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THE INTERGENERATIONAL TRANSMISSION OF CRIMINAL OFFENDING: EXPLORING GENDER-SPECIFIC MECHANISMS

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The intergenerational transmission of criminal behaviour is well-recognized, but less is known about the mechanisms that may explain it. This study presents new analyses from the Cambridge Study in Delinquent Development, which examine the intergenerational transmission of criminal convictions. It then investigates mediation via psychosocial risk factors. The convictions of fathers and mothers were significantly related to the convictions of their male offspring, and this was mediated via the fathers' drug use. However, the convictions of fathers were only indirectly related to the convictions of female offspring via the father's cohabitation problems. The convictions of mothers were also indirectly related to those of the female offspring through harsh parental discipline. Accurate identification of the role that psychosocial risk factors play in intergenerational pathways for males and females can inform much more effective gender-specific prevention.

Key words: criminal convictions, intergenerational transmission, psychosocial risk factors, mediation, gender

Introduction

Whether it is nature or nurture that causes criminal behaviour is a question that has intrigued criminologists for decades. In recent years, there has been an upsurge of interest in the association between the criminal behaviour of parents and their children (see [Farrington et al. 2001](#), [Thornberry et al. 2003](#); [Bijleveld and Wijkman 2009](#)), resulting in an accumulation of empirical knowledge concerning the strength of intergenerational relationships, and to a lesser extent the mechanisms through which transmission may occur. Although this insight and understanding has largely been achieved by examining the criminal offending of males, more recent studies have sought to analyse data from female participants (e.g. see [Keenan et al. 2010](#)). Motivating this change is a growing understanding that the aetiological factors involved in female offending may be somewhat different from those for males. More recent directions in research have acknowledged that men's and women's lives consist of different experiences, some of which are biological in origin, and others embedded in social and cultural practices ([Fineman 1995](#)) and researchers have sought to understand the ways in which shared and unique life events of males and females differentially impact upon their criminal offending (e.g. see [Theobald et al. 2015](#)).

Intergenerational Transmission

The term 'intergenerational transmission' broadly refers to the 'transfer of individual abilities, traits, behaviours and outcomes from parents to their children' ([Lochner](#)

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2008). Thornberry *et al.* (2003: 173) explain the conceptual differences between *intra-* and *intergenerational* transmission. Intragenerational transmission attempts to explain the child's delinquency by focusing on 'contemporaneous behaviours and statuses of the parents'. Intergenerational transmission, however, is concerned with the behaviour of the parent in the past, as intergenerational continuity ultimately refers to similar behaviour in the child at roughly the same developmental stage as the parent (Huesmann *et al.* 1984; Cairns *et al.* 1998). Intergenerational research investigates the causal sequences involved in the development of criminal behaviour in consecutive generations, as this can inform preventative interventions for offspring who may be at risk of delinquency.

While some research proposes that the developmental origins of criminal behaviour for males and females are alike, other research rejects the similarity of men's and women's pathways into crime for a number of reasons. First, the number of crimes perpetrated by males far exceeds that of females (Moffitt *et al.* 2001). The sex difference is greatest for violent offending (Smith and Visher 1980) and least for drug- and alcohol-related crimes (Moffitt *et al.* 2001). Second, there appears to be a gender paradox; females have the lowest prevalence of criminal and antisocial behaviour, yet they are at greatest risk for developing another comorbid condition (Keenan *et al.* 2014). Third, there is evidence that criminal careers develop differently for boys and for girls. Girls' delinquency tends to peak earlier than boys (Junger-Tas *et al.* 2003) and be shorter in duration. Furthermore, the type of offending often varies between males and females; burglary and theft of vehicles are more commonly committed by males, whereas shoplifting and deception are more commonly committed by females (Farrington and Painter 2004).

The social context of the development of delinquency varies between males and females. It is often thought that females typically become involved in delinquent behaviour as a result of associating with antisocial males (Caspi *et al.* 1993). In support of this, Giordano and Cernkovich (1979) found that male adolescents tended to engage in delinquent behaviour and abuse substances with other males, yet females were more likely to do so in mixed gender groups. Furthermore, girls are more likely to express aggressive behaviour through social and relational channels, with the aim of socially isolating and damaging the reputation of another (Xie *et al.* 2005). The interpersonal focus of girls' aggression emphasizes the importance of relationships in girls' socialization (McKnight and Putallaz 2005). Finally, although the genetic effect on criminal outcomes appears important for both sexes, individual genetic risk is typically more pronounced for female offenders compared with male offenders (Baker *et al.* 1989).

Studies of the mechanisms underlying the intergenerational transmission of criminal offending have often struggled with methodological complications.¹ First, genetic factors are not deterministic, and their impact cannot be examined in isolation from

¹This is explored in the empirical research literature through the analysis of intervening variables called mediators and moderators. A moderator variable affects the strength of the relationship between two variables. As Baron and Kenny (1986) describe it, 'a moderator is a qualitative (e.g. sex, race, class) or quantitative (e.g. level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable'. A mediator variable is presumed to 'transmit' some of the causal effects of prior variables on to subsequent variables; they are 'the generative mechanism through which the focus independent variable is able to influence the dependent variable of interest' (p. 1173). These definitions have been extended by Kraemer *et al.* (1997; 2001) who specify that the moderator variable must precede the independent variable, while the mediator variable must follow the independent variable.

the potential impact of environmental factors (Baker *et al.* 2008). Second, early studies relied on participants' retrospective recall of events, which were prone to recall error. Fortunately, prospective measures are now the norm. A third methodological issue concerns the difficulty and expense involved in retaining participants in multigenerational studies over several decades, which is necessary to achieve valid results. Finally, the reliance on official records to measure criminal behaviour may underestimate the true prevalence of crime, ignoring what Kivivuori (2011) refers to as the 'dark figure' of hidden crime. This is particularly relevant to the study of female criminal offending, which is typically less serious and of lower frequency.

