

University of East London Institutional Repository: <http://roar.uel.ac.uk>

This paper is made available online in accordance with publisher policies. Please scroll down to view the document itself. Please refer to the repository record for this item and our policy information available from the repository home page for further information.

To see the final version of this paper please visit the publisher's website. Access to the published version may require a subscription.

Author(s): Coid, Jeremy W; Yang, Min; Ullrich, Simone; Roberts, Amanda D.L; Hare, Robert D.

Article title: Prevalence and correlates of psychopathic traits in the household population of Great Britain

Year of publication: 2009

Citation: Coid, J. W. et al. (2009) 'Prevalence and correlates of psychopathic traits in the household population of Great Britain.' *International Journal of Law and Psychiatry*, 32 (2) 65–73.

Link to published version: <http://dx.doi.org/10.1016/j.ijlp.2009.01.002>

DOI: 10.1016/j.ijlp.2009.01.002

Abstract Word Count: 210

Article Word Count: 6,110

Prevalence and Correlates of Psychopathic Traits in the Household Population of Great Britain

Jeremy Coid^a, Min Yang^a, Simone Ullrich^a, Amanda Roberts^a, Robert D. Hare^b

^aForensic Psychiatry Research Unit, St. Bartholomew's Hospital, London, United Kingdom

^bDepartment of Psychology, University of British Columbia, Vancouver, Canada

Running Title

Prevalence and Correlates of Psychopathic Traits in the Household Population

Correspondence

Prof Jeremy Coid, MD, Forensic Psychiatry Research Unit, St. Bartholomew's Hospital, William Harvey House, 61 Bartholomew Close, London, EC1A 7BE, Ph: +44 (0)20 7601 8138, Fax: +44 (0)20 7601 7969 (j.w.coid@qmul.ac.uk)

Funding support

Department of Health, England and Wales.

ABSTRACT

There are no previous surveys of psychopathy and psychopathic traits in representative general population samples using standardized instruments. This study aimed to measure prevalence and correlates of psychopathic traits, based on a two-phase survey using the Psychopathy Checklist: Screening Version (PCL: SV) in 638 individuals, 16-74 years, in households in England, Wales and Scotland. The weighted prevalence of psychopathy was 0.6% (95% CI: 0.2-1.6) at a cut score of 13, similar to the noncriminal/nonpsychiatric sample described in the manual of the PCL: SV. Psychopathy scores correlated with: younger age, male gender; suicide attempts, violent behaviour, imprisonment and homelessness; drug dependence; histrionic, borderline and adult antisocial personality disorders; panic and obsessive-compulsive disorders. This survey demonstrated that, as measured by the PCL: SV, psychopathy is rare, affecting less than 1% of the household population, although it is prevalent among prisoners, homeless persons, and psychiatric admissions. There is a half-normal distribution of psychopathic traits in the general population, with the majority having no traits, a significant proportion with non-zero values, and a severe subgroup of persons with multiple associated social and behavioral problems. This distribution has implications for research into the etiology of psychopathy and its implications for society.

Declaration of Interest: R. Hare receives royalties from sales of the PCL: SV.

1. Introduction

Psychopathy can be differentiated from other personality disorders on the basis of characteristic interpersonal, affective, and behavioral symptoms. The classic clinical features were described by Cleckley (1941) who asserted that these personalities are not only found in prisons but in the community, giving examples of apparently successful individuals of higher social status whose façade of normality could extend into superficial material and social success. More recently, several commentators (Babiak & Hare, 2006; Hall & Benning, 2006; Lykken, 1995) have argued that some traits of the interpersonal and affective domains of psychopathy might be of advantage to achieve professional success in certain areas. However, while anecdotal examples abound, the concept of the “successful psychopath” has been subjected to little systematic investigation. Ullrich, Farrington, and Coid (2008) found that the domains of psychopathy are unrelated to success in a community sample of men, but only a few of the men had high psychopathy scores. Nonetheless, De Olivier-Souza, Ignácio, Moll, and Hare (2008) suggested that even among community members with high psychopathy scores their “success” often is ephemeral and defined without recognition of its negative impact on others.

The international standard for the assessment of psychopathy, the Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003), was developed with offender populations, whereas its derivative, the Psychopathy Checklist: Screening Version (PCL: SV; Hart, Cox, & Hare, 1995), was developed and validated for use with non-forensic samples. The two instruments are highly correlated and measure the same construct (Cooke, Michie, Hart & Hare, 1999; Guy & Douglas, 2006). Although not included in the ICD or DSM classifications, analyses of traits associated with personality disorders reveal a dimension remarkably similar to the personality features that constitute psychopathy (Blackburn & Coid, 1998; Ullrich &

Marneros, 2004; 2007). This underlying factor consisted of impulsive, dissocial, paranoid, histrionic and borderline dimensions in terms of the ICD classification and antisocial, paranoid, histrionic, narcissistic, borderline, and passive-aggressive traits according to DSM.

The reliability and validity of the PCL-R and PCL: SV for the measurement of psychopathy are established (Acheson, 2005; Hare & Neumann, 2008), together with their predictive validity for future violent and criminal behaviour (Douglas, Strand, Belfrage, Fransson, & Levender, 2006; Hemphill, 2007; Leistico, Salekin, DeCoster & Rogers, 2008). Recent developments in factor analysis have indicated the importance of different components of psychopathy. Although previously considered a higher-order construct underpinned by two correlated factors (Hare, 1991), subsequent confirmatory factor analysis has described a hierarchical three-factor model (Cooke & Michie, 2001) and more recently a four-factor model for both the PCL-R (Hare, 2003; Neumann, Hare, & Newman, 2007; Neumann, Vitacco, Hare & Wupperman, 2005) and the PCL: SV (Vitacco, Neumann & Jackson, 2005). This model (Table 1) permits finer descriptive analysis of individuals encountered in clinical practice and allows empirical study of subcomponents of psychopathy, including the possibility that these have different etiologies. Although there is consensus on the necessity of differentiating the traditional factors of psychopathy, and researchers agree on the interpersonal, affective and impulsive/lifestyle components, divergent opinions result in debate over antisocial behaviors and whether they constitute an integral facet of psychopathy (Hare & Neumann, 2006) or are merely a negative outcome of the core psychopathic personality traits (Cooke, Michie, Hart, & Clark, 2004).

Research on correlates and etiology of psychopathy has focused heavily on male prisoners and psychiatric patients in high security settings. Little is known of the epidemiology of psychopathy based on representative samples from the general population. Such studies are rare and have to overcome various obstacles, particularly due to the low base

rates of psychopathic traits (Hall & Benning, 2006). Nevertheless, clinicians and researchers have known that psychopaths exist in the general population and have recognized the importance of studying psychopathic traits in non-institutionalized studies (Kirkman, 2002). Studying psychopathy in non-forensic samples can rule out the effects of incarceration and recurrent institutionalization on dependent measures (Lilienfeld, 1994). Recent studies have demonstrated that psychopathic traits are continuously distributed among forensic, clinical and community samples, and that individuals with levels of psychopathy comparable with those in correctional and forensic psychiatric populations can be found in the general population (DeMatteo, Heilbonn, & Marczyk, 2006; De Oliveira-Souza et al., 2008; Neumann & Hare, 2008). These studies indicate that high levels of psychopathy in community samples have much the same predictive value, with respect to antisocial and criminal behavior, as they do in forensic populations.

The aim of this study was to estimate the prevalence and correlates of psychopathy, as measured by the PCL: SV, in the general population of Great Britain, using a two-phase survey of a large representative household sample of adults, aged 16-74, conducted in 2000. Both the PCL-R (Guay, Ruscio, Knight, & Hare, 2007) and the PCL: SV (Walters, Gray, Jackson, Sewell, Rogers, Taylor, et al., 2007) measure a dimensional construct, and our primary analyses therefore involved correlations between the PCL: SV (and its factors) and its correlates, including demographic characteristics, verbal intelligence, DSM-IV Axis-II personality disorder traits, ICD-10 clinical syndromes, and social and behavioral problems. In addition, however, the PCL-R and PCL: SV scores can be used to provide convenient threshold or cut-scores for psychopathy, thereby allowing estimates to be made of the prevalence of the disorder in our sample.

2. Method

2.1. Sample

The sample included 638 subjects participating in the second of a two-phase survey of Psychiatric Morbidity among Adults aged 16-74 years living in Private Households in England, Wales and Scotland (Singleton, Bumpstead, O'Brien, Lee, & Meltzer, 2001). The Small Users Postcode Address File (PAF) was used as the sampling frame and the Kish Grid Method (Kish, 1965) to systematically select one person in each eligible household. A total of 8,886 (69.5%) selected adults who agreed to complete a first phase computer-assisted interview by the UK Office of National Statistics were asked whether they would be willing to be contacted, if selected, to take part in the second phase of the survey.

The phase II sample was drawn on the basis of two self-report diagnostic instruments described below. Eligible subjects included (1) all satisfying one or more sift criteria for psychotic disorder; (2) half who sifted positive for antisocial and borderline DSM-IV personality disorder, with no evidence of psychotic disorder; (3) 1 in 14 who screened positive for other personality disorders with no evidence of psychotic disorder, and (4) 1 in 14 subjects who showed no evidence of either psychosis or personality disorder. The sample was sifted in this manner with the intention of identifying uncommon psychiatric disorders in the second phase and with a view to constructing weighting variables to estimate their prevalence. Of 1,036 subjects selected for the second stage, 638 (61.6%) agreed to participate and were interviewed.

