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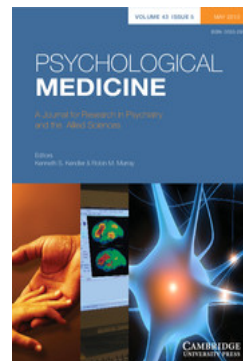
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# Intelligence and psychopathy: a correlational study on insane female offenders

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**Background.** The occurrence of a significant relationship between psychopathic traits and intelligence is still open to debate. Most of the relevant information has been obtained from crystallized IQ tests or on psychopathic male offenders. In this study we hypothesized a negative correlation between psychopathic traits and fluid intelligence on a sample of criminal female in-patients.

**Method.** We carried out a correlational study on a selected sample of 56 criminal female offenders. Variables that were measured include the Hare Psychopathy Checklist Revised (PCL-R) total score (and, separately, the scores from its four subscales: Interpersonal, Affective, Lifestyle and Antisocial) and fluid IQ measured by Raven's Progressive Matrices (RPM).

**Results.** Pearson's correlation between RPM IQ and total PCL-R score was negative ( $r_{54} = -0.55$ ,  $p < 0.001$ ); women with greater psychopathy traits (total PCL-R score) had lower IQ scores. Negative correlations were also found between IQ and the four PCL-R subscales, Interpersonal, Affective, Lifestyle and Antisocial ( $r_{54} = -0.35$ ,  $p < 0.01$ ,  $r_{54} = -0.52$ ,  $p < 0.001$ ,  $r_{54} = -0.53$ ,  $p < 0.001$ , and  $r_{54} = -0.49$ ,  $p < 0.001$  respectively).

**Conclusions.** The results indicate a general negative relationship between PCL-R and IQ, equally distributed across the four subcomponents of the psychopathic trait, and support the view that unsuccessful psychopathic women have poor planning and are unable to foresee and represent future consequences of their actions.

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**Key words:** Intelligence, PCL-R, psychopathic women, Raven's Progressive Matrices, violence.

## Introduction

Psychopathy is a severe disorder that involves a constellation of personality and behavioral anomalies, including interpersonal and emotional dysfunctions in addition to antisocial lifestyle and behavior. According to Cleckley (1976), psychopathic individuals are charming persons with a hypertrophic self-esteem but, at the same time, they are skillful manipulators, lacking both empathy and remorse. They are further characterized by shallow affect, impulsivity, poor behavior control and parasitic lifestyle, and are prone to persistent violations of social norms and expectations. Compared with offenders suffering from pure antisocial personality disorder (APD), psychopaths' emotional coldness predisposes them to commit violent crimes repeatedly (Blair, 1995; Lykken, 1995; Hare, 1996); according to Hart & Hare (1996), only one-third of APD offenders fulfill

psychopathy criteria. The international standard for the assessment of this disorder is the Psychopathy Checklist Revised (PCL-R; Hare, 2003). The issue of a possible relationship between intelligence and psychopathy is still controversial among researchers in the field; according to some of them, given psychopaths' great ability to fake, manipulate and injure others for their own advantage, their intelligence should be correlated positively with their level of psychopathy. Instead, according to other scientists, because in the long run criminal psychopaths are insensitive to repeated punishment and their ability to foresee the consequences of their actions and to make successful criminal plans is pathologically impaired and frustrated, lower intelligence scores should be associated with higher levels of psychopathy.

Past studies on criminal male offenders found significant associations between psychopathy, intelligence and violence (e.g. Holland *et al.* 1981; Heilbrun, 1982; Walsh *et al.* 2004). In their study, DeLisi *et al.* (2010) analysed a large sample of male and female psychiatric in-patients ( $n=840$ ) and found that participants who had higher levels of psychopathy [measured with the Psychopathy Checklist: Screening Version (PCL: SV)]

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had lower verbal intelligence as measured by the Wechsler Adult Intelligence Scale – Revised (WAIS-R) vocabulary subtest ( $r = -0.14$ ). Probably because of the general lower prevalence of psychopathy in female samples, very limited studies have been carried out on psychopathic women (for a review, see Nicholls *et al.* 2005) and only the study of Vitale *et al.* (2002) has analyzed the relationship between intelligence and PCL-R scores in non-psychotic female offenders. The authors found a negative weak relationship between intelligence and psychopathic traits, which was significant only for African American women ( $r = -0.13$ ) and not for Caucasian women (Vitale *et al.* 2002).

