Path diagram for structural model for the mediated effect of parental involvement on the risky behaviours of adolescents.

The model suggests that father's involvement at age 11 has a significant positive contribution towards fatherchild closeness at age 14, which confirms H2. The effect of father's involvement in early adolescence (i.e. Age 11) on father-child closeness in adolescence (i.

e. Age 14) was exactly equal to the effect of mother's involvement on mother-child closeness and both effects were small in magnitude (i.e. 0.037 SD).

As shown in Fig. 2, involvement of both parents at age 11 was strongly predicted by their involvement at age 7, and earlier parental involvement had an independent effect on parent-child closeness at age 14. The effects of both parents' involvement were not fully mediated by other components of the model. The residual direct effects of parental involvement at age 7 and age 11 on risky behaviour at age 14 were surprisingly inconsistent. Fathers'

involvement at age 11 had a direct association with lower levels of risky behaviour, whereas their involvement at age 7 was, on the contrary, associated with more delinquency. The non-mediated effect of mothers' involvement at age 7, on the other hand, was related to less delinquency, whereas maternal involvement at age 11 had a remaining positive effect on adolescent risky behaviour at age 14. This strange pattern of effects of paternal and maternal involvement may be a result of mediators not accounted for in our analysis.

5.2. Calculation of total effects

Mother's and father's involvement were linked with adolescent risky behaviours both directly and indirectly (through other focal components of the model). The total effects of parental involvement are shown in Table 1, together with the total effects of mother- child and father-child closeness on adolescent risky behaviours.

Total effects were obtained by summing up direct and indirect effects, whereas indirect effects were calculated by multiplying coefficients along paths.

The total effects in Table 1 reveal that higher levels of father's involvement at age 11 was significantly associated with lower levels of engagement in risky behaviour in adolescence. This finding confirms the above stated H1. In contrast, higher levels of mother's involvement at age 11 had no significant association. We tested a post-hoc hypothesis that mothers' involvement was not significant as a result of lower variability of mothers' relative to fathers' involvement, as mother's involvement is normative (Harris et al., 1JJ8). However, contrary to what was expected, mothers' involvement varied more (SD = 0.88 at both age 7 and 11) than fathers' involvement (SD = 0.86 at age 7 and SD = 0.83 at age 11).

Table 1 also shows that closer relationships with either parent were associated with less engagement in risky behaviour among adolescents. The total effect of father-child closeness on children's risky behaviours was twice the size of the total effect of mother- child closeness.

5.3. Effects of additional controls

A cohort member's sex was strongly associated with parental involvement, parent-child closeness, parental monitoring and adolescent risky behaviours. The results revealed that, at age 11, fathers were more involved with male children, whereas mothers were more involved with female children. On aver-age, male cohort members reported closer relationships with both parents in adolescence than female cohort members. Parental monitoring of male adolescents was, on average, less than parental monitoring of female adolescents. The analysis also revealed that at age 14 male adolescents engaged in delinquencies significantly more frequently than their female counterparts. **Table 1**

Standardised total effects of parental involvement and parent-child closeness on adolescent risky behaviours at age 14, *p < 0.05, * * p < 0.01, * * *p < 0.001.

Construct	Total effect	P (> z|)
Father's involvement at age 11	− 0.038***	0.000
Mother's involvement at age 11	0.007	0.135
Father-child closeness at age 14	− 0.174***	0.000
Mother-child closeness at age 14	− 0.087***	0.000

To complement our analysis, we re-ran the model separately for male and female children rather than controlling for sex variable in the model. This additional analysis did not demonstrate significant differences in the role that parents played for boys or girls. Produced total effects of parental involvement and parent-child closeness were nearly identical in two models, and so were the measures of fit.

From the model, cohort members with reported conduct problems (i.e. who were disobedient and had hot tempers, often lied or cheated, etc.) had more distant relationships with both parents. At the same time, the negative effect of conduct problems on mother- child closeness was higher than on father-child closeness. The figures also showed that children with conduct problems were monitored by parents less.

Cohort member's impulsivity was only mildly associated with parental monitoring and risky behaviours. Impulsivity did not have a significant effect on other focal components of the model.

Parents' engagement in risky behaviours (i.e. substance use and risk drinking) were significantly associated with the cohort members' own engagement in risky behaviours in adolescence. As Table A2 shows, both parental risk drinking and substance use were associated with lower levels of parental monitoring and more exposure to delinquent peers.

