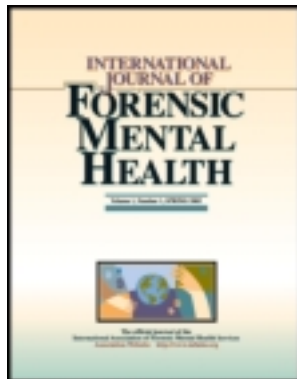


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Sanne Hillege^a, Corine de Ruiter^b, Niels Smits^c, Hans van der Baan^d & Jacqueline Das^e

^a LSG-Rentray, Adolescent Forensic Psychiatric Center, Zutphen, The Netherlands

^b Faculty of Psychology and Neuroscience, Maastricht University, Maastricht, The Netherlands

^c Vrije Universiteit, Department of Clinical Psychology, Amsterdam, The Netherlands

^d VUMC de Bascule, Duivendrecht, The Netherlands

^e De Waag, Almere, The Netherlands

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Sanne Hillege

LSG-Rentray, Adolescent Forensic Psychiatric Center, Zutphen, The Netherlands

Corine de Ruiter

Faculty of Psychology and Neuroscience, Maastricht University, Maastricht, The Netherlands

Niels Smits

Vrije Universiteit, Department of Clinical Psychology, Amsterdam, The Netherlands

Hans van der Baan

VUMC de Bascule, Duivendrecht, The Netherlands

Jacqueline Das

De Waag, Almere, The Netherlands

In the present study, the structural validity of the Dutch version of the Psychopathy Checklist: Youth Version (in Dutch: *Psychopathie Checklist: Jeugd Versie; PCL:YV*; de Ruiter, Kuin, de Vries, & Das, 2002) was examined in adolescent offenders by means of Confirmatory Factor Analysis (CFA) and Item Response Theory (IRT). The PCL:YV item ratings for 269 adolescent males, either admitted to a Dutch juvenile treatment institution or psychologically evaluated upon request of the court, were used to test the fit of different factor models presumed to represent the structure of psychopathy as measured by the PCL-R in adults. The study provides support for a good absolute and relative fit for the 3-factor model, but not for the 4-factor model. Results from IRT analyses demonstrate the highest discriminative value for the affective items in the Dutch adolescent sample. The present findings demonstrate poor discriminative power and age influence on item functioning for most antisocial items of the fourth factor.

Keywords: Psychopathy Checklist: Youth Version (PCL:YV), psychopathy, adolescence

The concept of psychopathy has received increasing attention in forensic psychological assessment in the last decades. The Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003) has become the gold standard to measure psychopathy in adults. Studies of adult male offenders have demonstrated that the concept of psychopathy is useful in discerning a distinct subgroup of offenders, characterized by an early onset of antisocial behavior (Forth & Burke, 1998; Hare, Hart,

Forth, Harpur, & Williamson, 1998), a deviant performance on neurocognitive tasks (e.g., Levenston, Patrick, Bradley, & Lang, 2000; Newman & Schmitt, 1998;), and high general and violent recidivism rates (Hemphill, Hare, & Wong, 1998; Hildebrand, de Ruiter, & de Vogel, 2004; Leistico, Salekin, DeCoster, & Rogers, 2008; Salekin, Rogers, & Sewell, 1996). Several scholars have argued that the identification of psychopathic traits in childhood or adolescence may offer an understanding of the etiology of the disorder and may provide starting-points for targeting interventions (Forth, Hart, & Hare, 1990; Forth & Mailloux, 2000; Frick, Bodin, & Barry, 2000).

Address correspondence to Sanne Hillege, LSG-Rentray, Adolescent Forensic Psychiatric Center, P.O. Box 94, 7200 AB, Zutphen, The Netherlands. E-mail: shillege@lsg-rentay.nl

A growing body of research is aimed at examining whether the nomological net surrounding psychopathy in adulthood also fits juvenile psychopathy (Lynam & Gudonis, 2005). This research has demonstrated that boys with psychopathic traits show more charges of severe violent and non-violent offenses in the past, more participation in different types of illegal activity in the past and greater willingness to use weapons (Forth et al., 1990; Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002; Murrie, Cornell, Kaplan, McConville, & Levy-Elkon, 2004; Salekin, Neumann, Leistico, DiCicco, & Duros, 2004) than boys without these traits. Furthermore, psychopathy in male adolescent offenders was found to be associated with violent recidivism (Forth et al., 1990; Gretton, Hare, & Catchpole, 2004; Gretton, McBride, Hare, O'Shaughnessy, & Kumka, 2001) and a shorter time span between release and re-offense (Brandt, Kennedy, Patrick, & Curtin, 1997; Gretton et al., 2004). For the assessment of psychopathy in adolescents aged 12–18 years, the Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) is often used. The PCL:YV closely resembles the PCL-R, but item descriptions were modified to take into account the restricted life experience of the adolescent and to emphasize peer contacts instead of romantic relationships (Forth et al., 2003). Despite significant parallels between research findings on psychopathy in adults and psychopathy in youth, critics have argued that, due to several methodological problems, the use of a simple downward extension of adult psychopathy measures like the PCL:YV to assess psychopathy in adolescence may not be warranted (Hart, Watt, & Vincent, 2002). Moreover, use of the term 'psychopathy' for juveniles is controversial, because of the great number of negative connotations (e.g., high risk, untreatable) professionals and laypeople alike associate with this term (Johnstone & Cooke, 2004), and because children and adolescents are still in development in terms of personality. Indeed, since an assessment of psychopathy in the mental health and criminal justice systems may have serious legal implications for an individual (Petrila & Skeem, 2003; Skeem & Cauffman, 2003), the PCL:YV should be the focus of intense psychometric scrutiny.

One of the remaining questions in this line of research is whether the psychopathic traits that define the disorder of psychopathy are the same in adolescents as found in adults (Vincent, 2002). This question can be addressed by evaluating the generalizability of the underlying structure (structural validity) and the score metric (metric validity) of the instrument to the adolescent population. Although the PCL-R is one of the most frequently used instruments for measuring psychopathy in adults, there is a certain degree of contention regarding its underlying structural model (e.g., Cooke & Michie, 2001; Cooke, Michie, Hart, & Clark, 2004; Hare & Neumann, 2010; Neumann, Vitacco, Hare, & Wupperman, 2005; Skeem & Cooke, 2010), which necessitates the examination of several empirically validated models.

