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Latent profile analysis of psychopathic traits among homicide, general violent, property, and white-collar offenders

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Abstract

Purpose: The aim of this study was to identify meaningful subtypes of psychopathic traits among prisoners. Another aim was to estimate the association between psychopathy class membership and type of offending (homicide, general violent, property, and white-collar offences).

Methods: A systematically selected representative sample of 1,126 adult male prisoners completed a personality-based self-report measure of psychopathy, the Psychopathic Personality Traits Scale (PPTS).

Results: Latent profile analysis revealed five distinct classes of psychopathic traits: a "high psychopathy group" (7.1%)", a "moderate psychopathy group" (10.8%), a "high interpersonal manipulation group" (20.8%), a "moderate affective/cognitive responsiveness group" (16.8%), and a "low psychopathy group" (44.6%). Multinominal logistic regression showed that general violent offenders were most likely to belong in the high psychopathy group, whereas property and white-collar criminals were most likely to be the members of the high interpersonal manipulation group.

Conclusions: Findings suggest that most inmates, even those detained in maximum and medium security units, do not meet the diagnostic criteria for psychopathy. The significance of the present findings is discussed in relation to past and future research as well as clinical practice.

Key words: Psychopathy; Psychopathic Personality Traits Scale (PPTS); Latent profile analysis; Type of offenders; Prison study

Psychopathy is a multi-faceted personality disorder which is commonly presented to consist of a set of interpersonal (e.g., deceitfulness, superficial charm, grandiosity), affective (e.g., lack of empathy, remorse, or guilt), lifestyle (e.g. impulsivity, irresponsibility), and behavioral (e.g., social deviance, criminality) traits (Hare & Neumann, 2008). This conceptualization of psychopathy is usually assessed using the Psychopathy Checklist (PCL; Hare, 1980), its updated form, the Psychopathy Checklist – Revised (PCL-R; Hare, 1991, 2003), or the self-report equivalent, the Self-Report Psychopathy Scale (SRP; Hare, 1985)[1].

Psychopathy is frequently studied in relation to criminal and antisocial activities and, due to its predictive utility for such behavior, has been posited as a crucial psychological construct within the criminal justice system (see DeLisi, 2016; Hart & Hare, 1997). Indeed, the personality disorder has been revealed to 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) as well as sexual reoffending (Furr, 1993; Olver & Wong, 2015; Quinsey, Rice, & Harris, 1995; Rice, Harris, & Quinsey, 1990), and has been associated with higher rates of crime (Hicks, Vaidyanathan & Patrick, 2010). While the PCL-R-based estimated prevalence of psychopathy in the general population is between 0.3-2%[2] (males: 1-2%, females: 0.3-0.7%; Patrick & Drislane, 2015), the occurrence of psychopathy in the federal offender population is suggested to oscillate between 15–25% (Lilienfeld & Arkowitz, 2007; Woodworth & Porter, 2002). Those rates, however, were noted to differ for various types of offenders. For example, between 10-15% of violent and sexual offenders (Ogloff, 2006) and approximately 35% of homicide offenders

[1] The SRP-III, sometimes also referred to as SRP-IV, (Paulhus, Neumann, & Hare, 2016) is the most recent version of the scale.

[2] Nevertheless, it is worth to note here that Colins, Fanti, Salekin, and Andershed (2016), using latent profile analysis to identify subgroups of psychopathic personality among a large community sample, demonstrated that as much as 12% of respondents belonged in a psychopathic personality group.

(Hodgins, Mednick, Brenann, Schulsiger, & Engberg, 1996) were found to have elevated psychopathy scores.

Nonetheless, although the PCL-R scores were most often suggested to be best captured by a four-factor model, reflecting interpersonal, affective, lifestyle, and antisocial characteristics (e.g., León-Mayer, Folino, Neumann, & Hare, 2015; Mokros *et al*., 2011; Neumann, Hare, & Johansson, 2013; Neumann, Hare, & Pardini, 2014), studies into the prevalence of psychopathy tend to utilize total scale scores. Similarly, cut-off points used to diagnose the condition rely on the sum of scores rather than ratings obtained on these separate dimensions. Such an approach to measurement and diagnosis assumes variations in trait intensity (quantitative differences) but not in the constellation of psychopathic traits (qualitative differences) across individuals, which remains inconsistent with the literature (Colins, Fanti, Salekin, & Andershed, 2016). To elaborate, Karpman (1941) introduced the distinction between primary and secondary psychopathy, which differ in etiology and expression of symptoms. While secondary psychopaths act impulsively and their demeanor is driven by such negative emotions as hatred or anger, the behavior of primary psychopaths is more instrumental, cool, and intentional (Karpman, 1948). Arieti (1963), on the other hand, argued for psychopathy subtypes which vary in interpersonal and aggressive behaviors.

