**Explanatory Risk Factors for psychopathic symptoms in men and women: Results from Generation 3 of the Cambridge Study in Delinquent Development**

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**Abstract**

Risk factors are central to the understanding and prediction of psychopathology. The current study focuses on risk factors for psychopathic personality and psychopathic behaviour by investigating the following: (1) Early risk factors for later psychopathic personality and psychopathic behaviour in men and women, and (2) Independently predictive risk factors for later psychopathic personality and psychopathic behaviour in men and women. The study analyses data from the third generation (Generation 3; “G3) of the Cambridge Study in Delinquent Development (CSDD). The G3 consists of both men (N=291) and women (N=260), and the results indicate that there are clear similarities in explanatory risk factors (e.g., risk taking and poor supervision) between men and women. There are however some important differences as it seems that attachment and socialisation factors are more important for women, and early school leaving is more important for men. Implications for early interventions are discussed.

*Keywords:* Psychopathy, risk factors, CSDD, longitudinal study

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Historically, psychopathy has been considered to consist of two main factors: Factor 1 (F1-PP) which measures psychopathic personality and Factor 2 (F2-PB) which measures psychopathic behaviour (Hare, 2003)[[1]](#footnote-2). As treatment in adulthood of those high on psychopathic symptoms is difficult and complicated (Harris & Rice, 2006; Tew & Bennett, 2020) and risk takes decades to mitigate (Farrington, 2019a), the repeated argument by Farrington and colleagues (e. g., Farrington, 1994; Farrington & Coid, 2003; Farrington & Welsh, 2007) has been that early prevention should take precedence over later treatment. There have been some notable successes with early treatment programmes targeting callous-unemotional traits (e.g., Hawes et al., 2014), but these are however of a tertiary nature, as they target children after the traits have been detected (Caplan & Grunebaum, 1967). From the perspective of successful prevention, it is arguably more beneficial to prevent the emergence of the phenomena (Farrington & Welsh, 2007).

The most successful early prevention methods (specifically primary and secondary prevention; Caplan & Grunebam, 1967) are programmes that target early risk factors for the outcome of interest (e.g., Farrington & Welsh, 2007). Establishing these risk factors is however complex, and requires prospective longitudinal designs (Murray et al., 2009), of which there are unfortunately few in the field of psychopathy that include women (Farrington & Bergstrøm, 2021a). This means that there is not yet a comprehensive knowledge base on early predictors of psychopathic personality versus psychopathic behaviour in both men and women that can be used in designing early primary and secondary prevention interventions (Farrington & Bergstrøm, 2018; 2021a). The aim of the current paper is therefore to address this research gap by studying the following: (1) Early risk factors for later psychopathic personality and psychopathic behaviour in men and women, and (2) Independently predictive risk factors for later psychopathic personality and psychopathic behaviour in men and women.

In light of debates about the nature of psychopathy (taxon versus dimension) (e.g., Farrington & Bergstrøm, 2018; Guay et al., 2018; Hare, 2003; Harris et al., 1994; Vasey et al., 2005), the current study will investigate predictors of psychopathic personality and behaviour both as continuous and dichotomous outcomes.

**Risk Factors: Key Definitions**

 A risk factor for psychopathy is defined as a factor that increases the risk of being high on psychopathy at some point in one’s life (e.g., Farrington, 2007; Farrington & Bergstrøm, 2018; Murray et al., 2009). But as Murray et al. (2009) have outlined, there are different types of risk factors depending on design of the study. For example, a risk factor as a correlation in a cross-sectional study is not that useful from a prevention standpoint as it is not possible to assert directional effects (Murray et al., 2009). What is usually established in the field of Developmental and Life-Course Criminology, which heavily relies on prospective longitudinal studies for theory generation (e.g., Farrington, 2005), are predictive risk factors (Murray et al., 2009). This means that the risk factor is measured at an earlier time point than the outcome (e.g., psychopathy), and as a result, it is possible to establish the temporal order of effects (Murray et al., 2009). Predictive risk factors can also be understood as explanatory or non-explanatory (Farrington et al., 2017). To avoid tautological concerns, the most useful factors to assess are those that conceptually do not overlap with the outcome of interest, and these are known as explanatory risk factors (Farrington et al., 2017). The current study focuses on independent predictors, which are here defined as risk factors that are independently predictive of psychopathic personality and behaviour after controlling for other potential risk factors.

**Psychopathy and Early Risk: Longitudinal Evidence**

Unfortunately, as discussed elsewhere (e.g., Farrington & Bergstrøm, 2018; 2021a) most research on predictors of psychopathy is of a cross-sectional nature or based on short-term longitudinal studies (Andershed, 2010; Farrington & Bergstrøm, 2021a). There are however some notable exceptions that have been recently published in the past two years that we would like to highlight here. For example, Backman et al. (2021) analysed data from the Pathways to Desistance Study, which consists mainly of males (n=1170), but also includes a smaller group of females (n=184). These were all delinquent youths from the USA assessed across eight waves of data collection (over 6 months to approximately 5 years). Psychopathic traits, caregiver contact, and parental warmth and hostility were measured using self-reports. The results indicated that parental warmth could function as a protective factor against the development of psychopathic traits, while hostility appeared to function as a risk factor.

 Vagos et al. (2022) studied the relationship between parent and peer attachment and psychopathic traits in youths (15-21 years of age; N=279; 116 males, 163 females) in a short longitudinal study spanning four months. The measures were all based on self-reports, and the analyses investigated effects both cross-sectionally and longitudinally. The path analyses found that attachment to mother, peers, and father were significantly and negatively related to psychopathic traits.

These two studies are interesting and informative, but they have some notable limitations. First, they rely heavily on self-reports from the participants themselves and second, that they have not included a wide range of potential risk factors. Farrington and Bergstrøm (2021b), however, investigated early risk factors (age 8-10) specifically for F1-PP (Factor 1 - psychopathic personality) and F2-PB (Factor 2 - psychopathic behaviour) at age 48 in the Cambridge Study in Delinquent Development’s (CSDD) ‘Generation 2 – G2’ males. The significant risk factors (at age 8-10) were as follows for F1-PP: convicted father, convicted mother, depressed mother, uninvolved father, harsh discipline, poor housing, low family income, large family size, high delinquency school, low non-verbal and verbal IQ, high daring, high impulsivity, high hyperactivity, low popularity, difficult to discipline, and high dishonesty. The significant risk factors for F2-PB were almost the same as for F1-PP, with some notable differences. Poor supervision, low SES, and high troublesomeness were significant risk factors for F2-PB, but not for F1-PP. High impulsivity was not a risk factor for F2-PB even though it was for F1-PP.

The five strongest risk factors for F1-PP were (in order of strongest to weaker): high delinquency school, high daring, high hyperactivity, low family income, and convicted father. The five strongest risk factors for F2-PB were (in order of strongest to weaker): high troublesomeness, high daring, high dishonesty, low family income, and disrupted family. These findings show that there are some differences in risk factors, and strength of relationships, for F1-PP versus F2-PB. Overall, the trend is that the risk factors have a stronger relationship with F2-PB compared to F1-PP. This could potentially be because F2-PB reflects behaviour, and especially antisocial and criminal behaviour (Hare, 2003). Because of the prospective longitudinal design, these risk factors are predictive, but this study did not attempt to disentangle which risk factors predicted psychopathy independently of other risk factors. This study also only included males when comparing F1-PP versus F2-PB, which limits the generalisability to females.

