



PCL-R psychopathy and its relation to DSM-IV Axis I and II disorders in a sample of male forensic psychiatric patients in the Netherlands

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1. Introduction

Psychopathy was the first personality disorder to be recognized in psychiatry. According to [Schneider \(1923\)](#), a German psychiatrist, the term psychopathy referred to a variety of personality disorders (psychopathic personalities [PDs]) as extreme variants of normal personality. It has been given many different labels ([Hare, 1991](#)) such as psychopathic inferiority, character deficiency, moral insanity, and manipulative personality. The current interest in the disorder is (at least partly) attributable to the development of the Hare Psychopathy Checklist-Revised (PCL-R; [Hare, 1991](#); [Hare et al., 1990](#)) and the abundance of empirical research it has generated over the past two decades. PCL-R items are personality traits and behaviors, which are scored on a 3-point scale (2 = *the item definitely applies to the participant*, 1 = *the item applies to a certain extent*, 0 = *the item does not apply to the participant*), yielding a maximum total of 40. A score of 30 or more is recommended by [Hare \(1991\)](#) to identify the prototypical psychopath. PCL-R items define two correlated oblique factors, Factor 1 (callous and remorseless style of relating to other people), primarily at high levels of the construct, and Factor 2 (unstable, socially deviant lifestyle) at low levels of the construct ([Cooke & Michie, 1997](#)). Recently, however, [Cooke and Michie \(2001\)](#), using confirmatory factor analysis, identified distinct interpersonal, affective, and behavioral factors of which the measurement is uncontaminated by items reflecting antisocial behavior.

Evidence gathered in the last decade demonstrates that the PCL-R scale is highly reliable when used with trained and experienced raters. Studies in a variety of countries have typically obtained intraclass correlations (ICCs) >.80 for a single rater. Internal consistency (alpha coefficients >.80; mean interitem

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correlations $>.22$) is also high. Considerable evidence has accrued attesting to the construct-related validity of the PCL-R. In several (mostly North American) studies (Hart & Hare, 1989; Hemphill, Hart, & Hare, 1994; Schroeder, Schroeder, & Hare, 1983; Smith & Newman, 1990), an expected pattern of relations with clinical assessments of DSM-III-R Axis I and II disorders (American Psychiatric Association, 1980, 1987) is reported, the interpretation of which is greatly clarified by an analysis of the two-factor structure of the PCL-R (Hart & Hare, 1997). In addition, there is increasing evidence that PCL-R scores are related, in appropriate ways, to so-called psychopathy-related self-report scales, as well as to a variety of behavioral variables (Bodholt, Richards, & Gacono, 2000; Hare, 1991; Hart & Hare, 1997).

The most common finding in studies that have examined the association between PCL-R psychopathy and DSM-III-R Axis I mental disorders is that a diagnosis of PCL-R psychopathy is rarely significantly associated with individual Axis I pathology other than substance-use disorders (Hart & Hare, 1989; Nedopil, Hollweg, Hartmann, & Jasper, 1998; Rice & Harris, 1995; Stålenheim & von Knorring, 1996). Hart and Hare (1989), for example, reported that patients with a diagnosis of PCL-R psychopathy (total score ≥ 30) were nine times less likely to receive any Axis I principal diagnosis than were other patients. However, moderate to strong associations between the PCL-R total and Factor 2 scores and substance-related disorders, and weak relationships between Factor 1 scores and substance abuse were found (Hart & Hare, 1989; Rutherford, Alterman, & Cacciola, 2000). Smith and Newman (1990) assessed substance-use disorder with a structured interview in 360 male prison inmates. Analyses revealed that PCL-R psychopathy was significantly associated with both alcohol and drug abuse/dependence disorders. Other studies (Hart, Hare, & Harpur, 1992; Hemphill et al., 1994) also found significant correlations between PCL/PCL-R scores and drug abuse/dependence diagnoses; however, correlations with alcohol abuse/dependence diagnoses were not significant. Similar associations were found in European samples of prisoners and forensic psychiatric patients (Andersen, Sestoft, Lillebæk, Mortensen, & Kramp, 1999; Stålenheim & von Knorring, 1996).

With regard to the association with PDs, the majority of PCL-R psychopaths meet the criteria for antisocial PD, whereas a large proportion of participants with the antisocial PD diagnosis do not meet the PCL-R criteria for psychopathy (Hart & Hare, 1989; Stålenheim & von Knorring, 1996). The correlation between PCL-R scores and (dimensional) diagnoses of antisocial PD is usually quite high, that is, $r=.55$ to $.65$ (Hart & Hare, 1989). The prevalence rates of (PCL-R) psychopathy among samples of forensic participants (15–30%), however, are much lower than those for the DSM diagnosis of antisocial PD (50–80%; Hare, 1985; Hart, Hare & Forth, 1994). Results further indicate that the PCL-R score correlates positively with DSM-III-R Axis II Cluster B disorders (“dramatic–erratic–emotional”) and negatively with Cluster C personality, the “anxious–fearful” cluster (Hart & Hare, 1985; Hart et al., 1994). Rutherford, Alterman, Cacciola, and McKay (1997), for example, found strong and significant correlations between the PCL-R total score and the number of symptoms of DSM-III-R APD, borderline, narcissistic, and histrionic PD in a sample of 250 male methadone patients. Hart and Hare (1989) reported positive correlations between PCL-R total scores and categorical diagnoses of DSM-III antisocial and histrionic PD in a sample of 80 North American men remanded by the courts for inpatient assessment of competency to stand trial. PCL-R Factor 1 scores were negatively correlated with the prototypicality ratings of avoidant and dependent PD. A diagnosis of psychopathy was significantly associated with only one DSM-III Axis II disorder, namely, APD (odds ratio = 11.32). Finally, examining 61 Swedish male forensic psychiatric patients, Stålenheim and von Knorring (1996) found that PCL-R-