Given that various subtypes of psychopathy may be differentially associated with criminal and non-criminal behavior, the ability to distinguish between them appears vital for risk assessment, prevention, and treatment (Brinkley, Newman, Widiger & Lynam, 2004). In order to empirically test whether meaningful variants of psychopathy can be distinguished, some recent research has utilized model-based clustering and latent profile/class analysis. This resulted in recovering two (e.g., Claes *et al*., 2014; Drislane *et al*., 2014; Lee & Salekin, 2010; Skeem, Johansson, Andershed, Kerr, & Louden, 2007; Vaughn, Edens, Howard, & Smith, 2009), three (Dembo *et al*., 2007; Mokros *et al*., 2015), four (Dhingra, Boduszek, &

Kola-Palmer, 2015), five (Coid, Freestone, & Ullrich, 2012; Colins *et al*., 2016), or six (Falkenbach, Stern, & Creevy, 2014) subgroups of psychopathy, across criminal and non-criminal populations. To elaborate, the above cited research which recognized two variants was largely congruent with Karpman's (1948) primary and secondary psychopathy theory. Colins *et al*. (2016), using data obtained from 2,500 young Swedish adults (aged 20-24 years), identified a psychopathic personality group which, compared with four remaining types, demonstrated significantly higher levels of aggression, offending, internalizing problems, substance use, and maltreatment. Interestingly, females in the psychopathic personality group were more likely to report exposure to sexual abuse and emotional difficulties than their male counterparts. Further, in a study within a sample of adult male offenders, Mokros *et al*. (2015) proposed a solution with three latent classes. Although an eight-class solution was statistically superior (based on Bayesian information criterion; BIC), the researchers did not construe it as parsimonious. In another above-cited study which uncovered three latent classes of psychopathy among 203 incarcerated youths, the groups different quantitatively (low, moderate, and high psychopathy) but not qualitatively. High psychopathy class membership predicted increased criminal thinking scores (Dembo *et al*., 2007). Finally, some prior investigations were limited to samples of individuals whose psychopathy scores were particularly high ($\geq$ 27, as indexed using the PCL-R[3]) (e.g., Mokros *et al*., 2015; Skeem *et al*., 2007). Relying on the PCL-R total scores, however, could have led to exclusion of participants scoring high on core interpersonal/affective but low on lifestyle/antisocial traits of psychopathy, resulting in skewed findings.

In keeping with the abovementioned limitation, it has been suggested that the current formulation of psychopathy is weighted too heavily towards indicators of behavioral

[3] The threshold for diagnosing psychopathy suggested in the PCL-R manual is 30 (Hare, 2003).

expressions of the condition, such as deviancy and maladjustment, which could have led to an overestimation of psychopathy in prison samples (see Boduszek & Debowska, 2016 for a critical review; Edens, Skeem, Cruise, & Cauffman, 2001; Patrick, 2007; Patrick, Hicks, Nichol, & Krueger, 2007; Rogers, 1995). While some researchers perceive criminal/antisocial tendencies as an important part of the personality disorder (e.g., Hare & Neumann, 2005; Neumann *et al*., 2014), others have argued that such behavior may ensue from psychopathic personality traits (e.g., Boduszek & Debowska, 2016; Boduszek, Dhingra, Hyland, & Debowska, 2015; Cooke & Michie, 2001; Skeem & Cooke, 2010a, b).

Indeed, the behavior-based conception of psychopathy can be understood as tautological: "Why has this man done these terrible things? Because he is a psychopath. And how do you know that he is a psychopath? Because he has done these terrible things" (Ellard, 1988, p. 387). In response to this logical paradox, a novel personality-based conceptualization of psychopathy along with an associated measure, the Psychopathic Personality Traits Scale (PPTS; Boduszek, Debowska, Dhingra, & DeLisi, 2016), has been recently introduced. The PPTS consists of four dimensions: affective responsiveness, cognitive responsiveness, interpersonal manipulation, and egocentricity. Affective responsiveness measures respondents' empathy and emotional depth of reactions. Cognitive responsiveness assesses the ability to understand others' emotional states, mentally represent others' emotional processes, and engage with another person emotionally at a cognitive level. Interpersonal manipulation includes statements inquiring into superficial charm, grandiosity, and deceitfulness. The final factor, egocentricity, measures an individual's tendency to focus on own beliefs, attitudes, and interests. Importantly, the scale is uncontaminated with behavioral items and hence well-suited to be used among forensic and non-forensic populations.

The Present Study

It has been noted that psychopathy may be over-diagnosed in criminal populations due to (*a*) the widespread use of measures based upon behavioral conception of psychopathy (such as the PCL-R) and (*b*) the utilization of cut-off points derived from the sum of scores, which defies research suggesting that psychopathy is multi-dimensional in character (Boduszek & Debowska, 2016; Boduszek *et al*., 2015; Debowska, Boduszek, Kola, & Hyland, 2014; Kennealy, Skeem, Walters, & Camp, 2010). Although studies using person-centered advanced statistical techniques [4], such as mixture modelling, have the strength to identify qualitatively different subtypes of psychopathy and reveal how psychopathic traits are expressed across a range of populations, their usefulness relies heavily upon methods applied and interpretation of results.