There is no shortage of criminological theories that seek to explain the relationship between criminal parents and their offspring's offending. Empirical tests of these theories have been somewhat slower to accumulate (Pratt 2015). Despite the various methodological complexities described, research has gone some way to indicate the extent of intergenerational transmission, to establish the relative impact of environmental and genetic factors, and to distinguish between the specific and common impacts of these factors for male and female offspring. This study aims to contribute to this accumulating knowledge by analysing data from the Cambridge Study in Delinquent Development (CSDD). The CSDD is a prospective longitudinal study of the development of delinquent behaviour in a sample of 411 males from south London, who were born around 1953. The original participants are referred to as G2 (generation two) and their parents are termed G1 (generation one). Their criminal behaviour has been studied extensively (for reviews of the study's findings, see Farrington 2003; Farrington *et al.* 2009b; 2013). The present analysis incorporates data from the most recent phase of the study of males and females from the third generation (G3) (generation three) and aims to establish the extent to which the conviction of a G2 father or mother increases the likelihood of conviction for G3 sons and daughters. Only biological relatives are included in these analyses.

A considerable amount of reliable empirical data concerning the mechanisms through which intergenerational transmission may take place has highlighted the importance of environmental factors; a meta-analysis, combining effect sizes in 51 twin and adoption studies, reported a heritability estimate of 41 per cent, with the remaining 59 per cent of variance being attributable to environmental factors (Rhee and Waldman 2002). For some time, the environmental risk factors remained quite unknown and did not specify how the child's experiences may lead to criminal offending (Baker *et al.* 2008). Farrington *et al.* (2001) offered six possible mechanisms to explain why antisocial behaviour is concentrated in families and transmitted from one generation to the next. Although it is not possible to investigate each of these, this analysis attempts to contribute to the understanding of this complex phenomenon, by focusing on the psychosocial risk factors that may mediate intergenerational transmission.

Environmental Mechanisms

Criminal parents tend to live in the most economically and socially disadvantaged circumstances, which increases the likelihood of their children becoming criminally involved too. Therefore, the effect of the parent's criminality on their offspring's offending may be mediated by negative environmental factors (Farrington *et al.* 2001).

Several prospective longitudinal studies have demonstrated mediation via family and social risk factors. For example, [Farrington *et al.* \(2009a\)](#) analysed criminal record data on the G2 study males up to age 50. Evidence for the intergenerational continuity of convictions from fathers to sons across three generations was found, and to a lesser extent from mothers to daughters. Risk scores that indicated the number of risk factors in each group (family, socio-economic and individual) were created. It was found that the degree of intergenerational transmission of convictions decreased after controlling for each category of risk factors, which is suggestive of partial mediation.

Without doubt, parenting practices have attracted the most attention in the empirical research literature and are thought to be important in explaining the intergenerational transmission of criminal behaviour. Antisocial individuals often struggle to be effective parents and this leads to antisocial behaviour in the next generation ([Patterson and Dishion 1988](#)). It has been demonstrated that poor parenting practices mediate the relationship between first-generation and second-generation deviant behaviours ([Conger *et al.* 1995](#)). The families of substance abusers often struggle to be effective parents ([Kandel 1990](#)) and respond punitively to their child's behaviour. Research studies that incorporate data on fathers and mothers are crucial, as the mother is most often the primary caregiver.

Research indicates that the behaviour of fathers and mothers affects children differently. Multigenerational studies of continuities in antisocial behaviour have found evidence of complex intergenerational pathways, with the degree of continuity in antisocial behaviour varying according to the gender of the parent and the child ([Serbin and Karp 2004](#)). Generally, there seems to be greater continuity between fathers and sons (e.g., see [Thornberry *et al.* 2003](#)), with the mothers' dysfunctional parenting mediating the relationships between her negative childhood experiences and the problematic behaviour of offspring ([Conger *et al.* 2003](#)). Surprisingly, findings from the Oregon Youth Study, which examined gender-specific pathways of the transmission of externalizing behaviour, showed that fathers had a larger influence on daughters than on sons ([Kim *et al.* 2009](#)).

Findings from the Rochester Youth Development Study have shown that, although intergenerational continuity in antisocial behaviour was modest in their sample, the intergenerational pathways differed according to the gender of the parent. The father's juvenile delinquency had both direct and indirect effects (via his parenting style) on the antisocial behaviour of his children. Yet, the adolescent antisocial behaviour of mothers did not have a direct effect on the offspring's antisocial behaviour but was mediated through parenting, which itself was influenced by family poverty and the grandparents' parenting style ([Thornberry *et al.* 2003](#)). However, a recent study has produced models that suggest that mediation effects via the family environment are small. Using a sample of sibling pairs from the AddHealth study, [Beaver \(2013\)](#) examined the concentration of self-reported criminal arrests within certain families. When examining mediation via the child's family environment (the child's disengagement and lack of attachment), there seemed to be no association between parental criminality and the family environment, but the family environment did have a small effect on child criminality. The direct effect of parental criminality on child criminality was largest and statistically significant.

There is far less empirical evidence of the role that socio-economic factors play in explaining the intergenerational transmission of criminal and antisocial behaviour.

Although intergenerational continuities in occupational status are widely recognized, two separate studies of the transmission of problem behaviour from fathers and mothers to offspring both indicate that a parent's educational failure precipitates their employment problems. Ramakers *et al.* (2011) found that, after controlling for education, intelligence, marital status and juvenile offending, the effect of the father's occupational status on offspring offending remained significant. This led them to conclude that a substantial part of the association between parental and offspring offending may be mediated by low education, which then leads to low occupational status. A mother's teenage pregnancy increases the likelihood that her education will be disrupted (Fergusson and Woodward 2000), and her educational attainment also mediates the intergenerational relationship between the mother's childhood aggression and her children's functioning (Serbin and Stack 1998).

What we can conclude from intergenerational studies that examine mediation is that the juvenile delinquency and criminal behaviour of parents has many negative consequences for several domains of family life. Parenting problems seem to be an important explanatory factor, and there is a fair amount of evidence to support this. Socio-economic factors could also be important, but there is far less empirical evidence of this. The gender of the parent and the child have also been demonstrated to be key determinants of transmission, but current studies have produced inconclusive findings on the relative influence of criminal mothers and father on their sons and daughters. Therefore, new investigations are important to bring new insight to these unresolved issues.