***Psychopathic Traits in Women and Men***

Women tend to overall score lower on psychopathic traits compared to men (e.g., Backman et al., 2021; Colins et al., 2017a; Hare, 2003). The available research suggests that, overall, psychopathy in women and men have similar predictors (Farrington & Bergstrøm, 2018) and correlates (Colins et al., 2017a), similar mechanisms for intergenerational transmission (Auty et al., 2015), and somewhat similar relationships with other personality disorders (Bergstrøm et al., 2022). However, while the similarities are striking (Miller et al., 2011), there are some important differences. Examples of these differences are that sexual abuse was more common amongst psychopathic women compared to men, and women had a higher level of PTSD than their male counterparts (Colins et al, 2017a). Similar findings on sexual abuse were found in a recent study on an all-female sample (9-17 years old; N=696) by Boduszek et al. (2019). Sexual abuse appears to be an important risk factor for the development of psychopathic traits in women. In line with the larger criminological and psychological literature on differences between men and women in aggression (e.g., Loeber et al., 2017; Colins et al., 2017b), men who were high on psychopathic traits were more likely to be deemed to be physically aggressive compared to women.

These differences can arguably influence interventions (e.g., Bloom et al., 2002; Thomson et al., 2021; Van Dieten, 2022) and the understanding of risk (e.g., Belisle et al., 2022; de Vogel et al., 2019; Olver & Stockdale, 2022). It is therefore important to better understand which specific risk factors might be independently important for women compared to men in relation to psychopathy.

**The Current Investigation**

 Early risk-focused interventions have been proven to be highly effective and beneficial in preventing offending and delinquency (for an overview, please see Farrington & Welsh, 2007). But despite being generally recognised for their success within DLC (e.g., Farrington & Bergstrøm, 2018; 2021a; Farrington & Welsh, 2007), these initiatives have not yet found widespread use in preventing psychopathy (Farrington & Bergstrøm, 2018; 2021a). There is however an emerging recognition that risk-focused prevention could have some utility in preventing the development of psychopathy (DeBrito et al., 2021). However, a potential hindrance for further adoption of a risk-focused prevention approach within psychopathy is the lack of an established knowledge base about predictive risk factors, especially those that are independently predictive and explanatory. The following research questions and hypotheses guided the current investigation:

1. What are the main risk factors for psychopathy in men and women?
* In line with past literature, it is expected that family and parental level factors will be predictive of psychopathy.
* Based on Farrington and Bergstrøm (2021b) it is expected that psychosocial risk factors will have a stronger relationship with F2-PB compared with F1-PP.
* Are there differences in risk factors for psychopathy in males versus females? As F1-PP might be more important in the female presentation of psychopathy (Forouzan & Cooke, 2005; Garcia et al., 2022), it is here suggested that the psychosocial risk factors might be more strongly related to F1-PP in women compared with men.
1. Which risk factors are independently predictive of psychopathy in men and women?
* It is expected that risk factors related to abuse will be more strongly predictive of psychopathic traits in women compared to men.

**Method**

**Design**

The CSDD is a prospective longitudinal survey of 411 London males who were first studied in 1961-62 at age 8-9. Their parents, teachers, peers, female partners, and children have also been interviewed. At the time they were first contacted in 1961-62, the males were all living in a working-class area of South London. The vast majority of the sample was chosen by taking all the males who were then aged 8-9 and on the registers of six state primary schools within a one mile radius of a research office which had been established. Most boys were born in 1953. In addition to 399 males from these six schools, 12 males from a local school for “educationally subnormal” (special needs) children were included in the sample, in an attempt to make it more representative of the population of males living in the area. Therefore, the males were not a probability sample drawn from a population, but rather a complete population of males of that age in that area at that time.

 Most of the males (357, or 87%) were White in appearance and of British origin, in the sense that they were being brought up by parents who had themselves been brought up in England, Scotland, or Wales. Of the remaining 54 males, 12 were African-Caribbean, having at least one parent of West Indian (usually) or African origin. Of the remaining 42 males of non-British origin, 14 had at least one parent from the North or South of Ireland, 12 had parents from Cyprus, and the other 16 males were White and had at least one parent from another Western industrialized country.

 On the basis of their fathers’ occupations when they were aged 8, 94% of the males could be described as working-class (categories III, IV, or V on the Registrar General’s scale, describing skilled, semi-skilled or unskilled manual workers), in comparison with the national figure of 78% at that time. The majority of the males were living in conventional two-parent families with both a father and a mother figure; at age 8, only 6% of the males had no operative father and only 1% had no operative mother. This was, therefore, overwhelmingly a traditional White, urban, working class sample of British origin.

The males have been interviewed nine times, at ages 8, 10, 14, 16, 18, 21, 25, 32, and 48. At all ages except 21 and 25, the aim was to interview all the males who were still alive, and it was always possible to interview a high proportion: 405 (99%) at age 14, 399 (97%) at age 16, 389 (95%) at age 18, 378 (94%) at age 32, and 365 (93%) at age 48. The original males are now termed generation 2 (G2), while their parents are G1 and their children are G3.

The results of the CSDD have been described in six books (Farrington, Piquero, & Jennings, 2013; Piquero, Farrington, & Blumstein, 2007; West, 1969, 1982; West & Farrington, 1973, 1977), and in nine summary articles (Farrington, 1995, 2003, 2019b, 2021; Farrington, Coid, & West, 2009; Farrington & Jolliffe, 2022; Farrington, Jolliffe, & Coid, 2021; Farrington & West, 1981, 1990).

***G3 children***

Between 2004 and 2013, efforts were made to interview the biological G3 children of the G2 males. There were 691 G3 children whose name and date of birth were known. Only children aged at least 18 (born up to 1995) were targeted. The ethical requirements of the South-East Region Medical Ethics Committee required that we contact the G2 male and/or his female partner in trying to interview the G3 children. Therefore, 20 children whose fathers refused at age 48, and 7 children who father was dead at age 48 (and where no female partner was available) were not eligible to be interviewed. An additional six G3 children who had died and three who were disabled (one Down’s syndrome, one mental health problems, one severe attention deficit-hyperactivity disorder), together with two who did not know that the G2 male was their father, were considered to be not eligible.

Of the 653 eligible G3 children, 551 were interviewed (84.4%); 291 of the 343 G3 males (84.8%) and 260 of the 310 G3 females (83.9%). Of the remainder, 39 children refused, 33 parents refused, 13 children could not be traced, 14 were elusive (agreeing or not refusing but never being available to interview), and three were aggressive or problematic. This article focuses on the G3 children. They were interviewed at the average age of 25, and more than half were aged between 23 and 27. The mean age interviewed was similar for the 291 G3 males (25.6) and the 260 G3 females (25.4).

**Criminal Record Searches of the G3 Children.** The minimum age of criminal responsibility in England and Wales is 10. Officially recorded cautions were counted as well as convictions in the Police National Computer (PNC), since cautions were routinely recorded on a national basis from 1995. In this article, “convictions” include cautions. Convictions were only counted if they were for “standard list” (more serious) offences, thereby excluding minor crimes such as minor traffic infractions and simple drunkenness. The most common offences that were included were thefts, burglaries and unauthorized takings of vehicles, although there were also quite a few offences of violence, vandalism, fraud and drug abuse. The definition of what is a “standard list” offence changed over time. In particular, common assault became a standard list offence in July 1995, drunk driving was added to the standard list from January 1996, and being drunk and disorderly was added in April 1997. All of these types of offences were counted.