Structural Validity of the PCL:YV

The dominant model in the PCL-R literature used to be a 2-factor model (Harpur, Hakstian, & Hare, 1988); Factor 1 is characterized by a selfish and callous interpersonal style and a lack of remorse and empathy, and Factor 2 by a chronically unstable and antisocial lifestyle (Hare et al., 1990). This model was also demonstrated to hold in adolescent samples (e.g., Brandt et al., 1997; Forth & Mailloux, 2000). However, Cooke and Michie (2001) have argued that the analytic strategy used in these studies does not justify the 2-factor model as the gold standard. Specifically, they criticized the use of the congruence coefficient obtained by using Principal Components Analysis as the only measure of factor similarity. Furthermore, they identified problems with the interpretation of values of congruence coefficients in previous research. Using a bottom-up approach, characterized by a literature review and Confirmatory Factor Analysis (CFA), Cooke and Michie (2001) found support for a hierarchical 13-item 3-factor model. In this model, psychopathy is a coherent construct underpinned by three subordinate factors: an arrogant and deceitful interpersonal style (new Factor 1), a deficient affective experience (new Factor 2), and an impulsive and irresponsible behavioral style (new Factor 3). Criminal behavior did not fit within the hierarchical model, but could be viewed as a consequence or correlate rather than a core feature of psychopathy (Cooke et al., 2004), although some have argued that this causal relation was not a statistically valid conclusion (Neumann et al., 2005). A comparison between the 2- and 3-factor models in an adolescent sample (Vincent, 2002) also provided support for the 3-factor model. Several scholars have argued that the exclusion of antisocial items is advantageous because it avoids tautology when discussing the relationship between psychopathy and antisocial and criminal behavior (Farrington, 2005; Johansson, Andershed, Kerr, & Levander, 2002). In fact, other child and adolescent psychopathy measures, such as the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) and the Youth Psychopathic traits Inventory (YPI; Andershed, Kerr, Stattin, & Levander, 2001), do not or only sparingly include antisocial items (one item; APSD).

Nevertheless, several concerns have also been raised regarding the 3-factor model. First, a conceptual concern is that the omission of antisocial items is arbitrary, taking into consideration that similar to the lifestyle items, the antisocial items are all signs of undercontrolled and externalizing behavior (Neumann et al., 2005). Furthermore, Hare and Neumann (2005) suggested that criminal behaviors are not merely consequences of psychopathy but that their relationship is interactive and reciprocal in nature. Other scholars have pointed at the general change in antisocial behavior over time (Lochman, Powel, Boxmeyer, Young, & Baden, 2010), because adolescence is a period of increased involvement in antisocial activities by many adolescents regardless of psychopathy. Second, the omission of antisocial items may limit

the external and predictive validity of the Hare PCL construct (Vitacco, Neumann, & Jackson, 2005). In fact, Skeem, Mulvey and Grisso (2003) demonstrated that predictions of future violence made on the basis of the 3-factor model were of a poorer quality than those made based on the 2-factor model. Additionally, Vitacco, Neumann, Caldwell, Leistico, and Van Rybroek (2006) found the 4-factor model to possess incremental validity compared to the 3-factor model in predicting instrumental aggression. Third, from a statistical point of view, the 3-factor model constitutes a less risky statistical test of model verisimilitude (Neumann et al., 2005). The 3-factor model requires 10 latent variables to explain the covariance of 13 items. Such a saturated model is likely to result in reasonable fit values. Furthermore, Kosson and colleagues (2002) found, in a sample of 115 male adjudicated delinquent adolescents, that Cook and Michie's hierarchical 3-factor model produced impossible values of parameter estimates. Instead, a modified model, where the first-order level specifying six testlets was effectively removed by allowing the items to directly load onto one of three factors, was found promising. In a re-analysis of the PCL-R validation data, Hare (2003) provided support for a parceled 4-factor model underlying the PCL-R, including the three Cooke and Michie (2001) factors and an additional antisocial behavior factor (new Factor 4). Studies comparing the 3- and 4-factor models in adult samples (Hill, Neumann, & Rogers, 2004; Vitacco et al., 2005) as well as in adolescent samples (Jones, Cauffman, Miller, & Mulvey, 2006; Neumann, Kosson, Forth, & Hare, 2006; Neumann et al., 2005; Salekin, Brannen, Zalot, Leistico, & Neumann, 2006) found both models to have satisfactory fit, but the 4-factor model was found to be more parsimonious from a mathematical perspective. Furthermore, the 4-factor model was found to be superior to the 3-factor model in predicting violence (Hill et al., 2004; Vitacco et al., 2005). It should be noted that instead of using hierarchical models, part of these studies tested intercorrelated models, in which the items loaded directly on the first-order factors without including the superordinate psychopathy factor (Hill et al., 2004; Neumann et al., 2006; Vitacco et al., 2005). In this way, the high level of saturation that is inherent in the hierarchical models is avoided. However, studies (Salekin et al., 2006) that also took the hierarchical 3-factor model into account, found a worse fit for this structure, compared to a modified model, due to undefined parameter estimates.

In summary, research findings regarding the structural validity of the PCL-R seem generalizable to the adolescent population. Support was provided for both the 3- and 4-factor intercorrelated models. However, it remains unclear whether these findings generalize cross-culturally. Most prior studies are exclusively based on North American samples, and those that have compared samples from North America with samples of other nationalities (e.g., Cooke & Michie, 1999; Neumann, Kosson, Forth, & Hare, 2006) have found notable incongruencies. Furthermore, previous studies have employed samples exclusively from English-speaking countries.

