Critical evaluation of psychopathy measurement (PCL-R and SRP-III/SF) and

recommendations for future research

Daniel Boduszek

Agata Debowska

Author Note

Daniel Boduszek, PhD, 1) Department of Behavioural and Social Sciences, University of Huddersfield, Huddersfield, Queensgate, HD1 3DH, UK;

2) SWPS University of Social Sciences and Humanities, Psychology Department, Katowice, Poland.

Agata Debowska, PhD, Department of Psychology, University of Chester, Chester, Parkgate Road, CH1 4BJ, UK

Correspondence concerning this article should be addressed to Daniel Boduszek, PhD, University of Huddersfield, Department of Behavioural and Social Sciences, Queensgate, Huddersfield, HD1 3DH, UK. Email: d.boduszek@hud.ac.uk

Abstract

Purpose: The purpose of this paper was to review, summarize, and critically engage with the most recent findings into the dimensionality of the PCL-R, SRP-III, and SRP-SF. Another objective was to provide a set of directions for future research.

Methods: A search in PubMed, PsychInfo, Scopus, Web of Science, Science Direct, and Google Scholar was performed. Twenty-one studies examining the dimensionality of the PCL-R and 11 studies assessing the factor structure of the SRP-III and SRP-SF were identified.

Results: A critical review of the studies revealed inconsistent findings as to the underlying structure of the PCL-R and SRP-III/SF. Research has been limited by methodological and conceptual weaknesses, which calls into question the applicability of its findings. As such, it is suggested that prior results should be interpreted with caution.

Conclusion: Future research should test competing models derived on the basis of previous research and theory, report the results of a differential predictive validity or alternative test, provide all relevant fit indices, utilize new data sets of appropriate size, avoid parceling procedures with short scales, and report the results of composite reliability.

Keywords: psychopathy; construct validity; PCL-R; SRP-III/SF; differential predictive validity

Introduction

The concept of psychopathy has been difficult to operationalize and research in the area of psychopathy measurement is compromised by the absence of an agreed definition of the disorder (O'Kane, Fawcett, & Blackburn, 1996). The description of psychopathy which has received the most widespread acceptance among researchers and clinicians is the one proposed by Cleckley (1941). Cleckley suggested psychopathy to be composed of 16 traits reflecting affective and interpersonal deficits, including callousness, lack of guilt, and egocentricity (see da Silva, Rijo, & Salekin, 2012 for a detailed description). This characterization of psychopathy has served as the basis for creating the Psychopathy Checklist (PCL; Hare, 1980) and its updated version, the Psychopathy Checklist – Revised (PCL-R; Hare, 1991, 2003) – often referred to as the "gold standard" for measuring psychopathy in clinical and forensic settings.

The PCL-R

The PCL-R (Hare, 1991) is a 20-item scale completed by a trained administrator on the basis of interviews and case-history data. All items are rated on a 3-point scale (0 = *does not apply*, 1 = *applies to a certain extent*, 2 = *definitely applies*), with scores varying from 0 to 40. A cut-off score of 30 has been suggested for diagnosing psychopathy (Hare & Neumann, 2008). Although the measure was first developed and validated using data from North American samples of male offenders and forensic psychiatric patients, more recent research reported the instrument's reliability and validity among offender samples from other cultural backgrounds (e.g., Grann, Långström, Tengström, & Kullgren, 1999), adolescent offenders (e.g., Forth & Burke, 1998; Forth & Mailloux, 2000), female offenders (e.g., Salekin, Rogers, & Sewell,

1997), and substance abusers (e.g., Rutherford, Cacciola, Alterman, & McKay, 1996). It has been noted that psychopathy, as indexed by the PCL-R and its progeny, can predict violent recidivism (see Dhingra & Boduszek, 2013 for a review; Hart, Kropp, & Hare, 1988; McCuish, Corrado, Hart, & DeLisi, 2015; Serin, 1996; Serin & Amos, 1995; Serin, Peters, & Barbaree, 1990) and sexual reoffending (Furr, 1993; Olver & Wong, 2015; Quinsey, Rice, & Harris, 1995; Rice, Harris, & Quinsey, 1990), which urged Rice and Harris (1995) to propose that the instrument should be used in clinical and legal decision-making. However, a growing body of evidence suggests that this predictive utility for crime is largely attributable to factor 2 (lifestyle/antisocial) rather than factor 1 (affective/interpersonal) scores (Salekin, Rogers, & Sewell, 1996; Skeem & Mulvey, 2001).

The PCL-R ratings were proposed to be best captured by two-, three-, and four-factor models. The two-factor solution is composed of two distinct yet correlated facets, namely factor 1 (affective/interpersonal) and factor 2 (lifestyle/antisocial) (Harpur, Hakstian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989). This solution, however, was not replicated in studies among female (e.g., Salekin *et al*., 1997) and African-American offenders (Kosson, Smith, & Newman, 1990). The four-factor conceptualization of psychopathy is underpinned by interpersonal, affective, lifestyle, and antisocial facets (Hare, 2003; Hare & Neumann, 2006). Based on 13 PCL-R items, Cooke and Michie (2001) argued for a three-factor hierarchical model, incorporating interpersonal (deceitful interpersonal style), affective (deficient affective experience), and behavioral (impulsive and irresponsible behavioral style) dimensions. This three-factor solution omits items referring to criminal/antisocial behavior, which may be a strong correlate of psychopathy rather than its integral part (Skeem & Cooke, 2010a, b). Finally, more recent factor analytic work revealed the

superiority of bifactor models in grasping the instrument's dimensionality (Flores-Mendoza, Alvarenga, Herrero, & Abad, 2008; Patrick, Hicks, Nichol, & Krueger, 2007).

Despite the well-documented predictive utility of the PCL-R, its construct validity remains debatable. Although the intention was for the PCL-R items to reflect Cleckley's original conceptualization of psychopathic personality, the formulation of psychopathy as grasped by the measure appears to be weighted more heavily towards indicators of behavioural expressions of the disorder, such as deviancy and maladjustment (Edens, Skeem, Cruise, & Cauffman, 2001; Patrick, 2007; Patrick *et al*., 2007; Rogers, 1995). Harpur, Hare, and Hastian (1989) argued that the PCL factor 1 corresponds with the classic depiction of psychopathy, whereas factor 2 is more closely related with the measures of criminal behaviour and Antisocial Personality Disorder (APD). Empirical research demonstrated that only factor 1 items function equivalently well across race and gender (e.g., Bolt, Hare, Vitale, & Newman, 2004; Cooke, Kosson, & Michie, 2001); poor generalizability of factor 2 was reported for substance-dependent patients (McDermott *et al*., 2000). Notably, antisocial traits were found to decline over time (Blonigen, Hicks, Krueger, Patrick, & Iacono, 2006; Gill & Crino, 2012). These findings may suggest that affective/interpersonal items lie closer to the core of psychopathy.

The SRP-III and SRP-SF

Notwithstanding the value of clinician-administered measures, their use is time-consuming and requires extensive training. Further, although detailed clinical history can be obtained for participants recruited in clinical settings, such information does not usually exist or is accessible for subclinical samples (Lilienfeld & Fowler, 2007).

With these limitations in mind, Hare and colleagues created a self-report version of the PCL(-R), the Self-Report Psychopathy Scale (SRP). The first edition of the SRP (Hare, 1985) consisted of 29 items, however, it failed to adequately address the core features of a psychopathic personality, such as callousness and dishonesty (Lilienfeld & Fowler, 2007). The SRP-II was composed of 60 items, 31 of which formed the core of the scale and aligned with the two factors of the PCL-R (Williams & Paulhus, 2004). Hare (2003), in a validation study within a forensic sample, reported a moderate correlation between the SRP-II and PCL-R ($r = .54$). The latest version of the measure, the SRP-III (Paulhus, Neumann, & Hare, in press) consists of 64 items measured on a five-point Likert scale. Paulhus *et al*. also developed a shortened, 29-item form of the scale (SRP-SF) in order to reduce the administration time.

The SRP-III factor scores were positively correlated with verbal and physical bullying, drug use, thrill seeking, and aggression (Debowska, Boduszek, Kola, & Hyland, 2014; Gordts, Uzieblo, Neumann, Van den Bussche, & Rossi, in press; Neal & Sellbom, 2012), and negatively correlated with empathy, honesty, conscientiousness, and agreeableness (Neal & Sellbom, 2012; ; Seibert, Miller, Few, Zeichner, & Lynam, 2011). As for the underlying factor structure, both the SRP-III and SRP-SF were best captured by four correlated facets, including interpersonal manipulation (IPM), callous affect (CA), erratic lifestyle (ELS), and antisocial behavior (ASB). However, recent analytic work has revealed some inconsistent results as to the dimensionality of the SRP-III (e.g., Debowska *et al*., 2014; Seibert *et al*., 2011), and unsatisfactory model fit parameters when using scale items as indicators (Debowska *et al.*, 2014; Neal & Sellbom, 2012).

Importantly, it has been stipulated that increased psychopathic traits, such as dominance and manipulativeness, can be found among individuals representing non-

criminal settings where impersonal style and cold calculation are valued (e.g., business, law enforcement, and politics) (Hall & Benning, 2007; Lilienfeld *et al*., 2012), indicating that criminal/antisocial behavior does not constitute an essential part of the construct of psychopathy. Consequently, because the SRP-III and SRP-SF were generated on the basis of the PCL-R and hence contain items referring to criminal/antisocial conduct, their suitability for use with non-forensic populations appears limited.