To explain inconsistencies across studies, some authors have suggested that the total PCL score is a complex, not unitary, construct to be used in a correlational design, and instead the two- or four-factor models and their corresponding subscales should be used (Vitacco *et al.* 2008). Indeed, factorial analysis of PCL has identified two main dimensions of psychopathy: the Emotional Detachment dimension (first factor, F1) and the Antisocial Behavior domain (second factor, F2; Harpur *et al.* 1988). Later, the two-factor model was further refined, so that the Emotional Detachment factor was split into an Interpersonal and an Affective component and the Antisocial Behavior factor was split into Lifestyle and Antisocial facets (Hare, 2003; Hare & Neumann, 2006).

Following this approach, Vitacco *et al.* (2008) found, in a sample of 100 incarcerated prisoners, a positive correlation between the Interpersonal and Antisocial components of psychopathy and intelligence measured with the Wechsler Abbreviated Scale of Intelligence (WASI;  $r = 0.70$  and  $r = 0.29$  respectively), whereas Affective and Lifestyle components were negatively associated with IQ ( $r = -0.72$  and  $r = -0.10$ , respectively).

The present study aimed to investigate the association between intelligence levels and psychopathy scores in a sample of criminal, insane, Italian females. Unlike most past studies that have used crystallized intelligence scales (e.g. the WAIS-R or the WASI), in which the scores on Verbal and Performance subscales are largely affected by education level or time constraints, we chose the fluid intelligence quotient (IQ) assessed by Raven's Progressive Matrices (RPM; Raven, 1938) to reduce interfering/confounding variables associated with possible low levels of patients' education or drug-related psychomotor slowing. On the basis of past literature on male, psychiatric, violent offenders (Walsh *et al.* 2004; DeLisi *et al.* 2010), and in line with the view that criminal psychopathy is related to poor planning and an inability to represent future outcomes of actions, we expected a significant,

negative correlation between patients' PCL-R (and its two- and four-factor subscales) and IQ scores.

## Method

Fifty-six criminal female in-patients were recruited from the Ospedale Psichiatrico Giudiziario (high-security psychiatric hospital for the criminally insane) of Castiglione delle Stiviere, Mantova, Italy, according to the following criteria: all patients had been convicted of violent criminal offenses, they were judged to be mentally insane<sup>†</sup>, and were all Caucasian. The psychiatrists who treated the patients explained the study procedure to them and ensured their mental competence in understanding and signing the informed consent to participate in the research. All patients were free from traumatic head injury or related neurological disorders, as demonstrated by their case histories and by negative magnetic resonance imaging/computed tomography (MRI/CT) scan assessment. Evaluation procedures were approved by the Ethics Committee of the Faculty of Psychology, University of Padova, and carried out in accordance with the ethical standards laid down in the Declaration of Helsinki.

The mean age of the patients was 39.0 years (S.D. = 9.8 years, range 22–77 years). Four of the 56 patients had a primary school qualification (i.e. 5 years), 26 a junior high-school qualification (i.e. 8 years), 19 a high-school qualification (i.e. five had 11 years, and 14 had 13 years), and two a university degree (i.e. 17 years). Psychiatrists were unable to determine the education level of five patients. All participants were convicted of personal offenses (20 patients for murder, nine for attempted murder, five for physical assault/personal injury, four for arson, three for domestic abuse, one for persecution, one for kidnapping, one for public damage, and one for extortion), armed threat/theft/robbery (10 patients) or drug holding/jailbreak (one patient). Psychiatric diagnoses were ascertained by the ward psychiatrists using the Structured Clinical Interview for DSM-IV (SCID). Psychiatric assessment classified 33 patients as being affected by personality disorders, 10 of whom by Borderline type (ICD-10 F60.3), nine Borderline/Antisocial type (ICD-10 F60.3/F60.2), six Antisocial type (ICD-10 F60.2), four Paranoid type (ICD-10 F60.0), two Histrionic type (ICD-10 F60.4), one Borderline/Histrionic type (ICD-10 F60.3/F60.4) and one Dependent type (ICD-10 F60.7). The other seven patients were classified as suffering from Major Depression (ICD-10 F34), of whom two had psychotic symptoms (ICD-10 F32.3), another six from Paranoid Schizophrenia (ICD-10 F20.0), three

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† The notes appear after the main text.