defined psychopathy was strongly associated with the presence of Cluster B disorders ($t=7.89$, $P<.0001$) and a diagnosis of antisocial personality disorder ($\chi^2=27.9$, $P<.001$) according to DSM-III-R criteria.

To summarize, previous work has generally supported the construct validity of Hare's PCL-R in relation to assessments of DSM-III-R Axis I and II disorders, based on semistructured interviews. Most of this work, however, has involved North American criminal and forensic samples. We do not know whether the findings reported are generalizable to European forensic psychiatric samples. In addition, to the best of our knowledge, no study has been published that systematically examined the association between PCL-R psychopathy and DSM-IV Axis I and II disorders (American Psychiatric Association, 1994).

2. Aim of this study

The current study was designed to examine the association between PCL-R scores and (a) assessments of DSM-IV Axis I disorders and (b) diagnoses of DSM-III-R/DSM-IV Axis II disorders, made on the basis of a semistructured interview, the preferred method of assessment in personality disorder research (Loranger, 1992; Zimmerman, 1994), in a sample of forensic psychiatric patients. On the basis of earlier findings, we expected PCL-R scores to be negatively correlated with individual Axis I disorders, except for substance-use disorders, and to be positively associated with PDs of the dramatic–erratic–emotional cluster and negatively with PDs of the anxious–fearful cluster.

3. Materials and methods

3.1. Setting

The study was conducted in the Dr. Henri van der Hoeven Kliniek, a Dutch forensic psychiatric facility for the residential treatment of criminal offenders who are sentenced by the court to involuntary commitment because of diminished responsibility for the crimes they committed. In terms of legal status, the patients are sentenced by the court to a *maatregel van terbeschikkingstelling* (TBS-order). The purpose of the Dutch TBS-order is to protect the society from unacceptably high risks of recidivism through involuntary admission to a forensic psychiatric hospital, and through the treatment provided there (de Ruiter & Hildebrand, 2003). Every 1 or 2 years, the court reevaluates the patient to determine whether the risk of recidivism is still too high and treatment needs to be continued. Most patients serve a limited prison sentence before they are hospitalized.

3.2. Participants

Participants were 98 male forensic psychiatric patients admitted to the hospital between January 1, 1996, and December 1, 2001, with whom we were able to administer the PCL-R based on (a) the results of an interview and (b) extensive collateral information. The sample represents approximately 75% of available male participants admitted to the hospital between January 1, 1996, and December 1, 2001. The remainder was either not examined or provided incomplete data as a result of refusal of an interview, referral to another facility, or their clinical symptoms.

The mean age at admission was 31.5 years (S.D. = 7.8, range = 19–50). Most (77.6%) of the patients were White, and the rest were Surinamese/Antillian (13.3%), Mediterranean (7.1%), or other descent. Sixty-six patients (67.3%) had never been married nor lived in a common law marriage. Fifty percent of the sample was convicted for (attempted) murder/homicide and 24.5% for sexual offences (e.g., sexual assault, rape, and child molestation), the others for (aggravated) assault, robbery with violence, threat, and arson.

3.3. Assessments

3.3.1. Psychopathy

Psychopathy was assessed with the PCL-R, following the guidelines provided by Hare (1991). PCL-R assessments of all patients were based on the results of an interview with the patient on the basis of the Dutch-language version of the semistructured PCL-R interview designed by Hare. In addition, for all patients, file records consisting of elaborate psychiatric and psychological evaluations, police records, criminal history, and family background data were reviewed. The authorized Dutch translation of the Hare PCL-R manual was used (Vertommen, Verheul, de Ruiter, & Hildebrand, 2002). The items were summed to yield three scores: Factor 1 (“callous and remorseless use of others”), Factor 2 (“chronically unstable and antisocial lifestyle”), and the PCL-R total score (Hare, 1991). In the present study, the item scoring for the two factors derived by Hare et al. (1990) was used.