Theoretical Background

Although the CSDD was not designed to test any particular theory of offending, its main strength is in being able to examine several different processes and mechanisms involved in the development of delinquent behaviour (Farrington 2003).

Developmental and life-course (DLC) theories seek to explain the development of offending and antisocial behaviour by individuals at different ages (i.e. changes within individuals). They also attempt to understand the influence of risk and protective factors and life events on offending at different ages.

Ever since the integrated theory of Elliott *et al.* (1979), criminologists have sought to combine theories in order to advance a more complete understanding of criminal behaviour. Thornberry (1989: 52) defines theoretical integration as 'the act of combining two or more sets of logically interrelated propositions into one larger set of propositions in order to provide a more comprehensive explanation of a particular phenomenon'; see Krohn and Eassey (2014) for a review of the different forms of theoretical integration. Theoretical integration is particularly suited to the current examination of intergenerational transmission as the propositions of one theory may have more explanatory value for males, whereas another may be more applicable to females. DLC theories are integrative in the sense that they combine the propositions of several macro-level criminological theories: (1) Strain theory focuses on how individuals react to strains produced by societal structures. (2) Control theories focus on how individuals' life events and attachments can increase or decrease the likelihood of delinquency. (3) Learning theories emphasize the role of observational learning (or modelling) and

reinforcement whereby individuals adopt the social behaviour of those close to them. Of the eight DLC theories summarized by Farrington (2006a), Thornberry's (1987) interactional theory seeks to explain the relationship between criminal parents and their offspring's offending and the key propositions are reviewed below.

Interactional Theory

Interactional theory (Thornberry 1987) proposes that involvement in antisocial behaviour and substance misuse during adolescence has developmental consequences that affect the lives of the subsequent generation. This is the first of three key propositions of interactional theory that Thornberry and Krohn (2005) describe as (1) Life-course influences: The causes of delinquency vary according to the individual's developmental stage and involvement in juvenile delinquency has a knock-on effect on adult criminal behaviour, and subsequent generations. Therefore, important life events (e.g. getting married or getting a job) serve to inhibit or reinforce the continuity of antisocial behaviour across generations. Thornberry (2005) finds this process to be gender specific: mothers who were not warm and nurturing parents and fathers who had financial problems and disciplined their children harshly both increased the likelihood that their children would be delinquent. One particular process is thought to involve the disruption of social bonds, which Thornberry *et al.* (2009: 81) describe as causing 'disorderly transitions' from adolescence to adulthood. Antisocial parents will experience several adversities and are more likely to abuse substances, which will have a negative impact on their parenting and ultimately lead to parent-child relationships characterized by conflict and poor affective bonds. These children are also more likely to have a negative temperament and neuropsychological problems.

(2) Bi-directional causality describes a process where delinquency unfolds in a two-way process of 'mutually reinforcing causal loops' (Thornberry 2005: 188), whereby an individual is both shaped *by* their environment and then in turn, shapes *it*. (3) There are multiple causes of antisocial behaviour and a single causal factor may lead to several different outcomes (see also Cicchetti and Rogosch 1996). The proportionality of cause and effect states that antisocial behaviour is most likely to occur in individuals exposed to multiple chronic causal risk factors. The parent's and their child's lives are therefore linked together in a complex pattern. Over time, these negative aspects become reinforced, particularly through reciprocal interactions, such as the parent responding negatively to the problematic temperament of the child and vice versa. Harmful parent-child interactions therefore become characteristic of the relationship between the parent and the child.

Societal factors also impact on the family context, as antisocial families are likely to be financially and socially disadvantaged, so the parent will have fewer resources available to them and be more stressed. This will also negatively affect parenting. As children approach adolescence and adulthood, the role of antisocial peers and other negative social factors can influence the development of antisocial behaviour, as antisocial parents will not be able to act as a barrier and protect the child from their influence. The onset of offending is therefore explained by the interaction between the individual's characteristics, deficiencies in parenting and societal factors. Interactional theory places more emphasis on family rather than societal factors having a causal role in the development of antisocial behaviour in younger children.

The roles of mothers and fathers are thought to be distinct from each other. In Western society, mothers are most likely to be the primary caregiver and fathers often have a supporting role (Thornberry 2005). The impact of a delinquent mother is thought to be mediated by her ineffective parenting techniques (Thornberry *et al.* 2003) and the influence of the father is likely to differ from that of the mother. The importance of environmental risk factors as mediators of the transmission of antisocial behaviour is thought to be contingent on the parent's continued contact with the child (Thornberry *et al.* 2009).

Theoretical predictions

Parents who are antisocial in adolescence have weak prosocial bonds and experience a range of disadvantages (or strains). As they make the transition to adulthood their adversities often mean that they do not have the resources to be successful in adult roles; they struggle to obtain satisfactory employment and be an effective parent. The increased pressures of adulthood mean that the cumulative effect of these earlier adversities cascades into adulthood and have negative consequences for the next generation, who are also exposed to many of the same strains as their parents and lack informal social controls (or buffers). Instead, they learn the poor coping styles of their parents in childhood and from antisocial peers in adolescence. It seems likely that some of these processes will vary between males and females.

Consistent with the propositions of interactional theory, we would also expect the convictions of parents to be indirectly related to the convictions of their offspring via the psychosocial risk factors (i.e. mediated). We would also expect these processes to vary according to the gender of the parent. In most Western societies, the mother is usually the primary caregiver, so her parenting may be an important mediator of the transmission of antisocial and criminal behaviour. It also seems likely that the role that the father plays in parenting will be dependent on his relationship with the mother (Hoeve *et al.* 2011). Therefore, we would expect that the relationship between the father and the mother would be an important mediator of the intergenerational transmission of criminal offending from fathers. Although risk factors specific to the family home environment are important in the transmission of risk from the mother, it could be the case that factors outside the family home explain the transmission of risk from fathers. In particular, unstable employment can lead to financial problems, which could then lead to parental conflict. In accordance with the final proposition, we would also expect there to be several different mediated intergenerational pathways.