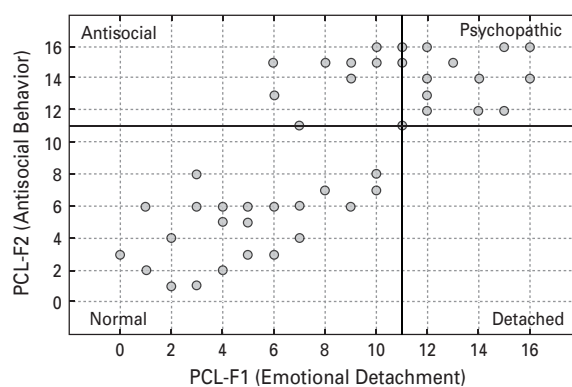
from Schizotypal Disorder (ICD-10 F21.0), three from Schizo-affective Disorder (ICD-10 F25.9), one of whom Bipolar type (ICD-10 F25.2), one from Dysthymia (ICD-10 F34.1), one Bipolar Disorder (ICD-10 F31.0), one Undifferentiated Schizophrenia (ICD-10 F20.3) and one Delusional Disorder (ICD-10 F22.0). On average, patients were mainly treated with anti-psychotic and benzodiazepines, and about one-third of patients also received antidepressant and mood-stabilizing drugs. With regard to psychological treatment, all patients underwent individual and group psychotherapy, including recreational activities such as painting or playing in comedy dramas.

Patients were screened to ascertain the presence of psychopathic traits according to the Italian version of the PCL-R. The ward psychiatrists assigned the PCL-R scores on the basis of patients' clinical symptoms and their past criminal career. For statistical purposes, PCL-R total scores and the two main factors Emotional Detachment (F1) and Antisocial Behavior (F2) were computed. We also investigated the two additional dimensions proposed in the four-factor model of psychopathy (Hare, 2003; Hare & Neumann, 2006), by rating the Interpersonal and Affective facets within the Emotional Detachment F1 factor and the Lifestyle and Antisocial components within the Antisocial Behavior F2 factor. A trained psychologist (D.S.), blind to patients' PCL-R scores, administered RPM to estimate the patients' IQ, which was corrected for patients' age. According to the Italian IQ norms obtained with a representative sample of 1123 male and female subjects aged between 11 and 70 years (Raven, 1999), the subject's age systematically affects the raw score of RPM: therefore, RPM IQ was corrected for age, in line with the Italian normative scores. The association between psychopathy and IQ was analyzed using Pearson's correlation.

## Results

According to the PCL-R cut-off criteria (a diagnosis of psychopathy is made when the PCL-R score is  $\geq 30$ , and a non-psychopathic diagnosis when it is  $< 20$ ), 21 out of 56 patients (37.5%) met the cut-off score of  $\geq 30$ , and were therefore classified as psychopathic; nine patients (16.1%) had 'borderline' scores (between 20 and 30) and 26 women (46.4%) were classified as non-psychopathic violent patients. The distribution of patients' PCL-R scores along the two main PCL factors, Emotional Detachment (F1) and Antisocial Behavior (F2), is shown in Fig. 1.

Patients who fell in the top right quadrant of Fig. 1 achieved high scores ( $> 11$ ) in both F1 and F2 and were classified as psychopathic criminals, whereas those who fell in the top left quadrant of Fig. 1 with



**Fig. 1.** Distribution of patients' Psychopathy Checklist Revised (PCL-R) scores along the continuum of the two main dimensions of psychopathy: Emotional Detachment (F1) and Antisocial Behavior (F2). All criminal women in the top right box fulfilled criteria for psychopathy.