As mentioned, there were 691 G3 children whose name and date of birth were known. Their median year of birth was 1981, and more than half were born between 1977 and 1985. They were first searched in microfiche records in 1994, and they were then searched in the PNC in 2003, 2006, 2011-12, and most recently in 2017. Because of the time intervals between an offence and a conviction, and between a conviction and its appearance in the PNC, the records only include offences committed up to the end of 2015. We have always counted the age when an offence was committed, not the age at the time of a conviction. In light of these considerations, the median age at which the G3 children were last searched was 34, and more than half were last searched between ages 30 and 37. The 31 G3 children who were abroad could not be searched, but 655 of the remaining 660 were considered to be searched. These included 342 G3 males and 313 G3 females. The other five cases had common names, and it was not clear that the correct person had been searched. Almost all G3 children (92%) were searched at least up to age 25.

Of the 291 G3 males who were interviewed, 275 had the PCL: SV completed. Of these 275, 269 were searched in criminal records in 2017. Of these 269, 81 (30.1%) were convicted. Of the 260 G3 females who were interviewed, 259 had the PCL-SV completed. Of these 259, 254 were searched in criminal records. Of these 254, 28 (11.0%) were convicted.

**Risk Factors**

The following section describes the risk factors included in the analyses. These were all dichotomised as described in Farrington et al. (2015). In general, the risk factors were dichotomised with the “worst” quarter versus the remainder. This facilitated a “risk factor” approach, made all the risk factors reasonably comparable, and did not usually involve much loss of information, as many variables were originally measured on 2, 3, or 4 point scales. Fortunately, different dichotomization splits produce highly correlated results (Farrington & Loeber, 2000). They were not measured on normally distributed equal-interval scales, as required by many statistical methods.

***Parental***

Convictions of the G2 father and G2 mother up to the G2 male’s age 32 were obtained from criminal record searches. Authoritarian attitudes to parenting of G2 fathers and G2 mothers were obtained from the Parental Attitude Schedules developed by Gibson (1968), completed by the G2 males and their G2 female partners when the G2 male was age 32. Example items are “Strict discipline develops a good strong character in children” and “Children who are made to obey will thank their parents later”. Young fathers referred to G2 males who were under age 23 at the time of the birth of their first child, while young mothers referred to G2 mothers who were under age 21 at the birth of their first known child. (We only have records of children that the G2 female had with the G2 male.)

***Family***

Uninvolved G2 fathers were those who spent the least time in activities with their children each week (according to their reports at age 32). Physical punishment referred to the G2 father hitting or smacking his children when they were very naughty. This was reported by the G3 children in retrospective questions about their childhood. Poor parental supervision referred to the G2 father not knowing where his children were when they were out, and this was also reported by the G3 children. Parental conflict was based on the G2 father’s report of frequent rows. The G3 children also reported on whether they had lived with the G2 father for the whole time period up to the sixteenth birthday or whether they had been separated.

***Socioeconomic***

Low take-home pay was reported by the G2 male at age 32. Large family size referred to the number of people living in the G2 male’s household when he was age 32. Poor housing of the G2 male at age 32 was rated by the interviewer, based on whether the home was dirty, smelly, damp, neglected, overcrowded, inadequately furnished, had vermin, or had structural problems. Low socioeconomic status at age 32 indicated that the G2 male had a semiskilled or unskilled manual job.

***Individual***

Early school leaving was based on the report of the G3 children that they had left school before age 16. The G3 children also reported on whether they often or very often took many risks under age 12, and on whether they always had difficulty paying attention at school. The G3 children also reported on whether they had ever been suspended from school and on whether they had been a frequent truant (one day per week or more).

**Psychopathy**

 Psychopathy in the G3s is described in Auty et al. (2015), and the symptoms were measured using the Hare Psychopathy Checklist: Screening Version (PCL:SV; Hart et al., 1995). The PCL:SV consists of 12 items, each measured on a 3-point ordinal scale (0,1,2) (Hart et al., 1995) as per the PCL tradition (Hare, 2003). For the current investigation, psychopathy was divided into the traditional two factor solution: F1-PP (Factor 1 – Psychopathic Personality) and F2-PB (Factor 2 – Psychopathic Behaviour) (Hart et al., 1995). F1-PP and F2-PB correlate strongly with each other. For example, for males, 24 of the 41 scoring highly on F1-PP also scored highly on F2-PB, and 223 of the 234 low scorers on F1-PP were also low scorers on F2-PB. Therefore, the OR between F1-PP and F2-PB was 28.62 (p<.001) (dichotomous) and the correlation was r=.72 (p<.001) (continuous). The effect sizes between F1-PP and F2-PB were only slightly weaker for females, where the OR was 19.97 (p<.001) (dichotomous) and the correlation for the continuous variables was r=.66 (p<.001).

The psychopathy outcome measures were not normally distributed equal-interval scales like height and weight, and they were not linearly related to convictions (see tables 1 and 2). Therefore, dichotomous psychopathy measures were used. However, in the interests of drawing the most defensible conclusions, the analyses were repeated with continuous psychopathy measures.

Dichotomous and continuous outcome measures both have advantages and disadvantages. Advantages of dichotomous measures include that they produce widely understandable results (e.g. to government policy-makers), make it easy to study interaction effects, and arguably produce more realistic measures of effect size. For example, Farrington and Koegl (2015) evaluated the effects of the SNAP early intervention programme on offending, and estimated d values of effect size between .2 and .4 (corresponding to r values to .1 to .2), which seems a small effect. However, these continuous measures corresponded to an 18% to 33% decrease in offending using dichotomous outcome measures, which does not seem a small effect.

The main disadvantage of dichotomous measures is their limited discrimination between outcome scores. Continuous measures, of course, have greater discrimination. However, most continuous analytic techniques used in criminology seem to be based on the product-moment correlation r, and its underlying assumptions (of linearly related, normally distributed interval scales) are clearly violated by the vast majority of criminological variables. Therefore, the main disadvantage of analyses based on continuous measures is that the results may be invalid and misleading. Readers can have most confidence in results that are replicated using both methods. Fortunately, the two methods agree quite well in the ordering of effect sizes of explanatory variables (see e.g. Farrington, 2020a; Farrington & Loeber, 2000).

**Results**

**Psychopathy and Convictions**

 As can be seen from Tables 1 and 2, psychopathic symptoms are clearly related to convictions, but not in a very linear way for the men. For example (see table 1), 12% of men who scored 0 on F1-PP were convicted. Around 30-35 % of men who scored between 1-4 on F1-PP were also convicted, but among the men who scored 5 or more, 65 % of the men were convicted. The highest scorers were especially likely to be convicted for both men and women.

<Insert Table 1 about here>

<Insert Table 2 about here>

According to the Cochran-Armitage linear trend test (see Agresti, 1990, pp. 100-102), which partitions the total chi-squared into linear and nonlinear components, three of the four relationships shown in Tables 1 and 2 are significantly nonlinear. For the 5x2 table for males relating F1-PP to convictions, chi-squared = 6.83, 1 df (p = .009). A similar analysis for males relating F2-PB to convictions yielded chi-squared = 5.99, 1 df (p = .014). For females, 3x2 tables were studied because of the small number of female convictions. The relationship for F2-PB for females was significantly nonlinear (chi-squared = 3.87, 1 df, p = .049). However, the relationship for F1-PP for females was not significant (chi-squared = 1.52, 1 df). These results indicate that relationships involving PCL-SV scores are nonlinear, as previously demonstrated for the G2 males (Farrington & Bergstrøm, 2021b). The high scorers are qualitatively different from lower scorers. In light of these results, the psychopathy scores were dichotomized into the highest scorers versus the rest.

