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Personality Disorder, Temperament and Childhood Adversity: Findings from a Cohort of Prisoners in England and Wales.

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ABSTRACT

Adverse childhood experiences and childhood temperamental features are known to contribute to the development of personality disorder. The aim of this study was to examine associations between personality disorder, childhood temperament, adverse childhood experiences and victimisation. The Prisoner Cohort Study was carried out as part of the dangerous and Severe Personality Disorder (DSPD) programme, commissioned by the Home Office. The study comprised 1396 male offenders interviewed with the Structured Clinical Interview (SCID II) to diagnose personality disorders in addition to self-reported experiences of childhood victimisation and disadvantage. Independent and joint relationships were examined between reported temperament and adverse childhood experiences and axis II disorders measured at interview. Prisoners with personality disorder reported adverse childhood experiences and victimisation more frequently than those with no personality disorder. Different childhood experiences were interrelated with specific personality disorder categories. The associations between temperamental features and specific personality disorders were increased by the addition of adverse childhood experiences (joint effects). A difficult temperament and childhood adversity increases the likelihood of personality disorders in prisoners and may identify risk factors to target for future early intervention.

Keywords: Adverse childhood experiences, childhood temperament, personality disorder, victimisation, prisoners.

INTRODUCTION

Early life stressors, specifically adverse childhood experiences and victimisation, increase risk for psychopathology later in life, including the development of personality disorder (Zanarini et al., 1997; Modestin et al., 1998; Johnson et al., 1999; Joyce et al., 2003; Bebbington et al., 2004; Spataro et al., 2004). Persons reporting neglect, and physical and sexual abuse, are more likely to develop personality disorders in early adulthood (Johnson et al., 1999; Spataro et al., 2004). For example, high rates of childhood adversity, principally child sexual abuse, have been found in adults with borderline personality disorder (Ogata et al., 1990; Goldman et al., 1992; Brodsky et al., 1995; Zanarini et al., 1997; McLean & Gallop, 2003), and sexual and physical abuse in antisocial personality disorder (Luntz & Widom, 1994; Horowitz et al., 2001). Avoidant personality disorder has also been shown to be associated with parental neglect (Johnson et al., 1999), and family instability, lack of parental affection and supervision associated with dependent personality disorder (Drake et al., 1988).

Less is known about childhood antecedents of adult personality disorders. However, most models propose that temperamental features are present during childhood which develop into personality disorders at a later stage (Rutter, 1987; Johnson et al., 1999; Carter et al., 2001). This link is firmly established between conduct disorder and adult antisocial personality disorder (Loeber, 1990; Robins & Reiger, 1991; Robins, 1996; Woodward & Fergusson, 1999; Hill, 2003). Avoidant personality disorder is associated with high harm avoidance in childhood (Joyce et al., 2003) and less peer engagement (Rettew et al., 2003), and extreme childhood solitariness is associated with adult schizoid personality disorder (Wolff & Chick, 1980). However, a key issue in the longitudinal development of axis II psychopathology is the interaction between childhood

temperament and childhood adversity, and subsequent development of personality disorder. The biosocial interaction hypothesis provides a theoretical framework for this relationship and the interaction between social and biological factors (Raine, 2002). According to this model, when biological and social factors are the grouping variable and antisocial behaviour is the outcome, the presence of both risk factors increases rates of antisocial and violent behaviour. Although the model is arguably simplistic in nature, and has been applied mainly to studies of genetic factors and antisocial and violent behaviour, it can be used to determine the effects of both temperamental features and adverse social environment features on personality disorder and whether or not the presence of both increases their prevalence.

Offender populations have high prevalences of personality disorder (Coid, 2003) and childhood traumatic experiences (Weeks & Widom 1998). However, few studies have examined the relationship between the two in large samples of male offenders. Most have focussed on life events in women (Keaveny & Zauszniewski, 1999), have restricted their measures of negative childhood experience to abuse and neglect (Fondacaro et al., 1999), or poor parental rearing styles (Timmerman & Emmelkamp, 2005). Few have examined these in relation to temperamental features (Johnson et al., 1999). Our aim was therefore to examine the independent associations between self-reported childhood temperamental features and adverse experiences and personality disorder in adulthood in a large sample of male offenders. We additionally aimed to examine the biosocial interaction hypothesis, and whether the combination of temperamental and adverse environmental features further increase the risk of axis II disorders (joint and interactive effects).

Methodology

The Prisoner Cohort Study

The Prisoner Cohort Study was commissioned by the Home Office as part of the Dangerous Severe Personality Disorder (DSPD) service development programme in England and Wales (Department of Health, Home Office, 1999). The main aim of the study was to validate risk assessment instruments and additional measures, including personality disorders, for future serious offending. The study included interviews with prisoners by trained researchers and the sample was drawn from all prisons in England and Wales.