To address limitations identified in prior research, the primary aim of the current study was to recover meaningful subtypes of psychopathy in a systematically selected representative sample of adult male prisoners, utilizing a personality-based psychopathy scale (PPTS; Boduszek *et al*., 2016) to assess the condition and latent profile analysis (LPA) to analyze the data. Since earlier LPA research included behavioral traits in psychopathy assessment, we did not formulate any *a priori* hypotheses in regard to the number of psychopathy variants, but we expected that a group scoring high on all four dimensions of psychopathy (i.e., affective responsiveness, cognitive responsiveness, interpersonal manipulation, and egocentricity) would be identified. We also predicted that this would be the least numerous group in the current analysis. In an attempt to verify the prevalence of psychopathy in forensic populations without relying on cut-off points calculated for total

[4] Person-oriented analyses, unlike variable-centered approaches, do not focus on associations between study variables; rather, they attempt to examine the ways in which numerous characteristics are configured within individuals (De Fruyt & De Clercq, 2014).

scores, another goal was to establish what percentage of inmates would be classed in the high psychopathy group. Lastly, prior research suggests significant differences in the condition intensity across various types of offenders (e.g., Hodgins *et al*., 1996: Ogloff, 2006), but little is known about qualitative disparities between them. Therefore, the final aim was to estimate the association between psychopathy class membership and type of offending.

Method

Sampling Procedure

In this study, we applied systematic sampling procedure to minimize sampling bias and maximize the generalizability of findings. According to the 2015 consensus, the prison population in the Republic of Poland consists of 76,145 inmates. There are 215 correctional units, including main prisons, remand prisons, and detention centers. For the purpose of the study, we only approached male inmates from randomly selected five maximum and five medium security prisons. Access to those prisons was granted by regional prison wardens. Printed self-reported anonymous surveys were delivered to all prisons and systematically distributed among inmates (stratification based on prison blocks and level of recidivism). Data collection occurred in inmates' living units and was monitored by one trained prison personnel on each block/wing (training delivered by the authors). The prison personnel explained the nature and purpose of the study and provided a summary of the informed consent. Given inmates' standing as a vulnerable population and the potential that they may feel compelled to participate, it was made clear both in the consent form and verbally that participation was voluntary. Inmates were also informed verbally that they should not participate in the study if they could not read; but providing specific reasons for not participating was not required. Prisoners consenting to participate were told that all information they provided in this study was anonymous. Respondents were instructed to

place completed surveys in envelopes and return them to a data collector. Inmates from medium security units could also place the surveys in a correspondence box which was available on each prison block. Completed surveys were collected from all participating prisons by the research team and posted to the home university in the United Kingdom.

Sample

The sample size consisted of 1,126 Polish adult male inmates. Participants ranged in age from 19 to 76 (M = 34.26, SD = 9.65, Mdn = 33, and Mode = 35). Six hundred and fifty-one (N = 651; 57.8%) participants were from maximum and 475 (42.2%) from medium security prisons. In terms of the type of crime committed, 393 were incarcerated for crimes against property (such as theft and burglary), 417 for general violent offences (such as assault, battery, sexual offences, and domestic violence), 199 for white-collar crimes, and 117 for homicide (all were single homicide offenders). Three hundred and sixty-four (N = 364) participants were in prison for the first time, 297 for the second time, 212 for the third time, 109 for the fourth time, and 144 respondents were in prison five times or more (range from 1 to 17 times, M = 2.66, SD = 1.95, Mdn = 2, Mode = 1). The sample consisted of 307 inmates having primary education only, 192 with junior high education, 151 with high school education, 381 with vocational qualifications, 58 with a technical college degree, 30 with a university degree, and seven participants did not indicate their level of education. Five hundred and fifty-one (N = 551) prisoners reported being single, 381 in a relationship, 168 divorced/separated, and 26 widowed. Seven hundred and forty-two (N = 742) were raised by both parents, 228 by mother only, 33 by father only, 46 by relatives, 26 by foster parents, and 51 were raised in a child care home.