The current study

As noted above, psychopathy is presented as a complex set of dimensions, which renders the disorder difficult to capture and define (Ogloff, 2006). This difficulty is further compounded by the lack of agreement among researchers as to what constitutes the essence of psychopathy. Indeed, some researchers have argued that criminal/antisocial behaviors form a critical/important part of the disorder (e.g., Hare & Neumann, 2005; Neumann, Hare, & Pardini, 2014; Vitacco, Neumann, & Jackson, 2005a); others have suggested that criminal/antisocial tendencies are the outcome of psychopathic traits (e.g., Boduszek, Dhingra, Hyland, & Debowska, 2015; Cooke & Michie, 2001; Skeem & Cooke, 2010a, b). The conceptual quandary must be resolved to enable the development of reliable and valid tools for the assessment of psychopathy. Despite the conceptual confusion surrounding the PCL-R and its self-report analogue, the SRP-III, they remain the most widely used measures of psychopathy in both research and clinical practice (Dhingra & Boduszek, 2013; Lee & Ashton, 2005). Additionally, the PCL-R is often equated with the concept of psychopathy, which is evidenced by its use as a referent for estimating the construct validity of other measures of the disorder (e.g., Brinkley, Schmitt, Smith, & Newman, 2001; Poythress *et al*., 2010). In light of the great theoretical importance assigned to

the PCL-R, there exists a need for further evaluation of the measure and its derivatives. Although research revealed inconsistent results as to the dimensionality, reliability, and differential predictive validity of the PCL-R and SRP-III, a detailed critical appraisal of this prior work is missing. Here, we aim to address this gap by reviewing, summarizing, and critically engaging with the most recent findings into the dimensionality of the PCL-R, SRP-III, and SRP-SF. Based on our analysis results, we provide a set of directions for surpassing the current methodological and conceptual limitations in the field of psychopathy measurement.

Methodology

Search strategy

A search in PubMed, PsychInfo, Scopus, Web of Science, and Science Direct was performed in August, 2015. The following keywords were used in order to identify relevant articles: *psychopathy, Psychopathy Checklist-Revised, PCL-R, Self-Report Psychopathy Scale, SRP-III, SRP-IV, Self-Report Psychopathy Scale-Short Form, SRP-SF*, combined with *factor structure, factor analysis*, *dimensionality, reliability,* and *(construct) validity*. Google Scholar and Robert Hare's website devoted to the study of psychopathy (www.hare.org) were searched for complementary literature to ascertain that all relevant materials were found. Cited published research not generated in the search was also accessed.

Selection process

Articles reviewed in the current study met the following selection criteria:

1. The study assessed factor structure of at least one of the following psychopathy scales: PCL-R, SRP-III, and SRP-SF.

2. The study is an original piece of research with primary or secondary data analysis (meta-analyses were excluded).

3. The study was written in English and published in a peer-reviewed journal.

4. Given a plethora of studies examining construct validity and dimensionality of the PCL-R, only papers published during the last 15 years (2000-2015) were evaluated.

5. Studies assessing the factor structure of the PCL-SV and PCL-YV were excluded for the sake of the brevity of the report.

The abstracts of 324 studies were inspected by both authors in order to ascertain whether they contained relevant information and met all the inclusion criteria. Most studies were rejected because they were not testing construct validity of the measures. Next, the remaining selection criteria were applied to find relevant studies. This process led to the identification of 34 research papers. The methodological quality of the studies was assessed by two independent reviewers. A consensus method was used (i.e., the decision to exclude papers employing item response theory) to resolve disagreements regarding inclusion of a study. Finally, 21 relevant empirical studies examining the construct validity and dimensionality of the PCL-R and 11 studies looking at the factor structure of the SRP-III and SRP-SF were identified.

Data extraction and analysis

Relevant information was extracted into summary tables (Tables 1 - 3). The following data from the studies were retrieved: author(s) and year of publication, number of

models tested, best factorial solution, correlations between latent factors, differential predictive validity, sample, and method of testing. Findings are presented in separate tables for each of the reviewed measures. Additionally, a narrative review of the results is provided.

Results

PCL-R

Results of 21 studies examining factor structure of the PCL-R are presented in Table 1 below. As shown in the table, research findings are inconsistent as to the underlying structure of the PCL-R, opening it to further scrutiny. In addition, prior research has been limited by methodological and conceptual weaknesses, which calls into question the applicability of its findings. As such, it is suggested that prior results should be interpreted with caution.

Seven of the reviewed studies examined only one possible model of the PCL-R (Cooke, Kosson, & Michie, 2001; León-Mayer, Folino, Neumann, & Hare, 2015; Medina, Valdés-Sosa, García, Almeyda, & Couso, 2013; Mokros *et al*., 2011; Neumann, Hare, Johansson, 2013; Neumann *et al*., 2014; Zwets, Hornsveld, Neumann, Muris, & van Marle, 2015); whereas Neumann, Hare, and Newman (2007) assessed two models, but fit statistics were only reported for one of them. Mokros *et al*. (2011) and Zwets *et al*. (2015) tested the four-factorial solution of the measure. Although the incremental index (CFI) was under the acceptable range (.89) for one of the subsamples in each study, no alternative models were assessed. Moreover, the Tucker-Lewis Index (TLI), another incremental fit index, was not reported (these

particular analyses were conducted using Mplus software and hence the TLI must have been available). Similar problems were demonstrated in Neumann *et al.*'s (2007) study. Namely, the TLI values for all samples were below the recommended cut-off point of .95 (Hu & Bentler, 1999), whereas the TLI for the forensic psychiatric patients sample fell below the less-conservative acceptable range of .90 (Hoyle, 1995). Cooke *et al.* (2001), who tested a hierarchical model with one super-ordinate and three subordinate factors, reported the CFI of .92 for both of the samples employed. Neumann *et al.* (2014), on the other hand, reported the relative fit (one of which was .88) and absolute fit values, but it was not specified exactly which fit indices were used for a particular subsample. It appears, therefore, that all the aforementioned studies sought to confirm the proposed model, rather than validate the measure. Thorough model comparisons as opposed to single model testing are warranted to evaluate the applicability of the above findings.

Zwets *et al.*'s (2015) approach to modeling the data appears even more surprising in light of the reported correlations between PCL-R facets and external variables (different measures of aggression). Specifically, factor 3 (lifestyle) and factor 4 (antisocial) formed similar significant correlations with external measures except for two instances (those correlations were however in the same direction). This is very problematic as the two dimensions were also very highly correlated with each other ($r = .80$), indicating that a three-factor model should have been considered. Factor 1 (interpersonal) and factor 2 (affective), on the other hand, correlated in different directions with some of the external measures, however, those associations were not statistically significant. This suggests that none of the PCL-R facets had differential predictive validity over the remaining ones, which calls into question the factorial solution tested in the above research. Along similar lines, association

between factor 2 (deficient affective) and factor 3 (impulsive and irresponsible behavior) in Weizmann-Henelius *et al.*'s (2010) study was very strong (.95), but only factor 3 associated significantly with borderline personality disorder (BPD) (both correlations were positive and the difference in the effect size was small). The aforementioned factors also formed significant positive correlations with APD and cluster B disorders, which indicates very low differential predictive validity.

Neumann *et al.* (2013), who also reported very high correlations between factor 1 and 2 (.87) as well as factor 3 and 4 (.88), utilized structural equation modelling with low anxiety and fearlessness (LAF) as a criterion variable. It was found that only factor 1 (interpersonal) and factor 4 (antisocial) were significantly positively associated with LAF, indicating that the correlated dimensions measure different concepts. However, these results should be tempered by the fact that the beta values for associations between factor 2 (affective) and 3 (lifestyle) psychopathy and LAF were not reported. Interestingly, when structural equation models were tested for individual PCL-R facets *separately*, each solution evidenced a good model fit, as indexed by the TLI and RMSEA; however, beta values for those relationships were not reported, therefore, the differential predictive validity of the PCL-R components cannot be established here. Correlations between PCL-R factors were also high in León-Mayer *et al.* (2015), Mokros *et al.* (2011) as well as Vitacco, Rogers, Neumann, Harrison, and Vincent's (2005b) study, yet differential predictive validity or equivalent tests were not performed.

In another study, Medina *et al.* (2013) tested only the two-factor model of the PCL-R. However, no fit indices were provided and hence it is impossible to comment on the fitness of the solution in this particular study. Medina and colleagues did however report some theoretically unexpected correlations between the PCL-R facets

and external measures. Specifically, both factors and the PCL-R total score formed

significant negative correlations with physical aggression, verbal aggression, anger,

and hostility. The total PCL-R and its factors correlated in the same direction with all

external measures and hence no differential predictive validity was observed.

Additionally, although Cooke, Michie, Hart, and Clark (2005a, b) tested more than

one possible solution (two-factor, four-factor [in Cooke *et al*., 2005b only], and three-

factor hierarchical model), fit statistics were not reported for one of the subsamples

(North American male offenders and psychiatric patients – a sample used in both

studies). Overall, it appears that testing only one possible solution of the PCL-R in the

aforementioned studies was misguided and such an approach to data modeling should

be avoided in future research, especially if similar problems are encountered. Such

uninquisitive examinations of the PCL-R dimensionality may seriously obscure our

understanding of the scale's true factor structure.