Participants

A sample of high risk offenders in custody in 139 penal establishments in England and Wales was generated from the IIS (Prison Service Inmate Information System) or Central System Database. Participants were included if serving a prison sentence of two years or more for a sexual or violent offence (excluding life sentence prisoners), aged 18 and over, had one year or less left to serve, and expected to be released within 6 months of interview. To obtain a cohort of potentially high risk offenders, the Offenders Group Recoviction Score (OGRS) (Copas & Marshall, 1998) was used. A stratified sample was obtained by oversampling high scorers on the OGRS, but with similar sized subsamples of prisoners from lower score ranges on this instrument. In addition, sex offenders were oversampled. The final sample under study comprised 1396 male offenders (17.4% of the total eligible prisoners in the population) which were interviewed in the first stage of the survey.

Assessment instruments

Semi-structured interviews were conducted over 2 years by 12 trained psychology graduates. Personality disorder was measured using the Structured Clinical Interview for DSM-IV Axis II disorders (SCID II) (First et al, 1997). The Intraclass Correlation (ICC; Shrout & Fleiss, 1979) for diagnostic interrater reliability was good (0.75). In addition, four axis I disorders were measured, including a combined category of schizophrenia and/or delusional disorder, major depressive disorder (derived from the SCID-I), (First et al., 2002) drug dependence, and alcohol dependence (obtained using questions from the Diagnostic Interview Schedule) (Robins et al., 1981).

Childhood temperamental measures were obtained from self-report at interview and included conduct disorder (defined as 3 or more criteria on the SCID II); hyperactivity (when the prisoner reported being told he was hyperactive during childhood by carers, or had been formally diagnosed with attention deficit hyperactivity disorder); and social withdrawal (defined as having no friends).

Adverse childhood experiences (before the age of 16) were measured according to self-report and combined into six categories: Family mental health problems (father, mother and/or sibling's mental health problems and whether they had been admitted to a psychiatric hospital); Family substance misuse problems (father, mother and/or siblings alcohol and drug dependence); Harsh discipline (strict rules in the home, often punished, and beaten severely); Criminality of family members (father, mother and/or siblings criminality, imprisonment, family taught them techniques of crime, Committed crimes with family members); Criminal influences from peer group (having criminal friends, friends taught them crime, in a gang); and Parental discord (parents fought or separated).

Additional adverse childhood experiences and victimisation events were measured, including; being in local authority care, sexual abuse by family members, neglect, emotional abuse, lack of affection from parents, and being bullied. All measures of adverse childhood experiences were dichotomous.

Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) 12.0. The Phi statistic was used to assess bivariate associations between temperamental factors. Multivariate logistic regression analyses were used to model prevalence of childhood temperament, adverse experiences, and childhood victimisation for each personality disorder diagnosis (using a categorical measure) compared to those without the personality disorder category. In the regression analysis, antisocial adult criteria were used (3 or more criteria on SCID II) instead of antisocial personality disorder because conduct disorder was an outcome variable. To determine relationships between childhood temperament, adverse experiences, and personality disorder independent of other risk factors, adjustments were made for age, ethnicity, alcohol disorder, drug disorder, psychosis, major depressive disorder and comorbid personality disorders.

Further logistic regression analysis examined the interactive effects of childhood environment, adversity factors and temperamental factors. A Multivariate multilevel model using MLwiN program (Rasbash, et al., 2003) was used to assess independent associations between childhood temperamental factors and adverse experiences. This type of multilevel software programme addressed the clustering of prisoners across the 139 penal establishments and took into account the correlational associations between all three temperamental outcomes and adjusted for age, ethnicity and other childhood

adverse experiences.

Ethical approval

The study was undertaken with full ethical approval given to the Home Office. An informed consent form was signed by each participant prior to interview. All participants were told of their right to withdraw from the study at any time.

RESULTS

The prevalence of any personality disorder in our sample was 72.9% with antisocial, followed by paranoid, the most frequent axis II category. The least prevalent were dependent and histrionic personality disorders. The most prevalent axis I disorder in this prisoner sample was lifetime drug dependence (Table 1). The prevalence of self-reported temperament factors are demonstrated in table 2. The most prevalent temperamental factor was conduct disorder. Table 3 demonstrates the prevalence of self-reported childhood adversity factors with more than three-quarters of the sample reporting harsh discipline in the family home. Temperamental factors were associated with each other. Conduct disorder demonstrated associations with hyperactivity (Φ 0.17; $p=0.000$) and social withdrawal (Φ 0.07; $p=0.006$). However, hyperactivity was not associated with social withdrawal (Φ 0.02; $p=0.14$). Independent associations between childhood temperamental factors and adverse childhood experiences are demonstrated in table 4. Conduct disorder was associated with family substance misuse problems, criminality of family members, parental discord, lack of parental affection, criminal influences from peer group, and being in local authority care. Hyperactivity was associated with parental discord and criminal influences from peer group. Social withdrawal was associated with sexual abuse, lack of affection from parents, being bullied, and being in local authority

care.

