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# Cognition and psychopathy in incarcerated sexual offenders

## *Cognição e psicopatia em autores de violência sexual encarcerados*

Rodrigo Perissinotto<sup>1</sup> , Ana Cristina Resende<sup>2</sup> 

<sup>1</sup> Centro Universitário de Mineiros, Unidade Básica das Biociências, Curso de Medicina. Mineiros, Goiás, Brasil.

<sup>2</sup> Pontifícia Universidade Católica de Goiás, Escola de Ciências Sociais e da Saúde, Programa de Pós-Graduação em Psicologia. Goiânia, Goiás, Brasil. Correspondence to: A. C. RESENDE. E-mail: <[profa.resende@gmail.com](mailto:profa.resende@gmail.com)>.

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### Abstract

#### Objective

The objective was to investigate if perpetrators of sexual offenses against children and adolescents with and without psychopathy differ regarding cognitive aspects.

#### Method

A total of 30 male inmates participated in the study, divided into two groups: one that included psychopaths and the other with non-psychopaths. The instruments used were: protocol for collecting information on criminal court records; Rorschach test according to the Performance Assessment System, considering the cognitive variables and the Psychopathy Checklist-Revised Scale.

#### Results

The results indicate that psychopaths exhibit greater impairment in the organization of thoughts, as well as greater vulnerability to the general personality disruption. The best regression model showed that 55% of psychopathy can be explained by a greater propensity to a general personality disorder (EII-3  $\beta$ : 4.77;  $p$ -value < 0.001), associated with the predisposition to be arrested at a young age ( $\beta$ : -0.26;  $p$ -value = 0.004).

#### Conclusion

The efficiency of the R-PAS is observed in the identification of cognitive failures in psychopath perpetrators of sexual violence and perpetrators of sexual violence, and its usefulness is enhanced, when associated with other behavioral measures in the identification of this type of personality profile.

**Keywords:** Antisocial personality disorder; Reality testing; Rorschach test.

### Resumo

#### Objetivo

O objetivo foi investigar se autores de violência sexual contra crianças e adolescentes, com e sem psicopatia, se diferenciam em relação aos aspectos cognitivos.

#### Método

Participaram do estudo 30 reeducandos cumprindo pena em regime fechado, divididos em dois

*grupos: um composto pelos psicopatas e outro pelos não psicopatas. Os instrumentos utilizados foram: protocolo de coleta de informações no processo criminal; teste de Rorschach, de acordo com o Sistema de Avaliação por Performance, considerando as variáveis cognitivas, e; a escala Psychopathy Checklist-Revised.*

### **Resultados**

*Os resultados indicaram que o grupo de psicopatas apresentou maiores prejuízos na organização do pensamento, bem como maior vulnerabilidade à desorganização geral da personalidade. O melhor modelo de regressão identificou que 55% da psicopatia pode ser explicada por uma maior propensão ao desajuste geral da personalidade (EII-3  $\beta$ : 4.77;  $p$ -value < 0.001), associada à predisposição a ser preso ainda jovem ( $\beta$ : -0.26;  $p$ -value = 0.004).*

### **Conclusão**

*A eficiência do R-PAS é observada na identificação de falhas cognitivas em psicopatas autores de violência sexual e autores de violência sexual, e sua utilidade é potencializada, quando associada a outras medidas comportamentais na identificação desse tipo de perfil de personalidade.*

**Palavras-chave:** *Transtorno de personalidade antissocial; Teste de realidade; Teste de Rorschach.*

Psychopathy is a serious personality disorder, which involves some subtle cognitive impairments, which may be at the base of emotions and affections processing, as well as the impairment in interpersonal interactions. Those impairments that are associated with emotions and affections lead to insensitivity, lack of empathy, absence of remorse and guilt. On the other hand, those related to interpersonal interactions favor manipulation and pathological lying. All of these disorders are the core of psychopathy, and together they facilitate antisocial and criminal behavior (Salvador-Silva & Hauck Filho, 2020; Verschuere et al., 2018). In addition, psychopaths would have a general impairment in processing aversive stimuli, which cause them to have difficulties in changing their behavior, even in the face of punishment. In other words, they would have difficulties in learning from their experience. Consequently, they would be predisposed to have impairments in the development of morality, or a sense that certain types of behavior, such as cruelty, sexual perversion and casual aggression, represent dissonant forms of social behavior (Blair, 2017; Patrick, 2018; Yildirim & Derksen, 2015).