Another limitation of some of the reviewed studies pertains to correlating

errors of measurement (Hildebrand, Ruiter, Vogl, & Wolf, 2002) and the use of the

parceling procedure/testlets[1] (e.g., Cooke & Michie, 2001; Cooke *et al*., 2005a;

Cooke, Michie, & Skeem, 2007; Vitacco *et al*., 2005b; Weizmann-Henelius *et al*.,

2010). The latter strategy indicates the failure to identify an adequate factorial

solution when using individual items of the scale. Parceling technique, developed by

Cattell and Burdsal (1975), is sometimes used for scales with multiple indicators in

order to reduce the large indicator-to-factor ratio (e.g., Debowska, Boduszek, Kola, &

Hyland, 2014; Neal & Sellbom, 2012). However, given that the PCL-R consists of

---

[1] The terms "parcels" and "testlets" are normally used interchangeably (e.g., Reeve & Lam, 2005). Some researchers, however, refer to parcels as aggregate scores, created prior to model fitting, composed of items from the same content area; whereas testlets are groups of items with local dependence and occur when items associations are too high to be explained by their relationship with a latent trait (Cooke *et al*., 2007).

only 20 items, it seems that this procedure should not have been used. Since parceling

can lead to the acceptance of misspecified models (Kim & Hagtvet, 2003), the use of

this technique should be avoided and alternative model solutions ought to be tested if

similar problems are encountered in future studies. Weaver, Meyer, Van Nort, and

Tristan (2006) applied testlets to two-, three-, four-factor, and two-factor/four-facet

models, and concluded that the procedure significantly improved the performance of

all solutions, which is not a surprising result.

Flores-Mendoza *et al*. (2008) and Patrick *et al*. (2007) utilized bifactorial

modeling procedure, which provides an empirically and conceptually distinct

alternative to traditional CFA model solutions. Bifactor modeling views covariation

among observable indicators to be explained by both ''general factors'' and

''grouping/specific factors'' which exist at the same conceptual level. Flores-

Mendoza *et al*. (2008) found a bifactor solution with one general factor and two

grouping factors to best capture the data. However, in this particular study, the

general and grouping factors had similar factor loadings and the researchers failed to

explain the influence of this finding on the subsequent use of the PCL-R in applied

settings. Moreover, three of the scale items evidenced non-significant loadings and

were removed from the model. Such an approach to data modeling is highly

problematic because item removal, especially in established measures, should be

guided by the theory. Finally, although the researchers correlated psychopathy

dimensions with external variables, it is not clear whether the general factor or the

total PCL-R score containing all items was subject to those analyses.

In the study by Patrick *et al*. (2007), on the other hand, a bifactor model with

one general and three grouping factors evidenced the best fit of the data. The general

factor and three specific factors showed some differential correlations with

personality trait constructs and externalizing behaviors. The specific affective factor failed to exhibit a single significant association with the measures of normal range personality traits, which may indicate that affect is captured differently by those measures. Although the above studies suggest the utility of applying bifactor modeling, the results are difficult to interpret based on existing theoretical conceptualizations of psychopathy. Specifically, psychopathy has never been theorized to reflect a single latent construct as reflected in models of Patrick *et al*. (2007) and Flores-Mendoza *et al*. (2008). Although this solution appears to be based on Cooke and Michie's (2001) hierarchical model with one super-ordinate and three subordinate facets, the hierarchical model was developed as a combination of theoretical conceptualizations of the nature of psychopathy and statistical procedures that explain the structure of the PCL-R ratings (as suggested by Byrne, 1994). A similar misguided view of the unidimensionality of the psychopathy construct was also assumed by McDermott *et al*. (2000). Indeed, Bishopp and Hare (2008) suggested that, in his original description of psychopathy, Cleckley was referring to "a constellation or syndrome of personality dimensions, rather than a single defining characteristic" (p. 119).

Another example of the failure to abide by the theoretical conceptualizations of psychopathy is the study by Hildebrand *et al*. (2002). First, the researchers allowed one of the scale items (impulsivity) to load onto two factors. Second, using exploratory principal components analysis (PCA), an *alternative* two-factor model was suggested as the best fit for the data. Possible justifications for such a model, however, were not provided and the new factors were not labelled.

Eleven of the reviewed studies tested the three-factor model of psychopathy, where items referring to criminal/antisocial behavior were removed (Cooke *et al*.,

2001; Cooke & Michie, 2001; Cooke *et al*., 2005a, b; Cooke *et al*., 2007; Flores-Mendoza *et al*., 2008; Hildebrand *et al*., 2002; Johansson, Andershed, Kerr, & Levander, 2002; Vitacco *et al*., 2005b; Weaver *et al*., 2006; Weizmann-Henelius *et al*., 2010). Cooke *et al*. (2001, 2005b), and Johansson *et al*. (2002) found the three-factor or hierarchical three-factor model with 13 items to be the best model fit for the data, whereas the same models with testlets were reported as the best factorial solutions in six other studies (Cooke & Michie, 2001; Cooke *et al*., 2005a; Cooke et al., 2007; Vitacco *et al*., 2005b; Weaver *et al*., 2006; Weizmann-Henelius *et al*., 2010). Notably, Flores-Mendoza *et al*. (2008), who assessed both the three-factor and bifactorial model, argued for the superiority of the latter. Further, although Patrick *et al*. (2007) did not examine a three-factor model, they established a bifactor solution with one general and three specific factors as the best model fit. This indicates the need to further explore the possibility that psychopathy is best captured by general and grouping factors existing at the same conceptual level.

An alternative approach to assessing the structure of the PCL-R using multidimensional scaling (MDS) was adopted by Bishopp and Hare (2008). MDS produces a visual output where variables are presented as points in space; from the emergent scalogram, the interpretation of item clusters depends on the theory and the researchers' judgement (Guttman & Greenbaum, 1998). Based on such a subjective interpretation, Bishopp and Hare (2008) suggested that the PCL-R is best captured by four distinct factors (as evidenced by the three-dimensional MDS solution). The two-dimensional MDS solution, however, could be interpreted with respect to the two- and four-factor models suggested within literature. "Factors 1 and 2 of the two-factor model are marked along the horizontal axis while the four-factor model is indicated vertically as F1, F2, F3 and F4" (p. 124). It may be, thus, that both two and four

factors of psychopathy exist simultaneously at equal conceptual footing and compete for explaining item variance – a solution referred to as the multitrait-multimethod (MTMM) model, which can be tested using CFA and SEM techniques (Maas, Lensvelt-Mulders, & Hox, 2009). Worthy of note, MTMM models have been previously found to best represent the dimensionality of two measures derived from the PCL-R, namely the PCL-SV (Boduszek et al., 2015) and the SRP-III (Debowska et al., 2014)[2]. Similar analyses using the PCL-R are lacking but, it appears, should be conducted.

The final issue pertains to the samples used in the reviewed studies. Specifically, a number of studies were conducted using secondary data and some of the samples were used repeatedly for the purpose of examining the same factorial solutions. Three of the reviewed studies were conducted using North American data set of male offenders described by Hare (2003) (Bishopp & Hare, 2008; Neumann et al., 2007; Neumann et al., 2014). Three quarters of Cooke and Michie's (2001) participants included in study 1, 2, and 3 were derived from Hare's (1991) PCL-R standardization sample. The same data from Scottish male prisoner samples were utilized in three of the reviewed studies (Cooke & Michie, 2001, study 4; Cooke et al., 2005a; Cooke et al., 2007). The sample of North American male adult offenders and psychiatric patients ($N = 2,067$), obtained for the purpose of prior research, were employed by both Cooke et al. (2005a) and Cooke et al. (2005b). It appears, therefore, that the results of the above studies should be taken with caution and more research using new data sets is needed to verify those findings.

---

[2] In both of those studies, the MTMM model was referred to as a bifactor model with two general and four grouping factors.

Table 1

Studies assessing factor structure of the PCL-R

Author(s) and year of publication	No. of models tested	Best factorial solution	Correlations between factors	Differential predictive validity	Sample	Method of testing
Bishopp & Hare (2008)	n/a	Four factors	n/a	n/a	4,630 male offenders	MDS
Cooke *et al.* (2001)	1	Hierarchical model with 3 subordinate factors and 1 super-ordinate factor (13 items)	n/a	n/a	359 Caucasian and 356 African American inmates	CFA, IRT
Cooke & Michie (2001)	Study 1 = 2 Study 2 = 5 Study 3 = 1 Study 4 = 1	STUDY 1: none but 2-factor model better than 1- factor model STUDY 2: 3 factors with testlets (13 items) – superordinate factor was included STUDY 3: 3 factors with testlets (13 items) – hierarchical model with 1 superordinate factor STUDY 4: 3 factors with testlets (13 items) – hierarchical model with 1 superordinate factor	n/a	n/a	STUDY 1, 2, & 3: 2,067 North American inmates and forensic psychiatric patients STUDY 4: 596 male Scottish prisoners	EFA, CFA, IRT
Cooke *et al.* (2005a)	2	3-factor hierarchical model with testlets	n/a	n/a	1,316 British adult male offenders (some secondary data); 2,067 North American adult male offenders	CFA, IRT
Cooke *et al.* (2005b)	3	3-factor hierarchical model with testlets	n/a	n/a	2,067 North American adult male offenders and psychiatric patients; 1,563 adult male offenders and forensic psychiatric patients	CFA, IRT

					from continental Europe	
Cooke *et al.* (2007)	11	Hierarchical 3-factor with testlets	n/a	n/a	1,212 adult male offenders	CFA
Flores-Mendoza *et al.* (2008)	7	Bi-factor model with 2 specific factors and 1 general factor (17 items)	F1 & F2 (.37)	Weak differential predictive validity	124 Brazilian male prisoners	CFA
Hildebrand *et al.* (2002)	7	Alternative 2-factor model	F1 & F2 (.25)	n/a	98 male forensic psychiatric patients	CFA (ML) and exploratory PCA using oblique rotation
Johansson *et al.* (2002)	2	3-factor model (13 items)	n/a	n/a	293 adult male violent offenders from a maximum-security prison in Sweden	EFA, CFA (WLS)
León-Mayer *et al.* (2015)	1	4-factor model	Range = .42 - .89	n/a	209 male inmates from the Prison of Los Andes, Chile	CFA (WLSMV)
McDermott *et al.* (2000)	n/a	2-factor model (prisoner sample); 1-factor model (substance-dependent sample)	n/a	n/a	326 male inmates from a prison in southern Wisconsin; 620 (n = 442 men, n = 178 women) substance-dependent patients	Exploratory orthogonal and oblique common factoring
Medina *et al.* (2013)	1	2-factor model (2 items did not load on any of the factors)	n/a	Lack of differential predictive validity	124 Cuban violent offenders	Factor analysis with normalized varimax rotation
Mokros *et al.* (2011)	1	4-factor model (18 items)	Range for North American sample = .59 - .86 Range for German sample = .83 - .94	n/a	North American sample: 2,622 male offenders (secondary data) German sample: 443 male offenders	CFA
Neumann *et*	1	4-factor model (18 items)	Range = .59 - .88	Lack of differential	1,031 offenders who underwent	CFA