Tables1-4

Independent associations between childhood temperamental factors and axis II disorders are demonstrated in table 5. Prisoners with no personality disorder were significantly less likely to report temperamental factors during childhood. Prisoners with adult antisocial behaviour had raised odds of childhood conduct disorder and hyperactivity. Prisoners with paranoid and schizoid personality disorders were more likely to report social withdrawal during childhood.

Table 5

Table 6 demonstrates the independent associations between self-reported adverse childhood experiences and axis II personality disorder. There were negative associations between all categories of adverse childhood experience and no personality disorder, except family mental health problems and experience of bullying. Prisoners with avoidant personality disorder were more likely to report criminality among family members, neglect, being bullied, but were less to report criminal influences from their childhood peers. Prisoners with obsessive compulsive personality disorder were more likely to report neglect and emotional abuse. Similarly, those with schizoid personality disorder were more likely to report emotional abuse, but less likely to report criminal influences from peers and parental discord. Prisoners with paranoid personality disorder were more likely to report lack of affection from parents.

Prisoners with histrionic personality disorder demonstrated strong associations with reported family mental health problems and were more likely to report being sexually abused and bullied. Those with narcissistic personality disorder were less likely to report criminality among family members, placement in local authority care, and lack of

affection from parents during childhood. Prisoners with borderline personality disorder were more likely to report sexual abuse by family members, being bullied, and placement in local authority care.

Men with adult antisocial personality behaviour demonstrated multiple associations with adverse childhood experiences, including substance misusers among their family, harsh discipline, criminality among their family, criminal influences from peers, parental discord, lack of affection from parents, and placement in local authority care. However, they were less likely to report being bullied. No associations were observed between reported adverse experiences and dependent and schizotypal personality disorders in adulthood.

Table 6

Table 7 demonstrates the joint effects of temperamental factors and adverse childhood experiences on adult axis II personality disorders. Being bullied together with criminality among family members increased the risk of avoidant personality disorder in adulthood with a joint odds ratio as the product of the OR of the two factors. However, reporting being bullied whilst experiencing peer group influences encouraging criminal behaviour reduced the risk of avoidant personality disorder. Having a socially withdrawn temperament, but experiencing parental discord in the family home reduced the risk of schizoid personality disorder. Having a socially withdrawn temperament but having affectionate parents increased the risk of narcissistic personality disorder. Experiencing both bullying and placement in local authority care during childhood increased the risk of borderline personality disorder.

Having conduct disorder and experiencing criminal influences from childhood peers

greatly increased the risk of antisocial traits in adulthood. Similarly, specific combinations of conduct disorder and hyperactivity, criminality among family members, and placement in local authority care greatly increased these same risks.

Hyperactivity and experiencing criminal peer influences, placement in local authority care, criminality among family members, and family members who were substance misusers also increased the risk of antisocial traits in adulthood.

There was one significant interaction between temperamental features and self reported adverse childhood experiences. Being hyperactive together with the reported experience of parental discord greatly increased the risk of antisocial traits in adulthood. However, the risk of antisocial traits in adulthood from criminality among family members, lack of affection from parents, and placement in local authority care were reduced among prisoners who reported that they had been bullied during childhood.

Table 7

DISCUSSION:

The study confirms strong relationships between personality disorder and childhood temperament and adversity. Prisoners with personality disorder reported difficult childhood temperaments, adverse childhood experiences, and victimisation more frequently than those without personality disorder. This is further highlighted by strong negative associations between no personality disorder and these variables. These findings remained after controlling for confounding from comorbid axis I and other axis II disorders and are consistent with previous findings in community samples (e.g. Johnson et al., 1999; Bebbington et al., 2004).

The prevalence of both axis I and axis II psychopathology was high in our sample, as expected. However, the prevalence of any personality disorder at 72.9% was somewhat higher than the National Survey in England and Wales at 64% for male sentenced prisoners (Singleton et al., 1998). This was due to higher prevalences of antisocial (64.6%), and borderline personality disorders (18.2%) and may reflect selection of a sample of mainly violent and sexual offenders, and those at a higher risk of reoffending. Similarly, the prevalences of reported temperamental factors and adverse childhood experiences were also high in our sample, the latter consistent with previous studies demonstrating that childhood victimisation increases risk of criminal behaviour in later life (Maxfield & Widom, 1996; Farrington & Loeber, 1998).

Temperament and childhood adversity.