PCL-R interviews are generally videotaped, for which patients have to give their written informed consent. Thus, the patients were selected on their willingness to give informed consent and to cooperate with the interview process. As a general procedure, PCL-R ratings were made by (at least) two independent raters. Nineteen patients refused to give consent for videotaping the interview, 13 agreed with a joint interview approach (one rater conducted the interview while a second rater was present as an observer), 6 refused the presence of a second observer, and PCL-R scores had to be based on the judgment of a single interviewer (MH or CdR). In all other cases ($n=92$), PCL-R scores were based on PCL-R ratings of at least two independent raters. Previously, we reported that comparisons between real-life and videotaped interviews indicated that the information source (interview vs. video) did not influence the raters’ coding (Hildebrand, de Ruiter, de Vogel, & van der Wolf, 2002). After the independent review of all available information (interview and file information), each rater scored the PCL-R, and a meeting was planned to obtain a final (consensus) rating for each patient. This procedure, recommended by Hare (1991, 1998), was chosen to optimize scoring accuracy. PCL-R consensus scores were used in all subsequent data analyses. It should be noted that PCL-R scores for every patient were established by at least one rater who previously participated in the interrater reliability study of the Dutch-language version of the PCL-R (Hildebrand et al., 2002). The interrater reliability appeared to be excellent. The ICC, using a two-way random effects model, for the PCL-R total score was .88 for a single rater (Factor 1=.76; Factor 2=.83). Ratings were also internally consistent (Cronbach’s alpha for the PCL-R total score=.87). All raters had been trained in scoring the PCL-R, either by Drs. Robert D. Hare and David Cooke in a 3-day PCL-R basic and advanced workshop held at the Dr. Henri van der Hoeven Kliniek in October 1997, by Drs. Robert D. Hare and Stephen D. Hart in a 3-day PCL-R workshop held at the University of Nijmegen, the Netherlands, in April 2000, or by Dr. Stephen D. Hart in a PCL-R workshop in Amsterdam in February 2001.

3.3.2. *DSM-IV Axis I disorders*

Consistent with earlier research (e.g., Coid, 1992; Rasmussen, Storsæter, & Levander, 1999; Timmerman & Emmelkamp, 2001), lifetime Axis I diagnoses were established by the first author (MH) using all available data (e.g., earlier psychological and psychiatric reports, earlier diagnoses, current psychiatric or psychological assessments). To be able to compare with other studies examining the prevalence of Axis I diagnoses, these diagnoses were reviewed by three independent raters: a senior diagnostician and a senior psychotherapist of the hospital staff, and the second author. Missing diagnoses were added, and disagreements between the four raters were discussed and resolved, and a set of final consensus diagnoses for all patients in the sample was established. This procedure (i.e., using consensus diagnoses) was chosen to maximize scoring accuracy. The diagnoses were clustered into the following categories: (a) organic disorders, (b) schizophrenia or other psychotic disorders, (c) mood disorders, (d) anxiety disorders, and (e) sexual disorders (paraphilia). In addition, the substance-use diagnoses (i.e., abuse and dependence) were divided into two main categories: alcohol-related disorders and other substance abuse/dependence (such as cannabis, polysubstance, sedative, and cocaine abuse/dependence). No interrater reliability data were collected for Axis I disorders.

3.3.3. *Axis II disorders*

PD diagnoses were obtained by administration of the Structured Interview for DSM-III-R (SIDP-R; (van den Brink & de Jong, 1992; Pfohl, Blum, Zimmerman, & Stangl, 1989) or DSM-IV Disorders of Personality (SIDP-IV; (de Jong, Derks, van Oel, & Rinne, 1996; Pfohl, Blum, & Zimmerman, 1994). Our use of DSM-III-R PD criteria is a consequence of the duration of the data collection, which started before the SIDP-IV became available. Eleven patients were diagnosed using the DSM-III-R criteria; the rest was diagnosed using DSM-IV criteria. The SIDP-R is a semistructured interview consisting of 160 items designed to assess the criteria of the DSM-III-R PDs. Questions are grouped into 17 topical sections (not into PDs) such as interpersonal functioning, emotional expression, and perception of threat. The SIDP-IV assesses all DSM-IV PDs plus the self-defeating PD of the DSM-III-R (sadistic PD is not included). The questions of the SIDP-IV are grouped into 10 topic areas such as interests, emotions, and activities. Interviewers are free to make additional inquiries when necessary. The interviewers did not rate items while interviewing but took detailed notes. Diagnostic criteria were rated after the interview was completed, and the interviewer had also examined available chart materials. Items are scored as “not present,” “subthreshold,” “present,” and “strongly present.” The interviewer must have clear evidence for the presence of a criterion as a stable characteristic of the patient—it must have been present during at least the preceding 5 years, not restricted to periods with Axis I disorders or to specific situations—to make a positive rating. For the present study, the items were recoded into two categories: absent or present. Categorical diagnoses and dimensional scores (i.e., total number of criteria present for each disorder) were derived. No interrater reliability data were collected for Axis II categorical diagnoses or dimensional ratings, but in most cases, the scoring was reviewed by a second, senior-level clinical psychologist who also knew the patient.