al. (2013)				predictive validity	psychological assessment at the National Assessment Unit in Kumla Prison. Not all offenders received complete assessment so the number of participants varied from 398 to 989.	
Neumann *et al.* (2007)	2	Comparisons between models not made, fit statistics reported for 4-factor model only	Range for the entire sample = .42 - .73	n/a	4,865 male offenders (sample 1), 1,099 female offenders (sample 2), 965 forensic psychiatric patients (sample 3)	CFA (MLR)
Neumann *et al.* (2014)	1	4-factor model	Average correlations reported. Range = .41 - .78	n/a	(1) 4,685 North American adult male offenders; (2) 209 South American adult male offenders; (3) 1,983 European male offenders; (4) 3,389 adult males from a psychiatric hospital in the Netherlands; (5) 1,046 Austrian male offenders; (6) 1,031 Swedish male offenders; (7) 445 Finnish male offenders; (8) 965 male psychiatric patients; (9) 1,099 female offenders; (10) 203 adults from corporate settings; (11) 304 male offenders from prisons in Wisconsin; (12) 208 young adult males from the Pittsburgh Youth Study; (13) 12,201 participants mega-sample: samples 1, 3, & 4 combined	SEM (WLSMV)
Patrick *et al.* (2007)	9	Bifactor with 1 general factor and 3 specific factors (20 items)	n/a	Good differential predictive validity	593 male inmates recruited from 2 American prisons	EFA CFA
Vitacco *et al.* (2005b)	6	3-factor testlets model	Range = .50 - .83	n/a	96 male mentally disordered offenders from the Tarrant County Jail in Fort Worth, Texas	CFA
Weaver *et al.* (2006)	8	3-factor testlets model (13 items, 6 testlets)	n/a	n/a	1,566 male sex offenders	CFA
Weizmann-Henelius *et*	5	3-factor model with 6 testlets (13 items)	Range = .64 - .92	Moderate differential	97 female homicide offenders (data collected from archives; file-only	CFA (ML)

al. (2010)				predictive validity	information and assessed retrospectively)	
Zwets *et al.* (2015)	1	4 factors	Range = .37 - .84	Moderate differential predictive validity	411 forensic psychiatric inpatients – personality disorders group (*n* = 269), psychiatric disorders group (*n* = 142)	CFA

Note. CFA = Confirmatory factor analysis; EFA = Exploratory factor analysis; MDS = Multidimensional scaling; ML = Maximum likelihood; PCA = Principal components analysis; SEM = Structural Equation Modelling; WLS = Weighted least square estimation; WLSMV = Robust weighted least squares estimation.

SRP-III and SRP-SF

Results of 11 studies evaluating the dimensionality and construct validity of the SRP-III and SRP-SF are presented in Tables 2 and 3 respectively.

Two of the reviewed studies (Mahmut, Menictas, Stevenson, & Homewood, 2011; Neal & Sellbom, 2012) revealed the four-factor model of the SRP-III, composed of interpersonal manipulation (IPM), callous affect (CA), erratic lifestyle (ELS), and antisocial behavior (ASB), to be the best fit for the data. In five other studies (Declercq, Carter, & Neumann, 2015; Gordts *et al.*, in press; León-Mayer *et al.*, 2015; Neumann *et al.*, 2014; Neumann, Schmitt, Carter, Embley, & Hare, 2012), the SRP-III and SRP-SF demonstrated a good fit for the four-factor model, however, no competing model solutions were assessed. The three-factor model suggested for the PCL-R scores by Cooke and Michie (2001) was found inappropriate for the SRP-III (e.g., Mahmut *et al.*, 2011), indicating that criminal/antisocial tendencies may constitute an integral part of psychopathy construct as indexed by this self-report instrument.

Debowska *et al.* (2014), Gordts *et al.* (in press) as well as Neal and Sellbom (2012) failed to find an appropriate model fit when using all 64 SRP-III items as indicators. Similarly to some prior studies examining the factor structure of the PCL-R, the researchers employed the parceling technique in order to reduce model complexity. The 64 items were assigned randomly into 16 radical parcels (four for each factor), which increased the CFI and TLI values and decreased the RMSEA and SRMR values for the assessed solutions. Gordts *et al.* (in press) and Neal and Sellbom (2012) suggested the four-factor parceled model as the best fit for the data, with the CFI value of .92 and .95 respectively (the TLI values were not reported). Debowska *et*

al. (2014), who used a Polish version of the SRP-III, assessed a bifactor conceptualization of psychopathy with two general factors (interpersonal/affective and lifestyle/antisocial) and four grouping factors (interpersonal manipulation, callous affect, erratic lifestyle, and antisocial behavior) and found it to be a statistically superior representation of the data (CFI = .96, TLI = .94, RMSEA = .058, SRMR = .045). Standardized factor loadings were significantly stronger for the grouping factors than for the general factors, therefore, the Polish SRP-III was suggested to be measuring four primary factors of psychopathy and two hidden factors. Given that all studies examining factor structure of the SRP-III and PCL-R reviewed here which have tested a bifactor model revealed it to be the best fit for the data (Debowska *et al.*, 2014; Flores-Mendoza *et al.*, 2008; Patrick *et al.*, 2007), future research should include a bifactoral conceptualization as a comparison model.

Further, despite some high correlations between the four SRP-III factors, they evidenced good differential predictive validity (e.g., Debowska *et al.*, 2014; Neal & Sellbom, 2011), suggesting that they measure disparate dimensions. However, in León-Mayer *et al.*'s (2015) investigation into the SRP-SF dimensionality, correlations between the IPM and CA factors and between the IPM and ELS factors were as high as .99 and .93 respectively, which questions their conceptual distinctiveness. Declercq *et al.* (2015) argued that strong correlations between the SRP-SF dimensions provide evidence for the existence of a super-ordinate psychopathy factor, however, neither a hierarchical nor a bifactor solution was tested to support this proposition. Interestingly, Gordts *et al.* (in press) reported corresponding SRP-III and SRP-SF facets to form some different associations with external variables. For example, SRP-III-IPM, but not SRP-SF-IPM, correlated significantly with the Adolescent Peer Relations Instrument – Social Target subscale (Parada, 2000). The SRP-III-CA

associated positively and SRP-SF-CA associated negatively with the Adolescent Peer Relations Instrument – Verbal Target subscale, yet these correlations were statistically non-significant. These differential correlations however indicate that the two versions of the SRP may not be qualitatively equal.

Mahmut *et al*. (2011) tested the viability of the SRP-III as a PCL-R-analogous instrument of psychopathy within a community sample ($N = 500$). Although the original scale consists of 64 items, the researchers dropped 24 items with loadings less than .30 in the exploratory factor analysis (EFA). As explained in the previous section, such an approach to factor structure examination is misguided as the resulting content of the measure is based on statistical rather than theoretical superiority. The EFA technique was also employed in Freeman and Samson's (2012) study. Psychopathy as indexed by the SRP-III was suggested to be composed of four factors, but some cross-loadings between the IPM and CA facets were evident. The utilization of the EFA technique in both of the above studies does not seem justified. This is because, unless no preconceived factor structure is provided, exploratory techniques should be avoided when assessing dimensionality of established instruments.

Seibert *et al*. (2011), on the other hand, employed the EFA to examine the joint factor structure of three self-report measures of psychopathy, namely the SRP-III, the Levenson Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl, & Fitzpatrick, 1995), and the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005). The analysis was performed on 14 psychopathy subscales and the domains from the five-factor personality model (neuroticism, extraversion, openness, agreeableness, and conscientiousness) together. Results revealed the existence of four psychopathy facets, however, not all SRP-III subscales loaded significantly on the expected factors. Specifically, both IPM and CA subscales

loaded onto factor 1 (.86 and .47 respectively), conceived as representing interpersonal/affective deficits. The CA subscale also loaded negatively on factor 4 (-.55), which represented the lack of emotion. The ELS subscale loaded on factor 3 (.86), which captured elements of poor impulse control. The ASB subscale did not load on any factor, yet this result was not explored further. Given existing theoretical conceptualizations of psychopathy, findings of this particular study are difficult to interpret, however, it appears that antisocial tendencies share little variance with the remaining psychopathy scales.

Neumann and Pardini's (2014) study provides another example of an analysis used to simultaneously evaluate the latent item measurement structures of two scales, the SRP-SF (ASB items were omitted) and the Youth Psychopathic Traits Inventory (YPI; Andershed, Kerr, Stattin, & Lavender, 2002). Although the solution with six latent factors evidenced an adequate model fit, full parameter results are only available upon request. Moreover, the omission of items referring to antisocial tendencies, which form an integral part of the measure, does not allow for inferences regarding the SRP-SF reliability and dimensionality to be made.

Indeed, an important limitation identified in studies utilizing the SRP-SF pertains to the number of scale items used. Although the original SRP-SF consists of 29 items, some researchers have reduced the number of indicators. For example, Gordts *et al*. (in press) used a 28-item scale. Neumann *et al*. (2014) utilized a 19- and 26-item (but the figure provided suggests that only 18 items were included) SRP-SF, without explaining which scale items were excluded. Neumann *et al*. (2012) analyzed the factor structure of an experimental 19-item version of the SRP. This lack of consistency significantly undermines the generalizability of research findings and the reliability of the measure.