Our findings demonstrated specific associations between measures of temperament and adverse childhood experiences, but our cross-sectional method posed limitations on exploring the direction of these associations. Associations between conduct disorder and hyperactivity in childhood are already widely acknowledged (Barklay et al., 1990; Biederman et al., 1991; Bird et al., 1994; Nigg & Casey, 2005). Conduct disorder was strongly associated with criminal influences from peer group and criminality among family members, as demonstrated in previous research (Waddell et al., 1999). Children who have parents who are substance misusers or are involved in criminal activities are also at particular risk of developing conduct disorders (Patterson et al, 1989; Frick et al, 1991; Siegel, & Senna, 2004). Conduct disorder was also associated with reporting lack of affection from parents and experiencing parental discord, suggesting dysfunction in these participants' family correspond to previous studies of the relationship between conduct disorder and family problems (Rutter, 1979; Moffit, 1993; Hill, 2002).

However, the causal pathway between conduct disorder and negative parenting is not straightforward. A difficult temperament in early childhood may make a child more likely to be the target of parental anger, which in turn may be linked to conduct disorder (Marshall & Watt, 1999). Other researchers have repeatedly shown that poor parenting skills have long-term associations with conduct disorder (see Scott, 1998). In addition, conflict between parents is strongly associated with conduct disorder (Webster-Stratton & Hammond, 1999). Conduct disorder was also associated with being in local authority care. However, this could equally have been due to substance misuse and criminality among family members, leading to poor parenting and inability to cope, or alternatively severe behavioural problems in the child making them exceptionally difficult to cope with.

Hyperactivity was also associated with parental discord and criminal influences from peer group. Attention deficit hyperactivity disorder has previously been shown to be associated with family adversity (Counts et al., 2005) and peer delinquency (Hinshaw & Melnick, 1995). Previous research has also shown that the influence of maladaptive peers can be detrimental to childhood development and greatly increases the likelihood of adverse outcomes such as delinquency, especially if the child comes from a family beset by multiple stressors (Loeber & Farrington, 1998).

Close associations were observed between social withdrawal and experience of bullying. Repeated victimization and bullying has been shown to produce insidious, potentially debilitating effects, including increased anger and depression, low self-esteem, and social withdrawal (Olweus, 1993; Crick, 1996; Craig, 1998; Hodges & Perry, 1999). In addition, other studies (Boivin, et al., 1995) have provided support for a mediational

model linking peer victimization to loneliness and depression in middle childhood, and found that children who report increased loneliness were more socially withdrawn.

It was unsurprising that a withdrawn temperament was associated with sexual abuse, unaffectionate parents, and being in local authority care, as this triad of associated adverse experiences may have resulted in social withdrawal rather than vice-versa.

Personality disorder, temperament and childhood adversity.

The previously established associations between criminal behaviour and antisocial personality disorder in adulthood and childhood precursors of both conduct disorder (Robins, 1966, 1978; Loeber, 1990) and hyperactivity (Farrington et al., 1990; Simonoff et al., 2004) were confirmed by our findings. However, the strength of association between childhood hyperactivity and adult antisocial traits was weaker than that of conduct disorder, suggesting either that hyperactivity could evolve into different conditions in adulthood, for example, substance abuse or other personality disorders, or simply that the risks for persisting antisocial behaviour in adulthood were not as strong as for conduct disorder. Previous studies have demonstrated that histrionic (Fischer et al., 2002) and borderline (Biederman et al., 1991) personality disorders are potential outcomes of childhood hyperactivity. However, in this prisoner sample, conduct disorder and hyperactivity were precursors only of adult antisocial traits. Importantly, the combination of conduct disorder and hyperactivity greatly increased the risks of antisocial traits compared to the outcome of these precursors alone. Lyman (1996) has postulated that children with both conduct disorder and attention deficit hyperactivity problems are “fledgling psychopaths” and that they are more likely to demonstrate callousness, superficial charm, and antisocial behaviour.

Adverse childhood experiences demonstrated independent effects on adult antisocial traits, including criminality among family members, criminal influences from peers, family substance misuse problems, parental discord, placement in local authority care, harsh discipline, and lack of affection from parents. The combination of child temperamental factors on conduct disorder and hyperactivity, together with certain adverse experiences, further increased the risk of adult antisocial traits. This was particularly the case where prisoners with conduct disorder also reported criminal influences from their peer group, family members, and when they had been placed in local authority care. However, the effects of the latter are unclear and placement in care may have been the outcome of particularly severe conduct disorder rather than a direct effect, resulting in the child becoming beyond parental control. Similarly, combinations of hyperactivity together with adverse early environmental experiences of criminal influence from peers and family members, family substance misuse, and placement in local authority care, further increased the risk of an adult antisocial outcome. Whether parental discord exacerbated the risk or resulted from the stress of coping with a hyperactive child requires further research.