4. Procedure

Since January 1996, newly admitted patients were assessed upon admission (T0; baseline assessment) with a standardized psychological assessment battery. PCL-R psychopathy assessment was implemented

in November 1997. To provide information on treatment progress, all patients in our hospital are retested 18–24 months (T1; Follow-up 1) and again 42 months after admission (T2; Follow-up 2). At baseline, PCL-R and SIDP-R/SIDP-IV interviews were administered to assess PCL-R psychopathy and Axis II disorders. Because PCL-R psychopathy assessment was not implemented until November 1997, 26 patients were administered the PCL-R at Follow-up 1. The examiner who diagnosed a particular patient using DSM-IV Axis II criteria was blind with respect to the PCL-R psychopathy score of this particular patient. Occasionally, however, PCL-R examiners had been in contact with the patient, previously, for other psychodiagnostic activities (especially for patients who were administered the PCL-R at T1).

PCL-R and SIDP-R/SIDP-IV ratings were conducted by a pool of 10 examiners, 7 females and 3 males. Seven raters were master's level (clinical) psychologists, one was an experienced PhD clinical and forensic psychologist (CdR), one was a mental health scientist, and one had a degree in both mental health science and law (MH). All were familiar with DSM-IV Axis I/II disorders and were experienced in assessment and/or treatment of (forensic) psychiatric patients.

5. Results

5.1. Base rate of PCL-R psychopathy

Fig. 1 presents the distribution of PCL-R psychopathy scores in the sample. The mean total PCL-R score (adjusted sum) was 21.4 (S.D. = 8.4), with a range from 3 to 38, a median score of 21.1, and a mode of 17. The kurtosis of the PCL-R total score was $-.753$ (S.E. = $-.244$). PCL-R scores were normally distributed (Kolmogorov–Smirnov $Z=.594$, $P=.872$). The mean Factor 1 score was 9.3 (S.D. = 3.8) and the mean Factor 2 score was also 9.3 (S.D. = 5.0). When a cutoff point of 30, designated

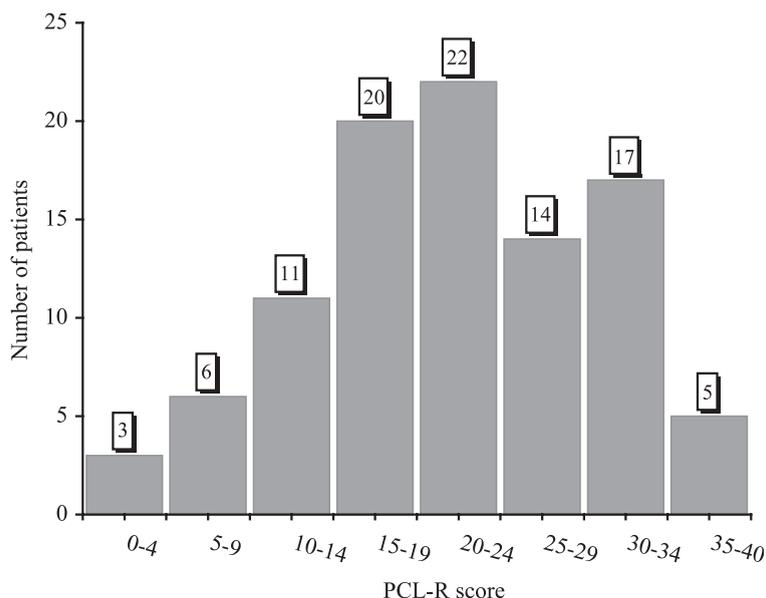


Fig. 1. Distribution of PCL-R psychopathy scores for 98 Dutch male forensic psychiatric patients.

by Hare (1991), was used to divide the patients into psychopathic and nonpsychopathic groups, 21 (21.4%) of the patients were classified as psychopaths. When we applied a lower threshold of 26, which is often used in European research (Grann, Långström, Tengström, & Stålenheim, 1998; Rasmussen et al., 1999), 34 patients (34.7%) received a diagnosis of psychopathy. Nine patients (9.2%) had very low scores (PCL-R score < 10).

5.2. Axis I disorders

There was a high frequency of psychiatric disorders in the study sample. Eighty-six patients (87.8%) met criteria for at least one Axis I disorder, including any alcohol- or other substance-related disorder (i.e., psychoactive substance or sedative use disorders). Sixty-one patients (62.2%) met criteria for an Axis I diagnosis other than alcohol- or psychoactive-substance-related disorders. Forty-seven patients

Table 1
Base rate of DSM-IV Axis I disorders (N=98)

Diagnostic group	n	%
Organic brain syndrome	2	2.0
Schizophrenia/other psychotic disorder	17	17.3
Mood disorders	5	5.1
Depressive disorder NOS	3	3.1
Bipolar disorder	2	2.0
Anxiety disorders	4	4.1
Anxiety disorder NOS	2	2.0
Posttraumatic stress disorder	1	1.0
Social phobia	1	1.0
Sedative, hypnotic, anxiolytic use disorders (abuse/dependence)	5	5.1
Alcohol-use disorders	27	27.6
Alcohol abuse/dependence	25	25.5
Alcohol intoxication	1	1.0
Alcohol withdrawal	1	1.0
Psychoactive substance use disorders (abuse/dependence)	46	46.9
Cannabis	16	16.3
Polysubstance	10	10.2
Cocaine abuse	8	8.2
Unknown/other substance	6	6.1
Amphetamine	2	2.0
Opioid	3	3.1
Hallucinogen	1	1.0
Paraphilias	20	20.4
Pedophilia	15	15.3
Parafilia NOS	4	4.1
Exhibitionism	1	1.0
Pathological gambling	11	11.2
Other	14	14.3
Any Axis I disorder	86	87.8
Any Axis I disorder (other than alcohol, substance or sedative abuse/dependence)	61	62.2

NOS = not otherwise specified.

