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Intergenerational transmission of personality disorder severity and the role of psychosocial risk factors

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Abstract

Background: Familial influences on the development of many psychopathologies are well recognised, yet the psychosocial risk factors that could help explain apparently intergenerational continuities of personality disorder (PD) are less well understood.

Aims: To establish whether there is an association between the severity of PD in men and their offspring in a community cohort, and whether factors recognised as having the potential to increase risk of psychopathology mediate this.

Methods: Participants in the Cambridge Study in Delinquent Development (n = 452 dyads) were assessed using the Tyrer and Johnson model of PD severity. Severe PD was defined as antisocial PD plus at least one other PD from a different cluster. Original participants were assessed by interview and their offspring by screening questionnaire. Chi-square tests and mediation models were used to investigate the intergenerational continuity of PD severity and its relationship with psychosocial risk factors.

Results: An association between severe PD in fathers and severe PD in their offspring was confirmed, regardless of whether the offspring were male or female. Whilst preliminary tests suggested that employment problems, poor parental supervision and family disruption we associated with

severe PD in daughters, mediation analysis suggested that these variables had very little effect once severity of father's disorder was in the model.

Conclusions: Psychosocial risk factors appear to play a limited role in the intergenerational transmission of PD severity, although future studies should take account of interaction data, for example, quality and quantity of paternal interaction given a child's temperamental traits.

KEYWORDS
personality disorder severity, psychosocial risk factors, intergenerational transmission, longitudinal studies

1 | INTRODUCTION

Familial influences on development of different forms of psychopathology are well recognised in the empirical research literature and include personality disorder (PD; Baron et al., 1985; Hicks et al., 2013; Oquendo et al., 2013; Reinelt et al., 2014). Psychosocial factors that explain intergenerational continuities are, however, much less understood than genetic factors. A literature review found a strong relationship between parental antisocial, borderline and narcissistic PDs and psychopathology in the offspring (Dutton, Denys-Keys & Sells, 2011). Intergenerational associations have also previously been demonstrated for antisocial behaviour and conduct disorder (Farrington, Barnes & Lambert, 1996; Frick & Loney, 2002; Rowe & Farrington, 1997; Thornberry et al., 2003) and for internalising disorders (Kim et al., 2009; Pettit et al., 2008). Relationships between the PD of parents and their offspring could be explained by genetic transmission but numerous twin studies have shown that PDs are only moderately heritable (Bouchard, 2004; Gjerde et al., 2012; Kendler & Prescott, 2006; Plomin et al., 2001).

Parental psychopathology could also have an indirect rather than direct influence on offspring through environmentally mediated processes, such as the family's socioeconomic circumstances or their parenting practices. Furthermore, these factors may have different impacts on male and female offspring. Measurement of links between a parent's experience in childhood and their child's experience at the same age (intergenerational) is often neglected in studies. Most focus on the contemporaneous behaviours of parent and child. Prospective studies in which two generations are followed up are quite rare.

Individuals with early onset conduct problems are often raised in families with multiple psychosocial disadvantages (Farrington, 1995). In adulthood, these children tend to experience problems in many areas of their functioning: financial and employment, substance misuse, drug-related and violent crime (Moffitt et al., 2002), with early childbearing (Jaffee, 2002), educational failure, poor physical and mental health, and interpersonal and marital relationship problems (Fergusson, Horwood & Ridder, 2005; Maughan & Rutter, 2001).

Studies examining the influence of parental psychopathology on the development of problem behaviours in children have traditionally focused on mothers, possibly due to the high prevalence of absenteeism amongst fathers. This has meant that the impact of fathers' behaviours is less well understood (Phares, 1992). Connell and Goodman (2002) examined the growing body of research on both maternal and paternal factors associated with internalising and externalising problems in children. Their meta-analysis of 134 independent samples found that, when comparing the strength of associations between psychopathology in mothers and fathers and internalising and externalising disorders in their children, associations were stronger for *maternal* rather than *paternal* psychopathologies and for *internalising* rather than *externalising* problems in children (Connell & Goodman, 2002). Furthermore, examinations of

intergenerational associations for individual PDs are needed in order to clarify what impact the personality pathology of the father may have on their offspring.