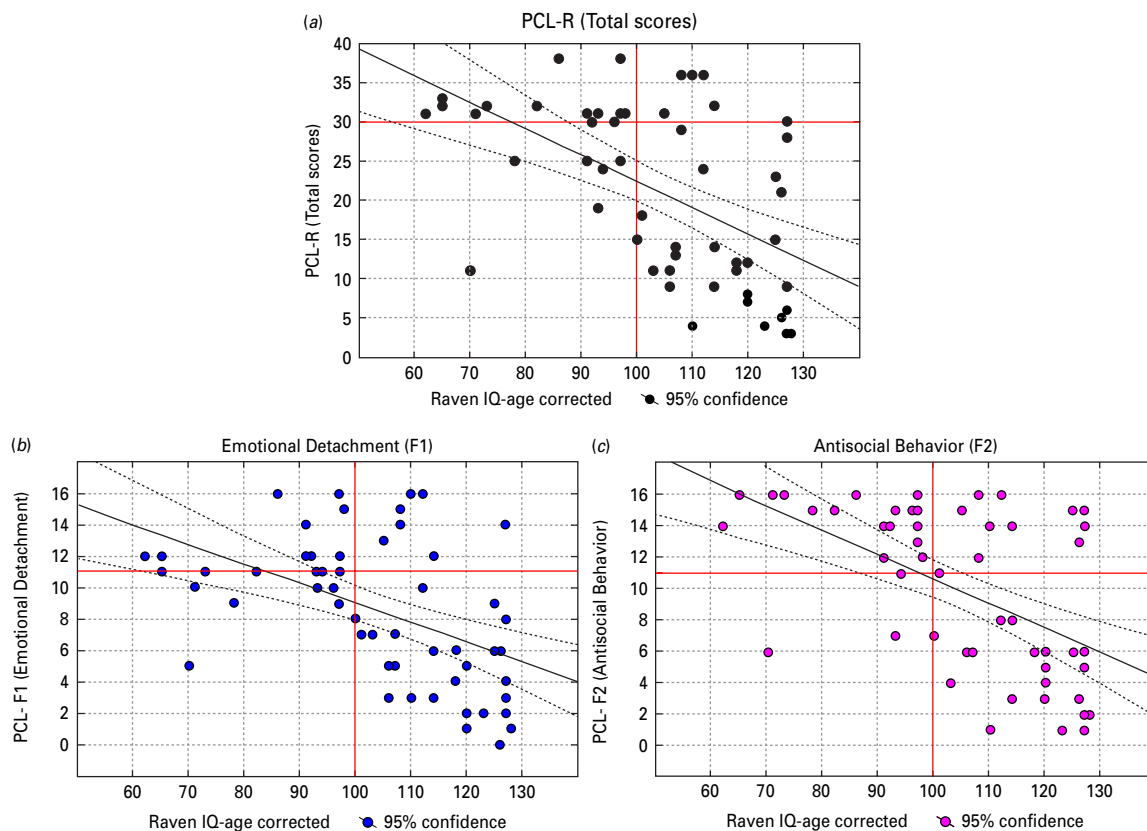
high scores in F2 but not in F1 were characterized by antisocial behavior without emotional detachment. There were no women showing high scores in F1 and low in F2, that is emotionally detached without antisocial behavior components (bottom right quadrant of Fig. 1), and about 45% of patients had low ( $\leq 8$ ) F1-F2 scores, a pattern that marks a lack of psychopathy traits.

A significant negative correlation was found between PCL-R total scores and RPM IQ age corrected ( $r_{54} = -0.55$ ,  $p < 0.001$ ); the higher the PCL-R total score, the lower the intelligence measured with RPM (Fig. 2 a). In addition, Pearson's correlations were significant when considering separately the two main PCL factors, Emotional Detachment (F1) and Antisocial Behavior (F2) ( $r_{54} = -0.50$ ,  $p < 0.001$  and  $r_{54} = -0.55$ ,  $p < 0.001$  respectively): the higher the emotional detachment (PCL-F1) and the antisocial behavior (PCL-F2), the lower the RPM IQ (Fig. 2 b, c).