(48.0%) met criteria for at least one substance-related disorder. In addition, 20 patients (20.4%) received a diagnosis of paraphilia, 17 (17.3%) met criteria for schizophrenia or another psychotic disorder, 11 (11.2%) received a diagnosis of pathological gambling, 5 met criteria for a mood disorder, 4 of an anxiety disorder, and 2 of an organic brain syndrome. Other diagnoses ($n=14$) included impulse control disorder ($n=4$), pervasive developmental disorder NOS ($n=2$), pyromania ($n=2$), attention-deficit/hyperactivity disorder ($n=2$), Asperger's disorder, autistic disorder, Gilles de la Tourette, and hypochondrias (all $n=1$). Table 1 presents the base rates of lifetime Axis I disorders.

5.3. Axis II disorders

Valid data were obtained from 94 patients. The prevalence of PDs in the sample was substantial (Table 2). Eighty-four patients (89.3%) received at least one Axis II diagnosis. Of the remaining 10 patients, 2 received an SIDP-IV diagnosis of mixed PD, defined as missing only one criterion for two or more PDs. Thus, only 8 patients did not receive a PD diagnosis. Comorbidity on Axis II was more common than a single diagnosis: Of the 83 patients given a PD diagnosis, 53 (63.9%) received multiple diagnoses. The mean number of PDs per patient, for patients with at least one PD, was 2.1. As expected, most PDs are found in Cluster B disorders, followed by Cluster A. The most frequently diagnosed PD was antisocial PD ($n=45$), followed by narcissistic ($n=26$), borderline ($n=24$), and paranoid PDs ($n=18$).

Table 2

Base rate of DSM-III-R/DSM-IV Axis II diagnoses and mean dimensional scores ($N=94$)

Personality disorder	Categorical diagnoses		Number of traits present	
	<i>n</i>	%	Mean	S.D.
Paranoid	18	19.1	1.89	1.76
Schizoid	7	7.4	1.09	1.37
Schizotypal	9	9.6	1.70	1.96
Antisocial	45	47.8	–	–
Conduct disorder (< 15 years)	55	58.5	3.88	2.29
Antisocial behavior since age 15	66	70.2	3.73	3.37
Borderline	24	25.5	2.79	2.44
Histrionic	5	5.3	0.95	1.35
Narcissistic	26	27.7	2.94	2.42
Avoidant	11	11.7	1.24	1.83
Dependent	4	4.3	1.09	1.60
Obsessive-compulsive	9	9.6	1.53	1.40
Passive-aggressive	7	7.4	1.15	1.45
Self-defeating	4	4.3	1.33	1.63
Depressive	6	7.2	1.31	1.32
Cluster A	29	30.9	–	–
Cluster B	66	70.2	–	–
Cluster C	22	23.4	–	–
Any personality disorder (mixed not included)	84	89.3	–	–

For depressive personality disorder, $n=83$. –: not calculated.

Comorbidity between lifetime Axis I and II disorder diagnoses was high. Seventy-one patients (72.4%) with at least one PD diagnosis did have at least one (lifetime) Axis I disorder diagnosis (including alcohol/drug/sedative use disorders). When alcohol/drug use disorders were excluded from the analyses, 49 patients (50%) met the criteria for both Axis I and II disorder diagnoses.

5.4. Categorical overlap of Axis I and II disorders with PCL-R psychopathy

It is apparent from Tables 1 and 2 that several diagnostic categories have (very) low base rates. Therefore, following Hart and Hare (1989), we excluded diagnostic categories with fewer than 10 patients from further analyses (i.e., base rate <10%). This resulted in 10 categories, five Axis I (schizophrenia, alcohol and other substance abuse/dependence, paraphilias, pathological gambling) and five Axis II (paranoid, antisocial, borderline, narcissistic, and avoidant PD) categories. Cluster A, B, and C disorders (presence of at least one PD of the particular cluster) and any Axis I and II were also included as diagnostic categories. Patients were divided into a low- (PCL-R <20), medium- (20 ≤ PCL-R <30), and high-psychopathy (PCL-R ≥ 30) group. The chi-square test was used to determine the differences in frequency distribution between diagnostic categories. In addition, we calculated the odds ratios from 2 × 2 (presence vs. absence of diagnosis) tables. An odds ratio refers to the conditional probability of a disorder A (i.e., PCL-R psychopathy) given that another disorder B (e.g., schizophrenia) is present, divided by the conditional probability of disorder A given that disorder B is not present (Fleiss, 1981). Odds ratios of 2 or 3 are typically considered to indicate a large effect size (Fleiss, Williams, & Dubro, 1986). Odds ratios were calculated for the recommended cutoff point of 30 to form psychopathic and nonpsychopathic groups, as well as for the cutoff point of 26. The chi-square statistic was used to determine the significance of each odds ratio (Fleiss, 1981). To reduce the risk of chance capitalization, Bonferroni correction (Stevens, 1986) is used for the chi-square tests. We tested each Axis separately. Because there were six comparisons for Axis I disorders, the Type 1 error rate per individual test was set at .008. For Axis II, there were nine comparisons, and the Type 1 error rate per individual test was set at .006. The association between PCL-R psychopathy and Axis I and II categorical diagnoses is presented in Table 3.