Previously, we found that the fathers' employment problems mediated the transmission of the fathers' antisocial behaviour (as measured using the Psychopathy Checklist Factor 2 score; Hart *et al.* 1995) to female offspring. Transmission to male offspring was mediated via the fathers' accommodation and employment problems and his drug use (Auty *et al.* 2015a). A stronger relationship between the antisocial behaviour of fathers and sons, compared with fathers and daughters, has been found in several analyses (Rowe and Farrington 1997; Farrington *et al.* 2009a), which suggests possible modelling between same-sex intergenerational dyads. Therefore, we would expect stronger relationships between the convictions of fathers and sons and between mothers and daughters.

The Current Study

Past research has generally focussed on the influence of fathers in predicting the criminal behaviour of their children (Hirschi 1969; Warr 1993; Farrington *et al.* 1996). However, the present analysis also incorporates conviction data for mothers. It aims to build on previous research into the intergenerational transmission of criminal convictions and has several advantages over previous studies. First, our information on criminal convictions comes from official records that were searched quite recently. Previously, official records were compared with self-reports of offending and showed a very high level of concordance (Auty *et al.* 2015b). The records were checked in detail and matched to the correct study participant using information provided in a face-to-face social interview. This ensured that any incorrect records were removed.

This paper investigates mediation using modern statistical methods to estimate mediation models. The analysis also has the advantage of having a larger sample of G3 offspring than has previously been studied (see Farrington *et al.* 2009a) so that transmission to males and females can be examined separately. A wide range of psychosocial risk factors (most of which are measured prospectively) are included in the analysis so that family processes underlying transmission can be systematically investigated. Finally, this analysis is unique in that it involves a large contemporary community sample. Many important findings on the intergenerational transmission of criminal behaviour have come from studies that were conducted quite some time ago and, given that family processes may change over time, new investigations are helpful in bringing about further insights into the mechanisms, which may explain it.

Method

Participants

The father and offspring dyads are participants in the Cambridge Study in Delinquent Development (CSDD; West and Farrington 1977; Farrington 2003), a prospective longitudinal study of the development of delinquent behaviour in a community sample of 411 males. The study began in 1961–62, with the original cohort containing all boys aged 8 or 9 years old from the registers of six state primary schools in south London.

Procedure

Between 1984 and 1986, when they were aged 32, 378 of the men (93.8 per cent of those still alive) participated in a social interview. Between 2004 and 2013, 550 of their offspring (84.1 per cent) were also interviewed. Participants had to be at least 18 years old to be eligible for interview, and at the time of the interview their average age was 25.4 years (SD, 3.63). The original male participants are referred to as G2 and their biological children as G3. In order to meet the standards of the South East England Regional Medical Ethics Committee, we informed the G2 father or his female partner of our desire to interview the G3 child. At each interview, written informed consent was obtained from all participants.

The data from the 550 G3 offspring interviews were matched with the data on their fathers and mothers. There were some instances when the G3 data could not be

matched to their father's data: 7 were the offspring of 5 fathers who refused to be interviewed at age 32 and 4 were the offspring of one father who had died before he could be interviewed. A further 12 G3 children were excluded from the analysis as they had moved abroad before the age of 10 and so they could not have acquired a conviction in the United Kingdom, and could not be searched for a criminal record in the country where they now lived. This resulted in a sample of 527 pairs (281 fathers and male offspring, 246 fathers and female offspring).

Measures

Criminal convictions

Criminal records were obtained for all study participants from the Home Office extract of the Police National Computer and the Ministry of Justice in London in March 2011. The records that were found were cross-checked with records from a number of previous searches and with self-report information obtained in the interviews to establish definitively that the record was matched to the correct person.

Psychosocial risk factors

Five dichotomous psychosocial risk factors were created based on criteria that had previously been used to calculate life success scores for the G2 men at age 32 (Farrington *et al.* 2006). These variables were Accommodation problems (two or more of; not a home owner, poor home conditions and more than two addresses in the last five years); Cohabitation problems (three or more of; not living with a partner, not married or cohabiting for five years or more, not divorced in the last five years and not getting on well with his partner); Employment problems (three or more of; currently unemployed, low occupational class, low wages and unemployed for more than nine months in the last five years); Alcohol misuse (three or more of; driving whilst under the influence of alcohol, a heavy drinker, a binge drinker and a CAGE (Ewing 1984) score of two or more); Drug use (taking an illegal drug in the last five years). Two additional risk factors were created using data from the G2 father's interview at age 32: Teenage father (at the birth of the first child) and Large family (father living with four or more children); Finally, three risk factors were created using data from the G3 offspring interview: Disrupted family (father left the family home before the child's 16th birthday); Poor supervision (parents never knew where their children were going when they went out, before age 16); Harsh discipline (parents hit their child with an implement as a form of discipline). The selection of psychosocial risk factors was based on previous CSDD analyses conducted on the G2 males, which found that these factors were important predictors of delinquency (West and Farrington 1973), antisocial personality at age 32 (Farrington 2000) psychopathy (measured using the PCL: SV: Hart *et al.* 1995) at age 48 (Farrington 2006b) and mediators of the intergenerational transmission of psychopathy (Auty *et al.* 2015a).

Analytical approach

First, the relationship between the parent and the offspring convictions was investigated (the direct effect, see path *c*, Figure 1) using the multilevel random-effects

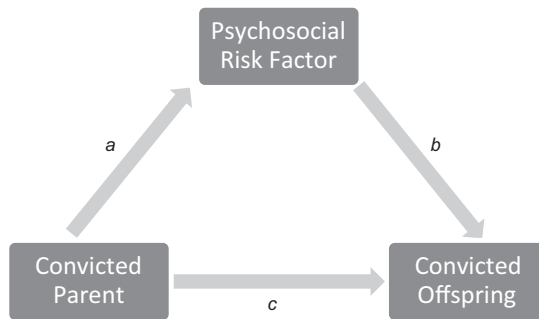


FIG. 1 Mediation model of the intergenerational transmission of convictions via psychosocial risk factors

logistic regression XTLOGIT command in Stata version 12.1 (StataCorp LP, College Station, TX). The robust standard errors take into account the non-independence of children from the same family. Next, univariate relationships between the convicted parent and the psychosocial risk factors were investigated (path *a*). Finally, the relationship between psychosocial risk factors and offspring convictions was explored (path *b*).