Metric Validity of the PCL:YV

The generalizability of the score metric of the PCL-R to the adolescent population should be examined in order to determine whether the regressions of the PCL:YV items on the latent variable are consistent for different ages. Given identical values for the latent variable, do item values differ across age groups? Furthermore, when the effects of age are accumulated across items, this may also influence the total score. This correlational structure of the test is analyzed when performing CFA. Since there is also interest in the difficulty to endorse of the separate items of the test, the metric properties of a test can be analyzed with Item Response Theory (IRT). When items or tests operate differently for different groups (measurement bias), differential item functioning (DIF) and differential test functioning (DTF) can be demonstrated with IRT analyses. Regarding the PCL-R, IRT has been used to demonstrate an absence of cross-national measurement bias by an invariance of PCL-R scores from Canada versus the United States (Cooke & Michie, 1997, 2001), and from white versus African American offenders within the United States (Cooke, Kosson, & Michie, 2001). However, a lack of scalar equivalence across Scottish and North American criminal offenders was substantial enough to suggest that different PCL-R cut-off scores should be used (Cooke & Michie, 1999). More recently, Bolt, Hare, Vitale, and Newman (2004) examined DIF and DTF for the PCL-R in female criminal offenders, male forensic psychiatric patients, and male criminal offenders scored from file reviews, with a sample of male criminal offenders as a reference group. They found that for the female offender sample, PCL-R items reflecting social deviance were more prone to display DIF than the affective and interpersonal items. Furthermore, despite the presence of a substantial number of DIF items for all comparison groups, the effects in terms of DTF were quite small. Apparently, the influences of external factors cancelled out at the level of total test scores. This was also demonstrated in the only study pertaining to the scalar equivalence of the PCL measures across age. Specifically, Vincent (2002) demonstrated DIF in interpersonal and behavioral items but not in affective items. Again, age bias was found to have little impact at the total test level.

In summary, IRT provides an appealing framework for studying scalar equivalence of PCL-R assessments in adults in contrast to PCL:YV assessments in adolescents. Preliminary evidence suggests that an age-related measurement bias may exist (e.g., Andershed, 2010). More research is needed in order to determine whether these findings can be replicated and generalized to samples other than the North American population.

The Present Study

The first objective of the present study was to examine the cross-cultural generalizability of the factor models underlying the PCL:YV. To this end, the Dutch translation of the

TABLE 1
Items from the Hare Psychopathy Checklist: Youth
Version and Their Loadings in the Cooke and Michie
(2001) 3-Factor Model and Hare (2005) 4-Factor
Model

Cooke and Michie 3-Factor Model	Hare 4-Factor Model
Interpersonal Factor	Interpersonal Factor
Impression management (<i>I</i>)	Impression management (<i>a</i>)
Grandiose sense of self-worth (<i>I</i>)	Grandiose sense of self-worth (<i>a</i>)
Pathological lying (<i>II</i>)	Pathological lying (<i>b</i>)
Manipulation for personal gain (<i>II</i>)	Manipulation for personal gain (<i>b</i>)
Affective Factor	Affective Factor
Lack of remorse (<i>IV</i>)	Lack of remorse (<i>d</i>)
Shallow affect (<i>III</i>)	Shallow affect (<i>c</i>)
Callous/lacking empathy (<i>III</i>)	Callous/lacking empathy (<i>c</i>)
Failure to accept responsibility (<i>IV</i>)	Failure to accept responsibility (<i>d</i>)
Lifestyle Factor	Lifestyle Factor
Stimulation seeking (<i>V</i>)	Stimulation seeking (<i>e</i>)
Parasitic orientation (<i>VI</i>)	Parasitic orientation (<i>f</i>)
Lacks goals (<i>VI</i>)	Lacks goals (<i>f</i>)
Impulsivity (<i>V</i>)	Impulsivity (<i>e</i>)
Irresponsibility (<i>V</i>)	Irresponsibility (<i>e</i>)
	Antisocial Factor
	Poor anger control (<i>g</i>)
	Early behavior problems (<i>g</i>)
	Juvenile delinquency (<i>h</i>)
	Revocation of conditional release (<i>h</i>)
	Criminal versatility (<i>h</i>)

Note. I–VI, testlets in the correlated 3-factor model; a–h, parcels in the modified 4-factor model.

Psychopathy Checklist: Youth Version (*Psychopathie Checklist: Jeugd Versie*; PCL:YV; de Ruiter, Kuin, de Vries, & Das, 2002) was used to measure psychopathic traits in a sample of 269 male adolescents, who were either admitted to a secure juvenile justice treatment institution in The Netherlands or were psychologically evaluated upon request of the court prior to their sentencing. Our aim was to identify whether the factor models proposed by empirical research with the PCL:YV provide a good fit to the PCL:YV data. According to the PCL:YV manual (Forth, Kosson, & Hare, 2003) only the 3- and 4-factor models have been found to show adequate fit. Two versions of each factor model common to empirical research were tested, one where the factors are allowed to intercorrelate without higher-order testlet and parcel levels, and one modified hierarchical model from as per Kosson and colleagues (2002). Table 1 presents an overview of the items in the different factor models.

The second objective of this study was to assess the discriminating value of the different underlying factors and items of the PCL:YV representing the concept of psychopathy. Item functioning was investigated within the four differ-

ent factor models for different age groups. Specifically, IRT techniques were used to examine whether DIF was present in the PCL:YV and PCL-R assessments between the different subgroups.