With regard to the overlap between PCL-R psychopathy and Axis I disorders, we found a positive trend between drug use disorders and PCL-R psychopathy, $\chi^2(2,98)=9.51$, $P=.009$. For alcohol-use-related disorders, we also found a positive trend, $\chi^2(2,98)=5.70$, $P=.058$. Paraphilia and any Axis I diagnosis showed a trend towards a negative association with PCL-R psychopathy, $\chi^2(2,98)=6.22$, $P=.045$ and $\chi^2(2,98)=7.11$, $P=.029$, respectively.

The odds ratios indicate that a diagnosis of PCL-R psychopathy (total score ≥ 30) was positively associated with drug and alcohol abuse/dependence. On the other hand, the odds ratio indicated that patients with a diagnosis of PCL-R psychopathy were about three and a half times less likely to receive a diagnosis of any Axis I disorder other than alcohol or other substance-use disorders. Similarly, these patients were about three times less likely to receive a diagnosis of paraphilias.

With regard to Axis II diagnoses, high PCL-R scores were significantly associated with Cluster B disorders, $\chi^2(2,94)=18.55$, $P<.001$. More specifically, high PCL-R scores tended to be significantly associated with antisocial PD, $\chi^2(2,94)=17.77$, $P<.001$. In addition, there were trends for paranoid, $\chi^2(2,94)=7.78$, $P=.020$, borderline, $\chi^2(2,94)=5.01$, $P=.082$, and any PD, $\chi^2(2,94)=9.46$, $P=.009$.

Table 3

Number of patients with low (PCL-R <20), medium (20–29), and high (≥ 30) PCL-R scores diagnosed with Axis I ($n=98$) and Axis II ($n=94$) categorical diagnoses, and association (odds ratio) between categorical diagnoses of PCL-R psychopathy and DSM-IV disorders

Diagnostic category ^a	PCL-R score			<i>P</i> ^b	Odds ratios ^c	
	<20	20–29	≥ 30		(≥ 26)	(≥ 30)
<i>Axis I diagnosis</i>						
Schizophrenia	6	9	2	.316	.55	.44
No schizophrenia	34	28	19			
Alcohol abuse/dependence	6	10	9	.058	2.29	2.86
No alcohol	34	27	12			
Drug abuse/dependence	9	16	13	.009	2.70	3.38
No drug abuse/dependence	31	21	8			
Paraphilias	13	5	2	.045	.28	.35
No paraphilias	27	32	19			
Pathological gambling	5	3	3	.732	1.76	1.44
No pathological gambling	35	34	18			
Any Axis I ^d	29	24	8	.029	.42	.28
No Axis I	11	13	13			
<i>Axis II diagnosis</i>						
Paranoid PD	3	7	8	.020	2.88	3.88
No paranoid PD	34	29	13			
Antisocial PD	9	19	17	<.001	20.39	6.83
No antisocial PD	28	17	4			
Borderline PD	6	9	9	.082	2.33	2.90
No borderline PD	31	27	12			
Narcissistic PD	6	13	7	.132	2.40	1.53
No narcissistic PD	31	23	14			
Avoidant PD	6	4	1	.423	.66	.32
No avoidant PD	31	32	20			
Cluster A	8	12	9	.223	1.19	1.99
No Cluster A	29	24	12			
Cluster B	17	29	20	<.001	25.41	11.74
No Cluster B	20	7	1			
Cluster C	10	10	2	.233	.63	.28
No cluster C	27	26	19			
Any personality disorder (mixed PD not included)	28	35	20	.009	6.28	3.18
No personality disorder	9	1	1			

Significant (Bonferroni corrected) values are in bold.

^a Diagnostic categories ≥ 10 patients (see text).

^b Chi-square test.

^c Chi-square test.

^d Other than alcohol or psychoactive substance use disorder diagnoses.

Finally, a computation of positive predictive power (PPP; Widiger, Hurt, Frances, Clarkin, & Gilmore, 1984), defined as the conditional probability of having one disorder given the other, strongly indicated that a diagnosis of PCL-R psychopathy was highly predictive of antisocial PD (PPP = 0.85). The reverse was not true: A diagnosis of antisocial PD did not predict PCL-R psychopathy (PPP = 0.38).