Statistical mediation analysis (Baron and Kenny 1986; MacKinnon *et al.* 2007) using the Stata programme, *binary_mediation* was used to determine whether any of the psychosocial risk factors could help explain intergenerational continuities in criminal offending. The programme can model multiple mediator variables and binary response variables. The indirect effects were computed using the product of coefficients approach. Coefficients were standardized before indirect effects were computed. A bootstrap approach was used to estimate standard errors, using the *cluster(varname)* option. Only psychosocial risk factors that demonstrated significant relationships for both paths *a* and *b* were tested as potential mediators. Final models are shown, where only significant mediators were retained (where the confidence interval does not contain zero).

Results

Prevalence of criminal convictions in the sample

There were 105 convicted G2 fathers (43.39 per cent) and 21 (8.68 per cent) convicted G2 mothers. There were 84 convicted G3 offspring (15.94 per cent), 65 sons (23.13 per cent) and 19 daughters (7.72 per cent). Of the 242 families in the analysis, 125 (51.65 per cent) had at least one convicted family member (a mother, father or child). Convictions also proved to be concentrated within a few families; 11.16 per cent of the total families in the sample were responsible for 58.03 per cent of total convictions. Few convicted fathers had a convicted female partner (24.0 per cent), but, strikingly, 88 per cent of convicted mothers had a convicted male partner.

Intergenerational transmission of criminal convictions to male and female offspring

Multilevel logistic regression was used to examine the relationship between the convictions of mothers and fathers and the convictions of the male and female offspring. The results (shown in Table 1) revealed large odds ratios (ORs) for same-sex

intergenerational pairs; a convicted mother considerably increased the likelihood that her female offspring would also be convicted (OR = 5.16, 95% CI = 1.37–19.39, $p < 0.05$). However, the relationship between convicted fathers and daughters was not significant because of small numbers of convicted daughters (OR = 3.48, 95% CI = 0.90–13.50, $p = ns$). There was also a significant association between convicted fathers and convicted male offspring (OR = 3.02, 95% CI = 1.55–5.91, $p < 0.01$), and the relationship between convicted mothers and convicted male offspring was similar in strength (OR = 2.98, 95% CI = 1.20–7.40, $p < 0.05$).

Convicted parents and psychosocial risk factors

The relationship between the convicted fathers and mothers and the psychosocial risk factors is next explored (path *a*). Table 2 gives the results of multilevel logistic regression models that relate the convictions of parents to the psychosocial risk factors for the male and female samples. The results show that the convictions of fathers and mothers

TABLE 1 Results for multilevel logistic regression model relating convicted G2 fathers and mothers to G3 male and female offspring convictions

	Convicted male offspring (<i>n</i> = 281)		Convicted female offspring (<i>n</i> = 246)	
	OR	95% CI	OR	95% CI
Convicted father	3.02**	1.55; 5.91	3.48	0.90; 13.50
Convicted mother	2.98*	1.20; 7.40	5.16*	1.37; 19.39

* $p < 0.05$; ** $p < 0.01$.

TABLE 2 Results for multilevel logistic regression models predicting psychosocial risk factors in male and female offspring

Psychosocial risk factors	Male offspring (<i>n</i> = 281)				Female offspring (<i>n</i> = 246)			
	Convicted fathers		Convicted mothers		Convicted fathers		Convicted mothers	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Accommodation problems	1.50	0.86; 2.61	2.22	1.00; 4.97	2.45**	1.42; 4.23	3.72**	1.72; 8.02
Cohabitation problems	2.19*	1.04; 4.63	1.23	0.40; 3.79	11.16***	3.78; 32.89	3.19**	1.35; 7.51
Employment problems	1.91*	1.04; 3.49	4.07**	1.80; 9.22	2.55**	1.36; 4.81	4.68***	2.17; 10.11
Alcohol misuse	3.61***	2.14; 6.11	2.71*	1.21; 6.05	5.02***	2.86; 8.82	1.80	0.86; 3.78
Drug use	4.14***	1.98; 8.65	4.96***	2.10; 11.70	5.64***	2.46; 12.91	2.13	0.90; 5.02
Teenage father	1.79	0.70; 4.57	2.43	0.75; 7.92	1.46	0.65; 3.27	1.89	0.70; 5.12
Disrupted family	1.96*	1.10; 3.50	1.12	0.45; 2.79	4.52***	2.43; 8.42	1.15	0.51; 2.60
Large family	1.45	0.85; 2.45	1.71	0.70; 4.19	0.97	0.55; 1.70	2.07	0.81; 5.26
Poor supervision	2.44	0.84; 7.08	0.58	0.07; 4.60	1.85	0.59; 5.84	2.93	0.85; 10.12
Harsh discipline	0.78	0.30; 2.00	3.18*	1.06; 9.56	1.58	0.61; 4.09	5.47**	2.01; 14.89

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

were significantly related to several of the psychosocial risk factors. Most ORs were greater than two, which is thought to be indicative of a strong effect (Cohen 1996). This indicates that having convicted parents greatly increases the likelihood that the offspring will experience many of the psychosocial risk factors in childhood. The largest OR was for the relationship between convicted fathers and cohabitation problems (OR = 11.16, $p < 0.001$), suggesting that convicted fathers have over 11 times the odds of having cohabitation problems.

Psychosocial risk factors and offspring convictions

The results of the multilevel regression analyses that relate the psychosocial risk factors to the convicted male and female offspring (path *b*) are shown in Table 3. For male offspring, five of the psychosocial risk factors proved to have a significant relationship with the convictions of sons. Most ORs were greater than two. These were the variables reflecting the father's drug use, his unsatisfactory accommodation and employment history at age 32. Also the disrupted family and poor supervision variables significantly predicted the convictions of male offspring. For female offspring, three different psychosocial risk factors significantly predicted their convictions and the ORs for each of these were greater than two: the fathers' cohabitation problems, his alcohol misuse at age 32 and harsh parental discipline.