Table 2

Studies assessing factor structure of the SRP-III

Author(s) and year of publication	No. of models tested	Best factorial solution	Correlations between factors	Differential predictive validity	Sample	Method of testing
Debowska *et al.* (2014)	8	Bi-factor model with 2 general and 4 grouping factors (64 items, 16 parcels)	Range = .57 - .88	Moderate differential predictive validity	319 Polish working adults	CFA (MLR)
Freeman & Samson (2012)	n/a	4-factor (64 items)	Range = .51 - .74	Lack of differential predictive validity	Australian community sample ($N = 300$)	EFA
Gordts *et al.* (in press)	2	4-factor model (64 items, 16 parcels)	Range = .49 - .74	Moderate differential predictive validity	Belgian community sample ($N = 1,510$)	CFA (WLSMV for items as indicators & RML for parcels)
Mahmut *et al.* (2011)	4	4-factor model (40 items)	Range = .24 - .51	n/a	Community sample ($N = 500$)	EFA, CFA
Neal & Sellbom (2012)	8	4-factor model (64 items, 16 parcels)	Range = .62 - .76	Good differential predictive validity	602 college students	CFA
Seibert *et al.* (2011)	n/a	4-factor model (64 items)	Range = .33 - .59	Weak differential predictive validity	143 undergraduate psychology students from a large Southeastern university	EFA with an oblimin rotation

Note. CFA = Confirmatory factor analysis; EFA = Exploratory factor analysis; RML = Robust maximum likelihood; SEM = Structural Equation Modelling; WLSMV = Robust weighted least squares estimation.

Table 3

Studies assessing factor structure of the SRP-SF

Author(s) and year of publication	Models tested	Best factorial solution	Correlations between factors	Differential predictive validity	Sample	Method of testing
Declercq *et al.* (2015)	1	4-factor model (29 items)	Range = .70 - .88	n/a	Dutch-speaking female undergraduates (*N* = 343)	CFA
Gordts *et al.* (in press)	1	4-fator model (28 items)	Range = .64 - .84	Moderate differential predictive validity	Belgian community sample (*N* = 1,510)	CFA (WLSM)
León-Mayer *et al.* (2015)	1	4-factor model (29 items)	Range = .85 - .99	n/a	209 male inmates from the Prison of Los Andes, Chile	CFA (WLSMV)
Neumann *et al.* (2014)	1	4-factor model (number of items included differed across samples)	Range for sample 1 only = .79 - .88	n/a	(1) North American adult mega sample (*N* = 1,730) – 26-item SRP-SF; (2) World adult mega sample (*N* = 33,016) – 19-item SRP-SF; (3) Male offenders from prisons in Wisconsin (*N* = 304) – number of SRP-SF items not specified; (4) Young adult males from the Pittsburgh Youth Study (*N* = 208) - number of SRP-SF items not specified	SEM (WLSMV)
Neumann & Pardini (2014)	1	6-factor model (SRP-SF-ASB items were excluded; CFA performed jointly on SRP-SF and YPI items)	n/a	Lack of differential predictive validity	Young adult males from the Pittsburg Youth Study (*N* = 425)	CFA (WLSMV)
Neumann *et al.* (2012)	1	4-factor model (19 items)	Range for total sample = .40 - .80; Range for female sample = .40 - .77; Range for male sample = .33 - .79	Moderate differential predictive validity	34,118 participants (14,301 men and 19,817 women) from the International Sexuality Description Project-2 (ISDP-2)	SEM (WLSMV)

Note. ASB = Antisocial Behavior; CFA = Confirmatory factor analysis; CFI = Comparative Fit Index; SEM = Structural Equation Modelling; WLSMV = Robust weighted least squares estimation; YPI = Youth Psychopathic Traits Inventory.

Discussion

The PCL-R and its self-report analogue, the SRP-III/SF, are the measures of psychopathy most commonly used in research and clinical practice. Although empirical studies have consistently demonstrated that increased PCL-R scores can predict violence and general recidivism (Dhingra & Boduszek, 2013; Salekin *et al.*, 1996), the instrument's construct validity has recently been challenged (Cooke & Michie, 2001; Skeem & Cooke, 2010a, b). Inconsistencies have also been reported regarding the factor structure of the measures, with some researchers suggesting two- (e.g., McDermott *et al.*, 2000; Medina *et al.*, 2013), three- (e.g., Cooke *et al.*, 2005a, b), four- (e.g., Freeman & Samson, 2012; León-Mayer *et al.*, 2015; Neumann *et al.*, 2013, 2014; Zwets *et al.*, 2015), and bi-factor (e.g., Debowska *et al.*, 2014; Flores-Mendoza *et al.*, 2008; Patrick *et al.*, 2007) models to best capture the PCL-R and SRP-III/SF ratings. In spite of this conflicting evidence, there is a lack of a critical review of such research. It appears that our understanding of the dimensionality of the instruments may be adversely influenced by the application of inappropriate methods for examining their latent structure. Since the PCL-R is often equated with the concept that it contends to measure, such methodological limitations may subsequently affect our understanding of psychopathy. In light of the above, the objective of the present paper was to provide a critical evaluation of the most recent studies assessing the factor structure of the PCL-R and SRP-III/SF. We conclude with recommendations for future scholarship in the field of psychopathy measurement.

As presented in detail in the results section, one of the reasons for contradictory findings amongst psychopathy factor analytic literature may be the failure to compare a number of alternative models. Although the dimensionality of the PCL-R and its derivatives remains debatable, we found a significant number of

studies to assess one possible solution (e.g., Cooke et al., 2001; Declercq *et al*., 2015; León-Mayer *et al*., 2015; Neumann et al., 2013, 2014), even when fit indices for the tested model were below the recommended values (such as in studies by Mokros *et al*., 2011; Zwets *et al*., 2015). Of questionable value is also research where fit statistics were reported selectively (e.g., Gordts *et al*., in press; Neumann *et al*., 2014; Vitacco *et al*., 2005; Zwets *et al*., 2015) or not reported at all (e.g., Medina *et al*., 2013). In addition, it appears that researchers underestimate the usefulness of bifactor modeling in grasping the PCL-R and SRP-III/SF scores, even though bifactorial solutions evidenced the best model fit in all studies that considered them (Debowska *et al*., 2014; Flores-Mendoza *et al*., 2008; Patrick *et al*., 2007). This finding urged us to suggest that future research using the PCL-R and its derivatives should include a bifactoral conceptualization as a comparison model[3]. Another methodological limitation identified amongst the reviewed studies pertains to the repeated use of the same data sets (e.g., Bishopp & Hare, 2008; Cooke *et al*., 2005a, b; Neumann *et al*., 2007; Neumann *et al*., 2014) and data sets of limited size (e.g., Flores-Mendoza *et al*., 2008; Hildebrand *et al.*, 2002; León-Mayer *et al*., 2015; Medina *et al*., 2013; Seibert *et al*., 2011; Vitacco *et al*., 2005; Weizmann-Henelius *et al*., 2010), possibly resulting in overconfidence in the fitness of some models.

Further, in regards to risk assessment and treatment, it is of utmost importance that those measures also evidence good differential predictive validity. However, only six of the reviewed studies examining the factor structure of the PCL-R (Flores-Mendoza *et al*., 2008; Medina *et al*., 2013; Neumann *et al*., 2013; Patrick *et al*., 2007; Weizmann-Henelius *et al*., 2010; Zwets *et al*., 2015) and eight studies using the SRP-

---

[3] Based on theoretical conceptualizations of psychopathy, we suggest that such a model should comprise two general and four specific factors (also referred to as the MTMM model).

III/SF (Debowska *et al.*, 2014; Freeman & Samson, 2012; Gordts *et al.*, in press; Neal & Sellbom, 2012; Neumann & Pardini, 2014; Neumann *et al.*, 2012; Seibert *et al.*, 2011) reported the results of some differential predictive validity (e.g., differential correlations with external variables). Notably, four of those studies demonstrated a lack of differential predictive validity (Medina *et al.*, 2013; Neumann *et al.*, 2013; Freeman & Samson, 2012; Neumann & Pardini, 2014). Although Neumann *et al.* (2012) reported a moderate differential predictive validity of the four psychopathy facets, the choice of external correlates included in the study was, to say the least, surprising (e.g., body mass index, adolescent fertility rate, gross domestic product per capita). As such, more research into the predictive utility of different psychopathy factors based upon solid theoretical grounds is warranted.