Table 4

Correlations between PCL-R psychopathy scores and Axis II dimensional scores ($n=94$)

Personality disorder	PCL-R		
	Total	Factor 1	Factor 2
Paranoid	.44**	.36**	.38**
Schizoid	–.14	–.02	–.18
Schizotypal	.04	.07	.01
Conduct disorder (<15 years)	.53**	.30*	.58**
Antisocial behavior since age 15	.64**	.39**	.65**
Borderline	.33**	.20	.32*
Histrionic	.32*	.37	.15
Narcissistic	.47**	.57	.26
Avoidant	–.19	–.18	–.16
Dependent	–.02	–.04	.00
Obsessive–compulsive	.19	.27	.04
Passive–aggressive	.28	.16	.32*
Self-defeating	.19	–.06	.31*
Depressive	–.13	–.18	–.06

For depressive personality disorder, $n=83$. Significant (Bonferroni corrected) values are in bold.

* $P < .004$; ** $P < .001$.

5.5. Dimensional overlap of Axis II disorders with PCL-R psychopathy

Product–moment correlations were used to examine the association between PCL-R and Axis II dimensional scores (see Table 4). Because there were 14 comparisons for Axis II dimensional scores, the Type 1 error rate per individual test was set at .004. Except for antisocial behavior since age 15, dimensional ratings of PDs were not normally distributed; we therefore subjected them to logarithmic transformation before computing the correlations with PCL-R scores.

Correlations with dimensional ratings revealed a strong association of the PCL-R total score with five Axis II disorders: PCL-R total scores correlated positively and significantly ($r \geq .33$) with paranoid PD, conduct disorder (<15 years), antisocial behavior since age 15, and borderline and narcissistic PDs. The difference between PCL-R Factors 1 and 2 was quite pronounced. Factor 1 showed significant positive correlations ($\geq .33$) for paranoid, histrionic, and narcissistic PDs, and also for conduct disorder (<15 years) and antisocial behavior after age 15. Factor 2 correlated positively ($\geq .33$) with paranoid PD, and also with conduct disorder and antisocial behavior since age 15. Thus, only paranoid PD and antisocial behavior since age 15 were significantly and meaningfully related to both factors of the PCL-R. Neither factor correlated ($\geq .33$) with schizoid, schizotypal, borderline, avoidant, dependent, obsessive–compulsive, passive–aggressive, self-defeating, and depressive PDs.

6. Discussion

In general, a high prevalence of lifetime DSM-IV Axis I psychiatric morbidity was found in the study sample. Almost 88% of the sample met criteria for at least one Axis I disorder, including any alcohol- or substance-related disorder. The finding that substance-use disorders were the most prevalent type of

disorder is consistent with most other studies with forensic participants (Hart & Hare, 1989; Stålenheim & von Knorring, 1996; Timmerman & Emmelkamp, 2001). However, only 5% of our patients were diagnosed with a lifetime diagnosis of a mood disorder, which is rather low compared with other studies with forensic psychiatric patients (Côté & Hodgins, 1992; Hart & Hare, 1989; Stålenheim & von Knorring, 1996; Timmerman & Emmelkamp, 2001). Timmerman and Emmelkamp (2001), for example, found that 51% of a sample ($N=37$) of Dutch TBS patients had a lifetime diagnosis of affective disorder. In their study, Axis I diagnoses were based on a fully structured interview, whereas in the present study, Axis I diagnoses were mainly based on file information, which may have resulted in an underestimation of the real psychopathology. On the other hand, prevalence rates for affective disorders typically range from about 3% to 25% in different forensic settings (Eaves, Tien, & Wilson, 2000).

The high percentage of patients with a PD is comparable with the prevalence rates between 60% and 80% in other European forensic psychiatric samples (Blackburn, Crellin, Morgan, & Tulloch, 1990; Coid, 1992; Kullgren, Grann, & Holmberg, 1996). de Ruiter and Greeven (2000), for example, found that 80% of a Dutch sample of 85 forensic psychiatric patients fulfilled diagnostic criteria for at least one PD according to the SIDP-R, with paranoid, antisocial, borderline, and narcissistic PDs as the most prevalent. Timmerman and Emmelkamp (2001) reported a lower frequency of PDs (45%) in a rather small sample ($N=39$) of Dutch forensic psychiatric patients. The difference is probably due to the fact that in the present study, as in the study by de Ruiter and Greeven, the interviewers also reviewed file records consisting of elaborate psychiatric and psychological evaluations, criminal history records, and family background data, whereas in the Timmerman and Emmelkamp study, PD diagnoses were based exclusively on information obtained from the patient, which most likely led to an underestimation of the prevalence of certain PDs. Indeed, de Ruiter and Greeven reported that especially Cluster B disorders are more difficult to detect by means of a self-report instrument, compared to a semistructured interview, because of the lack of self-insight and defensiveness inherent to Cluster B disorders. In line with these findings, Zimmerman and Coryell (1990) found that histrionic and antisocial PDs were more often diagnosed on the basis of a semistructured interview than with a self-report questionnaire. In our view, the use of a semistructured interview, in combination with extensive collateral information, is indispensable for the diagnosis of PDs in forensic participants. An alternative explanation for the lower frequency of PDs in the sample of Timmerman and Emmelkamp might be that, originally, TBS patients were referred to a *specific* hospital (e.g., the Dr. Henri van der Hoeven Kliniek) *after* having been examined in a special selection institute, where the best treatment program for their needs was decided. This selection might have caused the differences between the patient populations between the forensic psychiatric institutions. At the present time, random selection is practiced.