METHOD

Participants

The current adolescent sample (total $N = 269$) comprised three smaller samples from different sites. The first sample comprised 126 male adolescents admitted to a secure section of *Jongerenhuis Harreveld* and the second sample comprised 66 male adolescents admitted to a semi-secure section of *Rentray*. Both are juvenile justice treatment institutions for boys who were either sentenced to a civil supervision order or a mandatory treatment order by the court. A mandatory treatment order is a penal measure which can vary in duration between two and six years, depending on the seriousness of the offense, and on whether a mental disorder was present at the time of the offense. A supervision order is a civil measure that can be imposed when a child's development is psychologically or physically threatened because of incompetent parenting and/or behavioral problems of the child. During the supervision order, the custody of the adolescent becomes shared by the parents and the official child protection agency. The third adolescent sample comprised 93 male adolescents who were suspected of a violent offense and were psychologically evaluated upon request of the court in order to determine whether a mandatory treatment order was deemed appropriate. Although the adolescents in our sample differ in terms of judicial title (civil or criminal), their deviant and antisocial behavior is highly similar. Since the purpose of this study was to assess age-related measurement bias, potential influences of measurement bias arising from gender were avoided by excluding female participants from the study. Furthermore, 16 boys (6%) were removed as they were 19 years or older when the PCL:YV was coded, and the PCL:YV is designed for adolescents between the ages 12 and 18 (Forth et al., 2003). In Table 2 an overview is presented of the demographic characteristics of each of the subsamples. The final sample included 269 adolescents with a mean age of 15.70 years ($SD = 1.51$; range 11.8–19.9). Ethnic origin included 50% European, 18% Surinamese, 11% Moroccan, 5% from the Netherlands Antilles, and 15% other ethnic background. Within this sample, 120 adolescent males were sentenced with a mandatory treatment order, 94 with a supervision order, 13 were placed in one of the institutions by their guardian, and two male adolescents stayed in an institution voluntarily.

To explore DIF between different age groups an adult sample of PCL-R scores was used. These data were obtained from Hildebrand, Hesper, Spreen, and Nijman (2005). They examined the reliability and (predictive) validity of the

TABLE 2
Demographic Characteristics of the Three Adolescent Samples

Characteristics	Harreveld (<i>n</i> = 112)	Rentray (<i>n</i> = 65)	FPD (<i>n</i> = 92)
Age range, yrs	13–18	11–18	12–17
Mean age, yrs (<i>SD</i>)	16.3 (1.45)	15.3 (1.47) ^b	15.3 (1.40) ^b
Ethnicity ^a			
European	64%	66%	23%
Surinamese	11%	12%	31%
Moroccan	6%	6%	8%
Netherlands-Antilles	4%	4%	23%
Other	15%	12%	16%

Note. ^aSignificant overall difference between adolescent samples; ^b Significant difference compared with the Harreveld sample.

PCL-R in 156 males who had been treated in one of eight forensic psychiatric hospitals in The Netherlands under the order of *terbeschikkingstelling* (TBS). Furthermore, additional PCL-R data were obtained from 74 male offenders admitted to the *Rooyse Wissel*, under the TBS order. Participants younger than the age of 19 were removed (*n* = 2; 0.9%), resulting in a final sample size of 228 male adult offenders. The mean age of the participants in this adult sample was 35.2 (*SD* = 8.6; range = 22–58). The ethnic composition was 77% European, 5% Surinamese, 3% Moroccan, 5% Netherlands Antilles, and 9% other.

Psychopathy Measures

In this current adolescent sample, the authorized Dutch translation of the PCL:YV (Psychopathie Checklist: Jeugd Versie; PCL:YV; de Ruiter et al., 2002) manual and scoring sheet were used. For items 9 (*Parasitic orientation*), 11 (*Impersonal sexual behavior*), 13 (*Lacks goals*), 17 (*Unstable interpersonal relationships*), and 18 (*Serious criminal behavior*), the descriptive criteria were slightly revised from the Canadian original. Revisions comprised clarifications of when the level of psychopathy symptoms becomes non-normative. For example, because a certain lack of commitment to long-term goals (item 13) is a common feature in adolescents, raters were advised to also take into account whether the adolescent had demonstrated commitment to short-term goals. Clarifications were added to the item description in textboxes and Dr. Adelle Forth, first author of the Psychopathy Checklist: Youth Version (Forth et al., 2003), was informed of these slight amendments.

The 20 items of the PCL:YV are scored on a 3-point rating scale (0 = *item does not apply*, 1 = *item applies to a certain extent*, 2 = *item definitely applies*), resulting in a dimensional total score ranging from 0 to 40. Total and factor scores can be prorated when a limited number of items are omitted. For the categorical diagnosis of psychopathy, the traditional cut-off score of 30 was adopted for the PCL-R (Hare, 1991). For the PCL:YV, however, there is no designated cut-off score.

According to the manual, scores should be interpreted as dimensional ratings of the degree to which an adolescent matches the prototypical psychopath (Forth et al., 2003). For the adult sample, the authorized Dutch translation of the Psychopathy Checklist-Revised (PCL-R; Hare, 1991; Dutch translation: Vertommen, Verheul, de Ruiter, & Hildebrand, 2002) was used to rate psychopathy.

Procedure

All raters received official training in the administration and scoring of the PCL-R and PCL:YV. The training included a review of the clinical construct of psychopathy and the research literature pertaining to it. Scoring was practiced using videotapes of two Dutch adult forensic psychiatric patients. Raters for the adolescent samples used three additional videotapes of adolescent offenders to practice their scoring. The same set of raters performed the rating for all three subsamples.

PCL:YV ratings for the adolescents from both treatment institutions were based on the Dutch translation of the semi-structured PCL-R interview designed by Hare (1991; Dutch version: Vertommen et al., 2002) in conjunction with collateral information, including police files, psychiatric and psychological evaluations, and observational reports from previous institutional care. PCL:YV ratings for the adolescents evaluated for the court and PCL-R ratings for the first adult sample were based on file information only. Although the PCL-R and PCL:YV were not designed to be used without a clinical interview, several studies (e.g., Grann, Långström, Tengström, & Stålenheim, 1998; Wong, 1988) have shown that PCL scores derived from extensive file data are reliable and accurate, and acceptable for research purposes. Single measure Intraclass Correlation Coefficient (ICC; Shrout & Fleiss, 1979; McGraw & Wong, 1996) and Cronbach's coefficient α for the PCL:YV total for all subsamples are displayed in Table 3. Overall, these figures indicate good interrater reliability and internal consistency for the PCL:YV and PCL-R ratings for each of the samples.