6. Discussion

The aim of this paper was to explore how paternal involvement at age 11 affects adolescent risky behaviours, accounting for possible mediators related to parent-child relationships in adolescence. Paternal involvement at age 11 was significantly associated with lower levels of adolescent risky behaviour at age 14. Using the data from the MCS, we explored how this relationship was mediated by father-child closeness, parental monitoring and child's friendships with delinquent peers.

Paternal involvement in non-routine childcare in early adolescence was positively associated with fatherchild closeness at age 14. However, the magnitude of this association was low, compared to the effect of covariates (e.g. child conduct problems or child's sex). Father-child closeness in adolescence was associated with more parental knowledge about children's whereabouts, activi-ties and friends. Close relationship between fathers and children was associated with fewer delinquent friends and less engagement in risky behaviours at age 14.

The total effect of father's involvement on adolescent risky behaviour was negative and significant. In contrast, the total effect of mother's involvement was not significant. A contrast was also observed between the effect of father-child and mother-child closeness on risky behaviour: both effects had the same sign but the effect of father-child closeness on the reduction of risky behaviour was twice as large.

We draw three important conclusions from these findings. First, on the sur-face our findings align with claims in existing research (e.g. Yoder et al., 2016) that the quality of parenting is more important than quantity, as the total effect of father's involvement (i.e. quantity) was much lower than the effect of father-child closeness (i.e. quality). However, we note two caveats here. Firstly, we are comparing quantity at age 11 with quality at 14, and a priori we would expect a more temporally distant measure to have a weaker relation, whatever that measure was. Secondly, and possibly more importantly, the quantity measure at age 11 has a significant effect on the quality measure at age 14. So it appears that there is a complex interplay between quantity and quality; a perhaps more nuanced finding than in previous research. Second, adolescent engagement in risky behaviour is more responsive to paternal involvement than maternal involvement. The social-cultural importance of this finding should not be understated with obvious implications for childcare policy. It should be stressed that this finding does not imply anything about the relative importance of mothering and fathering in general as we are concerned here with one particular outcome. But in a social context where fathering is often undervalued compared to mothering the finding does provide an important contrast.

Third, father-child closeness had a larger total effect on reducing adolescent risky behaviour than motherchild closeness. The effect of mother-child closeness on adolescent risky behaviour was fully mediated by the constructs of delinquent friends and parental monitoring. In contrast, a direct significant association remained between father-child closeness and risky behaviour, after the mediators were accounted for. The results suggest that father-child relationships may have more powerful influence on the development of adolescence risky

behaviours. Other scholars (e.g. Cano et al., 201J; Harris et al., 1JJ8) similarly found evidence that the effect of paternal involvement on some aspects of child development was stronger than the effect of mother's involvement. We have examined risky behaviour at an important age of 14, as it is a point when adolescents are experiencing major changes, such as distancing from parents, increasing peer influence and more opportunities to engage in risky behaviour (Tacobson and Crockett, 2000).

7. Limitations

Our analysis used self-reports of adolescent risky behaviours, which we acknowledge might be prone to social desirability bias. There was no way for us to directly test the accuracy or self-reports and no alternative measurements of risky behaviour available. However, the MCS arranged private settings for adolescents to report their risky behaviours, and this would have mitigated this bias somewhat.

Modelling the effect of father's involvement on child behavioural outcomes is complicated by the lack of consistent theory (Cabrera et al., 2014). As a result, we cannot exclude the possibility that other factors that we have not considered confound the relationship between parental involvement and adolescent risky behaviour. However, given the very good model fit achieved, it is reasonable to assume that the results are likely to be robust to inclusion of such other factors. It is also possible that other relationships could be specified among the analysed factors that would have produced alternative, equally meaningful models, which is a limitation of the SEM framework. For instance, this paper examined whether parental involvement influenced adolescent risky behaviour, whereas it was suggested in the literature that bidirectional relationship between parenting and child behaviour might be a possibility (Goncy and van Dulmen, 2010). Given the lack of consistent theory and evidence, our research design does not allow us to describe the effects as causal. However, the study provides important insights into factors that are related to adolescent risky behaviour.

