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Abstract | The intergenerational transmission of criminality is well established. However, few intergenerational studies in Australia have examined the link between parents' offending and their children's behaviour. Even fewer have used large enough samples to examine serious maternal offending.

This study uses a sample of over 21,000 Australian children and their parents to determine the prevalence and co-occurrence of offending among mothers and fathers, and the relationship between parental offending and children's conduct problems at age 11.

The study found that parental offending increases a child's likelihood of conduct problems, and the offending most strongly associated with child conduct problems is maternal violent offending. It also found that the intergenerational transmission of antisocial behaviour begins early, highlighting the importance of intervention for at-risk children and programs targeted at mothers as well as fathers.

Parental offending and children's conduct problems

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Intergenerational transmission is defined as the continuity of a pattern of behaviour over subsequent generations—that is, the similarity between children's behaviour patterns and those of their parents (Boyd et al. 1999; Thornberry 2009). The intergenerational transmission of antisocial behaviour and criminality is well established in the criminological literature (Farrington & Welsh 2007; Loeber & Stouthamer-Loeber 1986; van der Rakt, Nieuwbeerta & de Graaf 2008). However, the mechanisms underpinning these patterns are not yet well understood (Flynn, Van Dyke & Gelb 2017).

One possible explanation, albeit debated, is assortative mating (Beaver 2013; Farrington 2011). According to this explanation, people tend to seek 'like' partners, such that people with delinquent tendencies seek delinquent partners, exposing their children to a higher risk of delinquency via both genetic and environmental factors. Farrington and colleagues found evidence of assortative mating, whereby the majority (61%) of women with convictions had children with men who also had convictions (Farrington, Barnes & Lambert 1996). This underlines the importance of accounting for the offending histories of both parents in understanding the intergenerational transmission of antisocial behaviour.



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Historically, criminological studies have tended to focus on the antisocial behaviour or criminality of men, because criminal behaviour occurs less frequently in women (Lauritsen, Heimer & Lynch 2009). However, studies have increasingly examined the role of mothers (and daughters), revealing a relationship between mothers' antisocial behaviour and their children's outcomes in different developmental periods: early childhood physical aggression (Tzoumakis, Lussier & Corrado 2012); diverse cognitive, social, emotional-behavioural, physical and communication skills (Laurens et al. 2017b); childhood behaviour problems (Raudino et al. 2013; Rhule, McMahon & Spieker 2004; Smith & Farrington 2004; Thornberry, Freeman-Gallant & Lovegrove 2009); juvenile delinquency (Bijleveld & Wijkman 2009); and violent offending (Frisell, Lichtenstein & Långström 2011).

Research on the intergenerational transmission of antisocial behaviour and offending has often used only an aggregate measure of offending (ie 'any' offending), which includes a diverse range of behaviours (eg burglary, assault, fraud). However, van de Weijer, Bijleveld and Blokland (2014) proposed that focusing on specific types of crime, which might require certain skills and characteristics, may be useful in understanding how crime is transmitted from one generation to the next. A study conducted in the Netherlands using criminal record data across five generations found the intergenerational transmission of offending from fathers to sons was greater for violent offending compared to non-violent offending (van de Weijer, Bijleveld & Blokland 2014). Other studies have also made a distinction between violent and non-violent offences, with findings suggesting some specificity in the transmission of violent criminal offending (Besemer 2012; Kendler et al. 2015) and sexual offending (Långström et al. 2015). The findings from these studies suggest that considering specific types of offences may reveal different patterns in the intergenerational transmission of offending.

Few intergenerational Australian studies to date have included data on antisocial behaviour or offending in parents and children. An early qualitative study of 16 known criminal families in Tasmania found that 50 percent of second-generation family members had a criminal record (Davies and Dax 1974; Dax 1983). To examine the intergenerational transmission of offending, Goodwin and Davis (2011) further identified six extended families in Tasmania with known criminal offending histories across several generations. They found that minor offending in parents was not associated with offspring convictions, while more serious parental offending increased the likelihood of offspring conviction. Moreover, paternal conviction history was more important than maternal convictions (Goodwin & Davis 2011); however, it is possible that the analyses were unable to detect associations for mothers due to the small sample.