TABLE 3
Interrater Reliability and Internal Consistency of the PCL Total and Factor Scores for the Adolescent Samples

	Harreveld (<i>n</i> = 108)	Rentray (<i>n</i> = 16)	FPD (<i>n</i> = 25)
Single measure ICC			
Total score	.76	.74	.92
New Factor 1	.68	.57	.85
New Factor 2	.41	.71	.58
New Factor 3	.61	.62	.72
New Factor 4	.71	.62	.79
Cronbach's α			
Total score	.82	.80	.90

Statistical Analysis

Before conducting CFA and IRT analyses, internal consistency was checked. In line with previous research (Cooke & Michie, 1997; Cooke et al., 1999; Hare, 1991), Cronbach's α will be calculated in SPSS 16.0 for Windows.

The factor structure of the Dutch language version of the PCL:YV was investigated by means of a Confirmatory Factor Analysis (CFA) performed in Mplus 6.0 (Muthen & Muthen, 1998). Mplus is ideal for testing models composed of ordinal variables, since it uses a robust weighted least squares procedure for parameter estimation and model fit. In order to avoid difficulty in the estimation of fit indices, missing items were prorated and then replaced by rounded item means equal to 1. The total of missing values in the current sample was 2%. Two absolute fit indices were calculated, including the standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA). These indices gauge how well the model-generated covariance matrix reproduces the sample matrix, and smaller residuals are better (between .08 and .06). To assess the fit of the hypothesized model with respect to the null-model, the comparative fit index (CFI) and the Tucker-Lewis index (TLI) were calculated. Larger values indicate better fit of the hypothesized model (between .90 and 1.0). The models tested were comprised of either the three Cooke and Michie factors (2001) or the four factors identified by Hare (2003). In line with previous research (Hill et al., 2004; Jones et al., 2006; Neumann et al., 2005; Neumann et al., 2006; Salekin et al., 2006; Vitacco et al., 2005), Correlated Models of both the 3- and 4-factor model were tested, where items loaded directly onto the factors and the factors were allowed to intercorrelate. Strong factor inter-relations imply the presence of a higher-order factor (Hill et al., 2004; Neumann et al., 2005; Vitacco et al., 2005). Additionally, in order to determine whether each factor reflects a central feature of a coherent psychopathy construct, a 3- and 4-factor hierarchical Modified Model was tested. The Modified Models were adjusted as per Kosson and colleagues (2002), where the first-order testlet level was left out.

In line with previous research (Bolt et al., 2004; Cooke & Michie, 1997; Vincent, 2002), *Samejima's Graded Response Model* (GRM; Samejima, 1997) was used to perform IRT analyses. This 3-parameter model is appropriate for tests with categorically ordered item ratings that are expected to increase as a function of θ (latent trait, i.e., psychopathy). For the estimation of the GRM item parameters, the ltm (Rizopoulos, 2006, 2011) library was used. The estimations of theta for these models were used as input for the ordinal logistic regression analyses. The interrelation between the probability of a possible response to an item and θ can be summarized by the parameters a , b_1 and b_2 . Parameter a is a measure of the discriminating power of an item and is responsible for the slope in so-called item characteristic curves

(ICC). The position of the inflection of this slope is given by the thresholds of parameter b_1 and b_2 (b_i). Parameter b_1 is the value of below which the probability of the item being rated 0 is below 0.5 and b_2 is the value of θ above which the probability of the item being rated 2 is above 0.5. The parameter b_i provides measures of item extremity or frequency of behavior or attitude (Cooke & Michie, 1997). Increases in the value of b_i , represent an increase in the items' level of extremity or infrequency. In order to perform IRT analysis, the data had to be recoded: PCL:YV scores 0, 1, and 2 were recoded as 1, 2, and 3, and missing values were coded as 9, which the program recognized as missing. Missing data was 1.9%. According to Graham (2009) this is a small percentage of missing data. Data were imputed using the Norm algorithm, which assumes missing at random. First, item functioning in the adolescent sample alone is evaluated to describe the relevance of item characteristics to the psychopathy construct in adolescents.

Second, differential item functioning (DIF) was investigated by performing ordinal logistic regression analyses (Crane, Gibbons, Jolley, & van Belle, 2006). DIF is present when different groups of individuals at similar levels of a common θ have different probabilities of individual item scores (Hulin, 1987). DIF is present when the parameters of one or more items cannot be constrained to be equal across groups without a significant decrease in model fit, as demonstrated by a significant R^2 , McFadden's R^2 . This model describes the change on an item category as a function on θ , age group and the interaction between them. We performed DIF analysis using ordinal regression methods (e.g., Crane et al., 2006), and focused on any deviation of the tracelines (i.e., we did not differentiate between uniform and non-uniform DIF, but contrasted no DIF models with any DIF models). Next we studied which type of DIF could best explain the outcomes. As a measure of effect size we used the change in McFadden's R^2 , and followed the suggestion of Choi, Gibbons, and Crane (2011) of using a value of 0.02 as a critical value for rejecting the null hypothesis of no DIF. Non-uniform DIF is present if there are significant differences between groups in item slopes (β_2 and β_3 deviate together from zero) and uniform DIF is present if there are significant differences in item thresholds (when β_2 deviates from zero). The DIF analyses were performed on items within the four different factor models. In order to perform these analyses, three different age groups were differentiated from the current sample of PCL:YV and PCL-R data. These groups consist of adolescent males aged the between 12 and 16 years or between 16 and 18 years, and adult males aged 18 years or more. Motives for this division were the Dutch judicial system, since one *can* be sentenced as an adult from the age of 16 years old in The Netherlands. At the age of 18 one *will* be sentenced as an adult (e.g., de Jonge & van der Linden, 2008).

RESULTS

Descriptive Statistics

Table 4 provides PCL:YV scores for each sample in accordance with the 3- and 4-factor models. An independent samples t-test demonstrated that there were no significant differences in mean PCL:YV and PCL-R total- and factor scores between the total adolescent sample and the total adult sample.

Internal Consistency

Cronbach's α was .86 for the 20-item version of the PCL:YV and the 18-item version based on the 4-factor model. For the 13-item, 3-factor model version, α was .85. These results indicate acceptable item consistency for the PCL:YV, irrespective of factor model.