Understanding the nature of mediating and moderating risk factors that can help explain problematic behaviours in adulthood is a priority for researchers, clinicians and policy makers; 'before appropriate treatments can be developed and evaluated, there must be a clear understanding of the mechanisms and processes that initiate and maintain the developmental pathways to disease' (Cicchetti & Toth, 2006, p. 621). Children who are most at risk for seriously maladaptive outcomes not only suffer themselves but also pose a high cost to society and it is not yet clear what are the most effective interventions.

There are few longitudinal prospective studies that examine the effect of psychosocial risk factors on PD in intergenerational community samples. The Cambridge Study in Delinquent Development (CSDD), a prospective longitudinal study of the development of delinquent behaviour in a sample of 411 boys, now men, from south London, who were born around 1953, offers an opportunity to do so. Many of the original participants, referred to as G2 (generation 2) have had biological offspring, referred to as G3. The criminal behaviour of the G2 men has been studied extensively (for recent reviews of the study's numerous findings see; Farrington, 2003; Farrington et al., 2009, 2013, 2021). Firstly, for this study our aim was to establish whether there is an association first between qualities of the PD of a community sample of men and their offspring, secondly whether there is an association between severity of the disorders and, thirdly, whether psychosocial risk factors mediate either or both.

2 | METHOD

2.1 | Ethics

The study was approved by the South East Regional Medical Ethics Committee.

2.2 | Sample

The father and offspring dyads are participants in the CSDD (Farrington, 2003), a prospective longitudinal study of the development of delinquent behaviour in a community sample of 411 males. The study began in 1961–1962, with the original cohort containing all boys aged 8 or 9 years old on the registers of six state schools in south London.

3 | PROCEDURES

Between 1984 and 1986, when they were aged 32 years, 378 of the G2 males (93.8% of those still alive) participated in a social interview. They had last been contacted in the period 1999 to 2004, aged ~48, for a social interview and a medical questionnaire when 365 of 394 men who were still alive were interviewed (92.6%). The social interview collected information on offending, drug use, alcohol use, sexual behaviour, illness and injuries, aggressive attitudes, personality, accommodation, employment, relationships, children and child-rearing attitudes and behaviour. Of these 365 men, 304 (83.3%) also completed the medical interview, including the PD assessment, which was carried out separately.

Between 2004 and 2011, 518 of the men's offspring (82.2% of the 630 eligible children born up to 1992 inclusive) were interviewed and assessed for PD; 506 (97.7%) were interviewed in person and 12 (2.3%) were interviewed over the telephone. The vast majority of interviews took place at the interviewee's home (73.6%). Just over a third (35.4%) of the G3 offspring were still living with one or both of their parents. Only 1% were still living in the original postcode in South London; 28% were living in other London postal districts; 42% were living in the counties south

of London (Surrey, Sussex or Kent); 5% were living elsewhere in the United Kingdom; and 24% were living abroad. At the time of the interview, their average age was 25.4 (SD, 3.6). We sought the agreement of fathers or their female partners to the offspring interview to meet the ethical standards of the South East Regional Medical Ethics Committee. Written informed consent of parent and offspring was obtained for each offspring interview.

The data from the 518 G3 offspring interviews were then matched with their father's data; some of the offspring could not be matched due to the father's death (7), his refusal (45), or the G3 psychopathy assessment not being completed; the latter problem arose when the interview was conducted over the telephone (14). Therefore, this analysis is based on a sample of 452 man and child dyads (230 fathers and sons and 222 fathers and daughters).