Another study, which used data on a birth cohort of 2,399 participants from the Mater-University of Queensland Study of Pregnancy, examined the relationship between fathers' arrests and imprisonment and the behaviour problems of their children at age 14 (Kinner et al. 2007). However, the prevalence of paternal arrest and imprisonment in this study was low (7.6% and 5.7% respectively), which is likely due to the way it was measured (maternal report of paternal offending at the children's age 14 assessment). The authors found that unadjusted associations were statistically significant, but after adjusting for social and family factors there was no relationship between paternal arrest and imprisonment and behaviour problems among their male or female children (Kinner et al. 2007).

More recently, a study in Western Australia examined early childhood developmental vulnerabilities in the five-year-old children (n=19,071) of parents who had either spent time in prison or served community orders (Bell et al. 2018). Children with a convicted parent were at higher risk of vulnerability across all developmental domains (including emotional maturity, which measured aggressive behaviour). The increase in risk ranged from 31 to 63 percent for children with a parent who had served a community order and 68 to 115 percent for those with a parent who had been incarcerated.

Another recent study examined aggression at age five, using data on over 69,000 children from the first wave of the New South Wales Child Development Study (NSW-CDS; Tzoumakis et al. 2017). Findings from this study showed that maternal and paternal offending histories were associated with early childhood aggression after accounting for individual and family risk factors. The association with aggression was stronger for parental histories of violent and frequent offending than for minor or infrequent offending (Tzoumakis et al. 2017).

The current study set out to determine the relationship between parental offending histories and childhood conduct problems in a large population of Australian children, focusing on outcomes in middle childhood (age 11), a key developmental period for intervention and prevention of antisocial behaviour and aggression. Determining whether and to what extent maternal and paternal offending influences childhood behaviour prior to formal involvement with the criminal justice system will help to inform early preventative interventions among at-risk young people. Firstly, the prevalence in the cohort of different types of maternal and paternal offending (eg violent, non-violent) will be established. Secondly, the extent to which offending co-occurs among mothers and fathers will be determined. Thirdly, associations between parental offending type and children's conduct problems in middle childhood will be examined.

Method

Data were drawn from the NSW-CDS (<http://nsw-cds.com.au/>), a state-wide longitudinal, intergenerational, population-based study. The NSW-CDS links records from multiple sources (eg health, crime, welfare and education) and combines information from two cross-sectional surveys. An independent agency, the Centre for Health Record Linkage (<http://www.cherel.org.au>), linked the records using probabilistic methods, in accordance with strict privacy protection protocols. Children's and parents' records were linked using names, dates of birth, residential addresses and gender. All data received by the research team were de-identified. Parents were identified via the children's birth registration records from the NSW Registry of Births, Deaths and Marriages, limiting analysis to those children whose births were registered in New South Wales.

The first wave of record linkage for the NSW-CDS was conducted in 2014. It brought together pre-birth records and those from when the children were approximately five years old (Carr et al. 2016). This first record linkage was defined by the 2009 Australian Early Development Census, a census of 99.7 percent of children entering their first year of formal schooling in the state of New South Wales in 2009 (n=87,026; Brinkman et al. 2014). The second wave of record linkage was conducted in 2016 and brought together records from pre-birth up to the age of 13 years (Green et al. 2018).

A key feature of this second record linkage is the addition of the Middle Childhood Survey (MCS), a cross-sectional assessment of the mental health and wellbeing of a subset of the sample. The aim of the MCS was to follow up with as many of the 87,026 children in the initial Australian Early Development Census cohort as possible. The MCS was an online self-report survey of 116 items that was administered to students in Year 6 (the final year of primary school in New South Wales) during class time (Laurens et al. 2017a). All New South Wales schools (government and non-government) with Year 6 enrolments (n=2,371) were targeted for participation, and 829 administered the survey. A total of 27,792 children completed the MCS (31.4% of eligible children). The representativeness of the MCS to the New South Wales population was demonstrated on a range of demographic indices (Laurens et al. 2017a). Analyses in the current study are based on 21,956 children whose mothers and fathers could be identified via New South Wales birth records, and who had complete information for the outcome of this study (ie conduct problems).