Mediation analysis—convicted fathers

The final stage of the analysis involved estimating mediation models to examine direct and indirect pathways. Mediation of the effect of convicted fathers on their male offspring's convictions through the father's drug use is shown in Table 4. The bootstrap results show that both the indirect and the direct effects are significant. The indirect effect ($b = 0.057$) is considerably smaller than the direct effect ($b = 0.221$), and the proportion of the effect that is mediated is 0.205. The mediation of the effect of convicted

TABLE 3 Results for multilevel logistic regression models relating the psychosocial risk factors to the convicted male and female G3 offspring

Psychosocial risk factors	Male offspring ($n = 281$)		Female offspring ($n = 246$)	
	OR	95% CI	OR	95% CI
Accommodation problems	1.98*	1.01; 3.88	1.76	0.55; 5.70
Employment problems	2.82**	1.38; 5.79	3.00	0.88; 10.22
Cohabitation problems	2.35	0.90; 6.17	11.26**	2.13; 59.43
Alcohol misuse	1.65	0.83; 3.13	4.85**	1.42; 16.62
Drug use	3.33**	1.41; 7.88	1.68	0.37; 7.62
Teenage father	1.97	0.64; 6.06	4.02	0.83; 19.42
Disrupted family	2.13*	1.09; 4.14	2.04	0.66; 6.32
Large family	1.72	0.86; 3.41	0.68	0.21; 2.24
Poor supervision	11.17***	2.89; 43.16	4.47	0.78; 25.65
Harsh discipline	2.49	0.94; 6.62	10.45**	1.74; 62.86

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

TABLE 4 *Mediation of the effect of convicted fathers on the offspring's convictions through psychosocial risk factors*

	Product of coefficients		Bootstrapping
	<i>b</i>	SE	BCa 95% CI
G3 males: sons (<i>N</i> = 281); fathers (<i>N</i> = 188)			
Indirect effect: father's drug use	0.057	0.026	0.014; 0.125
Direct effect	0.221*	0.084	0.044; 0.375
Total effect	0.278	0.077	0.119; 0.423
Proportion of total effect mediated	0.205		
Ratio of indirect to direct effect	0.258		
Ratio of total to direct effect	1.258		
G3 females: daughters (<i>N</i> = 246); fathers (<i>N</i> = 168)			
Indirect effect: cohabitation problems	0.177	0.073	0.047; 0.349
Direct effect	0.090	0.002	-0.243; 0.419
Total effect	0.267	0.154	-0.032; 0.581
Proportion of total effect mediated	0.664		
Ratio of indirect to direct effect	1.976		
Ratio of total to direct effect	2.976		

BCa, bias corrected and accelerated; 5,000 bootstrap samples.

* $p < 0.05$.

fathers on their female offspring's convictions through the cohabitation risk factor is shown in the panel below. The bootstrap results show that only the indirect effect is significant and it is substantially larger than the direct effect. The proportion of the total effect that is mediated is fairly large (0.66).

Mediation analysis—convicted mothers

The effect of a convicted mother on the convictions of male offspring is mediated again through the father's drug use. This is shown in Table 5. The indirect effect is 0.048, which is quite small compared with the direct effect ($b = 0.117$). The direct effect is not statistically significant. The proportion of the total effect that is mediated is 0.29. Table 4 also displays the results of the mediation for the effect of convicted mothers on female offspring through harsh discipline. Again, only the indirect effect is significant, but fairly small in magnitude ($b = 0.073$), compared with the direct effect (0.195). The proportion of the total effect that is mediated is relatively small (0.27).

Discussion

In this study, we investigated whether the convictions of fathers and mothers were related to the convictions of their male and female offspring. We then examined several psychosocial risk factors to see if they acted as mediators of intergenerational transmission by estimating indirect relationships. In the final analysis, all psychosocial risk factors that had a relationship with the convictions of fathers or mothers and the convictions of male or female offspring (paths *a* and *b*, Figure 1) were evaluated as

potential mediators. Final models were produced, which retained only significant psychosocial mediators. A summary of the final models is shown in Figure 2.

Examination of the intergenerational transmission of convictions found some evidence that the strongest relationship by far was for the same-sex intergenerational pairs of mothers and daughters. However, the OR for the relationship for the convictions of fathers and daughters was large, but not statistically significant (OR = 3.48). This is probably due to the low prevalence of convictions for females. Learning theories

TABLE 5 Mediation of the effect of convicted mothers on the offspring's convictions through psychosocial risk factors

	Product of coefficients		Bootstrapping
	<i>b</i>	SE	BCa 95% CI
G3 males: sons (<i>N</i> = 281); mothers (<i>N</i> = 188)			
Indirect effect: father's drug use	0.048	0.027	0.009; 0.122
Direct effect	0.117	0.085	-0.060; 0.271
Total effect	0.166	0.079	0.001; 0.310
Proportion of total effect mediated	0.292		
Ratio of indirect to direct effect	0.412		
Ratio of total to direct effect	1.412		
G3 females: daughters (<i>N</i> = 246); mothers (<i>N</i> = 168)			
Indirect effect: harsh discipline	0.073	0.041	0.006; 0.173
Direct effect	0.195	0.095	-0.010; 0.368
Total effect	0.268	0.107	0.035; 0.458
Proportion of total effect mediated	0.273		
Ratio of indirect to direct effect	0.375		
Ratio of total to direct effect	1.375		

BCa, bias corrected and accelerated; 5,000 bootstrap samples.