The second phase attrition rate (38.4%) was mostly due to refusals. Compared to respondents, they were more likely to be non-White (8.5% vs. 2.9%, $p=.001$), with no educational qualifications (39.7% vs. 31.0%, $p=.004$), less likely to have a university degree

(9.7% vs. 16.0%, $p=.004$), of lower social class (31.3% vs. 22.2%, $p=.000$), and more likely living in rented accommodation (43.1% vs. 33.9%, $p=.003$). Other background factors, including age, gender, legal marital status, employment status and family type, were similar between participants and non-respondents. The weighting procedure for the sample was designed to take these attrition factors into account.

Over half of all participants (56.7%) were female, with ages ranging from 16 to 74 years (mean=45.4, SD=15.6), with no statistical significant difference between men and women. Only a small proportion of the sample (2.8%) was non-white. Nearly half were married or cohabiting, just over a quarter were single, and one in seven was divorced. More than two-thirds had formal educational qualifications and over half were in paid employment, either full or part time.

2.2. Diagnostic measures

Probable cases of personality disorder were identified in Phase I using the screening questionnaire of the Structured Clinical Interview for Axis-II disorder (SCID II; First, Gibbon, Spitzer, & Williams, 1997). Subjects entered "yes" or "no" responses to 116 questions on laptop computer. Axis-II disorder categories were created by applying algorithms developed in a previous survey of prisoners (Singleton, Meltzer, Gatward, Coid, & Deasy, 1998). Subjects screening positive for psychotic disorder (Bebbington & Nayani, 1994) responded positively to one of: auditory hallucinations; having received a diagnosis of psychosis or psychotic symptoms; receipt of anti-psychotic medication; or having had an in-patient stay in a mental hospital or ward. Fulfillment of any of these criteria and diagnoses from the SCID-II screen determined selection for a second phase interview in which schizophrenia or other non-affective psychotic disorder was assessed using the SCAN

(Schedules for Clinical Assessment in Neuropsychiatry; Wing, Babor, Brugha, Burke, Cooper, Giel, et al., 1990; World Health Organisation Division of Mental Health, 1999) and personality disorder using the SCID-II interview (First et al., 1997).

Additional ICD-10 clinical syndromes were measured using self-report instruments in Phase I. Affective and anxiety disorders in the week preceding interview were assessed using the revised version of the Clinical Interview Schedule (CIS-R; Lewis & Pelosi, 1990). Data are presented on the prevalence of six ICD-10 syndromes: mixed anxiety and depressive disorder, generalized anxiety disorder, depressive episode, all phobias, obsessive-compulsive disorder, and panic disorder. Alcohol misuse was measured using the Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992), and alcohol dependence using the Severity of Alcohol Dependence Questionnaire (SAD-Q; Stockwell, Murphy, & Hodgson, 1983). Questions designed to measure drug use were included for a series of different substances for any of five questions to measure drug use and dependence over the past year (Singleton, Lee & Meltzer, 2002).

The National Adult Reading Test (Nelson & Willison, 1991; NART), a measure of premorbid verbal intelligence, was also applied in the first phase of the study, together with questions on healthcare service use, criminal justice involvement, and other social and behavioral problems over the lifetime.

Psychopathy was measured using the PCL: SV, a 12-item rating scale derived from the PCL-R. Items are rated on a 3-point scale (0 = does not apply, 1 = applies to a certain extent, 2 = applies) and summed to yield total scores ranging from 0 to 24. This represents a dimensional measure of the degree to which a given individual matches the prototypical psychopath. The recommended (standard) procedure is to score the PCL: SV by integrating interview and collateral information.

Although the PCL: SV measures a dimensional construct, researchers have adopted a score of 18 or greater as a convenient cut score for “probable psychopathy,” and scores between 13 and 17 as an indication of “possible psychopathy.” These cut scores were used in the MacArthur Violence Risk Assessment Study, which included samples of civil psychiatric patients and a comparison sample from the community (Steadman, Silver, Monahan, Applebaum, Robbins, Mulvey, et al., 2000). As in the present study, PCL: SV assessments in the MacArthur study were based on clinical inferences obtained primarily from interview data. Research with the PCL-R indicates that scores from interview-based assessments are lower than from those that include adequate collateral information (Alterman, Cacciola, & Rutherford, 1993; Hare, 2003). We therefore conducted analyses using cut scores of both 13 and 11 for possible psychopathy.

Interviewers in phase II of the survey were psychology graduates trained by the principal investigator (J.C.) by reviewing the research background to psychopathy, the PCL: SV assessment procedure, and in scoring using a large group format and involving the viewing of videotapes of assessment interviews to establish norms for scoring individual PCL: SV items. They were supervised throughout the fieldwork period by a trained field manager to provide quality assurance and standardization. Alpha coefficients of total, male, and female PCL: SV scores were within the acceptable range (Total=0.83, male=0.83, female=0.79) suggesting good internal consistency. Inter-item correlations ($M=0.27$, $SD=0.13$, $Md=0.25$), which should range between .25 and .50, also indicated satisfactory homogeneity.

2.3. Statistical analysis

Weights were calculated to compensate for differential sampling probabilities and non-response and have been previously reported (Singleton et al., 2002). Weighted analyses were performed on all statistical procedures throughout the study. For PCL: SV total and four factor scores, descriptive statistics for demographic characteristics and social adversity measures were calculated using SPSS (v12). Spearman's nonparametric correlation coefficients were calculated for inter-item correlations and Cronbach's alpha coefficient for overall consistency among the 12 items of PCL: SV. Partial correlation analysis was performed among the four factors of psychopathy, controlling for gender. Weighted Poisson regression analysis was applied to investigate associations between PCL: SV total scores and demographic characteristics of respondents, Axis II disorders, intelligence, and social problems experienced by respondents, adjusting for confounders or comorbid disorders applicable to each variable of interest. As the four PCL: SV factors (Table 1) are strongly correlated with each other, the analysis took this into account when investigating associations between variables of interest and factor scores. We used weighted multivariate Poisson regression analysis which treats the four factor scores as repeated measures within each respondent. The full variance-covariance structure of the four factor scores was then captured by the model. The effect of each variable on the PCL: SV scores was tested by the standard Z-score statistic. All regression analyses were performed in MLwiN (V2.0). Extra Poisson variation was allowed in the Poisson regression model to reflect excessive variation of PCL: SV scores due to extreme values.

3. Results

3.1. Prevalence and score distribution

Unweighted data included 11 (1.8%) subjects who scored 11 or more on the PCL: SV, 4 (0.6%) scoring 13 or more, with only 1 subject above the recommended cut-off for probable psychopathy of 18, who scored 20. The weighted prevalence of “possible” psychopathy, using a suggested cut score of 11 or more points in this population was 2.3% (95% CI: 1.2-3.8); 3.7% (95% CI: 1.8-6.6) in men and 0.9% (95% CI: 0.2-2.8) in women. The prevalence of possible psychopathy using a cut score of 13 or more was 0.6%; 1.3% in men (95% CI: 0.3-3.4) and 0% in the females.

The weighted distributions of PCL: SV scores among men and women in the population are demonstrated in Figure 1. The figure suggests a quasi-continuous (or half-normal) distribution of psychopathic traits, accounted for by a sub-group of the population, with the majority (70.8%) of persons demonstrating no psychopathic traits. The prevalence at every level of psychopathy measured using the PCL: SV was higher in men than women, with an overall gender ratio of 4:1. Mean total PCL: SV scores were 1.52 (SD=0.16) for men and 0.54 (SD=0.08) for women.

3.2. Demography and intelligence

Partial correlation analyses among the four factors, controlling for age, demonstrated that all were significantly intercorrelated (Table 2). The strongest correlation was between the Factor 4 (Antisocial) and Factor 3 (Lifestyle).

Lower mean PCL: SV total scores among persons aged 55-74 years, accounted for by lower Factor 2, 3 and 4, but not Factor 1 (Interpersonal) scores are demonstrated in Table 3. Mean total and all factor scores were significantly lower among women. Non-White participants demonstrated higher total, Interpersonal and Lifestyle scores. Marital and employment status did not correlate with psychopathy scores, except that persons who were economically inactive had lower Interpersonal and higher Lifestyle scores. There was no correlation between psychopathy scores and social class. However, persons who rented rather than owned their home had higher PCL: SV scores, accounted for by higher Affective, Lifestyle, and Antisocial, but not Interpersonal scores.

Regression analyses of premorbid intelligence coefficients (NART scores) and PCL: SV scores (after controlling for age and factor intercorrelations) demonstrated negative associations in the combined sample of men and women with total scores (β (standard error)=-0.029(0.008), $p=0.002$), Lifestyle scores (β (standard error)=-0.040(0.012), $p=0.008$) and Antisocial scores (β (standard error)=-0.044(0.010), $p<0.0001$), but with no significant correlations with Interpersonal and Affective scores.

3.3. Axis II Personality disorders

Correlations between dimensional scores of individual DSM-IV personality disorders and weighted PCL: SV scores are presented in Table 4. Total PCL: SV scores in the combined male and female sample were significantly correlated with borderline, histrionic, and adult antisocial scores. Interpersonal factor scores were positively correlated with narcissistic scores. Affective factor scores were positively correlated with schizoid and adult antisocial scores, but negatively with obsessive-compulsive and avoidant scores. Lifestyle factor scores were significantly correlated with histrionic, borderline, and adult antisocial scores.