**Risk Factors: Initial Results**

As highlighted in the methodology section, the risk factors were dichotomised into the “worst” quarter versus the rest. There were however some notable exceptions. These were convicted father (37 % of males, 45 % of females), convicted mother (7% of males, 11 % of females), poor supervision (49 % of males, 43 % of females), poor attention (13% of males, 9 % of females), and suspended (28 % of males, 11 % of females). At least 90 % of children were known on each risk factor, with the exception of authoritarian mother (81 % of males, 81 % of females), uninvolved father (78 % of males, 78 % of females), parental conflict (90 % of males, 87 % of females), low take-home pay (89 % of males, 84 % of females), and poor housing (81 % of males, 81 % of females).

Table 3 shows the relationships between the dichotomous risk factors versus dichotomous psychopathy for men. As can be seen, the following five risk factors were the strongest (and significant) for F1-PP for the males: suspended, early school leaving, large family size, risk taking, and poor housing. The five strongest risk factors for F2-PB for the males were as follows: poor housing, early school leaving, poor supervision, risk taking, and large family size.

<Insert Table 3 about here>

Table 4 shows the relationships between the dichotomous risk factors versus dichotomous psychopathy for women. The following five risk factors were the strongest for F-PP for the females: young mother, convicted mother, risk taking, low take home pay, and separated. The five strongest risk factors for F2-PB for the females were (in descending order): young mother, poor supervision, risk taking, early school leaving, and young father.

<Insert Table 4 about here>

Tables 5 and 6 shows the results for the dichotomous risk factors versus continuous psychopathy for the males and females respectively. Overall, the results are similar, with some notable exceptions. For the males (see tables 3 and 5), young mother was significant for the dichotomous F1-PP, but not for the continuous F1-PP. Separated and poor attention were significant for the continuous F1-PP, but not for the dichotomous F1-PP. Convicted father, separated, and poor attention were significant risk factors for the continuous F2-PB, but not for the dichotomous F2-PB.

<Insert Table 5 about here>

 For the females (see tables 4 and 6), authoritarian father, authoritarian mother, and physical punishment were significant risk factors for the continuous F1-PP, but not for the dichotomous F1-PP. Physical punishment, parental conflict and suspended were significant risk factors for the continuous F2-PB, but not for the dichotomous F2-PB. Interestingly, low take-home pay was significant for the dichotomous F2-PB, but not for the continuous F2-PB.

<Insert Table 6 about here>

**Risk Factors: Independently Predictive**

The main aim of the regression analyses was to identify a number of independent predictors of the psychopathy outcomes, using an iterative method. In the interest of studying only explanatory predictors, suspended and truant were excluded from these analyses, because they might be measuring underlying constructs that were similar to the underlying components of psychopathic behaviour.

 In order to maximize the number of independent predictors, they were included if they were significant at p<.10, one-tailed. Forward stepwise methods were used. The main advantage of forward stepwise regression (compared with entering all variables in the equation simultaneously) follows from the fact that it is usual in studies for several empirical variables to be measuring the same underlying theoretical construct. For example, in the CSDD, it is likely that low take-home pay, poor housing and low SES are all measuring underlying poverty. If all variables are entered in a regression equation simultaneously, the predictive efficiency of the underlying theoretical construct will be spread across several variables. Therefore, the importance of the theoretical construct will likely be under-estimated, particularly if no individual variable is an independent predictor of the outcome variable. In contrast, in forward stepwise regression, at least one empirical variable will enter the equation and indicate the importance of the underlying construct. The main criticism of forward stepwise regression seems to be that the results will be affected by random fluctuations between samples in the importance of empirical variables; several possible alternative models are not studied. This is called model selection bias or overfitting of models (see e.g. Whittingham et al., 2006). However, in our view, the advantages of forward stepwise selection outweigh any disadvantages that it may have, and it is preferable to the simultaneous entry of all variables.

In predicting F1-PP, for example, the first logistic regression included all 11 significant predictors shown in Table 5, and five of them proved to be independently predictive (early school leaving, convicted father, risk taking, low take-home pay, young mother). Then these five risk factors were included in a regression analysis and only three were independently predictive (risk taking, early school leaving, low take-home pay). Then these three were included in a regression analysis, but only two were independently predictive (risk taking and early school leaving). Then other significant predictors from Table 5 were added one by one to these two. Poor supervision was predictive independently of risk taking and early school leaving, and large family size was predictive independently of these three risk factors. The final model of four independent predictors is shown in Table 7.

 As can be seen from Table 7, the independently predictive risk factors for the dichotomous F1-PP for males were large family size, poor supervision, risk taking, and early school leaving. For the dichotomous F2-PB (males), poor housing, early school leaving, young father, risk taking, poor supervision, and large family size were independently predictive. For females, risk taking, parental conflict, low take-home pay, and poor supervision were independently predictive for the dichotomous F1-PP. Young mother, risk taking, separated, and poor supervision were predictive for the dichotomous F2-PB for females.

<Insert Table 7 about here>

 Forward stepwise multiple regression analyses were then carried out with continuous psychopathy scores. These analyses did not require the same degree of iteration as the logistic regression, since in all cases the risk factors that were significantly independent in the first analysis (based on all significant predictors) were also all significantly independent in the second analysis. For example, for F1-PP of males, the 13 significant risk factors (from Table 5, excluding suspended and truant) were entered in the first analysis, and seven were independently predictive. All seven were then entered into the second analysis, and once again all seven (shown in Table 8) were independently predictive).

<Insert Table 8 about here>

 As can be seen from table 8, risk taking, poor housing, convicted father, poor supervision, early school leaving, separated, and large family size were independently predictive for males of the continuous F1-PP. For the continuous F2-PB (males) the following factors were independently predictive: Poor supervision, risk taking, poor housing, early school leaving, large family size, low take-home pay, physical punishment, and separated.

 For females, the following risk factors were independently predictive for the continuous F1-PP: Young mother, separated, risk taking, convicted mother, low take-home pay, and poor supervision. For the continuous F2-PB, poor supervision, young mother, separated, risk taking, parental conflict, early school leaving, poor attention, authoritarian father, and physical punishment were independently predictive.

**Discussion**

**Risk Factors for Psychopathy**

Before discussing the main findings, it is essential to note that the current investigation has shown the importance of replicating findings treating psychopathy as both continuous and dichotomous. There is support for both views of psychopathy (e.g., Farrington & Bergstrøm, 2018; Guay et al., 2018; Hare, 2003; Harris et al., 1994). By investigating psychopathy as both continuous and dichotomous, the current study has shown that how psychopathy is measured could influence the final results. Interestingly, the analyses did not consistently show that one approach was better than the other in identifying significant risk factors, and it is therefore recommended that researchers replicate their results using both continuous and categorical outcomes in the future. The consistent predictors for males for F1-PP as both continuous and categorical were: Convicted father, young father, young mother, physical punishment, poor supervision, low take-home pay, large family size, poor housing, low SES, early school leaving, risk taking, suspended, and truant. For the continuous analyses, separated and poor attention were also found to be significant risk factors. For F2-PB for males the following risk factors were found in both analyses: Convicted mother, young father, young mother, physical punishment, poor supervision, low take-home pay, large family size, poor housing, low SES, early school leaving, risk taking, suspended, and truant. For the continuous analyses, the following risk factors also emerged as significant: convicted father, separated, and poor attention.