Factor Structure of the PCL:YV

Table 5 presents indices of absolute and relative fit for the four models that were tested with CFA. Good absolute and relative fit was demonstrated for the correlated (intercorrelated factors without a superceding Psychopathy factor) and modified (hierarchical without a first-order testlet level) 3-factor models. The results further indicate that correlated and modified 4-factor models did not achieve acceptable fit (RMSEA = .09 and CFI = .87). Finally, for both the 3- and 4-factor model, the higher order factor was found to account for the majority of the variance in the interpersonal dimension ($R^2 = .72$ and $.65$, respectively), affective dimension ($R^2 = .76$ and $.74$, respectively), lifestyle dimension ($R^2 = .75$ and $.85$, respectively), and antisocial dimension ($R^2 = .77$), supporting the unidimensional nature of the construct.

Item Functioning of the PCL:YV

In Table 6 the item parameters of the PCL:YV for the adolescent sample are presented. As indicated by the a parameters, three out of four items pertaining to the affective dimension (new Factor 2) were among those with the highest discriminative power, including Item 6 (*Lack of remorse*; $a = 2.14$), Item 8 (*Callous or lacking empathy*, $a = 1.68$), and Item

TABLE 4
M (SD) of PCL:YV and PCL-R Total and Factor Scores in the Adolescent and Adult Samples

	Adolescent Sample (n = 269)	Adult Sample (n = 228)	Difference
Total	21.2 (7.8)	20.4 (6.9)	$t (495) = 1.24, p = .22$
New Factor 1	3.0 (2.2)	2.8 (2.3)	$t (493) = 1.20, p = .23$
New Factor 2	5.6 (2.1)	5.6 (1.9)	$t (490) = .22, p = .83$
New Factor 3	5.1 (2.5)	5.9 (6.6)	$t (495) = 1.86, p = .06$
New Factor 4	5.5 (2.3)	5.6 (2.7)	$t (494) = .77, p = .44$

TABLE 5
CFA Indices of Fit in the Adolescent Sample

	Correlated 3-Factor Model	Modified 3-Factor Model	Correlated 4-Factor Model	Modified 4-Factor Model
χ^2	95.37 (41), $p < .001$	95.37 (41), $p < .001$	209.68 (67), $p < .001$	209.06 (67), $p < .001$
CFI	.94	.94	.87	.87
TLI	.97	.97	.93	.93
RMSEA	.07	.07	.09	.09
SRMR	.07	.07	.09	.09

Note. CFI = Comparative Fit Index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; SRMR = Standardized root mean square error.

16 (*Failure to accept responsibility*, $a = 1.65$). Of the interpersonal dimension (new Factor 1), Item 1 (*Impression management*) was found to have poor discrimination ($a = .91$), whereas the discriminative power of the other items was good. Results further demonstrated that the discriminating power of the lifestyle items (new Factor 3) ranged from low (Item 14, *Impulsivity*; $a = .70$) to high (Item 15, *Irresponsibility*; $a = 1.72$). Furthermore, of the antisocial dimension (new Factor 4), only Item 20 (*Criminal versatility*) showed good discrimination. Finally, both items (11, *Impersonal sexual behavior* and 17, *Unstable interpersonal relationships*) not belonging to any dimension were among those with the least discriminating power ($a = .64$ and $.87$, respectively).

According to the threshold parameters b_1 and b_2 , all items discriminated at various levels of the latent trait. However, affective Items 6, 8, and 16; lifestyle Item 15; and antisocial

TABLE 6
Item Parameters for the Adolescent Sample Prior to Common Metric

PCL:YV Item	a	b_1	b_2
1. Impression management	.91	-.27	1.76
2. Grandiose sense of self-worth	1.46	-.42	1.41
3. Stimulation seeking	1.03	-.89	1.02
4. Pathological lying	1.45	-.26	1.45
5. Manipulation for personal gain	1.59	-.17	1.28
6. Lack of remorse	2.14	-1.59	-.20
7. Shallow affect	1.28	-1.78	.44
8. Callous or lacking empathy	1.68	-1.78	.07
9. Parasitic orientation	1.44	.18	1.64
10. Poor anger control	1.13	-1.46	-.09
11. Impersonal sexual behavior	.64	-.37	.76
12. Early behavior problems	.58	-1.32	.83
13. Lacks goals	1.27	-.86	1.12
14. Impulsivity	.70	-2.45	.39
15. Irresponsibility	1.72	-1.49	.13
16. Failure to accept responsibility	1.65	-2.04	-.24
17. Unstable interpersonal relationships	.87	-1.66	1.51
18. Serious criminal behavior	.82	-4.58	-1.62
19. Serious violations of conditional release	1.00	.73	1.98
20. Criminal versatility	1.39	-.19	1.07

TABLE 7
Differential Item Functioning Parameter Estimates
(McFadden's R^2) for the Complete Sample for the 18
PCL:YV Items per Factor

	R^2
Interpersonal Factor	
1 Impression management	0.007
2 Grandiose sense of self-worth	0.001
4 Pathological lying	0.007
5 Manipulation for personal gain	0.015
Affective Factor	
6 Lack of remorse	0.008
7 Shallow affect	0.019
8 Callous/lacking empathy	0.012
16 Failure to accept responsibility	0.016
Lifestyle Factor	
3 Stimulation seeking	0.005
9 Parasitic orientation	0.004
13 Lacks goals	0.015
14 Impulsivity	0.007
15 Irresponsibility	0.021*
Antisocial Factor	
10 Poor anger control	0.011
12 Early behavior problems	0.051*
18 Juvenile delinquency	0.242*
19 Serious violations of conditional release	0.049*
20 Criminal versatility	0.008

Note. $R^2 \geq 0.02$.

Items 10 and 18 were found to have limited discriminative power at high levels of the latent trait.

Differential Item Functioning

A comparison of the statistical fit of the 18 items for each of the 4-factor models indicated the presence of DIF in seven items by a significant deviation in the tests. However, only four items showed the R^2 to be larger than 0.02 (Table 7). These were Items 12 (*Early behavior problems*), 15 (*Irresponsibility*), 18 (*Serious criminal behavior*), and 19 (*Serious violations of conditional release*). Three of these items (12, 18, and 19) are part of the fourth Antisocial factor.