We further factorized each of the two main PCL factors into their relative two subcomponents, the Interpersonal and Affective facets for the Emotional Detachment factor (F1) and the Lifestyle and Antisocial facets for the Antisocial Behavior factor (F2). All of these components were negatively correlated with RPM IQ age corrected ( $r_{54} = -0.35$ ,  $p < 0.01$ ,  $r_{54} = -0.52$ ,  $p < 0.001$ ,  $r_{54} = -0.53$ ,  $p < 0.001$ , and  $r_{54} = -0.49$ ,  $p < 0.001$  respectively), revealing that the higher the scores on Interpersonal, Affective, Lifestyle and Antisocial elements, the lower the IQ.

## Discussion

In the current study we analysed the association between intelligence and psychopathy in a sample of insane, female offenders, all convicted for violent crimes, including murder or attempted murder,



**Fig. 2.** Significant negative correlation between (a) patients' Psychopathy Checklist Revised (PCL-R) scores and Raven's Progressive Matrices (RPM) IQ ( $r_{54} = -0.55$ ,  $p < 0.001$ ); (b) patients' PCL-F1 (Emotional Detachment) scores and RPM IQ ( $r_{54} = -0.50$ ,  $p < 0.001$ ); and (c) patients' PCL-F2 (Antisocial Behavior) scores and RPM IQ ( $r_{54} = -0.55$ ,  $p < 0.001$ ).

physical assaults or personal injuries, and arson. In line with the main hypothesis that imprisoned psychopaths (also termed unsuccessful psychopaths) exhibit a reduced planning and learning capacity leading to irreducible failure, in female psychiatric patients we found a consistent negative correlation between PCL-R total/partial scores and RPM intelligence level: criminal women with the highest psychopathic traits had lower fluid IQ scores. One important issue concerns the test used to measure intelligence; in most of the past research on psychopathy, the WAIS (or its subtests) has been used. In the present study, the RPM was administered as it is faster and less influenced by culture and education level. However, these two IQ tools have shown a relatively high correlation in past literature, with an  $r$  value  $> 0.70$  between RPM IQ and WAIS Verbal and Performance IQ scores (e.g. McLeod & Rubin, 1962; Burke, 1972). Therefore, the two IQ tests are almost equivalent and most differences among all of the studies in this field should be explained mainly by other factors. In particular, a change in the direction of the correlation between PCL and IQ (negative *versus* positive) cannot be definitely attributed to differences between tools.

Despite the differences between our study and that of DeLisi *et al.* (2010) in the assessment of psychopathy (in the DeLisi study the PCL: SV was used) and IQ (RPM *versus* Vocabulary subtest of the WAIS-R), and in the samples of psychiatric in-patients studied, our negative correlation is in agreement with that of the DeLisi study. However, the effect size in the present study ( $r = -0.51$ ) was larger than that found ( $r = -0.13$ ) by DeLisi *et al.* (2010). This difference can be explained not only by the differences in the psychometric tools used but also by the fact that the previous study had a larger sample size, mixed genders and an unselected psychiatric population, all spurious variables affecting the extent of the correlation. In our study, the sample was smaller but it included only criminal insane women and for this reason it was expected to include a larger proportion of fully psychopathic women (representing 37.5% of the whole sample) and a larger variance in the PCL scores. The additional negative correlations of the PCL subscales and RPM IQ confirms that the patients' intelligence was associated equally with the Emotional Detachment and the Antisocial Behavior domains of psychopathy. The analysis of the four-factor subdivision of