3.1 | Assessment of PD

Category of PD according to the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV; American Psychiatric Association, 1994) was measured in the original (G2) male sample by a forensic psychiatrist trained in using the Structured Clinical Interview for DSM-IV PDs (SCID-II: First et al., 1997). The interview consists of 116 questions which, taken together, allow categorisation into one or more of the 10 Axis II PDs. PDs in the G3 sample were measured using the screening questionnaire of the Structured Clinical Interview for DSM IV PDs. The participants completed the paper-based questionnaire themselves, responding either 'yes,' 'no' or 'do not know' to each question; the screening questionnaire also differs from the interview in that there are no follow-up questions in the event of a positive answer to a screening question (Spitzer et al., 1990). As the G3 PD prevalence rates were calculated from data from a screening instrument, an overestimation of PD diagnosis is to be expected, and this would in turn lead to inflated figures for each of the categories of PD severity. Previous research has suggested that the SCID-II screening instrument overestimates diagnoses of PD in clinical samples by about 20%, compared to the full SCID-II interview (Ekselius et al., 1994). With this in mind, diagnostic cut points were imposed for research purposes only, and were adjusted according to the specifications of a previous study which had compared ratings of PD symptom ratings using the SCID-II screening instrument with those made using the full SCID-II interview (Ullrich et al., 2008).

Severity of PD was rated according to Tyrer's (2005) five-point scale:

1. No Personality Disorder (PD symptoms below sub-threshold criteria).
2. Personality Difficulty (one criterion less than the threshold for PD).
3. Simple Personality Disorder (PD in one DSM cluster only).
4. Complex Personality Disorder (two or more PDs in more than one cluster).
5. Severe Personality Disorder (antisocial PD plus one or more PDs from a different cluster).

3.2 | Psychosocial risk factors

Five dichotomous composite psychosocial risk factors, affecting parent or child, were created based on criteria that had previously been used to evaluate life success 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 5 years); cohabitation problems (three or more of: not living with a partner, not married or cohabiting for 5 years or more, divorced in the last 5 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 9 months in the last 5 years); alcohol misuse (three or more of: driving under the influence of alcohol, a heavy drinker, a binge drinker and a CAGE score of two or more [Ewing, 1984]); drug use (any illegal drug in the last 5 years). Two additional

risk factors were created using data from the G2 father's interview at age 32: Teenage father (at the birth of his first child) and large family (father living with four or more children).

Finally, three risk factors were created using data from the offspring interview: disrupted family (the father left the family home before the child's 16th birthday); poor supervision (the G2 parents never knew where their children were going when they went out, before age 16); harsh discipline (the G2 parents hit their children with an implement as a form of discipline). The selection of psychosocial risk factors was based on findings from previous CSDD analyses that delinquency amongst the original cohort (G2 boys; West & Farrington, 1973) was associated with parental antisocial personality at age 32 (Farrington, 2000), and psychopathy at age 48 (Farrington, 2006).

3.3 | Analytic plan

Firstly, the relationship between the severity of PD of the G2 father and of his G3 sons and G3 daughters was examined using Chi-square tests in STATA version 12.1 (StataCorp LP; path a – Figure 1). The two most important dichotomisations were imposed

1. No PD versus any evidence of PD (0 vs. 1–4 on the Tyrer five-point scale).
2. No severe PD versus severe PD (0–3 vs. 4 on the Tyrer five-point scale).

An indirect relationship through psychosocial risk factors was then investigated (paths b and c in Figure 1) using Chi-square tests. Indirect pathways (paths b and c) were not examined where a significant direct pathway (path a) had not been found. All *p*-values are based on one-tailed tests in light of clear directional predictions.

Finally, a test of mediation was performed using the STATA programme 'binary mediation', that can be used either with multiple mediator variables or binary response variables. The indirect effects were computed using the product of coefficients approach. Coefficients were standardised before indirect effects were computed. A bootstrap approach was used to estimate standard errors, using the cluster(varname) option to take account of the multiple offspring in each family in the dataset. Only the psychosocial risk factors that met the criteria for potential mediation (i.e. they could have a relationship with both the father's PD severity and the offspring's PD severity) were examined.