Antisocial factor scores correlated positively with conduct disorder and adult antisocial scores.

3.4. Co-morbid clinical syndromes

Associations between weighted PCL: SV scores and ICD-10 clinical syndromes indicate that there were no associations between mixed anxiety and depressive disorder, generalized anxiety disorder, or depressive episodes and the psychopathy scores (Table 5). Total PCL: SV scores were higher for participants with obsessive-compulsive and panic disorder. Phobias were only related to the Affective factor. Obsessive-compulsive disorder was associated with higher scores on the Interpersonal, Affective, and Lifestyle factors. Panic disorder was associated with higher scores on the Interpersonal, Lifestyle, and Antisocial factors.

There were no significant associations between total and individual factor scores for participants diagnosed with schizophrenia or other non-affective psychoses.

There were significantly higher total PCL: SV scores for participants with a history of cannabis use in the past year, lifetime heroin and amphetamine use, and dependence on any drug (Table 6). There were no associations between alcohol dependence or hazardous drinking and psychopathy scores. Differential associations with factor scores indicated that cannabis use and dependence on any drug were significantly associated with the Lifestyle and Antisocial factors but not with the Interpersonal or Affective factors. Heroin use was associated with the Interpersonal, Affective, and Antisocial factors but not with the Lifestyle factor. Amphetamine use was correlated only with the Interpersonal and Antisocial factors, whereas cocaine use was correlated only with the Interpersonal factor.

3.5. Social and behavioral problems

Associations between self-reported lifetime behavioral and social problems and PCL: SV scores indicate that total scores were associated with reporting criminal convictions, imprisonment, assaulting another person in the past 5 years, experiencing violence in the family home, being homeless, psychiatric admission, and parasuicide, but not with experiencing sexual abuse or financial crises over the lifetime (Table 7). Interpersonal factor scores were not associated with any social or behavioral problems except financial crisis. However, the Affective factor was independently associated with criminal convictions, imprisonment, violence towards others, experiencing violence in the family home, and homelessness. Lifestyle factor scores were independently associated with criminal convictions, imprisonment, experiencing violence (but not behaving violently towards others), homelessness, psychiatric hospital admission and attempted suicide. Antisocial factor scores were independently associated with reporting criminal convictions, imprisonment, violence towards others, experiencing violence, homelessness, psychiatric hospitalization, and attempted suicide.

4. Discussion

4.1. Prevalence of self-disclosed psychopathy in the British household population

To our knowledge, this survey is the first to measure psychopathy in a representative general population sample using a standardized instrument. Estimates of the prevalence of psychopathy and psychopathic traits depend on the measurement tool and the thresholds used. With the PCL: SV a score of 13 is used for “possible” psychopathy. Using this cut

score, 0.6% of the sample of men and women met the threshold. Recalculation using a cut score of 11 yielded a prevalence of 2.3%; 3.7% in men and 0.9% in women. Most previous studies have used university students or self-report measures of psychopathy (Forth, Brown, Hart, & Hare, 1996; Levenson, Kiehl, & Fitzpatrick, 1995; Lynam, Whiteside, & Jones, 1999; Salekin, Trobst, & Krioukova, 2001). A more direct comparison is with PCL: SV data from the community sample (n=519) in the MacArthur Violence Risk Study (Neumann & Hare, 2008) selected to match socioeconomic characteristics of a sample of civil psychiatric patients. The prevalence of possible psychopathy was 1.7% (2.0 % men and 1.6% women) at a cut score of 13, and 5.2% (7.6% men and 3.7% women) at a cut score of 11. These values probably are higher than in the present study because they were derived from a selected part of a particular urban population rather than from a representative sample of the general population. The MacArthur comparison group would be expected to have higher mean PCL: SV scores because it included a narrower age range of 18-40 years and was selected from urban census tracts in which the experimental group of patients in the follow-up study resided after discharge. Many were described as “disproportionately impoverished,” with “higher crime rates than the city as a whole” (Steadman, Mulvey, Monahan, Robbins, Applebaum, Grisso, et al., 1998). In contrast, our participants were drawn from a wide age range, including a representative number of elderly and young persons, selected from rural and semi-rural as well as urban areas, and the data were weighted. In this context, the distribution of scores in the US urban community sample, which resembles our own and contrasts with that observed in correctional and forensic psychiatric hospital samples (Hare, 2003), is of considerable interest. It provides some robust support for conceptualizing the distribution of psychopathy in the general population as continuous with, but different from, that observed among selected, offender samples.

The present data are broadly consistent with other estimates of around 0.75 to 1% for psychopathy in the general population, based on extrapolations of the ratio of psychopathy to antisocial personality disorder (ASPD) in prisons to the general population (approximately 3 or 4:1) (Blair, Mitchell & Blair, 2005; Hare, 2003). The prevalence of ASPD among men aged 16-74 years in this population was lower than North American surveys at 1% (Coid, Yang, Tyrer, Roberts, & Ullrich, 2006). All men scoring 13 or more on the PCL: SV received a diagnosis of ASPD.

Our findings also show that psychopathic features will be elevated among homeless persons and, to a lesser extent, persons admitted to psychiatric hospitals. The association with homelessness was not surprising given the fact that some criteria of the PCL: SV such as impulsiveness, irresponsibility and criminal behaviors increase the risk of becoming “of no fixed abode.” Since the strongest inter-relations were found for the more behavior-related factors of psychopathy, this suggests some contamination of outcome and predictor variables. However, previous research on ASPD has demonstrated that conduct disorder preceded the onset of homelessness and that the prevalence of ASPD was not significantly affected by discounting ASPD symptoms thought to be confounded with homelessness (North, Smith, & Spitznagel, 1993). The relationship between psychopathic traits and admission to a psychiatric hospital is not unexpected in view of recent research on ASPD in the general population, where a significantly higher proportion reported a lifetime psychiatric admission when compared to the rest of the population (Ullrich & Coid, accepted).

4.2. Distribution of psychopathic traits in the general population

Our findings confirm that the majority of the general population has very few psychopathic personality traits or associated behaviours, particularly when compared with individuals in correctional or forensic psychiatric institutions. The majority of the adult household population demonstrated no or only very few psychopathic traits, but with a small subgroup scoring up to a maximum of 20 points. The PCL: SV total scores were distributed continuously with one mode at a score of zero and the shape of a half-normal distribution. From an epidemiological point of view, the distribution of symptoms or traits has strong etiological implications. Psychopathy is likely to be multiply determined (Lilienfeld, 1998). Therefore, a true dichotomous distribution indicating one single cause would not have been expected. A simultaneous joint exposure to various risk factors (complete co-participation of causes) would have resulted in a bimodal distribution of the psychopathy scores. A continuous normal distribution, on the other hand, is thought to be determined by the effects of multiple, moderate risk factors, similar in magnitude, which act additively as well as independently (van Os & Verdoux, 2003). However, the half-normal shape of psychopathy scores in the general household population of Britain points in the direction of various risk factors with different potency which contribute independently, but with a certain degree of co-participation.

4.3. Demography and intelligence

In the present study, PCL: SV total and factor scores were generally lower among persons 55 or older than among younger persons, consistent with cross-sectional analyses of male prison PCL-R data. These data indicate that total PCL-R scores decline little as a

function of age (at least until about age 55 or 60), but that some decreases occur in the Lifestyle and Antisocial factors (Hare, 2003; Ullrich, Paelecke, Kahle, & Marneros, 2003). Similar age-related declines have been observed in the prevalence of ASPD (Regier, Boyd, Burke, Rae, Myers, Kramer, et al., 1988) and in criminal behaviour in general (Farrington, 1986), suggesting that certain behaviour-related traits related to psychopathy decrease in severity with age. Although there is evidence that the criminal activities of psychopathic offenders may decline in frequency with age (Harpur & Hare, 1994), this may be an artifact related to being in prison for longer periods than other offenders as they age (Porter, Birt, & Boer, 2001).

Reported prevalences of psychopathy are lower among females than males in forensic samples (Douglas et al., 2005; Hare, 2003; Verona & Vitale, 2006) but with similar factor structure and correlates (Hare, 2003; Neumann et al., 2007). Selection and differences among study settings are likely to have influenced these findings. It has also been argued that it may be more difficult to measure certain items in women (Salekin et al., 2001) or that some psychopathy-related behaviors manifest differently in females (Hare, 2003). In this community survey, a sex ratio of 4:1 suggested either that there is gender bias in identification or manifestation of certain items, or that there are true sex differences in the distribution of psychopathic traits in the general population, as suggested by Figure 1.

Psychopathic traits were found at all socioeconomic levels but were associated with lack of social success. Although studies of male offenders have demonstrated associations between low social class, educational failure and antisocial lifestyle, psychopathic prisoners are no more likely to come from lower social class backgrounds than other offenders (Hare, 2003). Previous evidence indicates that PCL-R measures are not unduly influenced by ethnicity, based on studies of White and African-American subjects (Cooke, Kosson, & Michie, 2001; Skeem, Edens, Camp, & Colwell, 2004) although there may be cultural

differences in expression of psychopathic traits. We could not examine ethnic or cultural factors due to the small number of participants and heterogeneous nature of the non-White category.