The PCL-R mean scores and standard deviations in our sample are comparable with those that have been reported in other European samples (Cooke, 1998; Logan, Blackburn, Donnelly, & Renwick, 2002), as is the proportion of patients classified as psychopaths (Stålenheim & von Knorring, 1996). Our findings suggest that high PCL-R scores tend to be positively associated with Axis I drug abuse/dependence, and negatively (trends) with schizophrenia and its variants, paraphilias, and any Axis I disorder (other than alcohol/drug use disorders). The results are consistent with findings of earlier studies (Hart & Hare, 1989; Nedopil et al., 1998; Rasmussen et al., 1999; Stålenheim & von Knorring, 1996).

In addition, the PCL-R showed a clear and expected pattern of associations with Axis II disorders. A PCL-R diagnosis (PCL-R score ≥ 30) was most strongly and significantly associated with a diagnosis of antisocial PD. This finding is consistent with existing findings on the construct validity of the PCL-R in a variety of populations including North American male prisoners (Harpur, Hare, & Hakstian, 1989) and

forensic psychiatric patients (Hart & Hare, 1989), as well as European samples of forensic psychiatric patients (Blackburn, 1998; Stålenheim & von Knorring, 1996). In addition, consistent with previous research (Hart & Hare, 1989; Stålenheim & von Knorring, 1996), we found that the link between PCL-R psychopathy and antisocial PD is asymmetric. Most patients (81%) diagnosed as psychopaths by PCL-R criteria met criteria for a diagnosis of antisocial PD, whereas a minority (38%) of those with antisocial PD also received a diagnosis of PCL-R psychopathy.

Correlations ($\geq .32$) between PCL-R scores and dimensional scores of Axis II disorders were found for paranoid, borderline, and narcissistic PDs, and with conduct disorder and antisocial behavior since age 15. These findings are largely consistent with previous findings (Blackburn, 1998; Hare, 1991; Hart & Hare, 1989; Hart et al., 1994; Stålenheim & von Knorring, 1996), as is the significant correlation of Factor 1 with paranoid and antisocial, histrionic and narcissistic dimensional scores, and the positive correlation of Factor 2 with paranoid and antisocial dimensional scores (Blackburn, 1998). However, Hart and Hare (1989) found that Factor 2 correlated significantly only with antisocial PD, which may be due to the lower base rate of psychopathy (12.5%) in the Hart and Hare sample. Of course, findings are in line with expectations, given the fact that a number of diagnostic criteria for these PDs are similar with a number of PCL-R criteria (e.g., grandiose sense of self-worth; impulsivity).

Several methodological limitations deserve attention. A limitation of our study is the fact that some of the Axis I diagnoses may not have been as reliable and valid as we would have liked them to be. The use of a (semi-)structured interview for the assessment of lifetime Axis I diagnoses according to the DSM-IV, in combination with a record review, would have been preferable. However, limited staff necessitated us to choose either an Axis I or II semistructured interview. Because patient files tended to include quite detailed information on Axis I pathology, we opted to employ the Axis II interview.

Second, Axis I and II diagnoses and PCL-R ratings were not completely independent from one another for all patients. Occasionally, raters had been in contact with the patient previously for other assessment sessions. This is especially true for some patients who were administered the PCL-R at T1. However, none of the raters had a long-term psychotherapeutic contact with a patient. We attempted to minimize bias in all cases by using as a final PCL-R diagnosis a consensus between (at least) two independent PCL-R ratings.

To summarize, PCL-R psychopathy was significantly and positively related with Cluster B disorders, especially antisocial PD. PCL-R scores were also positively correlated ($r \geq .30$) with dimensional scores of paranoid, borderline, and narcissistic PDs, and with conduct disorder and antisocial behavior since age 15. In general, results are consistent with previous research, providing further evidence for the cross-cultural stability of the PCL-R.

Acknowledgements

The authors are grateful to Cécile Vandeputte-van de Vijver and Daan van Beek, who aided in establishing DSM-IV Axis I diagnoses. We also gratefully acknowledge the assistance of Ellen van den Broek, Henriëtte van der Maeden, Cécile Vandeputte-van de Vijver, Vivienne de Vogel, Anke Weenink, PASCALLE van der Wolf, Pascal Wolters, and Stefan Zwartjes, who, in addition to the authors, participated as interviewers/raters. Finally, we would like to thank Robert D. Hare and an anonymous reviewer for their helpful comments on a previous version of this article.

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