Measures

Psychopathic Personality Traits Scale (PPTS; Boduszek *et al*., 2016) is a personality-based self-reported 20-item measure designed to assess psychopathic traits in forensic and non-forensic populations. The scale was developed to measure four factors labelled affective responsiveness (Factor 1), cognitive responsiveness (Factor 2), interpersonal manipulation (Factor 3), and egocentricity (Factor 4). Each subscale consists of five items measured using "*agree"* (1) and "*disagree"* (0) format (i.e., a trait is either present or absent). Scores range from 0 to 20, with higher scores indicating increased levels of psychopathic personality traits. Sample scale items include: "I don't care if I upset someone to get what I want." (affective responsiveness); "Before criticizing somebody, I try to imagine and understand how it would make them feel." (cognitive responsiveness); "I know how to pay someone compliments to get something out of them." (interpersonal manipulation); "In general, I'm only willing to help other people if doing so will benefit me as well." (egocentricity). Six scale items are reverse-scored. Internal reliability of the PPTS factors was assessed using composite reliability. Results suggest that all four psychopathy factors (affective responsiveness = .86, cognitive responsiveness = .76, interpersonal manipulation = .84, and egocentricity = .69) demonstrate good internal reliability.

Lie scale (Francis, Brown, & Philipchalk, 1992) is a 6-item subscale of the Eysenck Personality Questionnaire Revised-Abbreviated (EPQR-A) devised to control for social desirability bias. It is scored on a Yes (1) / No (0) format.

All questionnaires used in the present study were translated to Polish by a professional translator. Next, the Polish versions were translated back to English to ensure that the meaning of the original inventories has been retained. Both original translations and

back-translations were then shown to three experts in translation who suggested minor changes.

Analysis

Latent profile analysis (LPA) was used to identify homogeneous groups (latent classes) from large prison data using four dimensions of the PPTS. A two-stage procedure was applied. First, LPA was conducted to determine the number of psychopathy classes and verify whether they differed qualitatively or quantitatively. The LPA part of the model used four total psychopathy scores for each of the four psychopathy dimensions of the PPTS (affective responsiveness, cognitive responsiveness, interpersonal manipulation, and egocentricity). Second, using a multinomial logistic regression, we assessed the association between latent classes of psychopathy and type of offending (property, general violent, white-collar, and homicide offences).

Six alternative models were assessed (a 1-class model through to a 6-class model) using robust maximum likelihood (Yuan & Bentler, 2000). To avoid solutions based on local maxima, 500 random sets of starting values were used initially and 100 final stage optimizations. The relative fit of the models was compared using the Akaike Information Criterion (AIC; Akaike, 1987), the Bayesian Information Criterion (BIC; Schwartz, 1978), and sample size adjusted Bayesian Information Criterion (SSA-BIC; Sclove, 1987). The model with the lowest value indicates the best latent profile solution. Strong evidence from simulation studies have suggested that the BIC is the best information criterion for identifying the correct number of latent classes (Nylund, Asparouhov, & Muthén, 2007). We also calculated entropy value which indicates the ability of the model to correctly classify participants, with higher value indicating better classification (Ramaswamy, DeSarbo, Reibstein, & Robinson, 1993). In addition, the Lo-Mendell-Rubin adjusted likelihood ratio

test (LRT; Lo, Mendell, & Rubin, 2001) was used to compare models with increasing numbers of latent classes. A non-significant value ($p > .05$) suggests that the model with one less class should be accepted. All analyses were conducted using M*plus* version 7.4 (Muthén & Muthén, 1998-2015).

Results

The fit statistics for the LPA of psychopathy are presented in Table 1 below. The lowest BIC value is observed for the 5-class solution and the Lo-Mendell-Rubin's adjusted likelihood ratio test shows that there is no significant improvement in fit for the 6-class solution. The entropy test confirms the supremacy of the 5-class solution over alternative solutions. On the basis of these statistics, the 5-class solution is considered the best fitting model.

Table 1 *Fit Indices for the Latent Profile Analysis of the Four Psychopathy Factors*

Model	**AIC**	**BIC**	**SSA-BIC**	**LRT**	***p***	**Entropy**
1 class	15106.201	15146.032	15120.624	N/A	N/A	N/A
2 classes	14389.666	14454.395	14413.105	706.29	< .001	.864
3 classes	14085.658	14175.282	14118.111	17.84	< .001	.840
4 classes	13982.899	14097.419	14024.367	28.20	.021	.809
5 classes	13853.480	13992.896	13903.962	33.72	.025	.903
6 classes	13753.464	13997.776	13812.962	74.28	.143	.846

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; SSA-BIC = sample size adjusted BIC; LRT = Lo-Mendell-Rubin's adjusted likelihood ratio test.

Figure 1 shows the profile plot for the 5-class solution (means and standard deviations are presented in Table 2). Class 1 (44.6% of prisoners) is the largest group. It is characterized by low mean scores on all four psychopathy dimensions and is labelled the "low psychopathy group". Class 2 (16.8% of prisoners) is characterized by moderate mean scores on affective and cognitive responsiveness and relatively low on interpersonal manipulation and egocentricity. This class is labelled the "moderate affective/cognitive responsiveness group". Class 3 (20.8% of prisoners) is characterized by low mean scores on affective responsiveness, cognitive responsiveness, and egocentricity and high on interpersonal manipulation. This class is labelled the "high interpersonal manipulation group". Class 4 (10.8% of prisoners) is characterized by moderate mean scores on affective responsiveness, cognitive responsiveness, and egocentricity and high interpersonal manipulation. This class is labelled the "moderate psychopathy group". Class 5 (7.1% of prisoners) is the smallest group. It is characterized by very high mean scores on affective responsiveness, moderate cognitive responsiveness, and high interpersonal manipulation and egocentricity. This class is labelled the "high psychopathy group".