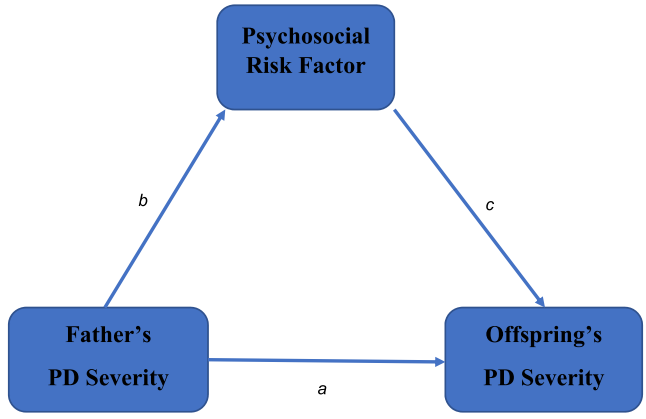

FIGURE 1 Mediation model of the intergenerational transmission of personality disorder severity via psychosocial risk factors

4 | RESULTS

4.1 | Intergenerational transmission of PD severity

Table 1 shows the results of the crosstabulation that relates the severity of the (G2) fathers' PD to severity of PD in their (G3) sons and daughters. About 49 (24%) of the fathers and 50 (22%) of the sons and 53 (24%) of the daughters had no evidence of PD at all. Of these 16 (8%) of the fathers, 32 (14%) of the sons and 20 (9%) of the daughters had a rating indicative of the most severe PD.

4.2 | Intergenerational comparison of no PD versus any indication of PD

About 140 (78%) of G3 sons of G2 fathers who had any evidence of PD had some evidence of PD themselves compared with 32 (64%) of G3 sons of G2 fathers who had no evidence of PD (OR = 1.97, $p = 0.024$). Amongst daughters, 134 (79%) had any evidence of PD when father did compared with 36 (68%) of G3 daughters of G2 fathers who had no evidence of PD (OR = 1.81, $p = 0.044$).

TABLE 1 Crosstabulation relating fathers' PD severity to PD severity of sons and daughters

Any PD severity symptoms			
Fathers			
	No	**Yes**	**Total**
Sons			
No	18	40	58
Yes	32	140	172
$\chi^2 = 3.94$, $df = 1$, OR = 1.97, $p = 0.024$			
Daughters			
No	17	35	52
Yes	36	134	170
$\chi^2 = 2.91$, $df = 1$, OR = 1.81, $p = 0.044$			
Severe PD			
Fathers			
	No	**Yes**	**Total**
Sons			
No	189	29	218
Yes	9	3	12
$\chi^2 = 1.30$, $df = 1$, OR = 2.17, $p = 0.127$			
Daughters			
No	188	15	203
Yes	14	5	19
$\chi^2 = 7.59$, $df = 1$, OR = 4.48, $p = 0.003$			

Note: One-tailed *p*-values were used because of directional predictions.

Abbreviations: OR, odds ratio; PD, personality disorder.

4.3 | Intergenerational comparison of presence of severe PD versus less severe or no disorder

Three (9%) of G3 sons of G2 fathers who had severe PD also had it themselves compared with 9 (5%) of G3 sons of G2 fathers who had no evidence of severe PD (OR = 2.17, $p = 0.127$). About 5 (25%) of G3 daughters of G2 fathers with severe PD had it themselves, compared with 14 (7%) of G3 daughters of G2 fathers with indications of PD below the severe threshold or none (OR = 4.48, $p = 0.003$).

4.4 | Association between fathers' severe PD and psychosocial risk factors

The severity of father's PD was related to six of the psychosocial risk factors: the father's employment problems, his alcohol misuse, his drug use, a disrupted family, poor supervision and harsh discipline. Table 2 shows the results of a crosstabulation and chi-square tests relating the G2 father's PD severity to the 10 psychosocial risk factors (path b – Figure 1), firstly for male and then for female offspring. For the male offspring, the severity of the father's PD was significantly related only to the father's drug use and disrupted family relationships. For female offspring, severity of father's PD was significantly related to four of the psychosocial risk factors: cohabitation problems, alcohol misuse, a disrupted family and the large family risk factor.