The measure of father's involvement was affected by limited available data in the MCS that described fatherchild relationships and interactions so only Lamb et al.'s dimension of paternal engagement was reflected in the measure. Future research should explore the effect of father's responsibility for and availability to the child given this may have a different effect on children's adolescent behaviour (e.g. Norman and Elliot, 2015).

Another limitation of the study relates to generalisability of our findings to non-resident fathers. One might argue that devoted fathers self-select into care, i.e. they choose to live together with their children, have on average closer relationships with them and be more involved than non-resident fathers. This has two consequences. Firstly, we have sampled from one part of the spectrum of involvement and the findings cannot be taken to imply that greater involvement of all fathers would necessarily lead to better outcomes for their children. Secondly, not only are families in the analysed sample more likely to have more involved fathers, but they also may differ from families excluded from the analysis on a spectrum of other characteristics. We compared demographic data and engagement into several forms of adolescent risky behaviours at age 14 between families in the analytic sample and families that were excluded from the analysis but appeared in Sweeps 4 to 6 of the MCS. As shown in Table A3 in the Appendices, families in the non- analytic sample were likely not to have two natural parents in the household and to be from lower income quintiles. The cohort children in these families were more likely to be of non-white background and were more actively engaged in risky behaviours, including severer forms of delinquency (such as vandalism or carrying a weapon). The discussed differences between the analytic and non-analytic samples were generally in line with our main findings, as a larger proportion of adolescents in the non-analytic sample experienced a lack of positive father's involvement, while risky behaviours were also more prevalent in this sample.

As a consequence of disproportionate selection of families from upper income quintiles into the analysis sample, the income variables were not significant in the model and thus were dropped from our analysis. We acknowledge that we have performed our study on a relatively advantaged sample. It is possible, however, that children from

disadvantaged families could benefit even more from positive father's involvement and secure father-child attachment.

8. Conclusion

In this paper, we contribute new evidence that father's involvement during early adolescence is associated with lower levels of adolescent delinquency. We found important differences in the way mothers and fathers affected adolescent risky behaviour. Such differences include the direct impact of father-child closeness on risky behaviours, which was not found for mother-child closeness. Further research is needed to understand why father-child closeness is directly associated with less engagement in risky behaviours by the children.

Our findings are relevant for adolescent delinquency intervention programs. The targeting of mother-child relationships by delinquency intervention pro-grams may be a reasonable way to increase parental monitoring, which is strongly related to a reduction in adolescent risky behaviour. However, our analysis suggests that reduced association with delinquent friends and direct reduction in the child's risky behaviour can be better achieved through improving father-child attachment. Introducing measures that aim to improve the quality of father-child relationships can be a promising area of intervention programs for child delinquents, particularly as scholars argue that such programs tend to overlook fathers (Goncy and van Dulmen, 2010; Yoder et al.,

2016). Although the effect of parental alcohol and substance use was not the focus of our study, we discovered that it significantly affected the quality of parent-child relation-ships in adolescence and was a contributing factor in development of child risky behaviour. An interesting direction of future research can be an investigation of whether/how positive involvement of drug-using parents with children affects development of adolescent delinquency (e.g. by using interaction terms). More broadly, there is a need for further research that examines how the association of parental involvement and child behaviour changes depending on the quality of parenting.

Overall, the current study provides valuable evidence about the importance of fathers in the outcomes of their children which can hopefully be used as a springboard for further research.

Declaration of competing interest None.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-forprofit sectors. The corresponding author, Darya Vanchugova, is a PhD Candidate in receipt of a bursary by Economic and Social Research Council (ESRC).

Appendices.

Table A1

Description of observed variables and their response categories used for measuring focal constructs

Construct	Observed variables	Response categories
ent involvement Frequency a parent plays active games with a	Not at all', 'Less often than	14) (2)
Age 11) child	once a month',	How often
Frequency a parent plays indoor games with a	Once or twice a month', 'Once	parents are child or twice a week',
aware of		
Frequency a parent talks with a child about	Several times a week',	what a child hings important to him/ her Every
day or almost every day' is doing		
ental Frequency a parent reads to a child	Not at all', 'Less often	(3) How nvolvement (Age Frequency a parent
draws, paints or makes han	once a month', 'Once or	often
7) hings with a child	wice a month', 'Once or twice a	parents are
Frequency a parent tells stories to a child	week', 'Several times a week',	aware of Frequency a parent plays
sports or active	Every day or almost every day'	who a child
games with a child	is out with	