Still on the cognitive aspects, research data have shown that psychopaths have a low level of intelligence and cognitive flexibility, and they reveal deficits in the perception of less evident environmental details, caused by the hyperfocus on reward (Yildirim & Derksen, 2015). This selective inattention to the finer details predisposes them not to process contextual information that is outside this primary and explicit focus of attention. Thus, with a predisposition to fail to process information, these individuals would have difficulty in inhibiting their impulses (Baliousis et al., 2019; Patrick, 2018).

As the ability to process information is directly related to intelligence, intellectual impairments predispose the individual to criminality, to the failure in the predisposition to anticipate the consequences of their actions and the recognition of the suffering of others in different situations (Guay et al., 2005). Less intelligent psychopaths would resort to violence as a means of compensating for their inability to manipulate other people, and for that reason are the most impulsive. The most intelligent are more predisposed to plan and make better decisions, suffering less imprisonment episodes and time and violence, when used, would be premeditated, for the purpose of personal gain (Porter et al., 2018).

It is worth mentioning that psychopathy is associated with more criminal versatility and greater recidivism, but not necessarily with intelligence, as the study by Beggs and Grace (2008) points out. The authors observed that intelligence was a protective factor against recidivism, and that above-average intelligence lowered the risks associated with high Psychopathy

Checklist-Revised (PCL-R) scores. Therefore, the higher the intelligence quotient, even with high psychopathy scores, the lower the criminal recidivism rates.

Regarding sexual violence, a study conducted by Brown et al. (2015) pointed out that, in this type of crime, Perpetrators of Sexual Violence (PSVs), with psychopathic characteristics associated with some kind of sexual deviant interest, tended to be more dangerous and to have a higher rate of recidivism, when compared to non-psychopathic PSVs. In addition, the authors state that psychopathic PSVs tend to be less vulnerable to stressful situations, presenting a more opportunistic behavior, without a specific victim's target, which makes them more predisposed to sexually abuse anyone, both children and adults.

Research carried out using the Rorschach test corroborated the investigations, which noted that psychopaths had below average intelligence. That is, they revealed a simplistic and superficial processing, as well as a poor involvement with the reality around them, whether reflecting on situations or considering affects and feelings.

Studies carried out by Franks et al. (2009) and Gacono et al. (2011), who investigated psychopathy using the Rorschach test, showed that, in relation to engagement and information processing, psychopaths, when compared to other groups of non-psychopathic criminals or in relation to normative samples, have few efficient resources to get involved and face the slightly more stressful demands that life often imposes on people ( $R\downarrow$ ,  $M\downarrow$ ,  $WSumC\downarrow$ ,  $F\%\uparrow$ ). This characteristic favors the development of an avoidant style when coping with everyday situations. As a consequence, or being the cause of it, they usually do not adequately process the signs of stress in the environment, tending to ignore issues that would concern people in general. In addition, it is suggested that they have low imaginative capacity ( $Mp < Ma$ ), which would imply difficulties in performing mental rehearsals to solve problems in fantasy, which predisposes them to a more concrete type of thinking. In this way, they would find it difficult to restrain their violent impulses, and violence, when used, would have an ego-syntonic character (Franks et al., 2009).

In the same way that psychopaths are less prone to stress and anxiety, they are also not used to processing affects and emotions. Thus, they tend to have low receptivity to situations that mobilize affections and emotions, as well as to have difficulty in expressing and modulating their feelings ( $Afr\downarrow$ ;  $WSumC\downarrow$ ;  $FC < CF + C$ ), which predisposes them to emotional coldness (Dåderman & Jonson, 2008; Franks et al., 2009; Gacono et al., 2011).

The Rorschach Performance Assessment System (R-PAS) emerged as a development of the Rorschach in the Comprehensive System, the result of an extensive meta-analysis study. The new system has strong evidence of validity, especially with regard to variables that assess cognitive aspects (Mihura et al., 2013). Thus, when evaluating psychopathy with the R-PAS, questions regarding the way in which individuals get involved in the solutions of everyday problems, as well as the resources they mobilize for this purpose and the way they process information, could be observed from the analysis of the interpretive domain "Engagement and Cognitive Processing" variables (Meyer et al., 2017).