4.5 | Psychosocial risk factors and severity of PD of offspring

Table 3 shows the relationships between psychosocial risk factors and PD severity for G3 offspring (path c). For the male offspring, father's accommodation problems and having a teenage father were related to their chance of having any indication of PD. There was no relationship between any psychosocial risk factor and severe PD amongst the male offspring. For the female offspring, none of the psychosocial risk factors distinguished between those who had no evidence at all of PD and those who had any evidence, but four of the psychosocial risk factors were significantly related to severe PD compared to none or a lower level of PD ratings: the father's accommodation problems, his employment problems, a disrupted family and poor parental supervision.

4.6 | Psychosocial mediation of severe PD between father and his offspring

Only the psychosocial risk factors for which significant relationships had been established with offspring PD were then examined in a mediation analysis. Thus, a mediation analysis could only be conducted between severe PD in fathers and daughters, allowing for offspring's employment problems, experience of poor parental supervision and a disrupted family. Therefore, the final model examines the mediation of the relationship between the fathers' severe PD and their female offsprings' severe PD by employment problems, a disrupted family and poor supervision.

Table 4 shows the results of the mediation analysis. When employment problems were entered into the model they were not found to be a significant mediator, yet the direct relationship between the father's severe PD and the daughter's severe PD remained significant. The bootstrap results confirm that the indirect effect of employment problems is very small (b = 0.024), when compared to the size of the direct effect (b = 0.212). Thus, the proportion of the total effect, that is mediated by accommodation problems is <10.1%.

In the second mediation analysis, disrupted family was similarly found to have a small effect in the model. The bootstrap results show that the indirect effect is small (b = 0.036), when compared to the size of the direct effect (b = 0.205). The proportion of the total effect that is mediated is thus <14.9%.

TABLE 2 Crosstabulation relating fathers' PD severity to psychosocial risk factors

G3 male offspring sample (n = 230)						G3 female offspring sample (n = 222)									
Any PD severity symptoms						Any PD severity symptoms					Severe PD				
Fathers (n = 153)						Fathers (n = 152)									
Psychosocial risk factors	**No**	**Yes**	**Odds ratio**	**χ^2**	***p*-value**	**No**	**Yes**	**Odds ratio**	**χ^2**	***p*-value**	**No**	**Yes**	**Odds ratio**	**χ^2**	***p*-value**
Accommodation problems															
No	39	126				34	101				123	12			
Yes	19	46	0.75	0.774	0.190	18	65	1.22	0.346	0.278	76	7	0.94	0.013	0.454
Cohabitation problems															
No	54	148				51	133				170	14			
Yes	4	24	2.19	2.020	0.078	1	33	12.65	9.699	0.001	29	5	2.09	1.817	0.089
Employment problems															
No	46	135				40	131				160	11			
Yes	12	37	1.05	0.017	0.448	12	35	0.89	0.093	0.380	39	8	2.98	5.195	0.012
Alcohol misuse															
No	40	102				37	88				123	2			
Yes	18	70	1.53	1.715	0.095	15	78	2.19	5.328	0.011	76	17	13.76	18.647	<0.001
Drug use															
No	58	137				49	136				176	9			
Yes	0	34	14.96	11.753	<0.001	3	30	3.60	4.666	0.160	23	10	8.50	22.778	<0.001
Teenage father															
No	52	162				45	155				181	19			
Yes	6	10	0.54	1.376	0.121	7	15	0.62	0.959	0.164	22	0	0.40	0.837	0.180
Disrupted family															
No	49	121				40	106				139	7			
Yes	9	43	1.94	2.736	0.049	10	59	2.23	4.372	0.019	58	11	3.77	7.590	0.003
Large family															
No	23	60				10	62				69	3			

TABLE 2 (Continued)

G3 male offspring sample (n = 230)						G3 female offspring sample (n = 222)								
Any PD severity symptoms						Any PD severity symptoms					Severe PD			
Fathers (n = 153)						Fathers (n = 152)								
Psychosocial risk factors	No	Yes	Odds ratio	χ^2	*p*-value	No	Yes	Odds ratio	χ^2	*p*-value	No	Yes	Odds ratio	χ^2	*p*-value
Yes	35	112	1.23	0.428	0.257	42	108	0.42	5.401	0.010	134	16	2.75	2.626	0.053
Poor supervision															
No	57	160				48	161				193	16			
Yes	1	12	4.28	2.244	0.067	4	9	0.67	0.415	0.260	10	3	3.62	3.719	0.027
Harsh discipline															
No	52	161				47	157				189	15			
Yes	6	10	0.54	1.348	0.123	5	13	0.78	0.207	0.325	14	4	3.60	4.673	0.016

Note: Haldane Anscombe correction was applied to empty cells. All tests had 1 degree of freedom.