The association between reduced risk of an adult antisocial outcome and bullying during childhood are a particular interest. These statistical associations at first suggest a “protective” effect. However, this is doubtful and is more likely to indicate other associated characteristics of the child that we did not measure in the study. For example, we did not measure size and physical strength of the child. Individuals with adult antisocial behaviour are more likely to be tall and have increased body bulk (Farrington, 1989; Pine et al., 1997; Raine et al., 1998; Ishikawa et al., 2001). It has been argued that

a larger child would be able to intimidate others more successfully and would be more likely to learn that using aggression during conflict is a valuable stratagem (Raine et al., 1998). These individuals would be more likely to use aggression than a smaller, weaker child, who would be more likely to be bullied (Perry et al., 2001).

Bullying was independently associated with avoidant personality disorder, a condition additionally associated with neglect and criminality among family members in this sample, but negatively associated with criminal influences from childhood peers. Previous findings that neglect is a risk factor for avoidant personality disorder (Johnson et al., 1999; Joyce et al., 2003) were confirmed by this study which also correspond to observations by Rettew et al., (2003) that avoidant individuals have less peer engagement, involvement in hobbies, and are less popular during adolescence. The association between criminality among family members may be an anomaly due to the criminal nature of the sample, explaining the inclusion of avoidant individuals rather than identifying an aetiological factor in the development of the condition. However, the combination of criminality among family members and experiencing bullying further increased the risk of avoidant personality in adulthood. On the other hand, the reduced risks of a combination of bullying and a criminal peer group is suggestive of a less severe childhood precursor of avoidant personality disorder, and where the child was less handicapped by avoidant features and able to join a peer group.

Previous findings that solitariness is associated with a diagnosis of schizoid personality disorder (Wolff & Chick, 1980) were confirmed. However, schizoid personality disorder in this criminal sample was additionally associated with emotional abuse, which has been observed previously (Johnson et al., 1999). Cold and unemotional childhood traits may

have led to emotional abuse within families and could have predisposed the child to becoming more introverted, emotionally cold, and distant as a means of coping. On the other hand, the retrospective method could have resulted in schizoid individuals remembering their family experiences as being emotionally abusive. The finding that socially withdrawn children were less likely to experience criminal peer group influences and parental discord was unsurprising in a condition characterised by indifference to the feelings of others and a restricted range of emotions.

The essential feature of paranoid personality disorder is the interpretation of actions of others as deliberately threatening or demeaning. In this study, individuals with this disorder were more likely to have been socially withdrawn as a child and to report lack of affection from parents, as previously observed (Carter et al., 1999). Lack of parental affection may have predisposed the child to distrust others, making them more likely to be withdrawn in social situations. However, the explanations as to why social withdrawal resulted in paranoid rather than schizoid disorder along a different developmental trajectory requires further research. Nevertheless, in a previous criminal sample, schizoid personality disorder was strongly associated with obstetric complications and developmental delay (Coid, 1999), measures that were not taken in this study.

Prisoners with obsessive-compulsive personality disorder were more likely to report neglect and emotional abuse, similar to previous studies (Johnson et al., 1999). Preoccupation with orderliness, perfectionism and control in these individuals may have developed as a way of coping with a traumatic childhood. However, this finding may be due to a sample effect, as 19.6% of individuals with obsessive-compulsive disorder were

sex offenders who are likely to have experienced higher rates of abuse during childhood than the general population (Becker & Murphy, 1998).

Precursors of excessive emotionality and attention-seeking in prisoners with histrionic personality disorder may have resulted in them being bullied, contrasting with bullying experienced by withdrawn children who later developed avoidant personality disorder. Similar effects may have been in operation in relation to the association of bullying with borderline personality disorder in adulthood. Both borderline and histrionic individuals were more likely to report experiences of sexual abuse from family members in childhood and these experiences may have driven more vulnerable children to excessive emotionality and attention-seeking as a means of surviving these problems. Alternatively, these childhood experiences may have led to emotional disturbance, impulsivity, and self-harm, corresponding to previous studies that have found higher rates of child sexual abuse in adults with borderline personality disorder (Ogata et al., 1990; Goldman et al., 1992; Brodsky et al., 1995; Zanarini et al., 1997; McLean & Gallop, 2003). In histrionic individuals, family mental health problems and sexual abuse by family members acted as independent risk factors. However, it is likely that sexual abuse would have occurred either from a mentally ill family member or in the absence of protection from the parent impaired by mental illness. In borderline individuals, sexual abuse was experienced together with placement in local authority care, the risk of the latter further increased when the prisoner reported childhood bullying.