Frequency a parent plays with toys or games Association ndoors with a child with (1)
Frequency a parent takes a child to the park or How many o an outdoor playground of child's
Frequency a parent does musical activities with friends a child (e.g. plays music, sings songs, listens to smoke music) cigarettes
ent-child How close a child feels with a father/mother Not very close', 'Fairly close', 'None of closeness (Age Very close', them', 14) Extremely close' 'Some of
Parental 1) How often parents are aware of child's Never', 'Sometimes', them', monitoring (Age whereabouts Usually', 'Always' 'Most of
them', 'All of delinquent friends (2) How many of child's friends drink alcohol them'
(Age 14) (3) How many of child's friends take marijuana or any other illegal drugs Adolescent risky (1) How often a child smokes cigarettes 'I have never smoked cigarettes', behaviour (Age 14) (2) How often a child smokes e-cigarettes 'I have only ever tried smoking cigarettes', 'I used to smoke sometimes but I never smoke now',
'I sometimes smoke cigarettes now but I don't smoke more than one a week',
'I usually smoke between one and six cigarettes per week', 'I usually smoke more than six cigarettes a week'
'I've never used or tried electronic cigarettes',
'I have used electronic cigarettes but don't at all now', 'I now smoke electronic cigarettes occasionally but not every day', 'I smoke e-cigarettes every day (3) How
many times a child has had an alcoholic drink in the last 12 'Never',
months '1–2 times',
(4) How many times has a child used/smoked cannabis or weed '3–5 times',
'6–J times',
'10-1Jtimes',
'20–3J times',
(continued on next page)

Table A1 (continued)

Construct	Observed variables	Response categories

40 or more times' 'Once or wice', 'Three or four times', Five to ten times', 'More than 10 times'
f a child has ever tried any other illegal No', 'Yes'
drugs (such as ecstasy, cocaine or speed)
f a child spent any of their own money on ruit machines in the last 4 weeks f a child placed a private bet for money (e.g. with friends) in the last 4 weeks
f a child placed a bet in a betting shop in the
ast 4 weeks
f a child has spent their own money on any
other betting in the last 4 weeks
10) Frequency a child hurts of picks on other Never',
children on purpose Less often than once in few months',
Every few months', 'About once a month', 'About once a week', 'Most days' Frequency sends unwanted or nasty emails, No', 'Yes' exts or messages or posts something nasty
about other children on a website
f a child has been noisy or rude in a public place in the past 12 months, so that other people complained and got them into trouble

f a child has taken something from a shop without paying in the past 12 months
f a child has written something or spray-
painted on a building, fence or train in the past 12 months
f a child has damaged something in a public
place that did not belong to them
f a child has ever carried a weapon f a child has ever gone into someone's home without their permission to steal or damage something
f a child has shoved/hit/slapped/punched
someone in the past 12 months
f a child has used weapon or hit someone
with a weapon in the past 12 months
f a child has stolen something from someone
e.g. phone or money) in the past 12 months f a child has ever been given a formal
warning or caution by a police officer
f a child has ever been arrested by a police No',
officer or taken to a police station Used to be a member of a gang
f a child is a member of a street gang but isn't anymore', 'Yes'
If a child has hacked into someone's No', 'Yes' computer, email or social networking
account in the past 12 months

Table A2

Standardised regression coefficients of structural model of father's involvement and child risky behaviour, *p < 0.05, ** p < 0.01, *** p < 0.001.

Response variable	Covariates	β	P (|>z|)
Father's Involvement at age 11	Male child	0.083***	0.000
Mother's Involvement at age 11	Father's Involvement (Age 7)	0.3J5***	0.000
	Male child	− 0.031***	0.000
Father's Involvement (Age 7)	Mother's Involvement (Age 7)	0.387***	0.000
Father-child closeness	Father's Involvement (Age 7)	0.057***	0.000
	Father's Involvement (Age 11)	0.037***	0.000
	Male child	0.105***	0.000

	Conduct problems	− 0.120***	0.000
	Father's drug use	− 0.025***	0.000
Mother-child closeness	Mother's Involvement (Age 7)	0.023***	0.000
	Mother's Involvement (Age 11)	0.037***	0.000
	Male child	0.037***	0.000
	Conduct problems	− 0.153***	0.000
	Mother's drug use	− 0.031***	0.000
Parental monitoring	Father-child closeness	0.131***	0.000
	Mother-child closeness	0.183***	0.000
	Male child	− 0.138***	0.000