Table 2 *Means (Standard Deviations) for the 5-class Solution of the Psychopathic Personality Traits Scale (PPTS)*

Means	**AR**	**CR**	**IPM**	**Ego**
Class 1	.33 (.57)	1.08 (1.42)	.83 (.91)	1.27 (1.13)
Class 2	2.31 (.57)	2.64 (1.42)	.99 (.91)	1.71 (1.13)
Class 3	2.22 (.57)	2.07 (1.42)	3.61 (.91)	3.12 (1.13)
Class 4	4.47 (.57)	2.64 (1.42)	3.67 (.91)	3.71 (1.13)
Class 5	.47 (.57)	1.04 (1.42)	3.51 (.91)	1.94 (1.13)

Note. AR = Affective responsiveness; CR = Cognitive responsiveness; IPM = Interpersonal manipulation; Ego = Egocentricity.

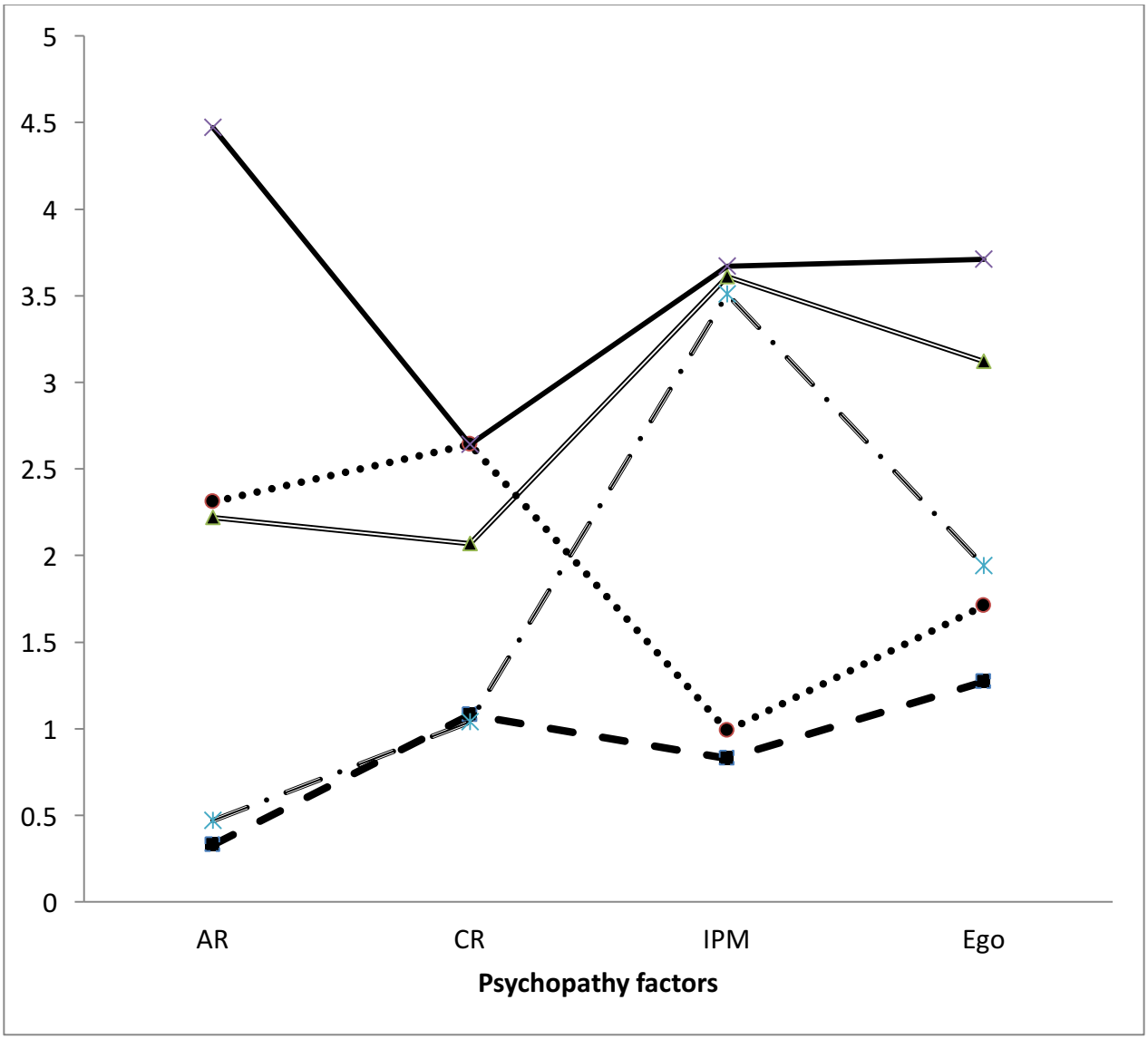

Figure 1. Latent profile analysis plot of psychopathic traits. Dashed line - Class 1 = "low psychopathy group" (reference group; 44.6% of cases); Dotted line - Class 2 = "moderate emotional/cognitive responsiveness group" (16.8% of cases); Double dashed/dotted line - Class 3 = "high interpersonal manipulation group"; double solid line - Class 4 = "moderate psychopathy group"; solid line - Class 5 = "high psychopathy group"; AR = Affective responsiveness; CR = Cognitive responsiveness; IPM = Interpersonal manipulation: Ego = Egocentricity.

The association between psychopathy class membership and type of offending was estimated using a multinomial logistic regression (see Table 3). The "low psychopathy group" (class 1) was a reference category. Results suggest that prisoners with moderate scores on affective and cognitive responsiveness (class 2) are significantly less likely to be homicide offenders (OR = .45, 95% CI = .20/.99, $p < .05$) in comparison to the "low psychopathy group" (class 1). Both white-collar criminals (OR = 2.05, 95% CI = 1.31/3.25, $p < .01$) and those engaging in property crime (OR = 1.91, 95% CI = 1.21/3.01, $p < .01$) are significantly more likely to belong in the "high interpersonal manipulation group" (class 3), comparing to the "low psychopathy group" (class 1). Finally, offenders characterized by very high mean scores on affective responsiveness, moderate cognitive responsiveness, and high interpersonal manipulation and egocentricity (class 5; the "high psychopathy group") are significantly more likely to engage in general violent offending (OR = 2.06, 95% CI = 1.22/3.49, $p < .01$) in comparison to inmates in class 1.

Table 3

Results from Multinomial Logistic Regression (Associations between the 5 Latent Classes and Offending Type)

Offending type	**2 vs 1 OR (CI 95%)**	**3 vs 1 OR (CI 95%)**	**4 vs 1 OR (CI 95%)**	**5 vs 1 OR (CI 95%)**
White-collar	.60 (.33/.1.09)	2.05** (1.31/3.25)	.50 (.20/1.21)	1.32 (.69/2.55)
Homicide	.45* (.20/.99)	.59 (.28/1.22)	1.32 (.68/2.55)	.51 (.18/1.43)