Abbreviation: PD, personality disorder.

TABLE 3 Crosstabulation relating to psychosocial risk factors to G3 offspring PD severity

G3 male offspring sample (n = 230)						G3 female offspring sample (n = 222)									
Any PD severity symptoms						Any PD severity symptoms					Severe PD				
Psychosocial risk factors	No	Yes	Odds ratio	χ^2	p-value	No	Yes	Odds ratio	χ^2	p-value	No	Yes	Odds ratio	χ^2	p-value
Accommodation problems															
No	41	124				30	105				128	7			
Yes	9	56	2.06	3.318	0.035	21	62	0.84	0.272	0.301	71	12	3.09	5.555	0.009
Cohabitation problems															
No	46	156				46	138				169	15			
Yes	4	24	1.77	1.041	0.154	5	29	1.93	1.697	0.097	30	4	1.50	0.471	0.247
Employment problems															
No	41	140				44	127				159	12			
Yes	9	40	1.30	0.416	0.260	7	40	1.98	2.416	0.060	40	7	2.32	2.875	0.045
Alcohol misuse															
No	30	112				33	92				116	9			
Yes	20	68	0.91	0.082	0.388	18	75	1.50	1.477	0.112	83	10	1.55	0.846	0.179
Drug use															
No	43	152				46	139				167	18			
Yes	7	27	1.09	0.036	0.425	5	28	1.85	1.474	0.113	32	1	0.29	1.580	0.104
Teenage father															
No	50	164				49	151				181	19			
Yes	0	16	5.26	3.134	0.039	4	18	1.46	0.435	0.255	21	1	0.45	0.594	0.221
Disrupted family															
No	39	131				39	107				137	9			
Yes	9	43	1.42	0.746	0.194	13	56	1.57	1.583	0.104	59	10	2.58	4.034	0.023
Large family															
No	19	64				21	51				68	4			
Yes	31	116	1.11	0.101	0.375	32	118	1.52	1.643	0.100	134	16	2.03	1.550	0.107

TABLE 3 (Continued)

G3 male offspring sample (n = 230)						G3 female offspring sample (n = 222)									
Any PD severity symptoms						Any PD severity symptoms					Severe PD				
Psychosocial risk factors	No	Yes	Odds ratio	χ^2	p-value	No	Yes	Odds ratio	χ^2	p-value	No	Yes	Odds ratio	χ^2	p-value
Poor supervision															
No	50	167				52	157				192	17			
Yes	0	13	4.25	2.244	0.067	1	12	3.98	1.989	0.079	10	3	3.39	3.334	0.034
Harsh discipline															
No	47	166				50	154				187	17			
Yes	3	13	1.23	0.096	0.379	3	15	1.62	0.560	0.227	15	3	2.20	1.401	0.119

Note: Haldane Anscombe correction was applied to empty cells. All tests had 1 degree of freedom.

Abbreviation: PD, personality disorder.

TABLE 4 Mediation of the effect of fathers' severe PD on their female offspring's severe PD through the father's employment problems, the disrupted family variable and poor supervision (*N* daughters = 222; *N* fathers = 152)

	Product of coefficients		Bootstrapping BC 95% CI	
	b	**SE**	**Lower**	**Upper**
Indirect effect				
Employment problems	0.024	0.026	−0.008	0.103
Direct effect	0.212	0.099	0.015	0.376
Total effect	0.236	0.108	0.002	0.426
Proportion of total effect mediated	0.098			
Ratio of indirect to direct effect	0.108			
Ratio of total to direct effect	1.108			
Indirect effect				
Disrupted family	0.036	0.034	−0.012	0.132
Direct effect	0.205	0.115	0.045	0.401
Total effect	0.241	0.105	0.008	0.421
Proportion of total effect mediated	0.159			
Ratio of indirect to direct effect	0.189			
Ratio of total to direct effect	1.189			
Indirect effect				
Poor supervision	0.024	0.022	−0.022	0.067
Direct effect	0.207	0.105	0.045	0.377
Total effect	0.232	0.105	−0.017	0.410
Proportion of total effect mediated	0.098			
Ratio of indirect to direct effect	0.109			
Ratio of total to direct effect	1.109			

Note: BC, bias corrected; 5000 bootstrap samples.