Narcissistic personality disorder is characterised by a pattern of grandiosity, need for admiration, and lack of empathy, and is typically comorbid with antisocial personality disorder in offender samples (Coid, 2003). In this study, prisoners with narcissistic

personality demonstrated protective factors during childhood, in that they were less likely to report criminality among family members, placement in local authority care, and lack of affection from parents which were strongly associated with certain other personality disorders. Unpublished research has indicated associations between higher IQ and narcissistic personality among offenders and in the general population is associated with life success in terms of career and finance (Ullrich et al., unpublished). Psychodynamic theories suggest that the development of narcissistic personality is related to over-indulgence (Kernberg, 1989) and outcome of narcissistic over-gratification during childhood, leading to difficulties in self-esteem regulation and the tendency to externalisation (Fernando, 1998). This supposition, and the multiplicative relationship between social withdrawal and affectionate parenting would partly explain the emergence of narcissistic personality disorder in this sample. However, additional factors are likely to explain this association and the high prevalence of the condition among this and other offender samples.

Biosocial Interaction Hypothesis.

Our findings demonstrate that when childhood temperamental features and adverse social environment features are both present, both risk factors have a joint effect on the rate of personality disorder, corresponding to the biosocial interaction hypothesis (Raine, 2002). For example, combinations of the presence of both hyperactivity and conduct disorder together with criminality among family or peers greatly increased the risk of antisocial traits in adulthood. Raine and colleagues (1996) reported that individuals with both biological and social deficits (neurological problems and adverse family environments) were twice as likely to become violent as those with either biological deficits alone or social problems alone. Correspondingly, in our study, negative effects of a difficult

childhood temperament predisposing the child to antisocial behaviour are exacerbated by the presence of adverse environmental experiences. Although these findings were additive and not interactive, they are still considered biosocial effects (Raine et al., 1997). Conversely, the biosocial interaction can produce the reverse effect in which certain childhood experiences can be protective. For example, the negative effects of a withdrawn temperament in predisposing certain individuals to avoidant personality disorder appear ameliorated by criminal influences from peers. However, only one finding was interactive and truly consistent with the biosocial interaction hypothesis (Raine, 2002). Adult antisocial traits were disproportionately higher among prisoners reporting both hyperactivity and parental discord compared to those who only reported one of these risk factors.

Limitations of the study.

The study was limited in that it could not distinguish the mechanism by which childhood events had influenced the development of personality disorder, specifically the causal pathways. It could not demonstrate the temporal sequence to enable differentiation between temperamental measures and occurrence of childhood maltreatment. Measures that were deemed temperamental could have been the outcome of adverse childhood experience. Furthermore, the experience of childhood disadvantage and victimisation may not have directly caused the development of a personality disorder but predisposed the individual to a chain of events that led to it. An alternative hypothesis is that childhood adversity generated psychological vulnerabilities that established a heightened emotional reaction to distress (Harris et al., 1990) or to more proximal risks for mental disorder (Maughan & McCarthy, 1997). Other models posit that maternal deprivation causes irreparable psychological damage (Bowlby, 1977; Maughan & McCarthy, 1997)

or that childhood adversity generates a greater susceptibility to effects of a pre-existing neural or biochemical mechanism associated with the development of subsequent psychopathology (Briere et al., 1997). These latter models would suggest that the antecedents of abnormal personality disorder were considerably earlier than our measures which had appeared much later along the developmental pathway.

There are added problems when examining associations between personality disorders and measures such as adverse experiences in a criminal population, as these may not be relevant to a general population sample. For example, in our study, obsessive-compulsive personality disorder, which is traditionally considered as high functioning (Kernberg, 1984) and can be associated with positive factors and life success, was specifically associated with sex offending against children. This could explain reports of neglect and childhood abuse, which might have resulted from confounding.

The primary limitation of the study was retrospective reporting of the childhood temperamental measures and adverse experiences. Limitations of retrospective studies include forgetting or repressing memories, recall bias for negative events, and exaggeration or minimisation in recall (Brown, 1974). More recent studies have shown that recall of both non-traumatic and traumatic events are subject to error (Mannuzza et al., 2002). Rettew et al., (2003), suggested that individuals with personality disorder may recall their childhood in a way that is consistent with present symptomatology. Furthermore, the childhood temperamental measures in our study, in particular hyperactivity, were relatively weak in that they relied on prisoners reporting that they had been informed that they have received the diagnosis or description.

However, regardless of the above methodological limitations, our study did have numerous strengths. These included the representative sample of male prisoners, the inclusion of all personality disorders, and a larger range of childhood measures than in many previous studies. The relationship between personality disorder, temperament and childhood adversity was assessed independently, controlling for confounding effects of comorbidity from both Axis I and Axis II disorders. Previous studies examining childhood antecedents of personality disorder in prisoners have used smaller samples and tended to focus only on abusive experiences or adversities such as poor parental rearing styles. It is clear from our findings that a difficult temperament and childhood adversity increases the likelihood of personality disorders in prisoners, and may provide the foundation on which risk factors to target for future early intervention.