Property	.92 (.60/1.41)	1.91** (1.21/3.01)	1.68 (.93/3.02)	1.02 (.58/.79)
General violent	1.39 (.93/2.07)	1.06 (.71/1.59)	.88 (.50/1.57)	2.06** (1.22/3.49)

Note. Class 1 = "low psychopathy group" (reference group); Class 2 = "moderate emotional/cognitive responsiveness group"; Class 3 = "high interpersonal manipulation group"; Class 4 = "moderate psychopathy group"; Class 5 = "high psychopathy group"; OR = Odds Ratio; 95% CI = 95% Confidence Interval. * $p < .05$; ** $p < .01$.

Discussion

In spite of the fact that some prior research employed person-oriented methodology to examine the patterns of co-occurrence of psychopathic traits among forensic (e.g., Dhingra *et al*., 2015; Mokros *et al*., 2015) and non-forensic (e.g., Coid *et al*., 2012; Colins *et al*., 2016) populations, those past studies utilized measures grounded upon behavioral conception of psychopathy (i.e., those including items inquiring into antisocial behavior and/or impulsivity). As such, the current study was the first to profile respondents based on personality-derived psychopathy dimensions. Using latent profile analysis (LPA), we identified five meaningful permutations of psychopathic traits among a systematically selected representative sample of prisoners, including a high psychopathy group with elevated scores on all factors (affective responsiveness, cognitive responsiveness, interpersonal manipulation, and egocentricity). Differential associations between psychopathy class membership and type of offending were revealed.

The results of LPA yielded a 5-class solution, suggesting that psychopathy should be construed as a continuum, with varying levels of each dimension across individuals, rather than a dichotomous entity (see Shevlin, Murphy, Dorahy, & Adamson, 2007). Class 1 was characterized by low mean scores on all four personality-based psychopathy dimensions and hence has been labelled the "low psychopathy group". Consisting of 44.6% of prisoners, this was the largest group in the current analysis. The present results are supportive of some previous research applying person-centered analytic techniques. Specifically, Colins *et al*. (2016) found a non-psychopathic group scoring below average on three psychopathy dimensions (grandiose-manipulative, callous-unemotional, and impulsive-irresponsible; as indexed using the Youth Psychopathic Traits Inventory-Short version; van Baardewijk *et al*., 2010). In another study within a sample of 810 civil psychiatric patients, Dhingra *et al*. (2015) also recovered the normative class, however, it incorporated merely 26.3% of all