Ethical approval for the NSW-CDS was obtained from the NSW Population and Health Services Research Ethics Committee (HREC/15/CIPHS/21), with data custodian approvals granted by the relevant government departments. Ethical approval for the MCS was obtained from the University of New South Wales Human Research Ethics Committee (UNSW HREC reference HC14307).

Measures

Parental offending

Parental offending data were obtained from the NSW Bureau of Crime Statistics and Research's Reoffending Database (1994–2009), which provides information on each parent in the NSW-CDS who was convicted of a criminal offence in New South Wales and data on their subsequent criminal court appearance. A binary indicator reflecting any maternal and paternal offending was created for children with a mother or father with a history of offending, respectively. To create mutually exclusive types of parental offending, maternal and paternal indicators were also coded based on most serious type of offence, using the following hierarchy:

- (0) none—no offences;
- (1) minor—at least one minor offence (eg traffic and vehicle offences, public health, and safety offences);
- (2) non-violent—at least one non-violent offence (eg theft, burglary, fraud, drug offences); and
- (3) violent—at least one violent offence (eg homicide, assault, aggravated robbery, sexual assault).

Children's conduct problems

The outcome measure used in this study was the conduct problems scale of the Strengths and Difficulties Questionnaire (SDQ; Goodman 1997), as assessed within the MCS (Laurens et al. 2017a). The SDQ is widely used in longitudinal research on child development and its psychometric properties are well established internationally (Goodman 2001). The SDQ conduct problems scale includes the following five items:

- (1) I get very angry and often lose my temper;
- (2) I usually do as I am told (reverse scored);
- (3) I fight a lot;
- (4) I am often accused of lying or cheating; and
- (5) I take things that are not mine from home, school or elsewhere.

These items were measured on the following three-point scale: 'not true' (scored 0), 'somewhat true' (scored 1) and 'certainly true' (scored 2). The five items were summed to create a total score ranging from zero to 10. Internal consistency of the conduct problems scale in the MCS was high (ordinal $\alpha=0.80$; Laurens et al. 2017a). Normative categories were then created based on United Kingdom population-based norms as follows: 'normal' (defined as ~80% of the population: a score of 0 to 3), 'borderline' (~10%: a score of 4) and 'abnormal' (~10%: a score of 5 to 10; Goodman 1997).

Children's demographic characteristics

Children's age and gender were obtained from the MCS. Their socio-economic status was calculated using Pink's (2013) Socio-Economic Index for Areas (SEIFA) and their residential postcodes, obtained within the MCS. The SEIFA is derived from census information and measures the average income and employment status for each postcode in Australia. As such, it indicates collective socio-economic status (relative disadvantage) and is likely to misclassify some individuals (Pink 2013). A binary socio-economic status indicator was created by recoding the national quintiles into the most disadvantaged (quintile 1) and those less disadvantaged (quintiles 2 to 5).

Analysis

Firstly, the demographic characteristics of the sample were analysed. Secondly, a cross-tabulation and chi-square test was used to determine the co-occurrence of maternal and paternal offending. Thirdly, multinomial regression models were used to examine the association between parental offending type and offspring conduct problems. Multinomial regression Model 1 examines the relationship between maternal offending type (ie 'minor', 'non-violent' and 'violent', or no offending), and conduct problems, as measured by the SDQ (ie 'borderline', 'abnormal' or 'normal'). Multinomial regression Model 2 adjusted for two demographic variables (the children's gender and socio-economic status) and, considering the high co-occurrence of maternal and paternal offending, paternal offending ('any'). Results of the multinomial regression analyses were considered statistically significant if the 95 percent confidence intervals did not cross 1. Analyses were conducted using SPSS version 24 (IBM 2016).