 For females, the following factors were significant for F1-PP in both analyses: convicted father, convicted mother, young father, young mother, poor supervision, parental conflict, separated, low-take home pay, early school leaving, risk taking, suspended, and truant. In addition to these, the continuous analyses found that authoritarian father, authoritarian mother, and physical punishment were predictors for F1-PP for females.

 For F2-PB for females, across analyses the following were significant risk factors: convicted father, convicted mother, young father, young mother, authoritarian father, poor supervision, separated, poor housing, early school leaving, risk taking, poor attention, and truant. In the dichotomous analyses, low take-home pay was also significant, and in the continuous analyses, physical punishment, parental conflict, and suspended were found to be significant.

As can be seen from this summary, the results are quite similar across analyses. This is in line with past research. Farrington (2020a) previously compared risk factors for dichotomous versus continuous outcomes and found (a) that the results were usually similar, and (b) that neither method consistently yielded stronger effects.

***Psychopathic Personality versus Behaviour***

The current study lends support to past research by Farrington and Bergstrøm (2021b) showing that parental, family, socioeconomic, and individual factors increase the risk of the development of psychopathic personality and psychopathic behaviour in the G2 males of the CSDD. Farrington and Bergstrøm (2021b) found that the strongest risk factors for F1-PP (dichotomous) were high delinquency school, high daring, high hyperactivity, low family income, and convicted father. The strongest risk factors for F2-PP (dichotomous) in the G2 males were high troublesomeness, high daring, high dishonesty, low family income, and disrupted family

The current study found that, for G3 males, the risk factors were quite similar for F1-PP, with suspended and early school leaving being the strongest risk factors for F1-PP (dichotomous). There were some differences for F2-PB between G2 males and their biological male G3 offspring. While individual level risk factors were more important for F2-PB for the G2 males, it appears that a greater range of risk factors influence the development of G3 F2-PB symptoms.

As Farrington and Bergstrøm (2021b) found, the psychosocial risk factors were more strongly related to F2-PB than to F1-PP. As previously noted, this is likely because F2-PB measures delinquent and antisocial behaviour (at least to some extent). Research from the CSDD has shown how these psychosocial risk factors predict later antisocial and criminal behaviour (Farrington et al., 2021). It should however be noted that the relationships between early risk factors and F1-PP are also interesting, since personality is not thought to be influenced by such external factors (Costa & McCrae, 2006).

The consistency across generations is also noteworthy. Farrington and Bergstrøm (2021b) reported results from the G2 males of the CSDD (411 males born in the 1950s). While the findings from the G2 have been replicated in other longitudinal studies (Farrington & Loeber, 1999; Zych et al., 2021), and G2 versus G3 risk factors correlated .80 (Farrington et al., 2015), the similarity in predictive risk factors for psychopathy in two generations supports earlier findings on the intergenerational transmission of psychopathy (Auty et al., 2015).

***Males versus Females***

 A clear strength of the current study is that, because of the mixed sample, it has been possible to move beyond the male dominated studies within the field of psychopathy (see also Verona & Vitale, 2018). The risk assessment literature has emphasized the importance of recognising gender-specific and gender-responsive risk profiles (Olver & Stockdale, 2021), and the current investigation offers a unique opportunity to investigate differential risk factors for men versus women. In line with previous research on psychopathy in women, the risk factors for psychopathy in men and women were quite similar. This similarity is striking, considering that women tend to be lower on both psychopathic personality and behaviour than men (e.g., Backman et al., 2021; Colins et al., 2017a; Hare, 2003), and that some research (e.g., Colins et al., 2017a) has found some unique predictors (e.g., experiencing sexual abuse) of psychopathy in women. Overall, the current study’s similar findings across genders support the extension of psychopathy, a construct mainly validated on men (Hare, 2003; Verona & Vitale, 2018), to women.

However, in line with Colins et al. (2017a), some factors were more important in the development of psychopathy in women versus men. This indicates that there might be some unique developmental experiences for women. For example, when investigating risk factors for F1-PP (continuous), authoritarian father and authoritarian mother were significant for women, but not for men. Conversely, socioeconomic risk factors for F1-PP (continuous) did not appear to be important for women, while they were significant for men. This could potentially suggest that the women are more relationship-oriented in their development of psychopathy (Forouzan & Cooke, 2005; Garcia et al., 2022).

When investigating independent risk factors in the multiple regressions and logistic regressions, there was some support for this view. Young mother, convicted mother, parental conflict and authoritarian father were found to be predictive of psychopathy in women, but not in men. Interestingly though, separation seemed to increase the risk for both men and women, for both psychopathic personality and psychopathic behaviour in the continuous analyses (multiple regressions). Early school leaving seemed to be specifically important for men’s development of psychopathy. This highlights some important gender differences, but more research on psychopathy in women, with direct comparisons between men and women, is needed (e.g., Verona & Vitale, 2018).

**Independently Predictive Risk Factors and Implications for Interventions**

As highlighted at the start of this discussion, there were some differences in results based on whether psychopathy was treated as a dichotomous or continuous outcome. These differences are especially important for the results on explanatory and independently predictive factors, where the dichotomous analyses provided more parsimonious models compared to the continuous analyses. The results that were replicated across analytical approaches are now highlighted.

For G3 males, large family size and poor supervision were significant predictors for F1-PP in both continuous and dichotomous analyses. Early school leaving and risk taking also emerged in both analyses as risk factors for F1-PP. Similar results were found for the G3 males in independently predicting F2-PB, where poor supervision, risk taking, poor housing, early school leaving, and large family size were all significant.

For the G3 females, the independently predictive predictors of F1-PP that were found across analyses were risk taking, low take-home pay, and poor supervision. For F2-PB, the consistent independent predictors were poor supervision, young mother, being separated, and risk taking.

Based on the results, it is here suggested that the Raising Healthy Children (RHC) (Catalano et al., 2021) might be implemented with children at risk to prevent the development of psychopathic personality and psychopathic behaviour in men and women. RHC adheres to the best practices in early intervention programmes (see Farrington & Welsh, 2007) and targets children within their larger school and family contexts. The components of the programme are divided into three: (1) interventions targeting teacher training (2) child focused interventions, and (3) interventions focused on the parents (Catalano et al., 2021, Table 1, p. 72). One notable benefit of this programme is that it consists of multiple components; such programmes have been found to be more effective than single-component programmes (e.g., Farrington & Welsh, 2007).

The current study was only able to establish that early school leaving was a significant risk factor, not why someone might leave early (and there might be individual differences in reasons), but the RHC targets a wide range of factors related to school success. The teacher component includes “proactive classroom management”, “interactive teaching”, and “cooperative learning” (Catalano et al., 2021, Table 1, p. 72) covering multiple tools and methods that can counteract school failure (Catalano et al., 2021). As highlighted above, RHC also includes a parent training component directly related to supporting children in valuing an education (Catalano et al., 2021). These interventions targeting both parents and teachers would likely counteract the mechanisms explaining why someone would leave school early. This in turn would reduce the risk for developing psychopathy for males. For both the G3 males and females, risk taking emerged as an important risk factor. The RHC can be helpful here as well through interventions towards the child (e.g., “identify consequences of problem behaviours”; Catalano et al., 2021, table 1, p. 72) which will also be reinforced through parent training (Catalano et al., 2021).