participants. Yet, this disparity may be due to methodological discrepancies between the past and current research. Namely, psychopathy in Dhingra *et al*.'s study was measured using the Psychopathy Checklist: Short version (PCL:SV; Hart, Cox, & Hare 1995), which reflects interpersonal, affective, lifestyle, and antisocial dimensions. Profiling respondents with an increased risk for aggression and violence utilizing behavioral psychopathy measures, could have led to under-inclusion of participants in the normative group. To corroborate, Dhingra *et al*. (2015) also retrieved a group with low scores on interpersonal/affective factors and high scores on lifestyle/antisocial factors, incorporating nearly one third of all respondents. It appears that, should the behavioral dimensions be excluded from the analysis, the number of participants within the normative group could be increased by further 31.3%.

Class 2 in the current study was characterized by moderate mean scores on affective and cognitive responsiveness and relatively low ratings on interpersonal manipulation and egocentricity. This group was labelled the "moderate affective/cognitive responsiveness group" and included 16.8% of prisoners. Correspondingly, a group of adults with elevated scores on callous/unemotional (CU) traits and below average scores on grandiose-manipulative and impulsive-irresponsible dimensions was recovered by Colins *et al*. (2016); however, unlike in the current sample, CU characteristics for the group were more pronounced than for any other group in the study. Since Colins *et al.* recruited community adults, it may be that configurations of psychopathic traits differ for forensic and non-forensic populations. Albeit noteworthy, the finding that qualitatively diverse permutations of psychopathy may exist across populations needs to be verified by further studies employing a similar research methodology.

Prior investigations among both incarcerated (Mokros *et al*., 2015) and non-incarcerated samples (Coid *et al*., 2012; Colins *et al*., 2016) distinguished a psychopathy subtype characterized by elevated scores on interpersonal manipulation. Coid *et al*. (2012)

labelled this specific cluster the "successful psychopath". Its members were found to have high IQ scores, low involvement with the criminal justice system (as measured through the number of convictions and imprisonments), and to be of a higher social class. The present results are in keeping with past research. Specifically, we identified the "high interpersonal manipulation group" (class 3; 20.8% of prisoners), characterized by low mean scores on affective responsiveness, cognitive responsiveness, and egocentricity and high on interpersonal manipulation. Inmates in this class were significantly more likely to be convicted of property offences than those in class 1. Consistent with earlier findings in regard to socioeconomic status of individuals with such traits, offenders in class 3, compared with class 1, were also more likely to engage in white-collar crime, which may be indicative of a higher social class background.

Further, similar ratings on affective and cognitive responsiveness to those noted for class 2 in the present analysis were recorded for prisoners in class 4; yet this particular group was also distinguished by moderate mean scores on egocentricity and high interpersonal manipulation (the "moderate psychopathy group"; 10.8% of inmates). A psychopathy subtype with moderate ratings on most psychopathy dimensions (the intermediate psychopathy group) was also retrieved by Dhingra *et al*. (2015). The moderate psychopathy subtype in both the current and Dhingra *et al*.'s research, largely mirrored the shape of the probabilities recorded for the "high psychopathy group" (class 5), differing primarily in the magnitude of factor scores. There was no specific type of offending most likely to be associated with this group, compared with the reference category (class 1).

Finally, in line with our predictions, the "high psychopathy group" (class 5; with very high mean scores on affective responsiveness, moderate cognitive responsiveness, and high interpersonal manipulation and egocentricity) was identified. This group constituted the smallest of all classes (7.1% of prisoners), which indicates that most inmates, even those

detained in maximum and medium security units, do not meet the diagnostic criteria for psychopathy[5]. High psychopathy groups were earlier extracted by Colins *et al*. (2016) and Dhingra *et al*. (2015); however, the class membership in the latter study amounted to 26.4%. As explained above, Dhingra *et al*. profiled respondents using a behavioral measure of psychopathy (the PCL:SV) and hence the current results are not directly comparable with this earlier research. Nonetheless, it appears that the high rates of psychopathy reported for some populations (those incarcerated and institutionalized in particular) may be accounted for by the inclusion of indicators of behavioral expressions of the condition (Boduszek & Debowska, 2016; Edens *et al*., 2001; Patrick, 2007; Patrick *et al*., 2007; Rogers, 1995).