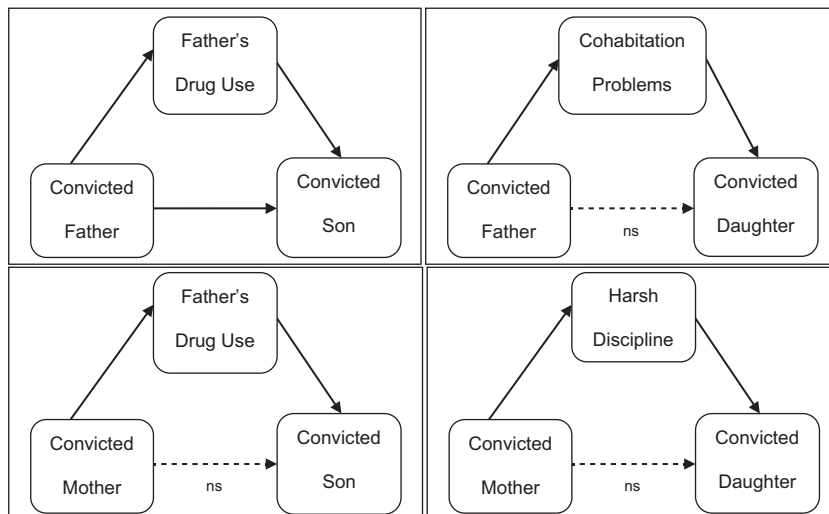


FIG. 2 Final mediation models for the intergenerational transmission of criminal convictions from fathers and mothers to male and female offspring

explain that children adopt gender roles from their environment, and therefore children may more closely identify with a parent who has the same characteristics as themselves. The present results provide some support for this argument. Whilst imitation of criminal behaviour has been observed between siblings, co-offending between parents and children is rare (Reiss and Farrington 1991). Most antisocial parents do not tolerate the antisocial behaviour of their children (Farrington 2003) and attempt to shield their children from their behaviour (Hirschi 1969). Therefore, it seems unlikely that there is a direct training effect from parents to their children. Learning theories explain that behaviours can be learnt even in the absence of direct reinforcement, but are less helpful explaining continuity, especially when antisocial parents attempt to discourage antisocial behaviour in their children. By way of resolving this, Giordano (2010) helpfully distinguishes between *direct transmission* where parents communicate attitudes and behaviours that support the criminal behaviour of their children and *indirect transmission* where parents tacitly communicate poor coping strategies to negative life events (i.e. a parent excessively drinking alcohol after a bad day at work). These interactions are much more common, and children are more likely to model these behaviours and apply them to similar contexts within their own lives. Explanations such as these would account for the intergenerational transmission of criminal behaviour in circumstances where the parent has attempted to prevent the child's antisocial behaviour.

We also anticipated that the convictions of parents would be related to several of the psychosocial risk factors and this was indeed the case. The convictions of fathers and mothers predicted many of the psychosocial risk factors: accommodation, cohabitation and employment problems, and the two substance misuse risk factors were strongly predicted by convicted fathers and, to a lesser extent, by convicted mothers. Criminally involved parents were more likely to experience strain in their social environment and this had a knock-on effect for their children, as several of the psychosocial risk factors then predicted the convictions of male and female offspring. The strongest predictor of convicted males was poor parental supervision and for females the strongest predictors of convictions were the father's cohabitation problems and harsh parental discipline.

The results suggest that environmental risk factors have a differential impact on males and females, as we expected. This could be explained by control theories, as Gottfredson and Hirschi (1990) originally proposed that a lack of individual self-control, which is developed through parental supervision, causes crime. This is also one of the key propositions of interactional theory and seems to apply particularly to the male offspring. For the females, the family is a source of informal social control, with its system of rewards and punishments. Females from an unstable home, who receive overly punitive discipline, are most at risk for criminal offending. Several other studies have also found that risk factors can have a differential impact on male and female offspring; McFadyen-Ketchum *et al.* (1996) found that harsh parenting may have a stronger effect on the externalizing behaviour of male offspring, but other studies have contradicted this (Webster-Stratton 1996). It has been suggested that males may be more susceptible to environmental stress, for example, Wachs (1992) found that males were more sensitive to overcrowding in the family home, divorce and the loss of a parent. This is known as the 'threshold' hypothesis, i.e. that girls have to pass a higher critical 'risk level' in order to become delinquent (Wong *et al.* 2013: 641). Using self-report data from the Pittsburgh Youth Study and the Pittsburgh Girls Study, Wong *et al.* (2013) examined whether there were sex differences in the risk threshold for delinquency. Accumulative

risk level had a linear relationship with boys' delinquency, indicating that every extra risk factor resulted in a similar stepwise increase in the probability of delinquency. For girls, however, this relationship turned out to be non-linear, with the increase in the probability of delinquency larger in the higher risk level ranges. Therefore, in high-risk environments, the recent evidence suggest that each extra risk factor substantially augments the probability of delinquency for girls.

We also expected that convicted mothers (and not convicted fathers) would strongly predict harsh parental discipline, and we found that this was the case for both male and female offspring. This could reflect that, in reality, mothers do most of the parenting. There is also some evidence to suggest that male and female offspring may receive different parenting (Keenan and Shaw 1997), especially with regard to supervision (Agnew 1985; Thornberry 1987; Dishion and McMahon 1998). This could be because parents believe that becoming involved in antisocial behaviour has more long-term consequences for females (e.g. teenage pregnancy), so they are more watchful of their daughters. Lack of parental supervision is thought to be a key factor in the development of delinquent behaviour. Findings from this study certainly suggest this, and it may explain gender differences in early delinquent behaviour (Simons *et al.* 1980; Jang and Krohn 1995). However, lack of parental supervision can also be a consequence of the adolescents' antisocial behaviour (Bell and Chapman 1986; Lytton and Romney 1991), and some parental supervision can have an undesirable effect if children feel overly controlled (Kerr and Stattin 2000).

The results from the mediation analyses offer us some insights into the areas of family functioning that may explain the intergenerational transmission of criminal behaviour. In keeping with our theoretical predictions, the psychosocial risk factors that were important mediators of transmission to daughters were related to the family home environment, cohabitation problems and harsh discipline. In keeping with previous findings already discussed, the results of the mediation analyses suggest that females are particularly at risk of repeating the criminal behaviour of their mother or father if their home environment is unstable and characterized by conflict. This could be for reasons previously mentioned such as females spending more time in the family home during childhood. In unstable family environments, children need at least one parent to protect them and act as a buffer. Our findings suggest that convicted mothers transmit most risk when they are also ineffective parents.