Notwithstanding the importance of factor analytic work in advancing our understanding of psychopathy, it will not reveal the true nature of the construct (Meehl, 1992; Skeem & Cooke, 2010b). In order to avoid exploratory model testing based on statistical procedures only, such studies should adhere to a predefined theoretical framework. Research in the field of psychopathy measurement, however, is compromised by the lack of a clear definition of the disorder (Cooke & Logan, 2015; Corrado, DeLisi, Hart, & McCuish, 2015). Further, there is a continuing debate as to whether or not criminal/antisocial tendencies constitute an integral part of psychopathy construct (see discussion between Hare & Neumann, 2010 and Skeem & Cooke, 2010a, b). According to the early conceptualization of psychopathy (Cleckley, 1941; Karpman, 1948), the essence of the disorder is characterized by affective and interpersonal deficits, whereas the proneness to transgress social and legal norms seems to comprise a possible behavioural manifestation of psychopathy (Skeem & Cooke, 2010a, b). However, psychopathic traits can make one successful in both

criminal and non-criminal endeavours (Millon, Simonsen & Birket-Smith, 1998). For example, Hassall, Boduszek, and Dhingra's (2015) research findings revealed that business students, relative to psychology students, scored significantly higher on all four psychopathy dimensions and that psychopathy was a significant correlate of academic achievement. The prevalence of psychopathic traits was also higher in a corporate sample than that found in community samples (Babiak, Neumann, & Hare, 2010). In another study, it was demonstrated that increased psychopathy scores among U.S. presidents were associated with a better-rated presidential performance (Lilienfeld *et al*., 2012). It appears thus that highly intelligent individuals with psychopathic traits may perform exceptionally well in non-criminal professions which value cold calculation and impersonal style. Along similar lines, Seibert *et al*.'s (2011) study results revealed that antisocial tendencies, as indexed by the SRP-III, share little variance with psychopathy measures not derived on the basis of the PCL-R. Consequently, in spite of Hare and Neumann's (2006) assertion that the omission of criminal tendencies from the PCL-R is inconsistent with its structural properties, a growing body of evidence suggests that such tendencies should *not* be regarded as central to the conceptualization of the construct of psychopathy.

Further, the above stated limitation is especially significant in the evaluation of clinician-administered measures. This is because, although different facets of the disorder are assessed separately, cut-off points used to diagnose psychopathy utilized in such instruments rely on the total scale score rather than ratings obtained on separate dimensions. As such, psychopathy is more likely to be diagnosed in forensic samples, which may be one of the reasons why psychopaths are overrepresented in prisons. Indeed, research indicates that approximately 25 per cent of inmates meet diagnostic criteria for psychopathy (Lilienfeld & Arkowitz, 2007), compared with 1

per cent of the general population (Coid, Yang, Ullrich, & Hare, 2009). It appears thus that the inclusion of criminal/antisocial tendencies in psychopathy measures constitutes a serious drawback which ought to be addressed. The use of similar items in self-report measures is perhaps less problematic because such scales are not normally used for diagnostic purposes and hence cut-off points for diagnosis are not specified. Yet, if criminal/antisocial tendencies are just one possible outcome of a psychopathic personality, other non-criminal/antisocial activities in which psychopaths may engage should also be accounted for. It appears, however, that such an approach would be counterproductive and, in terms of research participation, unnecessarily time-consuming.

In consideration of the above, it seems that the PCL(-R) and its progeny, through concentrating on criminal/antisocial behaviours, do not grasp the essence of psychopathy, as conceptualized by Cleckley (1941). Further, we suggest that, instead of focusing on behaviours associated with psychopathy, be it criminal/antisocial or non-criminal/antisocial, which appear to be potential *outcomes* of the disorder and not its integral element, psychopathy inventories should only assess relevant psychological traits. It is also of paramount importance that such measures distinguish between Antisocial Personality Disorder (APD; American Psychiatric Association, 2013) and core psychopathy. A clean personality measure of psychopathy uncontaminated with behavioral features would enable researchers to extend the construct to all populations regardless of criminal history (Johansson *et al*., 2002). Accordingly, notwithstanding the role of the PCL-R and its progeny in forwarding scientific research into psychopathy and its measurement, new generation of research based upon solid theoretical grounds and which "distinguishes between personality deviation and social deviance" is needed (Skeem & Cooke, 2010b, p. 455).

Recommendations for future research

Given the inconsistencies amongst the PCL-R and SRP-III/SF factor analytic literature, there exists a need for providing a set of recommendations which would systemize future research. As such, we recommend that the following indications are used as an absolute minimum when assessing construct validity and dimensionality of psychopathy measures:

1. Confirmatory techniques should be used to test competing models derived on the basis of previous research and theory. It is unacceptable to assume that there is only one solution (e.g., four-factor correlated model). Such an approach to model testing may obscure the true nature of the dimensionality of the measures. Further, bi-factor conceptualization should be used as a comparison model because it helps to assess the validity of a single (or two) general factor, while also acknowledging and incorporating aspects of multidimensionality (grouping factors) (see Hyland, 2015; Reise, Moore, & Haviland, 2010 for more information on the application of bi-factor modeling in psychological research).

2. When the best model fit is multidimensional in nature, a differential predictive validity or alternative test (e.g., correlation with external variables) must be performed in order to verify whether the recognized factors correlate differently with external criteria (the choice of which must be guided by the theory). This issue is especially important when the latent factors are highly correlated (i.e., .50 and above). Very high correlations between factors (such as .70 and above) would indicate the possibility that they reflect the same concept. As suggested by Carmines and Zeller (1979), if highly correlated factors measure different dimensions, they should differently relate to external

variables. If differential predictive validity is not demonstrated, the proposed factorial solution may be yet another "statistical exercise" rather than a proper validation of construct.

3. When assessing the construct validity and dimensionality using the confirmatory factor analysis (CFA), the absolute minimum requirement is that the following fit indices (if available) are provided in order to make direct comparisons between the competing models: the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), the root-mean-square error of approximation (RMSEA; Steiger & Lind, 1980), and the standardized root-mean-square residual (SRMR; Bentler, 1995) (all of these are available in Mplus software). If researchers use maximum likelihood (ML) or maximum likelihood robust (MLR) estimators (not recommended with categorical data), they should also report either the Akaike information criterion (AIC) or the Bayesian information criterion (BIC).

4. More studies using *new* data sets of appropriate size should be conducted. As noted by Weaver *et al*. (2006), much of the research inquiring into the dimensionality of the PCL-R has been based upon samples of questionable size. The requirement of the CFA is that the sample used is of a moderate/large size (Kline, 2010); if this condition is not satisfied, findings may be misleading (Floyd & Widaman, 1995). The minimum sample size required should be calculated based on the number of indicators (test items) and latent factors (Soper, 2015). For example, to test a four-factor model of the PCL-R containing 20 items, the minimum sample size to detect effect is 387 (for the anticipated effect size .10, desired statistical power level .80, and

the probability level .05). For a bi-factor model comprised of two general and four grouping factors, the sample size required increases to 526.

5. While the use of parceling is acceptable when a scale contains a large number of items (such as in the case of the 64-item SRP-III), the employment of the technique with short scales (such as the PCL-R) is questionable and should be avoided.

6. Finally, composite reliability should be reported instead for internal consistency (Cronbach's alpha) in a latent variable modeling context (see Debowska *et al*., 2014, p. 235).

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.

Andershed, H., Kerr, M., Stattin, H., & Levander, S. (2002). Psychopathic traits in non-referred youths: A new assessment tool. In E. Blaauw & L. Sheridan (Eds.), *Psychopaths: Current international perspectives* (pp. 131–158). The Hague, The Netherlands: Elsevier.

Babiak, P., Neumann, C. S., & Hare, R. D. (2010). Corporate psychopathy: Talking the walk. *Behavioral Sciences and the Law*, *28*(2), 174-193.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 217*, 238-246.

Bentler, P .M. (1995). *EQS structural equations program manual.* Encino, CA: Multivariate Software.

Bishopp, D., & Hare, R. D. (2008). A multidimensional scaling analysis of the Hare PCL-R: Unfolding the structure of psychopathy. *Psychology, Crime, & Law, 14*(2), 117-132.

Blonigen, D. M., Hicks, B. M., Krueger, R. F., Patrick, C. J., & Iacono, W. G. (2006). Continuity and change in psychopathic traits as measured via normal-range personality: a longitudinal-biometric study. *Journal of Abnormal Psychology, 115*(1), 85-95.

Boduszek, D., Dhingra, D., Hyland, P., & Debowska, A. (2015). A bifactorial solution to the Psychopathy Checklist: Screening Version in a sample of civil psychiatric patients. *Criminal Behaviour and Mental Health*. DOI: 10.1002/cbm.1956

Bolt, D. M., Hare, R. D., Vitale, J. E., & Newman, J. P. (2004). A multigroup item response theory analysis of the Psychopathy Checklist-Revised. *Psychological Assessment, 16*(2), 155-168.

Brinkley, C. A., Schmitt, W. A., Smith, S. S., & Newman, J. P. (2001). Construct validation of a self-report psychopathy scale: does Levenson's self-report psychopathy scale measure the same constructs as Hare's psychopathy checklist-revised?. *Personality and Individual Differences, 31*(7), 1021-1038.

Byrne, B. M. (1994). *Structural equation modeling with EQS and EQS/ Windows.* London: Sage.

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and Validity Assessment*.

    Newbury Park, CA: Sage Publications.

Cattell, R. B., & Burdsal, C. A. (1975). The radial parcel double factoring design: A

    solution to the item-vs-parcel controversy. *Multivariate Behavioral Research,*

    10, 165-179.

Cleckley, H. (1941). *The mask of sanity* (1st ed.). St. Louis, MO: C.V. Mosby.

Coid, J., Yang, M., Ullrich, S., Roberts, A., & Hare, R. D. (2009). Prevalence and

    correlates of psychopathic traits in the household population of Great Britain.

    International Journal of Law and Psychiatry, *32*(2), 65-73.

Cooke, D. J., Kosson, D. S., & 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(4)*, 531–542.

Cooke, D. J., & Michie, C. (2001). Refining the construct of psychopathy: towards a

    hierarchical model. *Psychological assessment*, *13*(2), 171.

Cooke, D. J., Michie, C., Hart, S. D., & Clark, D. (2005a). Assessing psychopathy in

    the UK: concerns about cross-cultural generalisability. *The British Journal of*

    Psychiatry, *186*(4), 335-341.

Cooke, D. J., Michie, C., Hart, S. D., & Clark, D. (2005b). Searching for the pan-

    cultural core of psychopathic personality disorder. *Personality and Individual*

    Differences, *39*(2), 283-295.

Cooke, D. J., Michie, C., & Skeem, J. (2007). Understanding the structure of the

   Psychopathy Checklist–Revised: An exploration of methodological confusion.