Abbreviation: PD, personality disorder.

Finally, poor supervision was also found to have a small mediating effect. The bootstrap results show a small effect (b = 0.024) compared to the direct effect size (b = 0.207). The proportion of the total effect that is mediated was thus under 10.4%.

5 | DISCUSSION

In this study, we found evidence for the intergenerational transmission of severe PD between fathers and daughters but not fathers and sons, although it must be acknowledged that the analyses were limited by the very low prevalence of severe PD in any group; there were only 16 fathers assessed to be at this level, 32 sons and 20 daughters.

Although preliminary analyses suggested that three of the psychosocial risk factors were associated with severity of PD amongst the daughters of men with PD in this cohort – fathers' employment problems, a disrupted family during childhood (generally that the father had left the family home before their offspring was 16 years old) and poor supervision of the child during childhood, mediation analyses suggested that these psychosocial problems had only

a small effect once severity of father's PD was in the model. This is in spite of the fact that we are confident about sequencing of the psychosocial measures; these were made when the father was aged 32 and when many of their offspring would have been under age 10 whilst the severity of offspring PD was measured when the offspring had reached adulthood.

Children of a father with PD suffer two potential disadvantages; increased genetic risk of that PD, and being raised in a home environment that is not conducive to successful child rearing. The suggestion from our findings is that, in this cohort, the genetic risk may have had more weight. Other studies, however, have suggested that there are two important considerations in mediating factors how a parent's behaviour may affect his or her child is its severity/quantity and the amount of time the child is exposed to that parent. Jaffee et al. (2003) found that, for the offspring of fathers who engaged in low levels of antisocial behaviour, the less time he lived in the family home, the more conduct problems the offspring had. By contrast, for children of fathers with high levels of antisocial behaviour who lived in the family home, the more time he was there, the poorer were the behavioural outcomes for the children. Similarly, Lamb (1997) argued that the amount of time fathers invest in child care is less closely associated with child outcomes than the quality of fathers' involvement with their children. Furthermore, intergenerational relationships are usually closer amongst same-sex pairs, as it is often thought that offspring may be more strongly influenced by the parent, that is most similar to themselves, and several studies have found that parents have the greatest impact on same-sex children through their negative (Deater-Deckard & Dodge, 1997; Koestner, Zuroff & Powers, 1991).

5.1 | Limitations

There are some important limitations to our study that must be taken into consideration. The use of a screening tool to detect PD means that PD will inevitably be over-diagnosed. Most instruments that assess PD rely on self-report, and there are two primary limitations to this method, identified by Klonsky, Oltmanns and Turkheimer (2002). Firstly, self-report provides only one perspective, when several independent perspectives would be preferable; secondly, individuals with PD often have problems with self-awareness and understanding the effect of their behaviour on others, which leads to both biased and incomplete information. In their review of 17 self-informant studies, Klonsky et al. (2002) conclude that correlations between self-reports and informant-reports tend to be moderate in size.

In future studies, it may be worth exploring other measures of PD severity. There is an important need to consider building other interaction measures into longitudinal studies of the future. In our analysis, the father's employment problems, poor parental supervision and family disruption were identified as potential mediators. Future research should also consider differences between individual characteristics, including details of personality traits, to see if some are more resilient than others to psychosocial risk factors. Adaptive coping strategies could also be investigated as those who have resilient personality traits may be more likely to seek out others who are similarly pro-social when they are faced with stressful life events, and therefore could be less likely to develop psychopathology in later life.

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DATA AVAILABILITY STATEMENT

Not applicable.

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