The following step in the analysis was to determine whether the DIF in the items was the result of significant differences in item slopes (non-uniform DIF) or item thresholds (uniform DIF). Analyses revealed that non-uniform DIF was present in Items 12 (*Early behavior problems*) ($R^2 = 0.0533$, $\Delta(\beta_2) = 0.2535$), 15 (*Irresponsibility*), 18 (*Serious criminal behavior*) ($R^2 = 0.2915$, $\Delta(\beta_2) = 1.1571$) as well as 19 (*Serious violations of conditional release*) ($R^2 = 0.0537$, $\Delta(\beta_2) = 0.0148$). These four items are scored different in the three age groups, as can be seen in Figures 1 through 4.

Item 15 (*Irresponsibility*), which is part of the Behavioral factor, is scored lower in adult males, while the adolescents under the age of 16 more frequently obtain a score of 2 on this item. It seems that (younger) adolescents have a greater

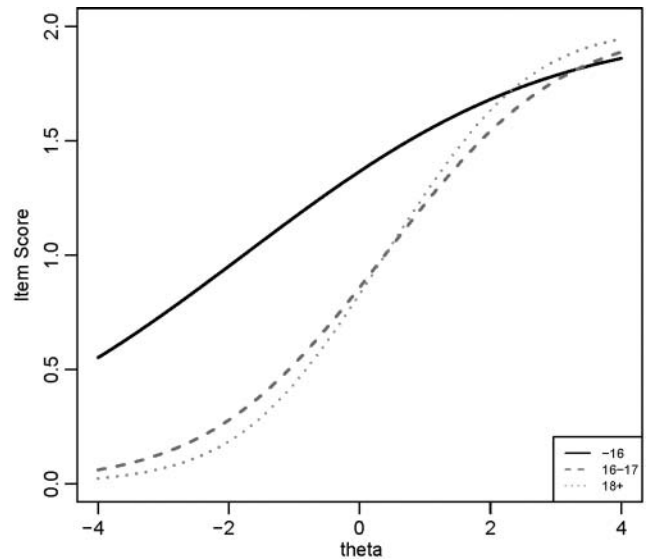


FIGURE 1 Item-True Score Function Early Behavior Problems.

chance to receive a high score on Items 12 (*Early behavior problems*) and 18 (*Serious criminal behavior*) than older males with the same θ . However, for Item 19 (*Serious violations of conditional release*) the trace line is more to the left, indicating that the older one is, the greater the chance of a high score with the same θ .

DISCUSSION

In the present study, the structural validity of the Dutch PCL:YV (PCL:YV) in adolescent offenders was examined by means of a Confirmatory Factor Analysis (CFA) on the

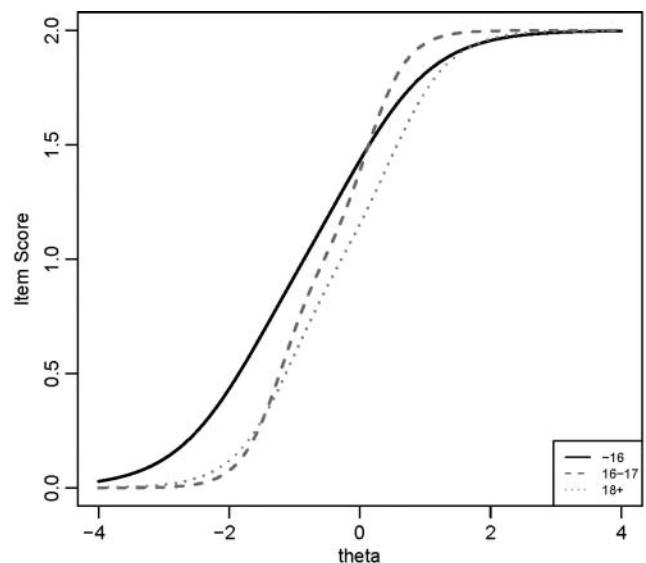


FIGURE 2 Item-True Score Function Irresponsibility.

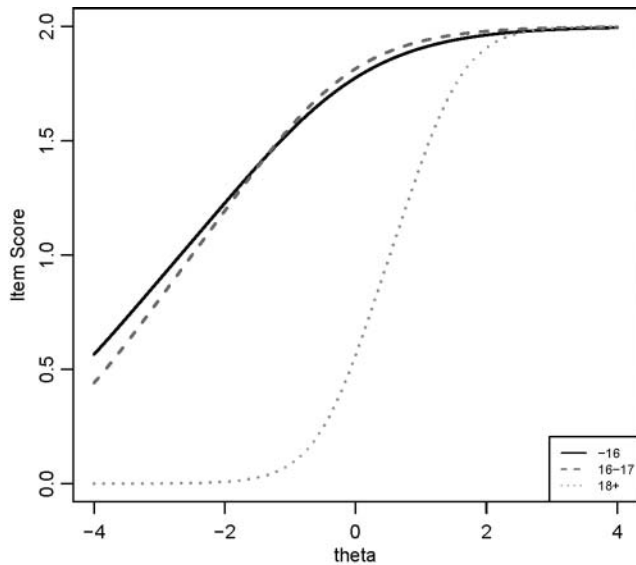


FIGURE 3 Item-True Score Function Serious Criminal Behavior.

hypothesized factor models. In line with recent research in adult (Hill et al., 2004; Vitacco et al., 2005) and adolescent samples (Jones et al., 2006; Neumann et al., 2006; Salekin et al., 2006), the correlated 3-factor model resulted in error-free estimates and provided a good fit to the data. In addition, support was provided for the modified 3-factor model proposed by Kosson et al. (2002). Finally, in contrast to previous research (Hill et al., 2004; Jones et al., 2006; Neumann et al., 2005; Neumann et al., 2006; Salekin et al., 2006), neither the Correlated nor the Modified 4-factor models could be supported by the results from the present study.