Table 1: Demographic characteristics of the sample

	Number	Percent
Gender		
Male	11,089	50.5
Female	10,867	49.5
Age		
<12 years	12,793	58.3
≥12 years	9,163	41.7
Socio-Economic Index for Areas		
Quintile 1 (Most disadvantaged)	3,918	17.8
Quintiles 2 to 5	18,038	82.2
SDQ conduct problems		
Normal	18,291	83.3
Borderline	1,684	7.7
Abnormal	1,981	9.0
Maternal offending		
Any	2,158	9.8
Type of maternal offending		
None	19,798	90.2
Minor	568	2.6
Non-violent	966	4.4
Violent	619	2.8
Paternal offending		
Any	6,229	28.4
Type of paternal offending		
None	15,727	71.7
Minor	1,747	8.0
Non-violent	2,153	9.8
Violent	2,322	10.6

Results

The demographic characteristics of the sample are presented in Table 1. Approximately half of the sample was male, 58 percent were under 12 years (mean age=11.9 years, standard deviation=0.4) and 18 percent of the sample was in the most disadvantaged SEIFA quintile. Based on the SDQ, nine percent of children were categorised in the 'abnormal' category, eight percent in 'borderline' and 83 percent in the 'normal' category. Nearly 10 percent of mothers in the cohort had been involved in offending, compared to 28 percent of fathers. Approximately three percent of mothers had a history of at least one violent offence, compared to almost 11 percent of fathers. Four percent of mothers and 10 percent of fathers had been involved in at least one non-violent offence.

Any paternal offending	Any maternal offending	
	No n (%)	Yes n (%)
No	15,082 (76.2%)	644 (29.9%)
Yes	4,716 (23.8%)	1,513 (70.1%)
Chi-square test	$\chi^2(1)=2,051.86, p<0.001, \phi=0.31$	

Note: Within column frequencies and percentages are reported

Results of a chi-square test to determine the co-occurrence of offending among the mothers and fathers in the cohort are presented in Table 2. The co-occurrence of paternal offending in the sample was high for maternal offending: 70 percent of children whose mothers had a history of offending also had a father with an offending history. The chi-square test was statistically significant, and the strength of the association was moderately strong ($\phi=0.31$). The cross-tabulation for fathers (not shown) was lower: 24.3 percent of children whose father had a history of offending also had a mother with an offending history.

	SDQ conduct problems			
	Borderline		Abnormal	
	OR	(95% CI)	OR	(95% CI)
Model 1: Unadjusted				
Maternal offending				
Minor	1.41	(1.05–1.88)*	1.96	(1.54–2.50)*
Non-violent	1.63	(1.32–2.02)*	2.11	(1.75–2.53)*
Violent	2.01	(1.56–2.60)*	3.43	(2.80–4.19)*
Model 2: Adjusted				
Maternal offending				
Minor	1.23	(0.91–1.65)	1.55	(1.21–1.98)*
Non-violent	1.36	(1.09–1.69)*	1.54	(1.27–1.86)*
Violent	1.64	(1.26–2.14)*	2.41	(1.95–2.97)*
Child is male	1.70	(1.53–1.88)*	1.88	(1.71–2.07)*
Socio-economic disadvantage	1.21	(1.07–1.37)*	1.36	(1.21–1.52)*
Any paternal offending	1.41	(1.26–1.58)*	1.81	(1.64–2.01)*

Note: Reference category for SDQ conduct problems is 'normal'. Reference category for the maternal offending type is no offending. OR=odds ratio, CI=confidence interval. Results considered statistically significant if the 95% CIs do not cross 1, as indicated by an asterisk (*)

Results from the multinomial regression analyses are provided in Table 3. The unadjusted associations (Table 3, Model 1) showed that the strongest association was between maternal violent offending and children being classified in the 'abnormal' category for SDQ conduct problems (OR=3.43; 95% CI=2.80–4.19). Overall, the odds ratios (ORs) for 'borderline' conduct problems were lower than the ORs for the 'abnormal' category. The strength of the associations observed between maternal offending type and conduct problems increased in line with the seriousness of offending. These patterns held when adjusting for the demographic covariates and paternal offending (Table 3, Model 2), although the ORs decreased in magnitude. In the adjusted model, maternal history of 'minor' offending was not statistically significant for 'borderline' conduct problems. Associations between child gender (male) and socio-economic status (most disadvantaged quintile of SEIFA) with 'abnormal' and 'borderline' conduct problems were statistically significant, and the strength of the association was low (ORs<2). Paternal offending history was also associated with both conduct problem categories. As with maternal offending, the ORs tended to be higher for 'abnormal' (OR=1.81; 95% CI=1.64–2.01) compared to 'borderline' (OR=1.41; 95% CI=1.26–1.58) conduct problems. In the adjusted model, the strongest association was again between maternal 'violent' offending and children's 'abnormal' conduct problems (OR=2.41; 95% CI =1.95–2.97).