   The British Journal of Psychiatry, *190*(49), s39-s50.

Cooke, D. J., & Logan, C. (2015). Capturing clinical complexity: Towards a

   personality-oriented measure of psychopathy. *Journal of Criminal Justice*.

   DOI: 10.1016/j.jcrimjus.2015.04.004

Corrado, R. R., DeLisi, M., Hart, S. D., & McCuish, E. C. (2015). Can the causal

   mechanisms underlying chronic, serious, and violent offending trajectories be

   elucidated using the psychopathy construct?. *Journal of Criminal Justice*.

   DOI: 10.1016/j.jcrimjus.2015.04.006

da Silva, D. R., Rijo, D., & Salekin, R. T. (2012). Child and adolescent psychopathy:

   A state-of-the-art reflection on the construct and etiological theories. *Journal

   of Criminal Justice*, *40*(4), 269-277.

Debowska, A., Boduszek, D., Kola, S., & Hyland, P. (2014). A bifactor model of the

   Polish version of the Hare Self-Report Psychopathy Scale. *Personality and

   Individual Differences*, *69*, 231-237.

Declercq, F., Carter, R., & Neumann, C. S. (2015). Assessing psychopathic traits and

   criminal behavior in a young adult female community sample using the Self-

   Report Psychopathy Scale. *Journal of Forensic Sciences*. DOI: 10.1111/1556-

   4029.12783

Dhingra, K., & Boduszek, D. (2013). Psychopathy and criminal Behaviour: A

   psychosocial research perspective. *Journal of Criminal Psychology, 3*(2), 83-

   107.

Edens, J. F., Skeem, J. L., Cruise, K. R., & Cauffman, E. (2001). Assessment of "juvenile psychopathy" and its association with violence: a critical review. *Behavioral Sciences & the Law*, *19*(1), 53-80.

Flores-Mendoza, C. E., Alvarenga, M. A. S., Herrero, Ó., & Abad, F. J. (2008). Factor structure and behavioural correlates of the Psychopathy Checklist-Revised [PCL-R] in a Brazilian prisoner sample. *Personality and Individual Differences*, *45*(7), 584-590.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, *7*(3), 286-299.

Forth, A. E., & Burke, H. C. (1998). Psychopathy in adolescence: Assessment, violence, and developmental precursors. In D. J. Cooke, A. E. Forth, & R. D. Hare (Eds.), *Psychopathy: Theory, research and implications for society* (pp. 205-229). Dordrecht, The Netherlands: Springer Netherlands.

Forth, A. E., & Mailloux, D. L. (2000). Psychopathy in youth: What do we know. In C. B. Gacono (Ed.), *The clinical and forensic assessment of psychopathy: A practitioner's guide* (pp. 25-54). Mahwah, NJ: Erlbaum.

Freeman, J. E., & Samson, F. (2012). Are you telling the truth? Psychopathy assessment and impression management in a community sample. *The Open Criminology Journal*, *5*, 16-23.

Furr, K. D. (1993). Prediction of sexual or violent recidivism among sexual offenders: A comparison of prediction instruments. *Annals of Sex Research*, *6*(4), 271-286.

Gill, D. J., & Crino, R. D. (2012). The relationship between psychopathy and age in a non-clinical community convenience sample. *Psychiatry, Psychology and Law*, *19*(4), 547-557.

Gordts, S., Uzieblo, K., Neumann, C. S., Van den Bussche, E., & Rossi, G. M. P. (in press). Validity of the Self-Report Psychopathy Scales (SRP-III full and short versions) in a community sample. *Assessment*.

Grann, M., Långström, N., Tengström, A., & Kullgren, G. (1999). Psychopathy (PCL-R) predicts violent recidivism among criminal offenders with personality disorders in Sweden. *Law and Human Behavior*, *23*(2), 205-217.

Guttman, R., & Greenbaum, C. W. (1998). Facet theory: Its development and current status. *European Psychologist, 3*(1), 13-36.

Hall, J. R., & Benning, S. D. (2007). The "successful" psychopath: Adaptive and subclinical manifestations of psychopathy in the general population. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 459 – 478). New York, NY: Guilford Press.

Hare, R.D. (1980). A research scale for the assessment of psychopathy in criminal populations. *Personality and Individual Differences, 1*(2), 111-119.

Hare, R.D. (1985). Comparison of procedures for the assessment of psychopathy. *Journal of Consulting and Clinical Psychology, 53*, 7-16.

Hare, R. D. (1991). *The Hare Psychopathy Checklist—Revised*. Toronto: Multi-Health Systems.

Hare, R. D. (2003). *The Hare Psychopathy Checklist—Revised. 2*. Toronto: Multi-
Health Systems.

Hare, R. D., & Neumann, C. (2005). Structural models of psychopathy. *Current
Psychiatry Reports, 7*(1), 57-64.

Hare, R.D., & Neumann, C.S. (2006). The PCL-R assessment of psychopathy:
Development, structural properties, and new directions. In C. Patrick
(Ed.), *Handbook of psychopathy* (pp. 58-90). New York: The Guilford
Press.

Hare, R.D., & Neumann, C.S. (2008). Psychopathy as a clinical and empirical
construct. *Annual Review of Clinical Psychology, 4,* 217-246.

Hare, R., D. & Neumann, C. (2010). The role of antisociality in the psychopathy
construct: Comment on Skeem and Cooke (2010). *Psychological Assessment,
22,* 446–454.

Harpur, T. J., Hakstian, A. R., & Hare, R. D. (1988). Factor structure of the
Psychopathy Checklist. *Journal of consulting and clinical psychology*, *56*(5),
741-747.

Harpur, T. J., Hare, R. D., & Hakstian, A. R. (1989). Two-factor conceptualization of
psychopathy: Construct validity and assessment implications. *Psychological
Assessment: A Journal of consulting and clinical Psychology*, *1*(1), 6.

Hart, S.D., Kropp, P. R., & Hare, R. D. (1988). Performance of male psychopaths
following conditional release from prison. *Journal of Consulting and Clinical
Psychology, 56*, 227-232.

Hassall, J., Boduszek, D., & Dhingra, K. (2015). Psychopathic traits of business and psychology students and their relationship to academic success. *Personality and Individual Differences*, *82*, 227-231.

Hildebrand, M., de Ruiter, C., de Vogel, V., & van der Wolf, P. (2002). Reliability and factor structure of the Dutch language version of Hare's Psychopathy Checklist-Revised. *International Journal of Forensic Mental Health, 1*(2), 139-154.

Hoyle, R. H. (1995). *Structural equation modeling: Concepts, issues and applications*. Thousand Oaks: Sage Publications.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

Hyland, P. (2015). Application of bifactor models in criminal psychology research: A guide to researchers. *Journal of Criminal Psychology, 5*(2), 65-74.

Johansson, P., Andershed, H., Kerr, M., & Levander, S. (2002). On the operationalization of psychopathy: further support for a three-faceted personality oriented model. *Acta Psychiatrica Scandinavica*, *106*(s412), 81-85.

Karpman, B. (1948). Conscience in the psychopath: Another version. *American Journal of Orthopsychiatry, 18*, 455-491.

Kim, S., & Hagtvet, K. A. (2003). The impact of misspecified item parceling on representing latent variables in covariance structure modeling: A simulation study. *Structural Equation Modeling*, *10*(1), 101-127.

Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.

Kosson, D. S., Smith, S. S., & Newman, J. P. (1990). Evaluating the construct validity of psychopathy in black and white male inmates: three preliminary studies. *Journal of Abnormal Psychology*, *99*(3), 250-259.

Lee, K., & Ashton, M. C. (2005). Psychopathy, Machiavellianism, and narcissism in the Five-Factor Model and the HEXACO model of personality structure. *Personality and Individual Differences, 38*(7), 1571-1582.

León-Mayer, E., Folino, J. O., Neumann, C., & Hare, R. D. (2015). The construct of psychopathy in a Chilean prison population. *Revista Brasileira de Psiquiatria*. Retrieved from http://www.scielo.br/pdf/rbp/2015nahead/1516-4446-rbp-1516-4446-2014-1540.pdf

Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a non-institutionalized population. *Journal of Personality and Social Psychology, 68,* 151–158.

Lilienfeld, S. O., & Arkowitz, H. (2007). What "psychopath" means. *Scientific American Mind*, *18*(6), 80-81.

Lilienfeld, S.O., & Fowler, K.A. (2007). The self report assessment of psychopathy: Problems, pitfalls, and promises. In C.J. Patrick (Ed.), *Handbook of psychopathy* (pp. 107-132). New York: The Guilford Press.

Lilienfeld, S. O., Waldman, I. D., Landfield, K., Watts, A. L., Rubenzer, S., &
Faschingbauer, T. R. (2012). Fearless dominance and the US presidency:
implications of psychopathic personality traits for successful and unsuccessful
political leadership. *Journal of Personality and Social Psychology*, *103*(3),
489-505.

Lilienfeld, S. O., & Widows, M. R. (2005). *Psychopathic Personality Inventory–
Revised: Professional manual*. Lutz, FL: Psychological Assessment
Resources.

Maas, C. J., Lensvelt-Mulders, G. J., & Hox, J. J. (2009). A multilevel multitrait-
multimethod analysis. *Methodology, 5*(3), 72-77.

Mahmut, M. K., Menictas, C., Stevenson, R. J., & Homewood, J. (2011). Validating
the factor structure of the Self-Report Psychopathy Scale in a community
sample. *Psychological Assessment*, *23*(3), 670.