We expected that factors outside the family home would explain the transmission of convictions from fathers. This was only suggested by findings for male offspring; the fathers' drug use was an important mediator for the intergenerational transmission of convictions to male offspring. This could reflect the strong underlying genetic components of criminal behaviour and poor impulse control, which are closely related.

Unusually, the mother's convictions impacted on her son's likelihood of conviction through the mediating effect of the father's drug use. This could be the effect of assortative mating, as convicted females are highly likely to have a convicted male partner. We know that antisocial individuals are likely to cohabit, marry and have children together. This happens for two reasons: first, people tend to find partners from the same social and geographical place as themselves (social homogamy); and second, people tend to choose partners who have the same personality and behavioural characteristics as themselves (phenotypic assortment). Previous findings from the CSDD have shown that the convictions of mothers and fathers were highly correlated (0.55)

(Rowe and Farrington 1997). Findings from other studies that have examined assortative mating as an explanation of the familial nature of criminal behaviour are similar; a recent Swedish study found fairly strong correlations (0.40) and evidence for both social homogamy and phenotypic assortment (Frisell *et al.* 2012). Also, an examination of assortative mating in the Dunedin Longitudinal Study by Krueger *et al.* (1998) found that the self-reported antisocial behaviour of partners was highly correlated.

In this study, a convicted mother is highly likely to have a convicted male partner and he would be at increased risk of drug use (as shown by the first mediation model). This would mean that the pathway from the mother to her son through the father's drug use actually reflects the strong influence of the father and assortative mating. There is some evidence from other studies to support this.

Galbaud du Fort *et al.* (1998) compared the psychiatric histories of a sample of spouses from the general population in Canada. They found that there was a significant relationship between spouses for alcohol and drug abuse, even after controlling for age. There were, however, several gender differences between the spouses; the antisocial personality of wives was related to the drug use of husbands, but the antisocial personality of husbands was not predictive of the drug use of their wives. Similarly, Moffitt *et al.* (2001) investigated the effects that assortative mating had on the continuity of antisocial behaviour. They found that an individuals' antisocial behaviour was influenced and encouraged by the antisocial behaviour of their partner. The continuity of antisocial behaviour for females varied according to whether they had an antisocial partner, and antisocial men are described as 'the engines in women's transition from juvenile delinquency to adult crime' (Moffitt *et al.* 2001: 193). By contrast, the continuity in the behaviour of antisocial males was not related to the behaviour of their female partners. The evidence seems to suggest that troubled marital relationships and the antisocial behaviour of partners are most relevant to the intergenerational transmission of the criminal behaviour of mothers.

Spousal similarity in criminal behaviour has important implications for the study of its intergenerational transmission, as assortative mating may increase the risk that criminal behaviour will be transmitted through genetic and environmental mechanisms such as social learning. The likelihood of intergenerational transmission is highest in family environments with genetic and environmental factors that coincide with antisocial behaviour and are concentrated within certain families. This clustering sharply distinguishes criminal families from other families in societies. In the final models, the mediators varied according to the gender of the offspring, not the gender of the parent. This is contradictory to our expectations and we can conclude that there are different causal mechanisms for males and for females; transmission of criminal behaviour from fathers to male offspring was explained by factors outside the family home that were also related to impulse control, such as the father's drug use. Transmission from mothers seemed to be explained by assortative mating, whereby convicted mothers were highly likely to have convicted male partners who used drugs. For the female offspring, transmission seemed to be explained by processes in the family home. The transmission of criminal behaviour from mothers was explained by harsh discipline, which may involve a modelling process between mother and daughter, whereas transmission from fathers to female offspring was explained by the troubled relationship between the father and the mother.

Limitations

This analysis does, however, have some important limitations. First, the prevalence of convictions was quite low, particularly for females (8.68 per cent of mothers and 7.72 per cent of daughters), which is to be expected in a community sample. It is possible that this meant that there was insufficient power in some of the statistical analyses. Second, it is hard to draw firm conclusions about the role of the two parenting measures (poor supervision and harsh discipline) that were found to be significant mediators because they were retrospectively measured in the G3 offspring interview. Third, limitations surrounding the use of official criminal record data also apply here, particularly with regard to incomplete records, although the CSDD data are thought to be largely complete, due to regular searches of records and several validation studies of the data (see [Auty et al. 2015b](#)). Fourth, a limitation of all prospective longitudinal studies is that data can only be collected prospectively on either mothers or fathers, as we can never know who participants will marry and have children with, and it tends to be people from outside the study. However, [Farrington and Painter \(2004\)](#) have shown in previous analyses of CSDD data that the convictions of fathers and mothers were both equally important predictors of the convictions of the brothers and sisters of the G2 males. Furthermore, the mother's risk factors were not more important for sisters and the father's risk factors were not more important for brothers. Finally, this analysis focussed solely on the transmission of criminal convictions, which underestimates the true prevalence of criminal behaviour, and it is important to bear in mind that what we are studying is a small subset of a much larger group of antisocial individuals.

Implications

The implications of this study's findings are three-fold. First, environmental risk factors partly explain the intergenerational transmission of criminal behaviour, but risk factors that occur in the family home may be more accurate predictors of offending in females than males. Therefore, interventions targeting these areas will be more successful with girls, compared with boys. Second, it seems to be the case that delinquent girls need different types of interventions compared with boys. Given the more problematic background of girls in the juvenile justice system, for them it might be even more important to address multiple problems simultaneously. It is likely that gender-specific interventions are necessary for girls, although evidence about the effectiveness of existing gender-specific interventions is still accumulating ([Turner et al. 1995](#); [Hipwell and Loeber 2006](#); [Zahn et al. 2009](#)). Finally, although findings from this study have indicated that the intergenerational transmission of criminal behaviour to male and female offspring is at least partly explained by different psychosocial risk factors, we are still unsure as to why males and females may be differentially exposed or socialized by their parents, and future research should aim to address this.

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