Recent studies have tested Cleckley's (1941) hypothesis of the intellectual abilities of the psychopath using the contemporary three/four factor models. Across all studies, a specific pattern of association has been established. The Interpersonal factor was positively associated with verbal IQ and an intellectual measure reflecting creativity, practicality, and analytic thinking (Salekin, Neumann, Leistico, & Zalot, 2004; Vitacco et al., 2005). The Affective factor was negatively associated with verbal IQ (Salekin et al., 2004) as were the Lifestyle/antisocial components of psychopathy (Vitacco et al., 2005). In accordance with these findings, our study demonstrated an inverse relationship between verbal intelligence and psychopathic traits at the population level, explained by Lifestyle and Antisocial factors. However, the negative association with the Affective factor was not confirmed by our study. Moreover, our findings do not support the hypothesis of an association between the interpersonal domain of psychopathy and greater cognitive abilities. It has to be considered, however, that our measure of intelligence was more simplistic than in other studies and that the lack of association might reflect measurement error.

4.4. Axis II personality disorder

Following adjustments, there were significant associations between PCL: SV and Axis II disorders, similar to those previously demonstrated in forensic samples (Cooke et al., 1999; Ullrich & Marneros, 2007). These studies have indicated that PCL-R and PCL: SV total scores correlate most strongly with antisocial, borderline, histrionic, and narcissistic scores. Specific correlates between narcissistic traits and the interpersonal factor confirm similarities

between narcissistic personality features and interpersonal items of superficial charm, grandiosity, and deceitfulness. The emotional dysfunction reflected in the Affective factor may explain its correlates with detachment from social relationships and restricted emotional expression of schizoid personality disorder, together with negative correlates with social anxiety, measured by avoidant traits, and conscientiousness, rigidity and perfectionism, measured by obsessive-compulsive traits.

The Lifestyle factor was strongly correlated both with excessive emotionality and attention-seeking of histrionic, and instability of self-image and affect, and impulsivity of borderline personality disorder. Axis II adult antisocial scores were highly correlated with the Affective, Lifestyle, and Antisocial factors, suggesting that emotional dysfunction, impulsivity and irresponsibility can contribute to an antisocial lifestyle in adulthood. However, the lack of an association between conduct disorder and total PCL: SV scores was unexpected. Conduct disorder is a necessary precursor of ASPD, and the association with the Antisocial factor was therefore expected. The most likely explanation for lack of associations with total and other factor scores is twofold: firstly, adjustments in the regression analysis, secondly, the nature of the sample. Conduct disorder in this household population was less prevalent than among prisoners using the same research diagnostic instruments (Singleton et al 1998). Although childhood conduct disorder was not uncommon among the household population, the prevalence of ASPD was low (Coid et al., 2006). More cases had a good prognosis and did not result in adverse adult outcomes such as ASPD, in marked contrast to prisoners.

4.5. Psychotic, affective and anxiety disorders

According to Cleckley's original observations, psychopathic individuals do not show either psychoneurotic or psychotic symptoms (Cleckley, 1941). In this study, persons with schizophrenia, depressive episodes, mixed anxiety and depressive disorder, generalized anxiety disorder, and phobias did not have raised psychopathy scores, corresponding to offender samples which have not demonstrated associations with affective disorders (Cooke et al., 1999; Hare, 2003). In offender samples, measures of anxiety tend to have low, negative correlations with the PCL-R. It has been argued that anxiety in psychopathy is related primarily to an antisocial lifestyle and its consequences (Schmitt & Newman, 1999), but more recently that it is independent of psychopathy (Coid, Yang, Ullrich, Roberts, Moran, Bebbington, et al., accepted; Hare, 2003). The association with obsessive-compulsive disorder (OCD) was unexpected. This suggests that at lower levels of psychopathic traits there may be associations with OCD and panic disorder at the general population level, but among populations with higher trait levels, and individuals with psychopathy, these associations are absent.

4.6. Substance misuse, social and behavioral problems

Previous studies have shown that psychopathy is related to alcohol misuse (Hare, 2003). In this study, psychopathic traits were not associated with alcohol use or hazardous drinking, although the latter was very prevalent in this household population. Psychopathic individuals in forensic samples are likely to have more severe problems due to alcohol misuse, but this survey indicated weak associations with psychopathic traits at the population level.

All categories of illicit drug misuse except cocaine were associated with higher PCL: SV scores, but with differing patterns of association between individual factors. Being dependent on any drug, use of cannabis in the past year, and lifetime amphetamine and heroin use were associated with the Antisocial factor, consistent with findings with offenders (Hare, 2003). However, specific associations between heroin, cocaine, and amphetamine use and the Interpersonal factor at the population level were of interest, indicating the possibility of psychopathic personality traits influencing preference for certain substances.

As expected, strong associations were obtained between raised PCL: SV scores and a range of self-reported social and behavioral problems, in particular violence and criminality, but also self-harm and psychiatric hospitalization. Also, as expected, these problems were associated most strongly with the Antisocial factor. However, independent associations with the Lifestyle component confirmed the importance of impulsivity and instability in contributing to these adverse outcomes. The findings also confirmed independent contributions of the Affective factor to criminal behaviour and violence (Vitacco et al., 2005), the latter possibly relating to fearlessness and lack of aversion to engaging in fighting. No associations were found with the Interpersonal factor except for financial crises, raising the intriguing possibility that this component contributed to financial manipulation, mismanagement and failure in those with higher disposable incomes. It has been argued that certain individuals in the general population can be highly problematic, particularly in work settings, and manifest interpersonal and affective features of psychopathy, but without exhibiting the antisocial acts or lifestyle of criminal psychopaths (Babiak & Hare, 2006; Hall & Benning, 2006).

No associations were found between psychopathy and sexual victimization over the lifetime (it was not possible to identify age of victimization). There have been reports of early sexual and physical abuse among psychopathic offenders (Farrington, 2006) but the effects

are small and inconsistent, and any observed associations are not necessarily causal in nature (DiLalla & Gottesman, 1991). No information on circumstances of admission to a psychiatric hospital was available to explain associations with the Lifestyle and Antisocial factors. These were most likely related to drug misuse, self-harm, and adjustment disorders secondary to situational crises.

4.7. Four-factor model

There has been lack of agreement over whether psychopathy is better described by a three- or four-factor model (Cooke & Michie, 2001; Cooke et al., 2004; Hare, 2003; Hare & Neumann, 2006; Neumann et al., 2005; Skeem, Mulvey, & Grisso, 2003; Vitacco et al., 2005). Our findings indicate that it would be inappropriate to dispense with the fourth (Antisocial) factor. Debates over factor structure based on confirmatory factor analysis of psychopathy items are not supported by correlates with external measures in an epidemiologically representative sample. Separation of the original PCL-R Factor 1 into interpersonal and affective factors has proven useful in the clinical description of psychopathy. The Interpersonal factor, with features similar to narcissistic personality disorder, may represent a higher functioning component of psychopathy and is unlikely to result from cognitive dysfunction. At lower levels of the trait within the population, it may convey certain advantages in social functioning. The Affective factor, characterised by callousness, lack of empathy and sense of responsibility, comprises essential components of the psychopathy construct. Although these items do not correlate with verbal intelligence in a community sample, further research may reveal cognitive processes involved in this particular form of emotional dysfunction, increasing the risk for goal-directed, instrumental aggression (Blair et al., 2005).

The closely inter-correlated nature of the Lifestyle and Antisocial factors indicates that dispensing with the latter may be difficult to achieve, especially in clinical assessment. Although the Lifestyle factor demonstrated independent associations with several measures, few distinguished it from the Antisocial factor, except measures of Axis II personality disorder.

4.8. Methodological limitations

This study examined correlates with psychopathic traits at the population level and not with psychopathy as categorically defined. The sampling frame for the survey was designed to estimate the prevalence of uncommon conditions using self-report instruments in the first phase to screen for participants who received research diagnostic interviews in the second (Singleton et al., 2001). However, our estimates are limited by the rarity of individuals with psychopathic features, and by the fact that no women exceeded the commonly-used PCL: SV cut score of 13 for psychopathy. This may have been due to reluctance of psychopathic individuals to participate. Furthermore, subsequent attrition in both phases of the survey may not have been compensated for by weighting. In addition, prisoners and homeless persons were not included in this survey. Heavy reliance on interview data could have led to an underestimate of psychopathy scores.

It can be argued that the skewed distributions of the factors of psychopathy towards zero (particularly the interpersonal component) had a negative impact on the statistical power of some analyses. However, Poisson regression analyses considering overdispersion is the method of choice to address this problem. Nevertheless, it cannot be ruled out that some nonsignificant findings were due to the lack of statistical power.

Diagnostic categories of affective and anxiety disorders and substance use were derived from self-report measures in the first phase of the survey and were not measured in the second. This may have resulted in false positives. In the second phase, lack of collateral information available to interviewers may have biased PCL: SV scores. This may be a serious problem when measuring a condition characterized by conning, pathological lying, and intense impression management. Subsequent research may be able to obtain more extensive collateral information than was available to us. In spite of these limitations, it is encouraging that correlates of the PCL: SV and its components were consistent with the literature on psychopathy in forensic populations.

4.9. Conclusion

Psychopathy is a rare condition in the general population. In this study only a very small minority of individuals met common criteria for psychopathy or demonstrated elevated levels of psychopathic traits. These findings are in accordance with previous research. Furthermore, psychopathic traits were associated with multiple social and behavioral problems and a substantial co-morbidity with mental disorders on both Axis I and II of the DSM classification. The results of our study indicate that elevated psychopathic traits in non-incarcerated and non-psychiatric individuals are a disabling condition with various negative outcomes similar to those found in forensic and psychiatric samples.