PCL further strengthens the univocal direction of correlation in all subscales: lower IQ scores were significantly associated with high levels in all four PCL subscales (Interpersonal, Affective, Lifestyle and Antisocial), although a larger and comparable contribution was found for three facets: affective, lifestyle and antisocial. The correlation with the Interpersonal component of psychopathy was relatively weak with respect to the other three psychopathy dimensions, suggesting that the traits that defined this facet (i.e. superficial charm, grandiose sense of self-worth, pathological lying and manipulation) were less negatively associated with intelligence. In comparison with the study of Vitacco *et al.* (2008) in male inmates (using a different assessment of psychopathy, the PCL: SV, and the intelligence test, WASI IQ), our results revealed a good agreement for the Affective and Lifestyle components, which were negatively associated with full-scale IQ. By contrast, in the male sample, significant positive correlations were found between IQ scores and Interpersonal/Antisocial dimensions of psychopathy whereas, in our female sample, the association between IQ and these two factors was negative. These aspects of psychopathy partially overlap with narcissistic traits of personality. Because the Narcissistic Personality traits affect males (75%) more frequently than females, a possible interpretation of our findings is that the dimensions that entered the Interpersonal facet of Emotional Detachment depicted typical male characteristics. Thus, the association between high levels of Interpersonal PCL-R scores and low/high levels of intelligence for females and males respectively could be the result of a gender-biased construct, positively correlated with intelligence in men (i.e. the presence of narcissistic traits) and negatively correlated in women.

From the observed negative correlation it is possible to draw some final considerations. At a biological level, criminal psychopathy has been associated with both altered structure and impaired functional activity at the level of the prefrontal regions (Gorenstein, 1982; Gordon *et al.* 2004; Yang *et al.* 2005; Kiehl, 2006). Indeed, the prefrontal cortex subserves executive functions, impulsivity control, planning and cognitive flexibility, is necessary for effective decision making, action and perspective taking and learning from losses and punishment. These abilities are impaired not only in criminal imprisoned unsuccessful psychopaths but also in neurological patients affected by the pseudopsychopathy syndrome, which typically follows severe ventromedial and orbitofrontal cortex lesions (Blair & Cipolotti, 2000; Angrilli *et al.* 2008; Koenigs *et al.* 2010). Although at first glance, in laboratory testing, intelligence is spared in frontal lobe lesion pseudopsychopathic patients (Eslinger & Damasio, 1985;

Angrilli *et al.* 1999), in real-life situations, more related to fluid intelligence, it is severely affected (Shallice & Burgess, 1991). Intelligence measured by the WAIS has been found to be associated with an intact left frontoparietal network (Barbey *et al.* 2012). In accordance with this, a relationship between lower general intelligence and frontal lobe dysfunction has been reported in research on goal-directed behavior, and also healthy subjects may sometimes exhibit goal-neglect problems mainly due to novelty distraction, weak error feedback and concurrent task requirements (Duncan *et al.* 1996). Similar limits arise in criminal psychopaths as they are not able to remain on long-term legal goals and they tend to pursue immediate, impulsive rewards and goals without processing losses, failures and punishments (Hare, 1999). The present investigation supports this view by showing, in a sample of Caucasian criminal females, that high psychopathy traits are associated with lower IQ scores. As we used a correlational design, the results are obviously limited in that no causality can be inferred. Although this holds true for Caucasian criminal imprisoned women, our results cannot be generalized to other populations, nor do they contradict the alternative hypothesis in samples of successful (out of jail) psychopaths, for whom higher intelligence levels might be associated with higher levels of psychopathy and intact frontal functioning (Yang *et al.* 2005). Future research is needed to investigate the complex factors associated with successful *versus* unsuccessful psychopathy mediated by intelligence.

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### Declaration of Interest

None.

### Notes

<sup>1</sup> Article 2046 of the Italian Civil Code and Article 85 of the Italian Penal Code exclude responsibility by reason of insanity on the premise that if there is no *mens rea* because of insanity, there is no criminal responsibility. However, the guilty verdict (i.e. premeditated or unpremeditated attitude/behavior/criminal intent) is legally different from the responsibility (i.e. to be *non compos mentis*). In particular, the 'guilty but mentally ill' verdict *de facto* allows a person to be convicted for their crime but at the same time

requires a psychiatric evaluation of their insanity with respect to the crime; when the psychiatric examination attests a mental disorder falling within those included in Axis I of the DSM-IV-TR, the defendant is confined in a high-security psychiatric hospital for the criminally insane.

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