There are also some important implications for secondary and tertiary intervention in adolescence. Because of the lack of focus on females in this context (e.g., Loeber et al., 2017), the current discussion will focus on suggestions for girls and women. For example, the present results could be used to guide interventions with justice involved females in adolescence. A suggestion could be multisystemic therapy (MST; e.g., Henggeler, 1999), which might be useful in preventing future behavioural problems and could also be useful in preventing the development of F2-PB (Manders et al., 2013). MST would allow a focus on individual level factors such as risk taking, but would also target parental/family level risk factors identified in this study such as poor supervision (Henggeler, 1999). Recent research has found that MST can be used successfully with females (Keles et al., 2021), but it should be noted that in some older research it was more successful with males than with females (Asscher et al., 2013).

**Limitations and Suggestions for Future Research**

There are some limitations to the current investigation. While the G3 consist of both men and women, there are some threats to generalisability. The CSDD is a prospective longitudinal study set in the United Kingdom, and the G3’s fathers (G2) all came from a similar background (Farrington et al., 2021). It is important to note, however that as previously stated, the CSDD results have been replicated in other studies (e.g., Farrington & Loeber, 1999; Zych et al., 2021), showing that these potential concerns are not necessarily warranted. While the current study includes a wide range of risk factors at different levels, there are some variables that were not included that could be of interest, for example attachment, as found in Vagos et al. (2021). This could be a potential limitation of the current study. There is also a lack of research on very early risk factors on psychopathy (Thomson, 2019). Future research should include obstetrical and post-natal factors in addition to the childhood factors studied here.

Another potential limitation is that, while the design and analytical strategy have allowed for establishing explanatory and independently predictive risk factors, the current study was not able to establish causal risk factors unambigiously as there are no experimental manipulations (Murray et al., 2009). It is therefore suggested that future research on the development of psychopathic personality and behaviour should follow the recommendations by Farrington et al. (1986) and establish prospective longitudinal studies that include experimental manipulations. In these studies it will be possible to not only establish independently predictive risk factors, but also to establish causal risk factors (Murray et al., 2009), within ethical guidelines of course (e.g., British Psychological Society, 2021).

**Conclusion**

The current investigation has established that there are several psychosocial risk factors for the development of psychopathic personality and psychopathic behaviour for both men and women. Risk factors such as risk taking, poor housing, separated, large family size, young parents, and convicted parents were also independently predictive in predicting psychopathy. Early school leaving and socioeconomic factors appear as more important for males, while it seems that factors related to attachment and socialization are more important as risk factors for females. These findings can be used in selecting intervention methods.

**Acknowledgements**

For funding the CSDD, we are very grateful to the Home Office, the Department of Health, the Department for Education, the Rayne Foundation, the Barrow Cadbury Trust, and the Smith-Richardson Foundation. For carrying out criminal record searches, we are very grateful to Gwen Gundry in the 1960s and 1970s, Lynda Morley in the 1980s, Sandra Lambert in the 1990s, Debbie Wilson in the 2000s, Owen Thomas in 2011-12 and Lisa Robinson in 2017.

**Conflict of Interest Statement**

The author(-s) have no conflict of interest.

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**Tables**

**Table 1**

*PCL:SV Scores and Percentage Convicted for Males*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| F1-PP score | N | % Convicted | F2-PB | N | % Convicted |
| 0 | 92 | 12.0 | 0 | 63 | 4.8 |
| 1 | 46 | 30.4 | 1 | 45 | 11.1 |
| 2 | 46 | 34.8 | 2 | 44 | 34.1 |
| 3-4 | 45 | 31.1 | 3 | 37 | 27.0 |
| 5+ | 40 | 65.0 | 4-5 | 46 | 50.0 |
|  |  |  | 6+ | 34 | 73.5 |

*Note.* F1-PP = Factor 1, psychopathic personality. F2-PB = Factor 2, psychopathic behaviour.

**Table 2**

*PCL:SV Scores and Percentage Convicted for Females*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| F1-PP | N | % Convicted | F2-PB | N | % Convicted |
| 0 | 151 | 6.0 | 0 | 100 | 3.0 |
| 1 | 45 | 11.1 | 1 | 69 | 7.2 |
| 2 | 26 | 15.4 | 2 | 33 | 12.1 |
| 3+ | 32 | 31.3 | 3 | 23 | 21.7 |
|  |  |  | 4+ | 29 | 37.9 |

*Note.* F1-PP = Factor 1, psychopathic personality. F2-PB = Factor 2, psychopathic behaviour.

**Table 3**

*Risk Factors for G3 Males (Dichotomous Variables)*

|  |  |  |
| --- | --- | --- |
|  | F1-PP (14.9%) | F2-PB (12.7%) |
|  | %NR | %R | OR | %NR | %R | OR |
| Parental |  |  |  |  |  |  |
| Convicted G2 father 32 | 11.6 | 20.6 | 1.98\* | 11.0 | 15.7 | 1.51 |
| Convicted G2 mother 32 | 13.8 | 27.8 | 2.40 | 10.9 | 33.3 | 4.10\* |
| Authoritarian G2 father 32 | 15.4 | 14.5 | 0.93 | 13.3 | 12.0 | 0.89 |
| Authoritarian G2 mother 32 | 15.7 | 14.3 | 0.90 | 10.5 | 14.3 | 1.43 |
| Young G2 father | 11.7 | 26.2 | 2.69\* | 8.4 | 27.9 | 4.21\* |
| Young G2 mother | 13.2 | 22.9 | 1.96\* | 10.0 | 25.0 | 3.00\* |
|  |  |  |  |  |  |  |
| Family |  |  |  |  |  |  |
| Uninvolved G2 father 32 | 18.1 | 7.9 | 0.39 | 15.3 | 2.6 | 0.15 |
| Physical punishment G3 | 12.0 | 20.7 | 1.90\* | 9.3 | 19.6 | 2.38\* |
| Poor supervision G3 | 7.2 | 22.8 | 3.81\* | 4.3 | 21.3 | 6.01\* |
| Parental conflict 32 | 14.7 | 16.5 | 1.14 | 12.9 | 11.8 | 0.90 |
| Separated G3 | 13.1 | 19.7 | 1.63 | 11.1 | 16.9 | 1.64 |
|  |  |  |  |  |  |  |
| Socioeconomic  |  |  |  |  |  |  |
| Low take-home pay 32 | 9.6 | 19.6 | 2.29\* | 7.6 | 17.4 | 2.57\* |
| Large family size 32 | 9.5 | 31.4 | 4.39\* | 8.0 | 27.1 | 4.31\* |
| Poor housing 32 | 10.4 | 31.7 | 4.01\* | 5.5 | 31.7 | 7.98\* |
| Low SES 32 | 11.2 | 29.8 | 3.36\* | 10.7 | 21.1 | 2.21\* |
|  |  |  |  |  |  |  |
| Individual |  |  |  |  |  |  |
| Early school leaving G3 | 11.4 | 36.8 | 4.52\* | 8.5 | 36.8 | 6.30\* |
| Risk taking G3 | 8.9 | 28.9 | 4.19\* | 6.8 | 26.5 | 4.97\* |
| Poor attention G3 | 13.9 | 21.6 | 1.71 | 11.8 | 18.9 | 1.75 |
| Suspended G3 | 8.6 | 30.8 | 4.71\* | 8.1 | 24.4 | 3.64\* |
| Truant G3 | 10.0 | 30.8 | 4.00\* | 8.1 | 27.7 | 4.35\* |

*Note.* F1-PP = Factor 1, psychopathic personality. F2-PB = Factor 2, psychopathic behaviour; NR = Non-Risk, R = Risk; OR = Odds Ratio.