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Table 1: Prevalence of Personality and Mental Disorders (n= 1396):

	n	(%)	95%CI
Avoidant	124	(9.0)	7.5 – 10.5
Dependent	10	(0.7)	0.3 – 1.1
Obsessive-Compulsive	92	(6.7)	5.4 – 8.0
Paranoid	298	(21.7)	19.5 – 23.9
Schizotypal	53	(3.9)	2.9 – 4.9
Schizoid	96	(7.0)	5.7 – 8.3
Histrionic	16	(1.2)	0.6 – 1.6
Narcissistic	140	(10.2)	8.6 – 11.8
Borderline	249	(18.1)	16.1 – 20.1
Antisocial Personality Disorder	886	(64.5)	62.0 – 67.0
Adult Antisocial Criteria	1026	(73.5)	71.2 – 75.8
Any Personality Disorder	1002	(72.9)	70.6 – 75.2
Psychosis	142	(10.2)	8.2 – 11.8
Alcohol dependence	277	(19.9)	17.8 – 22.0
Depressive disorder	419	(30.0)	27.6 – 32.4
Drug dependence	542	(39.1)	36.5 – 41.7

Table 2: The Prevalence of Self Reported Temperament Factors (n=1396).

	N	(%)	95%CI
Conduct disorder	958	(68.6)	66.2 – 71.1
Social withdrawal	260	(18.6)	16.6 – 20.7
Hyperactive	249	(17.8)	15.8 – 19.9

N.b. Percentage that answered “yes” to dichotomous variable.

Table 3: The Prevalence of Self Reported Childhood Adversity Factors (n=1396).

Harsh discipline in home	1085	(77.7)	75.5 – 79.9
Criminal influences from peer group	990	(70.9)	68.5 – 73.3
Parental discord	861	(61.7)	59.1 – 64.2
Criminality of family members	772	(55.3)	52.7 – 57.9
Family substance misuse problems	589	(42.2)	39.6 – 44.8
Local authority care	450	(32.2)	29.8 – 34.7
Family mental health problems	277	(19.8)	17.8 – 21.9
Parents not affectionate	381	(27.3)	25.0 – 29.6
Bullied	373	(26.7)	24.4 – 29.0
Emotionally abused	245	(17.6)	15.6 – 19.6
Neglected	170	(12.2)	10.5 – 13.9
Sexually abused (family)	95	(6.8)	5.5 – 8.1

N.b. Percentage that answered “yes” to dichotomous variable.

Table 4: Independent associations between temperamental factors in childhood and adverse childhood experiences.

	Family substance misuse problems		Criminality of family members		Parental discord		Sexually abused (family)		Parents not affectionate		Criminal influences from peer group		Bullied		Local authority care	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Conduct disorder	1.53*	1.09-2.15	1.58	1.15-2.16	1.62	1.19-2.21			1.65	1.13-2.41	5.76	4.20-7.89			2.38	1.64
Hyperactive					1.40	1.00-*1.96					1.98	1.31-2.99				
Social withdrawal							1.92	1.16-*3.17	1.66	1.21-**2.28			1.49	1.08-2.05	1.63	1.19-2.22

* P<0.05; ** P<0.01; *** P<0.001

Adjusted odds ratios (AOR): Controlling for: age, ethnicity, and comorbid adverse childhood experiences.

N.B. Non-significant results are omitted from tables and can be requested from the author.

Table 5: Independent associations between temperamental factors in childhood and personality disorder.

	Paranoid		Schizoid		Antisocial		No PD	
	AOR	95% CI			AOR	95% CI	AOR	95% CI
Conduct disorder					10.66 ***	7.60-14.97	0.02 ***	0.01-0.03
Hyperactive					2.40 ***	1.48-3.89	0.39 ***	0.25-0.60
Social withdrawal	1.51 *	1.05-2.18	3.06 ***	1.93-4.87			0.55 **	0.38-0.80

* P<0.05; ** P<0.01; *** P<0.001

Adjusted odds ratios (AOR): Controlling for: age, ethnicity, and comorbid Axis I and Axis II disorders.

N.B. Non-significant results are omitted from tables and can be requested from the author.

Table 6: Independent associations between adverse childhood experiences and personality disorder.