(continued on next page)

Table A2 (continued)

Response variable	Covariates	β	P (| > z|)
	Conduct problems	− 0.075***	0.000
	Child's impulsivity	− 0.040***	0.000
	White	− 0.063***	0.000
	Mother's drug use	− 0.035***	0.000
	Mother's risk drinking	− 0.05J***	0.000
	Father's risk drinking	− 0.035***	0.000
Delinquent peers	Mother-child closeness	− 0.072***	0.000
	Father-child closeness	− 0.105***	0.000
	White	0.0J3***	0.000
	Mother's drug use	0.045***	0.000
	Father's drug use	0.055***	0.000
	Mother's risk drinking	0.056***	0.000
	Father's risk drinking	0.03J***	0.000
Engagement in risky behaviours	Mother's Involvement (Age 7)	−0.026***	0.000
	Father's Involvement (Age 7)	0.018**	0.008

Mother's Involvement (Age 11)	0.011*	0.018
Father's Involvement (Age 11)	− 0.031***	0.000
Parental monitoring	− 0.314***	0.000
Delinquent peers	0.410***	0.000
Father-child closeness	− 0.0J0***	0.000
Male child	0.0J1***	0.000
Child's impulsivity	0.035***	0.000
Father's drug use	0.040***	0.000
Mother's drug use	0.00J*	0.045

Table A3

Comparison of demographic characteristics and prevalence of adolescent risky behaviour in analytic versus non-analytic sample.

Variable	Analytic Sample (n 5 587)	Non-analytic Sample (n 4 862)	p-value
1. Cohort child characteristics. **Cohort Child's Sex:**			
Female	0.502	0.510	0.450
Male	0.4J8	0.4J0	
Ethnic Group:			
White	0.820	0.748	0.000
Mixed	0.038	0.052	0.000
ndian	0.028	0.023	0.215
Pakistani/Bangladeshi	0.060	0.068	0.040
Black and Black British	0.018	0.037	0.000
Other ethnic group	0.020	0.025	0.050
2. Household characteristics.			
Both natural parents in household:			
Yes	1.000	0.26J	0.000
No	0.000	0.731	
Country of Residence:			
England	0.640	0.672	0.001
Wales	0.135	0.137	0.700
Scotland	0.121	0.0J8	0.000
Northern Ireland	0.104	0.0J3	0.058
Equivalised Income Group (whole of the UK):			
1st	0.077	0.236	0.000
2nd	0.075	0.254	0.000
3rd	0.163	0.250	0.000
4th	0.312	0.160	0.000
5th	0.373	0.100	0.000
3. Cohort child's risky behaviour.			
How often a child smokes cigarettes:			

Never smoked cigarettes	0.J03	0.808	0.000
Only ever tried smoking cigarettes	0.062	0.106	0.000
Used to smoke sometimes ut never smokes now	0.014	0.035	0.000
Sometimes smokes cigarettes now but does not smoke more than one a week	0.012	0.021	0.001
Usually smokes between one and six cigarettes per week	0.003	0.012	0.000
Usually smokes more than six cigarettes per week	0.005	0.018	0.000
How many times a child has had an alcoholic drink n the last 12 months:			
Never tried alcohol	0.583	0.522	0.000
Never in the last 12 months	0.025	0.035	0.003
1-2 times	0.1J5	0.210	0.060
3-5 times	0.0J2	0.108	0.012
-J times	0.056	0.062	0.235
-1J times	0.031	0.044	0.001
-3J times	0.011	0.011	0.J32
or more times	0.006	0.00J	0.11J
If a child has taken something from a shop without paying in the past 12 months:			
Yes	0.025	0.040	0.000
No	0.J75	0.J60	
If a child has damaged something in a public place that did not belong to them:			
Yes	0.022	0.03J	0.000
No	0.J78	0.J61	
If a child has ever carried a weapon:			
Yes	0.01J	0.028	0.000
No	0.J81	0.J72	

Variable n = 5,587) | Analytic Sample | Non-analytic Sample (n = 4,862) | p-value

(continued on next page)

Table A3 (continued)

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