McCuish, E. C., Corrado, R. R., Hart, S. D., & DeLisi, M. (2015). The role of
symptoms of psychopathy in persistent violence over the criminal career into
full adulthood. *Journal of Criminal Justice*. DOI:
10.1016/j.jcrimjus.2015.04.008

McDermott, P. A., Alterman, A. I., Cacciola, J. S., Rutherford, M. J., Newman, J. P.,
& Mulholland, E. M. (2000). Generality of Psychopathy Checklist—Revised
factors over prisoners and substance-dependent patients. *Journal of Consulting
and Clinical psychology*, *68*(1), 181.

Millon, T., Simonsen, E., & Birket-Smith, M. (1998). Historical conceptions of
psychopathy in the United States and Europe. In T. Millon, E. Simonsen, M.

Birket-Smith, & R.D. Davis (Eds.), *Psychopathy: Antisocial, criminal, and violent behaviour* (pp. 3-31). New York: Guilford.

Medina, P., Valdés-Sosa, M., García, L. G., Almeyda, S. V., & Couso, O. (2013). Reliability and validity of the Psychopathy Checklist-Revised (PCL-R) in a Cuban prison sample. *Salud Mental*, *36*, 439-444.

Meehl, P. (1992). Factors and taxa, traits and types, differences of degree and differences in kind. *Journal of Personality, 60*(1)*,* 117–174.

Mokros, A., Neumann, C. S., Stadtland, C., Osterheider, M., Nedopil, N., & Hare, R. D. (2011). Assessing measurement invariance of PCL-R assessments from file reviews of North American and German offenders. *International Journal of Law and Psychiatry*, *34*(1), 56-63.

Neal, T. M., & Sellbom, M. (2012). Examining the factor structure of the Hare self-report psychopathy scale. *Journal of Personality Assessment*, *94*(3), 244-253.

Neumann, C. S., Hare, R. D., & Johansson, P. T. (2013). The Psychopathy Checklist-Revised (PCL-R), low anxiety, and fearlessness: A structural equation modeling analysis. *Personality Disorders: Theory, Research, and Treatment, 4*(2), 129-137.

Neumann, C. S., Hare, R. D., & Newman, J. P. (2007). The super-ordinate nature of the Psychopathy Checklist-Revised. *Journal of Personality Disorders*, *21*(2), 102.

Neumann, C. S., Hare, R. D., & Pardini, D. A. (2014). Antisociality and the construct of psychopathy: data from across the globe. *Journal of Personality*. DOI: 10.1111/jopy.12127

Neumann, C. S., & Pardini, D. (2014). Factor structure and construct validity of the Self-Report Psychopathy (SRP) Scale and the Youth Psychopathic Traits Inventory (YPI) in young men. *Journal of Personality Disorders*, *28*(3), 419-433.

Neumann, C. S., Schmitt, D. S., Carter, R., Embley, I., & Hare, R. D. (2012). Psychopathic traits in females and males across the globe. *Behavioral Sciences and the Law*, *30*(5), 557-574.

Ogloff, J.R.P. (2006). Psychopathy/antisocial personality disorder. *Australian and New Zealand Journal of Psychiatry, 40*, 519-528.

O'Kane, A., Fawcett, D., & Blackburn, R. (1996). Psychopathy and moral reasoning: A comparison of two classifications. *Personality and Individual Differences*, *20*(4), 505-514.

Olver, M. E., & Wong, S. C. (2015). Short-and long-term recidivism prediction of the PCL-R and the effects of age: A 24-year follow-up. *Personality Disorders: Theory, Research, and Treatment*, *6*(1), 97-105.

Parada, R. (2000). *Adolescent Peer Relations Instrument: A theoretical and empirical basis for the measurement of participants roles in bullying and victimization of adolescence: An interim test manual and a research monograph: A test manual*. Publication Unit, Self-concept Enhancement and Learning Facilitation (SELF) Research Centre, University of Western Sydney.

Patrick, C. (2007). Back to the future: Cleckley as a guide to the next generation of psychopathy research. In C. Patrick (Ed.), *Handbook of psychopathy* (pp. 605–617). New York: Guilford Press.

Patrick, C. J., Hicks, B. M., Nichol, P. E., & Krueger, R. F. (2007). A bifactor approach to modeling the structure of the psychopathy checklist-revised. *Journal of Personality Disorders*, *21*(2), 118.

Paulhus, D.L., Neumann, C.S., & Hare, R.D. (in press). *Manual for the Self-Report Psychopathy Scale*. Toronto: Multi-Health Systems.

Poythress, N. G., Lilienfeld, S. O., Skeem, J. L., Douglas, K. S., Edens, J. F., Epstein, M., & Patrick, C. J. (2010). Using the PCL-R to help estimate the validity of two self-report measures of psychopathy with offenders. *Assessment*, *17*(2), 206-219.

Quinsey,V. L., Rice, M. E., & Harris, G. T. (1995). Actuarial prediction of sexual recidivism. *Journal of Interpersonal Violence, 10,* 85-105.

Reeve, C. L., & Lam, H. (2005). The psychometric paradox of practice effects due to retesting: Measurement invariance and stable ability estimates in the face of observed score changes. *Intelligence*, *33*(5), 535-549.

Reise, S.P., Moore, T.M., & Haviland, M.G. (2010). Bifactor models and rotations: Exploring the extent to which multidimensional data yield univocal scale scores. *Journal of Personality Assessment, 92*, 544-559.

Rice, M. E., & Harris, G. T. (1995). Violent recidivism: assessing predictive validity. *Journal of Consulting and Clinical Psychology*, *63*(5), 737.

Rice, M. E., Harris, G. T., & Quinsey, V. L. (1990). A follow-up of rapists assessed in a maximum security psychiatric facility. *Journal of lnterpersonal Violence,* 5, 435-448

Rogers R. (1995). *Diagnostic and structured interviewing: A handbook for psychologists*. PAR: Odessa, FL.

Rutherford, M. J., Cacciola, J. S., Alterman, A. I., & McKay, J. R. (1996). Reliability and validity of the Revised Psychopathy Checklist in women methadone patients. *Assessment*, *3*(2), 145-156.

Salekin, R. T., Rogers, R., & Sewell, K. W. (1996). A review and meta-analysis of the psychopathy checklist and psychopathy checklist-revised: predictive validity of dangerousness. *Clinical Psychology: Science and Practice*, *3*(3), 203-215.

Salekin, R. T., Rogers, R., & Sewell, K. W. (1997). Construct validity of psychopathy in a female offender sample: A multitrait–multimethod evaluation. *Journal of Abnormal Psychology*, *106*(4), 576-586.

Seibert, L. A., Miller, J. D., Few, L. R., Zeichner, A., & Lynam, D. R. (2011). An examination of the structure of self-report psychopathy measures and their relations with general traits and externalizing behaviors. *Personality Disorders: Theory, research, and treatment*, *2*(3), 193-208.

Serin, R. C. (1996). Violent recidivism in criminal psychopaths. *Law and Human Behavior*, *20*(2), 207.

Serin, R. C., & Amos, N. L. (1995). The role of psychopathy in the assessment of dangerousness. *International Journal of Law and Psychiatry*, *18*(2), 231-238.

Serin, R. C., Peters, R. D., & Barbaree, H. E. (1990). Predictors of psychopathy and release outcome in a criminal population. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *2*(4), 419.

Skeem, J. L., & Cooke, D. J. (2010a). Is criminal behavior a central component of psychopathy? Conceptual directions for resolving the debate. *Psychological Assessment, 22,* 433–445.

Skeem, J. L., & Cooke, D. J. (2010b). One measure does not a construct make: Directions toward reinvigorating psychopathy research—reply to Hare and Neumann (2010). *Psychological Assessment, 22*(2), 455-459.

Skeem, J. L., & Mulvey, E. P. (2001). Psychopathy and community violence among civil psychiatric patients: results from the MacArthur Violence Risk Assessment Study. *Journal of Consulting and Clinical Psychology*, *69*(3), 358-374.

Soper, D.S. (2015). *A-priori Sample Size Calculator for Structural Equation Models* [Software]. Available from http://www.danielsoper.com/statcalc

Steiger, J. H., & Lind, J. C. (1980, June). *Statistically based tests for the number of common factors.* Paper presented at the annual meeting of the Psychometric Society, Iowa City, IA (Vol. 758).

Tucker, L.R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*, 1-10.

Vitacco, M. J., Neumann, C. S., & Jackson, R. L. (2005a). Testing a four-factor model of psychopathy and its association with ethnicity, gender, intelligence, and violence. *Journal of Consulting and Clinical Psychology*, *73*(3), 466.

Vitacco, M. J., Rogers, R., Neumann, C. S., Harrison, K. S., & Vincent, G. (2005b). A comparison of factor models on the PCL-R with mentally disordered offenders

the development of a four-factor model. *Criminal Justice and Behavior*, *32*(5), 526-545.

Weaver, C. M., Meyer, R. G., Van Nort, J. J., & Tristan, L. (2006). Two-, three-, and four-factor PCL-R models in applied sex offender risk assessments. *Assessment, 13*(2), 208-216.

Weizmann-Henelius, G., Putkonen, H., Grönroos, M., Lindberg, N., Eronen, M., & Häkkänen-Nyholm, H. (2010). Examination of psychopathy in female homicide offenders—Confirmatory factor analysis of the PCL-R. *International Journal of Law and Psychiatry*, *33*(3), 177-183.

Williams, K.M., & Paulhus, D.L. (2004). Factor structure of the Self-Report Psychopathy scale (SRP-II) in non-forensic samples. *Personality and Individual Differences, 37*, 765-778.

Zwets, A. J., Hornsveld, R. H., Neumann, C., Muris, P., & van Marle, H. J. (2015). The four-factor model of the Psychopathy Checklist—Revised: Validation in a Dutch forensic inpatient sample. *International Journal of Law and Psychiatry*, *39*, 13-22.