Pursuant to DeLisi's (2016) general theory of crime, the high psychopathy class membership in the present investigation was associated with general violent offending. Correspondingly, Colins *et al*. (2016) and Dhingra *et al*. (2015) reported the highest odds of violence perpetration among adults in the high psychopathy group. As such, individuals resorting to violent offending do not engage with others at emotional and cognitive level, and tend to consider own interest as paramount. Key to explaining this association may be the violence inhibition mechanism (VIM; see Blair, 1995 for a review), which is necessary for moral emotions, including empathy, remorse, and guilt, to develop. The absence of the mechanism, hence, is synonymous with the absence of moral emotions which inhibit aggressive behavior (Debowska, Boduszek, Hyland, & Goodson, 2014). Interestingly, although 35% of homicide offenders were previously estimated to meet the diagnostic criteria for psychopathy (e.g., Hodgins *et al*., 1996), no association between this type of offending and high psychopathy group membership was found in the current analysis. It appears that those earlier results could have been affected by the inclusion of behavioral rather that

[5] Of note, previous research in psychopathological behaviour suggested that only approximately 5% of population can be classed in the most extreme group (Moffitt, 1993; Vaughn *et al.*, 2011; Vaughn, Salas-Wright, DeLisi, & Maynard, 2014).

interpersonal/affective psychopathy dimensions. It must also be noted here that some past as well as the present homicide samples included inmates sentenced for both manslaughter and murder, i.e., individuals *with* (the latter group) and *without* (the former group) the *intent* to kill. Given this crucial psychological distinction, it seems that the proportion of each offender type in the total sample used can have a profound impact on overall findings. Thus, it is recommended that future studies treat such offenders as two separate groups.

The present study should be interpreted in the context of several limitations. First, the use of self-report data among a sample of prisoners whose command of language may be poor, could have introduced several well-known limitations, such as response bias. Given psychopaths' increased manipulativeness, the use of a self-report psychopathy measure could have also resulted in skewed findings. However, the same limitation pertains to evaluations performed by trained raters, who may be misled by skilled assessees. Still, it is recommended that future research focuses on developing a personality-based psychopathy checklist to counter the problems associated with self-report questionnaires. Second, we only recruited a sample of male inmates. Although Colins *et al*. (2016) demonstrated that subtypes of psychopathy do not differ for the two genders among community participants, future studies should explore whether psychopathy profiles remain invariant for male and female offenders. Additionally, the current study found no association between psychopathy and homicide offending, but we did not distinguish between the types of homicides. To build on this interesting result, future psychopathy profiling research should aim to assess whether certain forms of homicide (e.g., gang homicide, sexual homicide, armed robbery homicide) are more likely to be perpetrated by offenders scoring high on all psychopathy dimensions. Lastly, prior research suggested that participants' IQ scores may be a decisive factor in the expression of psychopathic traits and associated behaviors (see Bate, Boduszek, Dhingra, &

Bale, 2014; Boduszek *et al*., 2016). As such, future examinations of psychopathy profiles among both forensic and non-forensic populations should control for this important aspect.

Despite these limitations, the present research has some important strengths and practical implications. First, this was the first study to profile individuals based on a personality-derived psychopathy assessment. This is important because the inclusion of lifestyle/antisocial factors in psychopathy measurement could have led to over-diagnosing the disorder among criminal samples (Boduszek & Debowska, 2016; Edens *et al*., 2001; Patrick, 2007; Patrick *et al*., 2007; Rogers, 1995). Second, since psychopathy is multi-dimensional in character, we did not limit the analysis to participants scoring particularly high on the total psychopathy scale. This enabled us to recover meaningful variants of psychopathic traits in a systematically selected representative sample of adult male prisoners and to establish how those subgroups are associated with offending behavior – a particularly vital finding for the development and provision of appropriate treatment and prevention programs as well as effective risk assessment. It also appears that interventions tailored to the specific needs of individuals representing different psychopathy subgroups would be beneficial. For example, offenders with high interpersonal manipulation, who are likely to commit financial offences and crimes against property, should engage in prison programs focused on demonstrating the inappropriateness of using such tactics for personal gain. Most notably, we revealed that the prevalence of psychopathy among individuals incarcerated in medium and maximum security prisons amounts to 7% of the total prison population and hence is *much lower* than previously speculated. Using a similar research methodology[6], Colins *et al*. (2016) found that as much as 12% of adults in the general population belong in a psychopathic personality group. This may indicate that the difference in intensity of psychopathic traits between forensic and non-

[6] With the exception of including some behavioral characteristics (i.e., impulsive-irresponsible traits) in the assessment of psychopathy, which could partly explain the high class membership rates.

forensic populations is not as pronounced as reported to date. In light of this, it is recommended that both researchers and practitioners urgently re-evaluate the currently utilized conceptualization of psychopathy and assessment methods. Additionally, psychopathy measures which index behavioral traits and rely on cut-off points for total scale ratings should be used with caution in clinical assessment of the condition.

To conclude, the present findings provide evidence for the existence of qualitatively distinct subgroups of psychopathy, which are differentially associated with white-collar, homicide, property, and general violent offences. Although some groups identified resemble those retrieved in earlier research, several dissimilarities between past and present findings may be due to the exclusion of behavioral aspects of psychopathy in the current study. Given the pioneering nature of this investigation with regard to the model of psychopathy employed, more studies are needed to verify whether the current results can be replicated using other samples and contexts.

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