References

- Acheson, S. K. (2005). Review of the Hare Psychopathy Checklist-Revised, 2nd edition. In R. A. Spies & B. S. Plake (Eds.), *The sixteenth mental measurements yearbook* (pp. 429–431). Lincoln, NE: Buros Institute of Mental Measurements.
- Alterman, A. I., Cacciola, J. S., & Rutherford, M. J. (1993). Reliability of the Revised Psychopathy Checklist in substance abuse patients. *Psychological Assessment, 5*, 442–448.
- Babiak, P., & Hare, R. D. (2006). *Snakes in suits: When psychopaths go to work*. New York: Harper Collins.
- Babor, T. F., de la Fuente, J. R., Saunders, J., & Grant, M. (1992). *AUDIT: The Alcohol Use Disorders Identification Test: Guidelines for use in primary healthcare*. Geneva: World Health Organisation.
- Bebbington, P., & Nayani, T. (1994). The Psychosis Screening Questionnaire. *International Journal of Methods in Psychiatric Research, 5*, 11-19.
- Blackburn, R., & Coid, J. (1998). Psychopathy and the dimensions of personality disorders in violent offenders. *Personality and Individual Differences, 25*, 129-145.
- Blair, J., Mitchell, D., & Blair, K. (2005). *The Psychopath, emotion, and the brain*. Malden, MA: Blackwell Publishing.
- Cleckley, H. (1941). *The mask of sanity*. St Louis, MO: Mosby.
- Coid, J., Yang, M., Tyrer, P., Roberts, A., & Ullrich, S. (2006). Prevalence and correlates of personality disorder in Great Britain. *British Journal of Psychiatry, 188*, 423-431.
- Coid, J., Yang, M., Ullrich, S., Roberts, A., Moran, P., Bebbington, P., Brugha, T., Jenkins, R., Farrell, M., Lewis, G., Singleton, S., & Hare, R. (accepted). Psychopathy among prisoners in England and Wales. *International Journal of Law and Psychiatry*.

- Cooke, D. J., Kosson, D. S., and Michie, C (2001). Psychopathy and ethnicity: Structural, item, and test generalizability of the Psychopathy Checklist–Revised (PCL-R) in Caucasian and African American participants. *Psychological Assessment, 13*, 531-542.
- Cooke, D. J., & Michie, C. (2001). Refining the construct of psychopathy: Towards a hierarchical model. *Psychological Assessment, 13*, 171-188.
- Cooke, D. J., Michie, C., Hart, S. D., & Clark, D. A. (2004). Reconstructing psychopathy: Clarifying the significance of antisocial and socially deviant behavior in the diagnosis of psychopathic disorder. *Journal of Personality Disorders, 18*, 337-357.
- Cooke, D. J., Michie, C., Hart, S. D., & Hare, R. D. (1999). Evaluating the screening version of the Hare Psychopathy Checklist-Revised (PCL: SV): An Item Response Theory analysis. *Psychological Assessment, 11*, 3-13.
- De Oliveira-Souza, R., Ignácio, F. A., Moll, J., & Hare, R. D. (2008). Psychopathy in a civil psychiatric outpatient sample. *Criminal Justice and Behavior, 35*, 427-437.
- DiLalla, L. F., & Gottesman, I. I. (1991). Biological and genetic contributors to violence – Widom’s untold tale. *Psychological Bulletin, 109*, 125-129.
- DeMatteo, D., Heilborn, G., & Marczyk, G. (2006). An empirical investigation of psychopathy in a noninstitutionalized and noncriminal sample. *Behavioral Sciences and the Law, 24*, 133-146.
- Douglas, K. S., Strand, S., Belfrage, H., Fransson, G., & Levender, S. (2005). Reliability and validity evaluation of the Psychopathy Checklist: Screening Version (PCL: SV) in Swedish correctional and forensic psychiatric samples. *Assessment, 12*, 145-161.
- Douglas, K. S., Vincent, G. M., & Edens, J. E. (2006). Risk for criminal recidivism: The role of psychopathy. In C. Patrick (Ed.) *Handbook of psychopathy* (pp. 533-554). New York: Guilford.

- Farrington, D. P. (1986). Age and crime. In N. Morris and M. Tonry (Eds.) *Crime and justice: An annual review of research, Vol. 7* (pp. 189-250). Chicago: Chicago University Press.
- Farrington, D. P. (2006). Family background and psychopathy. In C. Patrick (Ed.) *Handbook of psychopathy* (pp. 229-250). New York: Guilford.
- First, M. B., Gibbon, M., Spitzer, R. L., & Williams, J. B. W. (1997). *Structured Clinical Interview for DSM-IV Axis-II personality disorders*. Washington: American Psychiatric Press.
- Forth, A. E., Brown, S. L., Hart, S. D., & Hare, R. D. (1996). The assessment of psychopathy in male and female noncriminals: reliability and validity. *Personality and Individual Differences, 20*, 531-543.
- Guay, J. P., Ruscio, J., Knight, R. A., & Hare, R. D. (2007). A taxometric analysis of the latent structure of psychopathy: Evidence for dimensionality. *Journal of Abnormal Psychology, 116*, 701-716.
- Guy, L. S., & Douglas, K. S. (2006). Examining the utility of the PCL:SV as a screening measure using competing factor models of psychopathy. *Psychological Assessment, 18*(2), 225-230.
- Hall, J. R., & Benning, S. D. (2006). The “successful” psychopath: Adaptive and subclinical manifestations of psychopathy in the general population. In C. Patrick (Ed.) *Handbook of Psychopathy* (pp. 459-480). New York: Guilford.
- Hare, R. D. (1991). *Manual for the Revised Psychopathy Checklist*. 1st ed. Toronto, ON: Multi-Health Systems.
- Hare, R. D. (2003). *Manual for the Revised Psychopathy Checklist*. 2nd ed. Toronto, ON: Multi-Health Systems.

- Hare, R. D., & Neumann, C. N. (2006). The PCL-R assessment of psychopathy: development, structural properties, and new directions. In C. Patrick (Ed.) *Handbook of Psychopathy* (pp. 58-88). New York: Guilford.
- Hare, R. D., & Neumann, C. S. (2008). Psychopathy. In P. Blaney and T. Millon (Eds.). *Oxford Textbook of Psychopathology* (pp. 622-650). Oxford: Oxford University Press.
- Harpur, T. J., & Hare, R. D. (1994). The assessment of psychopathy as a function of age. *Journal of Abnormal Psychology, 103*, 604-609.
- Hart, S. D., Cox, D.N., & Hare, R.D. (1995). *The Hare Psychopathy Checklist: Screening Version*. New York: Multi-Health Systems Inc.
- Hemphill, J. F. (2007). The Hare Psychopathy Checklist and recidivism: methodological issues and critical evaluation of empirical evidence. In H. Hervé and J. Yuille (Eds.) *The Psychopath: Theory, Research, and Practice* (pp. 141-170). Mahwah, NJ: Lawrence Erlbaum and Associates.
- Kirkman, C.A. (2002). Non-incarcerated psychopaths: why we need to know more about the psychopaths who live amongst us. *Journal of Psychiatric and Mental Health Nursing, 9*, 155-160.
- Kish, L. (1965). *Survey Sampling*. London: Wiley & Sons.
- Leistico, A. R., Salekin, R. T., DeCoster, J., & Rogers, R. (2008). A large-scale meta-analysis relating the Hare measures of psychopathy to antisocial conduct. *Law and Human Behavior, 32*, 28-45.
- Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a noninstitutionalized population. *Journal of Personality and Social Psychology, 68*, 151-158.
- Lewis, G., & Pelosi, A. J. (1990). *Manual of the Revised Clinical Interview Schedule (CIS-R)*. London: Institute of Psychiatry.

- Lilienfeld, S. O. (1994). Conceptual problems in the assessment of psychopathy. *Clinical psychology Review, 14*, 17-38.
- Lilienfeld, S. O. (1998). Methodological advances and developments in the assessment of psychopathy. *Behavior Research and Therapy, 36*, 99-125.
- Lykken, D. T. (1995). *The antisocial personalities*. Hillsdale, NJ: Erlbaum.
- Lynam, D. R., Whiteside, S., & Jones, S. (1999). Self-reported psychopathy: a validation study. *Journal of Personality Assessment, 73*, 110-132.
- Nelson, H. E., & Willison, J. R. (1991). *The Revised National Adult Reading Test – Test Manual*. Windsor: NFER-Nelson.
- Neumann, C. S., & Hare, R. D. (2008). Psychopathic traits in a large community sample: links to violence, alcohol use, and intelligence. *Journal of Consulting and Clinical Psychology, 76*, 893–899
- Neumann, C. S., Hare, R. D., & Newman, J. P. (2007). The super-ordinate nature of the Psychopathy Checklist-Revised. Manuscript under review. *Journal of Personality Disorders, 21*, 102-107.
- Neumann, C. S., Vitacco, M. J., Hare, R. D., & Wupperman, P. (2005). Deconstructing the “reconstruction” of psychopathy: A comment on Cooke, Michie, Hart, & Clark. *Journal of Personality Disorders, 19*, 624-640.
- North, C. S., Smith, E. M., & Spitznagel, E. L. (1993). Is antisocial personality a valid diagnosis among the homeless? *American Journal of Psychiatry, 150*, 578-583.
- Porter, S., Birt, A. R., & Boer, D. P. (2001). Investigation of the criminal and conditional release profiles of Canadian federal offenders as a function of psychopathy and age. *Law and Human Behavior, 25*, 647-661.