\*p<.05, one tailed; 32 = measured at 32; G3 = measured by G3; N=275.

**Table 4**

*Risk Factors for G3 Females (Dichotomous Variables)*

|  |  |  |
| --- | --- | --- |
|  | F1-PP (13.2%) | F2-PB (11.6%) |
|  | %NR | %R | OR | %NR | %R | OR |
| Parental |  |  |  |  |  |  |
| Convicted G2 father 32 | 9.1 | 18.3 | 2.23\* | 5.6 | 19.1 | 3.99\* |
| Convicted G2 mother 32 | 10.2 | 29.6 | 3.69\* | 7.9 | 22.2 | 3.33\* |
| Authoritarian G2 father 32 | 11.2 | 16.7 | 1.59 | 8.4 | 19.4 | 2.64\* |
| Authoritarian G2 mother 32 | 7.9 | 14.1 | 1.91 | 7.2 | 5.6 | 0.77 |
| Young G2 father | 9.5 | 21.3 | 2.57\* | 6.1 | 23.8 | 4.76\* |
| Young G2 mother | 8.4 | 27.9 | 4.20\* | 5.3 | 27.9 | 6.95\* |
| Family |  |  |  |  |  |  |
| Uninvolved G2 father 32 | 12.9 | 8.7 | 0.64 | 11.0 | 0.0 | 0.09 |
| Physical punishment G3 | 11.7 | 16.5 | 1.49 | 9.4 | 16.5 | 1.89 |
| Poor supervision G3 | 8.1 | 19.8 | 2.80\* | 4.1 | 21.6 | 6.53\* |
| Parental conflict 32 | 8.3 | 16.3 | 2.15\* | 5.5 | 10.0 | 1.90 |
| Separated G3 | 8.5 | 21.8 | 3.01\* | 6.1 | 21.8 | 4.33\* |
| Socioeconomic  |  |  |  |  |  |  |
| Low take-home pay 32 | 8.8 | 23.4 | 3.16\* | 6.5 | 17.0 | 2.97\* |
| Large family size 32 | 11.3 | 16.2 | 1.52 | 12.4 | 9.5 | 0.74 |
| Poor housing 32 | 11.2 | 10.4 | 0.93 | 6.3 | 16.4 | 2.92\* |
| Low SES 32 | 11.0 | 18.3 | 1.82 | 9.9 | 16.7 | 1.81 |
| Individual |  |  |  |  |  |  |
| Early school leaving G3 | 11.4 | 23.1 | 2.34\* | 8.2 | 30.8 | 4.99\* |
| Risk taking G3 | 10.4 | 29.7 | 3.66\* | 8.1 | 32.4 | 5.44\* |
| Poor attention G3 | 12.8 | 16.7 | 1.37 | 9.8 | 29.2 | 3.80\* |
| Suspended G3 | 11.3 | 27.6 | 2.99\* | 10.4 | 20.7 | 2.24 |
| Truant G3 | 10.6 | 21.7 | 2.34\* | 8.5 | 21.7 | 2.96\* |

*Note.* F1-PP = Factor 1, psychopathic personality. F2-PB = Factor 2, psychopathic behaviour; NR = Non-Risk, R = Risk; OR = Odds Ratio; 32 = measured at 32; G3 = measured by G3; N=259

\*p<.05, one tailed

**Table 5**

*Risk Factors for G3 Males (Continuous Variables)*

|  |  |  |
| --- | --- | --- |
|  | F1-PP (1.96) | F2-PB (2.59) |
|  | MNR | MR | t | MNR | MR | t |
| Parental |  |  |  |  |  |  |
| Convicted G2 father 32 | 1.58 | 2.60 | 3.99\* | 2.27 | 3.15 | 3.00\* |
| Convicted G2 mother 32 | 1.85 | 2.89 | 2.06\* | 2.42 | 4.39 | 3.48\* |
| Authoritarian G2 father 32 | 2.01 | 1.84 | 0.60 | 2.55 | 2.75 | 0.61 |
| Authoritarian G2 mother 32 | 1.95 | 1.93 | 0.08 | 2.36 | 2.67 | 0.94 |
| Young G2 father | 1.73 | 2.75 | 3.43\* | 2.23 | 3.85 | 4.87\* |
| Young G2 mother | 1.81 | 2.50 | 2.09\* | 2.35 | 3.65 | 3.52\* |
| Family |  |  |  |  |  |  |
| Uninvolved G2 father 32 | 2.14 | 1.66 | 1.26 | 2.73 | 2.18 | 1.29 |
| Physical punishment G3 | 1.71 | 2.46 | 2.83\* | 2.23 | 3.32 | 3.64\* |
| Poor supervision G3 | 1.42 | 2.51 | 4.44\* | 1.73 | 3.48 | 6.54\* |
| Parental conflict 32 | 1.83 | 2.21 | 1.35 | 2.44 | 2.82 | 1.23 |
| Separated G3 | 1.77 | 2.45 | 2.39\* | 2.42 | 3.13 | 2.17\* |
| Socioeconomic |  |  |  |  |  |  |
| Low take-home pay 32 | 1.59 | 2.41 | 2.64\* | 2.07 | 3.43 | 3.96\* |
| Large family size 32 | 1.70 | 2.71 | 3.57\* | 2.22 | 3.73 | 4.70\* |
| Poor housing 32 | 1.65 | 2.90 | 4.03\* | 2.10 | 3.85 | 5.12\* |
| Low SES 32 | 1.75 | 2.75 | 3.27\* | 2.30 | 3.79 | 4.31\* |
| Individual |  |  |  |  |  |  |
| Early school leaving G3 | 1.75 | 3.29 | 4.34\* | 2.25 | 4.58 | 5.95\* |
| Risk taking G3 | 1.59 | 2.82 | 4.65\* | 2.04 | 3.87 | 6.22\* |
| Poor attention G3 | 1.87 | 2.57 | 1.91\* | 2.43 | 3.62 | 2.86\* |
| Suspended G3 | 1.57 | 2.95 | 5.16\* | 2.04 | 3.99 | 6.56\* |
| Truant G3 | 1.62 | 3.05 | 5.00\* | 2.10 | 4.18 | 6.63\* |

*Note.* F1-PP = Factor 1, psychopathic personality. F2-PB = Factor 2, psychopathic behaviour; MNR = Mean non-risk; MR = Mean risk, t = t-test; 32 = measured at 32; G3 = measured by G3; N=275.

\*p<.05, one tailed.