	Avoidant	Obsessive-compulsive	Paranoid	Schizoid	Histrionic	Narcissistic	Borderline	Antisocial	No PD				
	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI			
Family mental health problems					8.58 ***	2.85- 35.81							
Family substance misuse problems								1.90 ***	1.38- 2.62	0.40 ***	0.30- 0.54		
Harsh discipline in home								1.82 ***	1.30- 2.54	0.52 ***	0.39- 0.70		
Criminality of family members	1.61 * 2.50	1.04- 2.50				0.63 * 0.94	0.43- 0.94		2.15 ***	1.60- 2.90	0.46 ***	0.35- 0.60	
Criminal influences from peer group	0.58 * 0.94	0.36- 0.94		0.52 * 0.90	0.30- 0.90				5.05 ***	3.67- 6.95	0.25 ***	0.19- 0.34	
Parental discord				0.60 * 0.96	0.39- 0.96				1.89 ***	1.41- 2.54	0.45 ***	0.34- 0.58	
Local authority care						0.56 * 0.86	0.37- 0.86	1.44 * 2.05	1.01- 2.05	2.65 ***	1.85- 3.79	0.32 ***	0.23- 0.45
Sexually abused (family)					9.37 ***	2.46- 35.69		2.23 **	1.23- 4.01			0.49 * 0.89	0.27- 0.89
Neglected	1.69 * 2.81	1.02- * 1.11- 3.30	1.92 * 1.11- 3.30								0.34 ***	0.20- 0.58	
Emotionally abused		1.90 ** 3.10	1.17- 3.10	1.70 * 2.80	1.04- 2.80						0.44 ***	0.29- 0.67	
Parents not affectionate			1.45 * 2.01	1.04- 2.01			0.56 **	0.35- 0.88		1.42 * 2.01	1.01- 2.01	0.52 ***	0.38- 0.72
Bullied	1.74 ** 2.68	1.13- 2.68			3.99 **	1.35- 11.76		1.52 * 2.20	1.05- 2.20	0.72 * 1.00			

* P<0.05; ** P<0.01; *** P<0.001

Adjusted odds ratios (AOR): Controlling for: age, ethnicity, and comorbid Axis I and Axis II disorders.

N.B. Non-significant results are omitted from tables and can be requested from the author.

Table 7: Joint effects of difficult temperament, childhood adverse environmental factors and axis II personality disorder.

Avoidant	OR (95% CI)	Joint effects OR
Bullied	1.74 (1.14-2.65)**	3.01
Criminality of family members	1.73 (1.12-2.67)**	
Bullied	1.76 (1.16-2.70)**	1.04
Criminal influences from peer group	0.59 (0.37-0.95)*	
Schizoid	OR (95% CI)	Joint effects OR
Social withdrawal	3.13 (1.96-4.98)***	1.85
Parental discord	0.59 (0.37-0.95)*	
Narcissistic	OR (95% CI)	Joint effects OR
Social withdrawal	1.63 (1.05-2.53)*	0.85
Parents not affectionate	0.52 (0.33-0.83)**	
Borderline	OR (95% CI)	Joint effects OR
Bullied	1.53 (1.06-2.22)*	2.17
Local authority care	1.42 (1.01-2.02)*	
Antisocial	OR (95% CI)	Joint effects OR
Conduct disorder	7.90 (5.23-11.28)***	21.49
Criminal influences from peer group	2.72 (1.89-3.92)***	
Conduct disorder	10.22 (7.28-14.35)***	18.29
Hyperactive	1.79 (1.05-3.07)**	
Conduct disorder	9.82 (6.97-13.83)***	15.12
Criminality of family members	1.54 (1.10-2.15)**	
Conduct disorder	9.66 (6.83-13.66)***	15.07
Local authority care	1.56 (1.04-2.35)*	
Hyperactive	2.04 (1.23-3.39)***	9.89
Criminal influences from peer group	4.85 (3.52-6.69)***	
Hyperactive	2.34 (1.42-3.85)***	5.99
Local authority care	2.56 (1.79-3.68)***	
Hyperactive	2.38 (1.45-3.89)***	5.09
Criminality of family members	2.14 (1.59-2.89)***	
Hyperactive	2.42 (1.49-3.95)***	4.65
Family substance misuse	1.92 (1.39-2.65)***	
Hyperactive	2.29 (1.40-3.76)***	4.14
Parental discord	1.81 (1.35-2.44)***	
Hyperactive x parental discord	7.09 (2.24-20.37)***	29.39 (Interaction)
Bullied	0.70 (0.50-0.99)*	1.88
Local authority care	2.68 (1.87-3.83)***	
Bullied	0.68 (0.48-0.95)*	1.50
Criminality of family members	2.20 (1.63-2.98)***	
Bullied	0.70 (0.50-0.98)*	1.03
Parents not affectionate	1.47 (1.04-2.08)*	

* P<0.05; ** P<0.01; *** P<0.001

Adjustments made for age, ethnicity and other childhood adverse experiences.

N.B. Non-significant results are omitted from tables and can be requested from the author.