- Regier, D. A., Boyd, J. H., Burke, Jr J. D., Rae, D. S., Myers, J. K., Kramer, M., Robins, L. N., George, L. K., Karno, M., & Lock, B. Z. (1988). One-month prevalence of mental disorders in the United States. *Archives of General Psychiatry*, *45*, 977-986.
- Salekin, R. T., Neumann, C. S., Leistico, A-M. R., & Zalot, A. A. (2004). Psychopathy in youth and intelligence: An investigation of Cleckley's hypothesis. *Clinical Child and Adolescent Psychology*, *33*, 731-742.
- Salekin, R. T., Trobst, K. K., & Krioukova, M. (2001). Construct validity of psychopathy in a community sample: A nomological net approach. *Journal of Personality Disorders*, *15*, 425-441.
- Schmitt, W. A., & Newman, J. R. (1999). Are all psychopathic individuals low-anxious? *Journal of Abnormal Psychology*, *108*, 353-358.
- Singleton, N., Bumpstead, R., O'Brien, M., Lee A., & Meltzer H. (2001). *Psychiatric morbidity among adults living in private households, 2000*. London: The Stationery Office.
- Singleton, N., Lee, A., & Meltzer, H. (2002). *Psychiatric morbidity among adults living in private households, 2000: Technical Report*. London: Office for National Statistics.
- Singleton, N., Meltzer, H., Gatward, R., Coid, J., & Deasy, D. (1998). *Psychiatric morbidity among prisoners in England and Wales*. London: The Stationery Office.
- Skeem, J. L., Edens, J. F., Camp, J., & Colwell, L. H. (2004). Are there ethnic differences in levels of psychopathy? A meta-analysis. *Law and Human Behavior*, *28*, 505-527.
- Skeem, J. L., Mulvey, E. P., & Grisso, T. (2003). Applicability of traditional and revised models of psychopathy to the Psychopathy Checklist: Screening Version. *Psychological Assessment*, *15*, 41-55.
- Steadman, H. J., Mulvey, E. P., Monahan, J., Robbins, P. C., Applebaum, P. S., Grisso, T., Roth, L. H., & Silver, E. (1998). Violence by people discharged from acute psychiatric

- inpatient facilities and by others in the same neighborhoods. *Archives of General Psychiatry*, 55, 393-401.
- Steadman, H. J., Silver, E., Monahan, J., Applebaum, P., Robbins, P. C., Mulvey, E. P., Grisso, T., Roth, L. H., & Banks, S. (2000). A classification tree approach to the development of actuarial violence risk assessment tools. *Law and Human Behaviour*, 24, 83-100.
- Stockwell, T., Murphy, D., & Hodgson, R. (1983). The severity of alcohol dependence questionnaire: Its use, reliability and validity. *British Journal of Addictions*, 78, 145-155.
- Ullrich, S., & Coid, J. (accepted). Antisocial personality disorder: co-morbid Axis I mental disorders and health service use among a national household sample. *Personality and Mental Health*.
- Ullrich, S., & Marneros, A. (2004). Dimensions of personality disorders in offenders. *Criminal Behaviour and Mental Health*, 14, 202-213.
- Ullrich, S., & Marneros, A. (2007). Underlying dimensions of ICD-10 personality disorders: Risk factors, childhood antecedents, and adverse outcomes in adulthood. *The Journal of Forensic Psychiatry and Psychology*, 18, 44-58.
- Ullrich, S., Farrington, D. P., & Coid, J. (2008). Psychopathic personality traits and life-success. *Personality and Individual Differences*, 44, 1162-1171.
- Ullrich, S., Paelecke, M., Kahle, I., & Marneros, A. (2003). Kategoriale und dimensionale Erfassung von "psychopathy" bei deutschen Straftätern: Prävalenz, Geschlechts- und Alterseffekte [Categorical and dimensional assessment of psychopathy in German offenders: Prevalence, effects of gender and age]. *Nervenarzt*, 74, 1002-1008.
- van Os, J., & Verdoux, H. (2003). Diagnosis and classification of schizophrenia: category versus dimensions, distribution, versus disease. In: R. M. Murray, P.B. Jones, E. Susser,

- J. van Os, M. Cannon. *The epidemiology of schizophrenia*. Cambridge. Cambridge University Press.
- Verona, E., & Vitale, J. (2006). Psychopathy in women: assessment, manifestations, and etiology. In C. Patrick (Ed.) *Handbook of psychopathy* (pp. 415-436). New York: Guilford Press.
- Vitacco, M. J., Neumann, C. S., & Jackson, R. L. (2005). Testing a four-factor model of psychopathy and its association with ethnicity, gender, intelligence, and violence. *Journal of Consulting and Clinical Psychology, 73*, 466-476.
- Walters, G. D., Gray, N. S., Jackson, R. L., Sewell, K. W., Rogers, R., Taylor, J., & Snowden, R. J. (2007). A taxometric analysis of the Psychopathy Checklist: Screening Version (PCL: SV): further evidence of dimensionality. *Psychological Assessment, 19*, 330-339.
- Wing, J.K., Babor, T., Brugha, T., Burke, J., Cooper, J.E., Giel, R., Jablenski, A., Regier, D., & Sartorius, N. (1990). SCAN: Schedules for Clinical Assessment in Neuropsychiatry. *Archives of General Psychiatry, 47*, 586-593.
- World Health Organisation Division of Mental Health (1999). *SCAN Schedules for Clinical Assessment in Neuropsychiatry, Version 2.1*. Geneva: World Health Organisation.

Table 1**The PCL: SV four-factor model of psychopathy**

| | Label | Items |
|----------|---------------|---|
| Factor 1 | Interpersonal | Superficial Grandiose Deceitful |
| Factor 2 | Affective | Lacks remorse Lacks empathy Doesn't accept responsibility |
| Factor 3 | Lifestyle | Impulsive Lacks goals Irresponsible |
| Factor 4 | Antisocial | Poor behavioral controls Adolescent antisocial behaviour Adult antisocial behaviour |

Note. Copyright 1995 R.D. Hare and Multi-Health Systems, 3770 Victoria Park Avenue, Toronto, Ontario, M2H 3M6. All rights reserved. Reprinted by permission. Note that the item titles cannot be scored without reference to the formal criteria contained in the PCL: SV Manual. The Interpersonal and Affective Factors comprise Part 1 described in the PCL: SV Manual. The Lifestyle and Antisocial factors comprise Part 2 described in the PCL: SV Manual.

Table 2**PCL: SV inter-factor correlation coefficients (Log transformed)**

| | Pearson's simple correlation | | | Partial correlation (adjusted for gender and other factors) | | |
|------------|------------------------------|-----------|-----------|--|-----------|-----------|
| | Interpersonal | Affective | Lifestyle | Interpersonal | Affective | Lifestyle |
| Affective | 0.32*** | | | 0.26*** | | |
| Lifestyle | 0.25*** | 0.44*** | | 0.18*** | 0.38*** | |
| Antisocial | 0.38*** | 0.50*** | 0.54*** | 0.32*** | 0.45*** | 0.49*** |

Note. *** $p < 0.0001$ (two tailed)

Table 3**Sociodemographic and socioeconomic characteristics of the total sample – weighted data (n=620)**

| Demographic characteristic | Category group | Respondents N (%) | Total Mean (SD) | Interpersonal Mean (SD) | Affective Mean (SD) | Lifestyle Mean (SD) | Antisocial Mean (SD) |
|-----------------------------------|----------------------------|------------------------------|----------------------------|------------------------------------|--------------------------------|--------------------------------|---------------------------------|
| Age group | 16-34 | 211 (34.0) | 1.22 (2.49) | 0.20 (0.61) | 0.24 (0.81) | 0.29 (0.68) | 0.49 (1.13) |
| | 35-54 | 268 (43.2) | 1.13 (2.44) | 0.19 (0.54) | 0.20 (0.69) | 0.29 (0.81) | 0.46 (1.17) |
| | 55-74 | 141 (22.8) | 0.46 (1.25)** | 0.12 (0.42) | 0.08 (0.38)* | 0.09 (0.41)* | 0.17 (0.63)** |
| Gender | Male | 301 (48.5) | 1.52 (2.80) | 0.27 (0.70) | 0.31 (0.84) | 0.32 (0.83) | 0.61 (1.32) |
| | Female | 319 (51.5) | 0.54 (1.45)*** | 0.09 (0.30)*** | 0.07 (0.46)*** | 0.17 (0.52)** | 0.21 (0.68)*** |
| Ethnic origin | White | 601 (96.9) | 0.97 (2.22) | 0.17 (0.53) | 0.18 (0.68) | 0.23 (0.67) | 0.39 (1.05) |
| | Non-White | 19 (3.1) | 2.28 (3.09)* | 0.51 (0.75)* | 0.34 (0.73) | 0.70 (1.07)** | 0.73 (1.45) |
| Legal marital status | Married/cohabiting/widowed | 354 (57.1) | 0.83 (1.93) | 0.12 (0.39) | 0.15 (0.52) | 0.20 (0.66) | 0.36 (1.02) |
| | Separated/divorced | 82 (5.9) | 1.40 (2.86) | 0.27 (0.66) | 0.23 (0.80) | 0.33 (0.85) | 0.58 (1.26) |
| | Single | 184 (29.7) | 1.22 (2.54) | 0.24 (0.69) | 0.26 (0.87) | 0.30 (0.68) | 0.43 (1.05) |