Additional multinomial regression analyses (not shown; see Tzoumakis et al. 2019) were conducted to examine the association between paternal offending type and children's conduct problems, adjusting for maternal offending ('any'). The results were similar; the strongest association was between paternal violent offending and children being classified in the 'abnormal' SDQ conduct problems category. Again, the strength of the associations increased with the seriousness of the fathers' offending. After adjusting for demographic indicators, the magnitude of the associations decreased, but all types of paternal offending remained statistically significant. The adjusted ORs for paternal offending type were similar in magnitude to those found for maternal offending type.

Discussion

The findings from the current study are consistent with the international literature showing that having a parent involved in antisocial behaviour or offending increases a child's likelihood of conduct problems (Raudino et al. 2013; Rhule et al. 2004; Smith & Farrington 2004). By using data from a large sample of over 21,000 Australian children and their parents, it was possible to examine maternal offending type, which showed that maternal history of violent offending had the greatest association with child conduct problems, followed by non-violent offending.

Findings also revealed high levels of assortative mating for mothers. That is, 70 percent of mothers with a history of offending also had a partner with a history of offending. This finding was consistent with past studies, which also uncovered moderate to strong assortative mating for offending (Farrington, Barnes & Lambert 1996), antisocial behaviour (Krueger et al. 1998) and violent offending (Frisell et al. 2012). This type of assortative mating can significantly impact children in multiple ways, since they are at risk of inheriting genetic risk from parents as well as being subjected to the social and environmental risk associated with antisocial behaviours (Beaver 2013). However, as the present study did not examine genetics, it was not possible to account for genetic risk owing to assortative mating. Few intergenerational studies have included sufficient numbers of offending mothers and

fathers to be able to examine the role of assortative mating in the intergenerational continuity of antisocial behaviour. Therefore, further research should be conducted on assortative mating and how this might influence parents' offending trajectories and their children's development.

The NSW-CDS has the largest sample of Australian children for which successive waves of record linkage are being undertaken longitudinally. Major strengths of the study's design are that it avoids recall bias and minimises selection and attrition biases. Importantly, its large sample size allows examination of relatively rare exposures and outcomes such as female offending and violent offending. However, the NSW-CDS uses data from administrative records that were not collected for research purposes, which means that misclassification errors may have occurred when the records were created. In addition, the use of official data underestimates offending by failing to capture uncharged offences, although evidence suggests that official and self-report offending measures over the life course are similar (Payne & Piquero 2016). The study is also limited by the absence of other important covariates such as parenting practices, parental contact with children, individual-level socio-economic status, and genetic information.

Overall, findings from this study demonstrate that the intergenerational transmission of antisocial behaviour begins early, highlighting the importance of disrupting this transmission prior to young people's contact with the criminal justice system. Moreover, intervention should target mothers as well as fathers. Findings also suggest that maternal and paternal offending had similar associations with children's conduct problems. Analyses using a larger subset of the NSW-CDS cohort have indicated that mothers involved in offending faced greater adversity than non-offending mothers—for example, they were younger at their child's birth and experienced higher rates of mental illness and socio-economic disadvantage (Tzoumakis et al. 2017). As mothers involved with the criminal justice system often experience multiple and compounding disadvantages, there is compelling evidence of the need to devise gender-specific support strategies for them. These interventions are therefore a worthy subject of development and evaluation, given that rates of incarceration in Australia have been steadily increasing in the last 10 years, with the number of female prisoners growing at a faster rate than the number of male prisoners (Australian Bureau of Statistics 2017). Policymakers should therefore consider developing and targeting programs for mothers involved in offending, considering their importance in the early transmission of conduct problems in children.

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