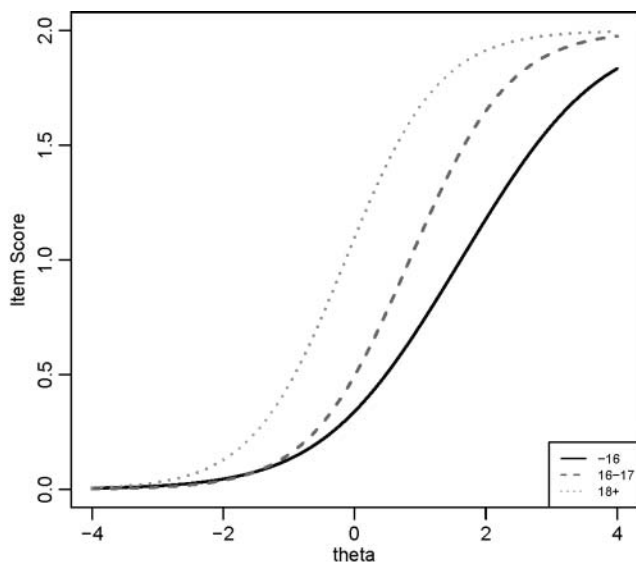


FIGURE 4 Item-True Score Function Serious Violations of Conditional Release.

Several conclusions can be drawn from these findings. First, psychopathy as assessed by the Dutch PCL:YV consists of three dimensions, that is, an interpersonal, an affective, and a lifestyle dimension. Second, the large degree of variance in these dimensions that could be explained by a superordinate factor provides evidence for a coherent syndrome, at least at the symptom level. However, Vincent (2002) has suggested that we should only refer to this syndrome as psychopathy after evidence is provided for its stability from adolescence into adulthood. Third, from a model building perspective, the antisocial items may not be necessary features in the assessment of psychopathy in male adolescent offenders. Because adolescence shows a peak in antisocial behavior, it may not be as discriminating for psychopathy at this age period, but it may become again in adulthood. In adults, the 4-factor model has been found to be superior to the 3-factor model in predicting violence (Hill et al., 2004; Vitacco et al., 2005). Future research should compare the validity of the 3- and 4-factor models in various populations (e.g., criminal-noncriminal; adult-adolescent; male-female), and their ability to predict aversive outcomes, in order to determine whether antisocial behavior items should be included in the assessment of psychopathy. Furthermore, the validity of both models should also be examined across the entire period of adolescence. For instance, Das, de Ruiter, Lodewijks, and Doreleijers (2007) demonstrated that in male adolescents admitted to a secure facility, institutional physical violence was best predicted by the antisocial factor. However, in younger and less criminal adolescents admitted to a semi-secure facility, the lifestyle dimension was more predictive of institutional physical violence. Hypothetically, the lifestyle dimension is a more general characteristic of psychopathy in younger and (still) less criminal adolescents, and is therefore more likely to be related to physical violence, whereas the antisocial dimension becomes more important as actual overt antisocial and criminal behaviors become more discriminating of psychopathy in adulthood. In a sample consisting entirely of criminal recidivists, antisocial behavior will become less important as a discriminative factor. This seems in keeping with results found in previous research (Neumann & Hare, 2008). In a similar vein, the antisocial dimension may be more revealing of psychopathy in older and more criminal adolescents and in non-convicted adults.

Results from the IRT analyses demonstrated that the affective items were among those with the highest discriminative power and least susceptibility to age bias, suggesting these items have the most relevance for assessing psychopathy in adolescence. However, they were found to have limited discriminative power at high levels of the latent trait. This may be explained by the difficulty experienced by outsiders in rating the affect of others. Affect recognition is not exact, as shown by increasing deficits with age (Sullivan & Ruffman, 2004). Item descriptions could be modified to improve the discriminative power across various levels of the latent trait for each

of the four affective items. Additionally, considering the importance of the affective dimension, it may be necessary to extend the number of affective items so as to provide more information at higher levels of the latent trait.

Results further demonstrated that all interpersonal items but Item 1 (*Impression management*) had high discriminative power and within this factor there is no sign of DIF between different age groups. The lifestyle items showed more variable discriminative power. Item 15 (*Irresponsibility*) demonstrated to be the strongest of the four items in the new Factor 3 in discriminating psychopathic traits in adolescents. This item was more prevalent among adolescents than among adults with the same level of the latent trait, psychopathy, which may indicate that this trait is more important in discerning psychopathic traits in adolescents than in adults. However, it is important to note that adolescent behavior in general is often marked by greater impulsivity and irresponsibility than adult behavior (Lochman et al., 2010). Of the antisocial dimension, Items 12 (*Early behavior problems*), 18 (*Serious criminal behavior*), and 19 (*Serious violations of conditional release*) demonstrated poor discriminative power and age influence in item functioning, suggesting they may not be relevant for the assessment of psychopathy in adolescents. Given the criminal nature of Items 18 and 19, this would be in keeping with the assertions of Hare and Neumann (2010) that antisociality, but not criminality per se, is part of the psychopathy construct.

In conclusion, the results from the present study suggest that the affective items have the most relevance for assessing psychopathy in a sample of Dutch adolescent offenders. Furthermore, the interpersonal and lifestyle items were also found to be relevant. Finally, most antisocial items may not be relevant for the assessment of psychopathy in adolescents.

Limitations

The results of the present study should be qualified by several caveats. Specifically, it is possible that differences in demographic characteristics (i.e., age and ethnicity) and method of psychopathy assessment (i.e., interview versus file) between the subsamples have influenced the results. For instance, cross-national differences in the manifestation of psychopathic traits have been demonstrated by Cooke and Michie (1999). These differences reflect a differential expression of the disorder and did not reflect variations in raters' perceptions of symptoms (Cooke, Hart, & Michie, 2004). Furthermore, Bolt et al. (2004) have found differences in item functioning between PCL-R ratings based on file information versus PCL-R ratings based on a clinical interview plus file information, and between male PCL-R ratings versus female PCL-R ratings. Future research should examine whether these differences are also present among adolescents. Nevertheless, the present study adds to the still limited research base on the structural and metric validity of the PCL:YV in adolescent offenders. In the long run, this type of knowledge

should help the forensic clinician in gauging the value of PCL-subscores and guide refinement of psychopathy assessment across different cultures and ages.

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