Table 3 continued

Sociodemographic and socioeconomic characteristics of the total sample – weighted data (n=620)

| Demographic characteristic | Category group | Respondents N (%) | Total Mean (SD) | Interpersonal Mean (SD) | Affective Mean (SD) | Lifestyle Mean (SD) | Antisocial Mean (SD) |
|----------------------------|-----------------------|----------------------|--------------------|----------------------------|------------------------|------------------------|-------------------------|
| Employment status | Working | 393 (63.4) | 0.88 (1.95) | 0.22 (0.60) | 0.16 (0.63) | 0.18 (0.52) | 0.33 (0.88) |
| | Unemployed | 21 (3.3) | 3.08 (4.34) | 0.27 (0.52) | 0.82 (1.48) | 0.67 (0.99) | 1.31 (2.07) |
| | Economically inactive | 206 (33.3) | 1.05 (2.43) | 0.09 (0.37)* | 0.18 (0.63) | 0.32 (0.90)* | 0.45 (1.18) |
| Social class | I | 32 (5.3) | 0.87 (2.23) | 0.38 (0.59) | 0.27 (0.84) | 0.08 (0.57) | 0.13 (0.86) |
| | II | 160 (27.1) | 0.80 (1.63) | 0.19 (0.52) | 0.17 (0.63) | 0.13 (0.39) | 0.30 (0.78) |
| | IIINM | 154 (26.1) | 0.47 (1.14) | 0.08 (0.33)* | 0.04 (0.22) | 0.18 (0.51) | 0.17 (0.57) |
| | IIIM | 112 (19.0) | 1.54 (2.96) | 0.21 (0.58) | 0.31 (0.88) | 0.37 (0.91) | 0.65 (1.44) |
| | IV | 94 (16.0) | 1.36 (2.93) | 0.19 (0.74) | 0.21 (0.76) | 0.39 (0.93) | 0.57 (1.35) |
| | V | 38 (6.5) | 1.56 (2.71) | 0.22 (0.63) | 0.25 (0.65) | 0.38 (0.89) | 0.71 (1.25) |
| Housing tenure | Owned outright | 115 (18.5) | 0.38 (1.22) | 0.13 (0.41) | 0.06 (0.33) | 0.07 (0.30) | 0.12 (0.56) |
| | Owned with mortgage | 302 (48.7) | 0.64 (1.43) | 0.14 (0.44) | 0.11 (0.49) | 0.12 (0.41) | 0.27 (0.77) |
| | Rented | 203 (32.7) | 1.92 (3.25)** | 0.26 (0.71) | 0.37 (0.98)* | 0.52 (1.02)** | 0.77 (1.48)** |

Note. For comparing the mean scores between the category levels within each variable, other demographic variables are adjusted for. * $p \leq 0.05$, ** $p \leq 0.01$,

*** $p \leq 0.001$

Table 4

Associations between dimensional scores of Axis II personality disorder criteria and PCL: SV scores

| Axis II disorder | Total | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|----------------------|---------|----------------------|------------------|------------------|-------------------|
| | | <i>Interpersonal</i> | <i>Affective</i> | <i>Lifestyle</i> | <i>Antisocial</i> |
| Avoidant | -1.26 | -1.14 | -2.69** | -1.02 | -1.78 |
| Dependent | -0.15 | -0.52 | 0.72 | 1.90 | 0.07 |
| Obsessive-compulsive | -0.79 | 0.19 | -2.28* | -0.76 | 1.56 |
| Paranoid | 0.46 | -1.34 | 0.95 | -0.01 | 0.25 |
| Schizotypal | 0.51 | 0.93 | 1.19 | 1.65 | 0.44 |
| Schizoid | 1.71 | -1.50 | 3.56** | 1.83 | 0.54 |
| Histrionic | 2.50* | 0.77 | 1.29 | 3.21** | 0.24 |
| Narcissistic | 1.44 | 5.95*** | 1.63 | -0.49 | 0.18 |
| Borderline | 2.73** | 1.06 | 0.73 | 3.13** | 1.95 |
| Conduct disorder | 0.33 | 0.70 | -1.34 | -1.90 | 2.25* |
| Adult antisocial | 5.48*** | 0.73 | 5.53*** | 2.60** | 5.52*** |

Note. Adjustments: Gender, age, ethnicity, drug dependence, alcohol dependence, affective/anxiety disorder, psychosis, intercorrelations of four factors, and comorbid PD scores (Factor 4 was not controlled for conduct disorder and adult antisocial for Factor 1, Factor 2, Factor 3). The association is presented by z-score as the partial regression coefficient over its standard error. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 5**Association between ICD-10 categories of Axis I affective/anxiety disorder and PCL: SV scores**

| | Present/ absent | Respondent | Total | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|--|--------------------|------------|-------------------|-----------------------------------|-------------------------------|-------------------------------|--------------------------------|
| | | s N(%) | Mean (SD) | <i>Interpersonal</i> Mean (SD) | <i>Affective</i> Mean (SD) | <i>Lifestyle</i> Mean (SD) | <i>Antisocial</i> Mean (SD) |
| Mixed anxiety/ depressive disorder | No | 520 (84.0) | 0.93 (2.05) | 0.16 (0.49) | 0.16 (0.59) | 0.24 (0.70) | 0.36 (0.98) |
| | Yes | 99 (16.0) | 1.49 (3.19) | 0.26 (0.76) | 0.32 (1.04) | 0.26 (0.68) | 0.64 (1.40) |
| Generalized anxiety disorder | No | 556 (89.9) | 0.87 (2.06) | 0.18 (0.55) | 0.15 (0.62) | 0.20 (0.59) | 0.34 (0.93) |
| | Yes | 63 (10.2) | 2.31 (3.42) | 0.16 (0.47) | 0.51 (1.05) | 0.63 (1.25) | 1.01 (1.78) |
| Depressive episode | No | 579 (93.5) | 0.99 (2.20) | 0.17 (0.53) | 0.18 (0.65) | 0.24 (0.68) | 0.40 (1.05) |
| | Yes | 40 (6.5) | 1.46 (3.11) | 0.22 (0.64) | 0.36 (1.02) | 0.38 (0.95) | 0.50 (1.26) |
| All phobias | No | 583 (94.3) | 0.92 (2.10) | 0.17 (0.53) | 0.16 (0.65) | 0.21 (0.61) | 0.37 (0.99) |
| | Yes | 35 (5.7) | 2.73 (3.86) | 0.25 (0.65) | 0.62 (1.06)* | 0.90 (1.43) | 0.96 (1.81) |
| Obsessive- compulsive disorder | No | 602 (97.3) | 0.45 (2.13) | 0.17 (0.52) | 0.17 (0.63) | 0.23 (0.66) | 0.39 (1.03) |
| | Yes | 17 (2.7) | 3.67 (4.67)*** | 0.57 (0.92)** | 1.00 (1.58)* | 1.03 (1.33)* | 1.07 (1.79) |
| Panic disorder | No | 610 (98.7) | 0.99 (2.22) | 0.17 (0.54) | 0.19 (0.69) | 0.23 (0.65) | 0.38 (1.03) |
| | Yes | 8 (1.3) | 3.08 (4.56)** | 0.36 (0.77)* | 0.0 (0.0) | 1.23 (2.20)** | 1.49 (2.54)** |

Note. Adjustments: Age, sex, ethnicity, employment, any PD, psychosis, drug dependence, alcohol dependence, intercorrelations of four factors. * $P \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 6**Association between substance misuse and PCL: SV scores**