**Table 6**

*Risk Factors for G3 Females (Continuous Variables)*

|  |  |  |
| --- | --- | --- |
|  | F1-PP (0.93) | F2-PB (1.39) |
|  | MNR | MR | t | MNR | MR | t |
| Parental |  |  |  |  |  |  |
| Convicted G2 father 32 | 0.68 | 1.26 | 3.07\* | 1.03 | 1.84 | 3.97\* |
| Convicted G2 mother 32 | 0.74 | 1.89 | 3.94\* | 1.17 | 2.37 | 3.77\* |
| Authoritarian G2 father 32 | 0.79 | 1.17 | 1.74\* | 1.21 | 1.79 | 2.49\* |
| Authoritarian G2 mother 32 | 0.63 | 1.00 | 1.90\* | 1.03 | 1.27 | 1.20 |
| Young G2 father | 0.75 | 1.34 | 2.86\* | 1.13 | 1.98 | 3.86\* |
| Young G2 mother | 0.67 | 1.69 | 4.71\* | 1.06 | 2.28 | 5.28\* |
| Family |  |  |  |  |  |  |
| Uninvolved G2 father 32 | 0.90 | 0.67 | 0.93 | 1.33 | 1.04 | 1.15 |
| Physical punishment G3 | 0.81 | 1.23 | 2.05\* | 1.24 | 1.73 | 2.21\* |
| Poor supervision G3 | 0.64 | 1.32 | 3.62\* | 0.93 | 2.01 | 5.44\* |
| Parental conflict 32 | 0.70 | 1.03 | 1.66\* | 0.97 | 1.55 | 3.01\* |
| Separated G3 | 0.70 | 1.34 | 3.40\* | 1.10 | 1.98 | 4.05\* |
| Socioeconomic |  |  |  |  |  |  |
| Low take-home pay 32 | 0.71 | 1.45 | 2.90\* | 1.13 | 1.51 | 1.52 |
| Large family size 32 | 0.84 | 1.05 | 1.02 | 1.37 | 1.39 | 0.08 |
| Poor housing 32 | 0.74 | 0.99 | 1.20 | 1.04 | 1.67 | 2.96\* |
| Low SES 32 | 0.82 | 1.15 | 1.44 | 1.29 | 1.65 | 1.44 |
| Individual |  |  |  |  |  |  |
| Early school leaving G3 | 0.80 | 1.67 | 3.29\* | 1.19 | 2.54 | 4.85\* |
| Risk taking G3 | 0.80 | 1.76 | 3.59\* | 1.21 | 2.49 | 4.46\* |
| Poor attention G3 | 0.89 | 1.33 | 1.34 | 1.27 | 2.58 | 3.76\* |
| Suspended G3 | 0.81 | 1.93 | 3.80\* | 1.27 | 2.34 | 3.33\* |
| Truant G3 | 0.77 | 1.47 | 3.11\* | 1.13 | 2.25 | 4.73\* |

*Note.* F1-PP = Factor 1, psychopathic personality. F2-PB = Factor 2, psychopathic behaviour; MNR = Mean non-risk; MR = Mean risk; t = t-test; 32 = measured at 32; G3 = measured by G3; N = 259

\*p<.05, one tailed.

**Table 7**

*Results of Logistic Regression Analyses (Dichotomous Variables)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | LRCS | *p* | POR | *p* |
| Males – F1-PP (N=270) |  |  |  |  |
| Large family size | 17.26 | .0001 | 3.29 | .001 |
| Poor supervision | 13.00 | .0002 | 2.97 | .004 |
| Risk taking | 8.03 | .002 | 2.63 | .006 |
| Early school leaving | 3.40 | .033 | 2.29 | .030 |
| Males – F2-PB (N=223) |  |  |  |  |
| Poor housing | 22.28 | .0001 | 4.60 | .001 |
| Early school leaving | 9.55 | .001 | 2.75 | .036 |
| Young father | 7.98 | .002 | 2.27 | .060 |
| Risk taking | 3.57 | .029 | 2.13 | .068 |
| Poor supervision | 2.60 | .053 | 2.56 | .055 |
| Large family size | 2.27 | .066 | 2.21 | .064 |
| Females – F1-PP (N=202) |  |  |  |  |
| Risk taking | 9.39 | .001 | 3.75 | .010 |
| Parental conflict | 4.25 | .020 | 3.17 | .013 |
| Low-take home pay | 3.33 | .034 | 2.84 | .033 |
| Poor supervision | 2.11 | .073 | 2.08 | .074 |
| Females – F1-PB (N=244) |  |  |  |  |
| Young mother | 18.79 | .0001 | 6.88 | .0001 |
| Risk taking | 10.83 | .0005 | 4.21 | .005 |
| Separated | 9.94 | .0008 | 4.37 | .002 |
| Poor supervision | 7.74 | .003 | 4.10 | .004 |

*Note.* F1-PP = Factor 1, psychopathic personality; F2-PB = Factor 2, psychopathic behaviour; LRCS = Likelihood ratio chi-square improvement; POR = Partial odds ratio

**Table 8**

*Results of Multiple Regression Analyses (Continuous Variables)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *B* | *SE* | Beta | *t* | *p* |
| Males – F1-PP (N=223) |  |  |  |  |  |
| Risk taking | 0.69 | 0.29 | 0.15 | 2.42 | .008 |
| Poor housing | 0.81 | 0.29 | 0.17 | 2.75 | .003 |
| Convicted father | 0.66 | 0.27 | 0.15 | 2.45 | .008 |
| Poor supervision | 0.63 | 0.26 | 0.15 | 2.42 | .008 |
| Early school leaving | 0.85 | 0.38 | 0.14 | 2.21 | .014 |
| Separated  | 0.53 | 0.29 | 0.11 | 1.81 | .036 |
| Large family size | 0.51 | 0.30 | 0.11 | 1.72 | .043 |
| Males – F2-PB (N=202) |  |  |  |  |  |
| Poor supervision | 1.13 | 0.28 | 0.24 | 4.04 | .0001 |
| Risk taking | 1.01 | 0.31 | 0.19 | 3.26 | .0007 |
| Poor housing | 0.93 | 0.32 | 0.17 | 2.92 | .002 |
| Early school leaving | 1.15 | 0.42 | 0.17 | 2.77 | .003 |
| Large family size | 0.94 | 0.32 | 0.18 | 2.94 | .002 |
| Low take-home pay | 0.79 | 0.36 | 0.13 | 2.18 | .015 |
| Physical punishment | 0.54 | 0.29 | 0.11 | 1.87 | .032 |
| Separated  | 0.55 | 0.31 | 0.10 | 1.75 | .041 |
| Females F1-PP (N=206) |  |  |  |  |  |
| Young mother | 0.73 | 0.24 | 0.20 | 3.08 | .001 |
| Separated | 0.48 | 0.21 | 0.15 | 2.32 | .011 |
| Risk taking  | 0.64 | 0.28 | 0.15 | 2.26 | .013 |
| Convicted mother | 0.77 | 0.32 | 0.16 | 2.41 | .008 |
| Low take-home pay | 0.44 | 0.24 | 0.12 | 1.84 | .034 |
| Poor supervision | 0.36 | 0.20 | 0.12 | 1.79 | .037 |
| Females F2-PB (N=217) |  |  |  |  |  |
| Poor supervision | 0.63 | 0.20 | 0.19 | 3.08 | .001 |
| Young mother | 0.66 | 0.25 | 0.17 | 2.70 | .004 |
| Separated | 0.51 | 0.21 | 0.15 | 2.43 | .008 |
| Risk taking | 0.78 | 0.28 | 0.16 | 2.74 | .003 |
| Parental conflict | 0.60 | 0.21 | 0.17 | 2.90 | .002 |
| Early school leaving  | 0.67 | 0.29 | 0.14 | 2.31 | .011 |
| Poor attention | 0.54 | 0.34 | 0.10 | 1.60 | .056 |
| Authoritarian father | 0.32 | 0.22 | 0.09 | 1.41 | .079 |
| Physical punishment | 0.29 | 0.21 | 0.08 | 1.37 | .086 |

*Note.* F1-PP = Factor 1, psychopathic personality; F2-PB = Factor 2, psychopathic behaviour; *B* = increase in score; *SE* = Standard error of B; Beta = standardized B; *t* = *t*-test

1. Please note that there are some disagreements about the factor structure of psychopathy (e.g., Cooke & Michie, 2001; Cooke et al., 2004; Skeem & Cooke, 2010). [↑](#footnote-ref-2)