| | Present/ absent | Respondent s N (%) | Total Score | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|-------------------------------------|--------------------|--------------------------|-------------------|----------------------------|------------------------|------------------------|-------------------------|
| | | | Mean (SD) | Interpersonal Mean (SD) | Affective Mean (SD) | Lifestyle Mean (SD) | Antisocial Mean (SD) |
| Cannabis use – past year (1-3,6) | No | 542 (87.6) | 0.78 (1.92) | 0.16 (0.52) | 0.15 (0.58) | 0.19 (0.60) | 0.28 (0.85) |
| | Yes | 77 (12.4) | 2.74 (3.54)** | 0.31 (0.64) | 0.51 (1.13) | 0.66 (1.09)* | 1.27 (1.78)** |
| Heroin use – ever (1-3,6) | No | 610 (98.7) | 0.94 (2.07) | 0.15 (0.46) | 0.17 (0.63) | 0.24 (0.68) | 0.38 (1.01) |
| | Yes | 8 (1.3) | 7.13 (6.38)*** | 1.99 (1.89)*** | 1.67 (2.04)** | 0.84 (1.57) | 2.63 (2.28)*** |
| Cocaine use – ever (1-3, 6) | No | 576 (93.2) | 0.86 (1.97) | 0.14 (0.45) | 0.15 (0.59) | 0.22 (0.67) | 0.35 (0.95) |
| | Yes | 42 (6.8) | 3.18 (4.28) | 0.63 (1.13)** | 0.75 (1.36) | 0.58 (0.99) | 1.23 (1.90) |
| Amphetamine use – ever (1-3,6) | No | 546 (88.3) | 0.83 (1.87) | 0.15 (0.46) | 0.14 (0.56) | 0.22 (0.65) | 0.32 (0.90) |
| | Yes | 72 (11.7) | 2.49 (3.95)* | 0.39 (0.93)* | 0.56 (1.21) | 0.46 (0.95) | 1.07 (1.74)** |
| Drug dependence – any (1-3, 5) | No | 577 (93.4) | 0.84 (2.00) | 0.17 (0.53) | 0.16 (0.63) | 0.20 (0.62) | 0.32 (0.90) |
| | Yes | 41 (6.6) | 3.47 (3.90)* | 0.31 (0.62) | 0.59 (1.10) | 0.91 (1.22)* | 1.65 (2.01)** |
| Alcohol dependence (1-3, 4) | No | 553 (89.6) | 0.89 (2.10) | 0.16 (0.51) | 0.16 (0.64) | 0.21 (0.64) | 0.36 (1.00) |
| | Yes | 64 (10.4) | 2.15 (3.22) | 0.36 (0.70) | 0.42 (0.97) | 0.59 (0.99) | 0.77 (1.46) |
| Hazardous drinking (1-3, 7) | No | 429 (69.5) | 0.82 (2.01) | 0.16 (0.52) | 0.13 (0.54) | 0.20 (0.64) | 0.34 (1.01) |
| | Yes | 188 (30.5) | 1.49 (2.73) | 0.23 (0.57) | 0.33 (0.92) | 0.37 (0.80) | 0.57 (1.17) |

Note. Adjustments: 1 = age, sex, ethnicity, employment, 2 = any personality disorder, affective/anxiety disorder, 3 = psychosis, 4 = any drug dependence, 5 = alcohol dependence, 6 = hazardous drinking, 7 = any drug use, inter-correlations of four factors, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 7**Association between social / behavioral problems and PCL: SV scores**

| | Present/absent | Respondents N (%) | Total Score | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|--------------------------------------|----------------|----------------------|----------------|----------------------|------------------|------------------|-------------------|
| | | | | <i>Interpersonal</i> | <i>Affective</i> | <i>Lifestyle</i> | <i>Antisocial</i> |
| | | | Mean (SD) | Mean (SD) | Mean (SD) | Mean (SD) | Mean (SD) |
| Any | No | 525 (85.0) | 0.63 (1.51) | 0.14 (0.44) | 0.12 (0.53) | 0.18 (0.52) | 0.20 (0.63) |
| convictions | Yes | 93 (15.0) | 3.19 (3.99)*** | 0.37 (0.90) | 0.60 (1.14)** | 0.64 (1.23)** | 1.58 (1.92)*** |
| Prison sentence | No | 593 (96.0) | 0.80 (1.82) | 0.17 (0.52) | 0.16 (0.62) | 0.19 (0.55) | 0.29 (0.80) |
| | Yes | 25 (4.0) | 6.06 (4.76)*** | 0.36 (0.87) | 0.93 (1.35)** | 1.58 (1.78)*** | 3.19 (2.17)*** |
| Violence in past 5 years | No | 520 (84.1) | 0.70 (1.66) | 0.15 (0.45) | 0.10 (0.43) | 0.20 (0.59) | 0.25 (0.81) |
| | Yes | 98 (15.9) | 2.73 (3.83)*** | 0.33 (0.86) | 0.69 (1.30)*** | 0.48 (1.07) | 1.23 (1.70)*** |
| Victim violence in family home | No | 534 (86.4) | 0.88 (2.15) | 0.18 (0.54) | 0.16 (0.62) | 0.20 (0.63) | 0.35 (1.01) |
| | Yes | 84 (13.6) | 1.89 (2.79)** | 0.18 (0.53) | 0.38 (0.99)* | 0.56 (0.97)** | 0.77 (1.30)** |
| Sexual abuse | No | 558 (90.3) | 0.93 (2.11) | 0.17 (0.54) | 0.17 (0.62) | 0.22 (0.66) | 0.36 (1.00) |
| | Yes | 60 (9.7) | 1.83 (3.32) | 0.21 (0.50) | 0.35 (1.10) | 0.47 (0.97) | 0.80 (1.47) |
| Homelessness | No | 564 (91.3) | 0.82 (1.89) | 0.17 (0.53) | 0.15 (0.60) | 0.19 (0.58) | 0.31 (0.88) |
| | Yes | 54 (8.7) | 3.07 (4.16)*** | 0.26 (0.66) | 0.57 (1.20)* | 0.86 (1.28)** | 1.38 (1.99)*** |
| Financial crisis | No | 512 (82.8) | 0.83 (1.87) | 0.14 (0.49) | 0.15 (0.56) | 0.20 (0.58) | 0.34 (0.91) |
| | Yes | 106 (17.2) | 1.94 (3.50) | 0.33 (0.69)* | 0.41 (1.08) | 0.48 (1.08) | 0.73 (1.57) |
| Psychiatric hospital admission | No | 490 (79.2) | 0.85 (2.05) | 0.17 (0.53) | 0.17 (0.65) | 0.19 (0.55) | 0.32 (0.91) |
| | Yes | 129 (20.8) | 1.66 (2.90)** | 0.20 (0.57) | 0.27 (0.79) | 0.46 (1.06)** | 0.73 (1.47)** |
| Attempted suicide | No | 516 (83.4) | 0.83 (1.91) | 0.16 (0.47) | 0.16 (0.60) | 0.19 (0.61) | 0.32 (0.90) |
| | Yes | 103 (16.6) | 1.99 (3.42)* | 0.29 (0.80) | 0.34 (1.00) | 0.52 (0.99)* | 0.86 (1.59)* |

Note. Adjustments = age, sex, ethnicity, employment, alcohol dependence, drug dependence, psychosis, affective/anxiety. *p≤0.05, **p≤0.01, ***p≤0.001

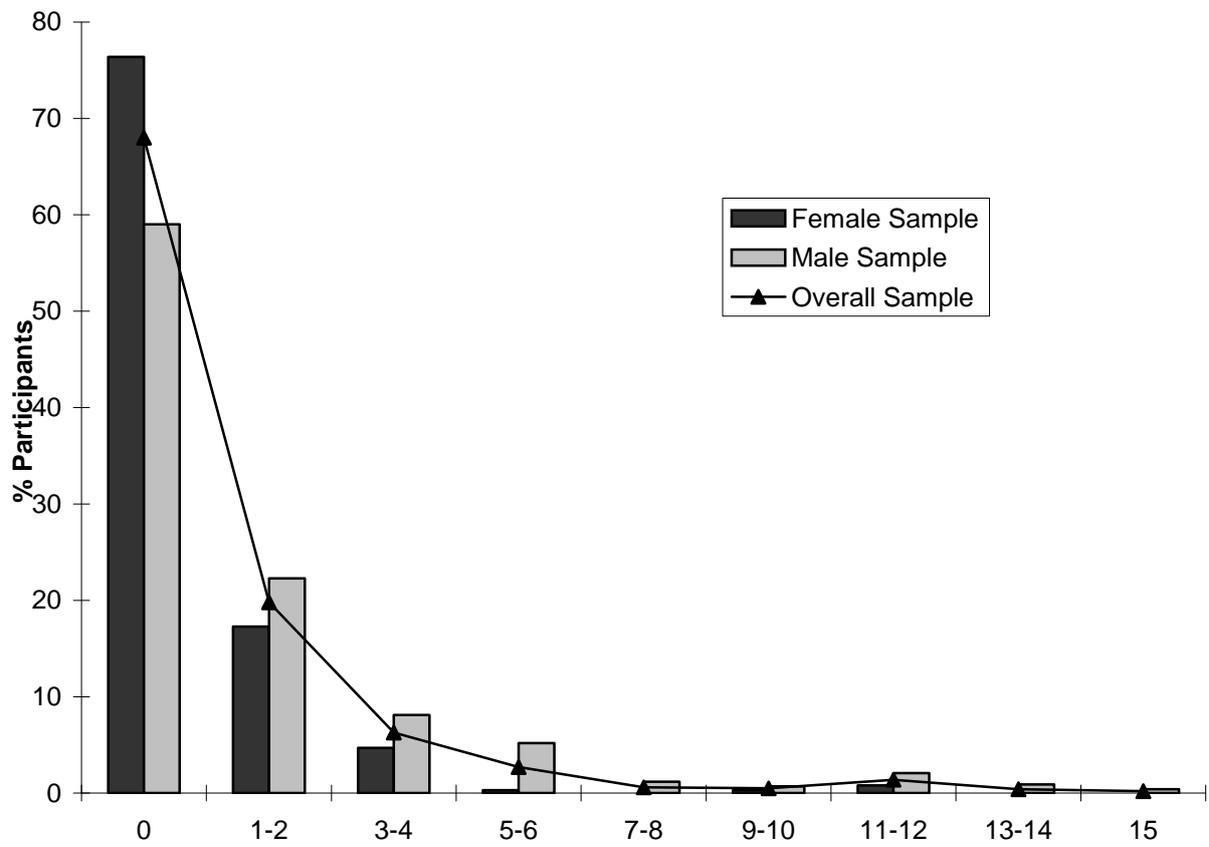


Figure 1. Distribution of Weighted PCL: SV Total Scores