Regarding thinking and perception problems, research with the Rorschach has shown that psychopaths present impairments in the reality test, with more distorted and mistaken perceptions, either in relation to other criminals or in relation to the population in general ( $FQo\%\downarrow$ ,  $FQ-\%\uparrow$ ). In addition, they have distorted thoughts ( $WSum6\uparrow$ ), ranging from moderate to severe levels (Dåderman & Jonson, 2008; Gacono et al., 2011). In the R-PAS, issues related to the way individuals organize the logical flow of thoughts, the way they perceive reality and also the vulnerability to

psychopathological personality disruption, can be observed from the analysis of the variables of the interpretative domain “Problems of Perception and Thinking” (Meyer et al., 2017).

In view of the above, the following questions arise: is there any difference, in cognitive terms, between Psychopath Perpetrators of Sexual Violence (PPSV) and PSV? How much can psychopathy be explained considering cognitive performance? To answer these questions, the following objective was outlined: to assess whether the cognitive aspects of PPSV against children and adolescents are different from those of the PSVs.

In this way, some hypotheses are raised regarding the cognitive aspects of PPSVs, in comparison with non-psychopathic PSVs:

Hypothesis 1: PPSVs will have a worse performance than PSV in terms of engagement and cognitive processing, as well as perception and thinking characterized by: 1.1 fewer coping and engagement resources (MC); 1.2 More simplistic processing style (Complexity, F%, R, Sy, Blends); 1.3 general personality disruption (EII-3); 1.4 reality test losses (FQ-%, WD-%, TP-Comp); 1.5 thoughts disruption (WSumCog, SevCog).

Hypothesis 2: Psychopathy in PSVs is associated with cognitive performance.

## Method

### Participants

A total of 30 male inmates, serving sentences for sexual crimes against children and adolescents participated in this study. They were from the same prison in the Midwest region of Brazil, selected by the criterion of convenience from a population of 136 individuals who committed the same type of crime. Regarding education, the prevalence was of incomplete Elementary School (85.7%). As to the race, there was a prevalence of white and brown inmates (73.3%). These participants were divided into two groups, according to their PCL-R score: Group 1 (G1), considered psychopaths ( $N = 10$ ,  $PCL-R \geq 30$ ), and Group 2 (G2) – considered non-psychopaths ( $N = 20$ ,  $PCL-R < 30$ ). The participants of G1, when they were sentenced, were significantly younger, with a mean age of 28.4 years ( $SD = 7.6$ ;  $t = -2.3$ ;  $p = 0.029$ ), in comparison with those of G2, whose mean age when sentenced was 36.1 years ( $SD = 9.1$ ).

### Instruments

– *Protocol for the Collection of Information in the Criminal Case*: it was used to assist in the collection of criminal cases information, available at the prison registry office; the data sought were sociodemographic data (age, schooling, marital status, race/skin color, if they had children), and number of cases in which they were involved: total cases and number of cases for sexual violence.

– *Psychopathy Checklist-Revised (PCL-R)* (Morana, 2004): psychological test used to discriminate between participants in G1 (psychopathic PSVs) and G2 (non-psychopathic PSVs). The test has been developed by Robert Hare, in the United States, for the assessment of psychopathy, and adapted for Brazil by Morana (2004), for male forensic populations. The scale is composed of three parts: a semi-structured interview script, to be carried out with the person to be evaluated; a roadmap for investigating collateral information, and a 20-item three points (0, 1, 2) scale, which is filled in by the evaluator taking into account the collateral information and the information collected directly from the respondents. In this survey, collateral information was obtained only through

the participants' criminal proceedings. The scale score provides a dimensional assessment, that is, the extent to which the individual displays characteristic traits of psychopathy (Salvador-Silva & Hauck Filho, 2020). However, when used for diagnostic purposes, the American version of the scale uses a 30-point cutoff value to classify individuals as psychopaths and non-psychopaths. The Brazilian version suggests 23 points as the cutoff point. However, a more conservative 30 points cut-off point was chosen for this investigation following the American version and other studies in this field (Brown et al., 2015; Hare, 2003; Krstic et al., 2018).

– *Rorschach Performance Assessment System (R-PAS)* (Meyer et al., 2017): this is a psychological test composed of ten cards with inkblots, developed by Hermann Rorschach, in 1921, in Switzerland, to evaluate different personality aspects. It is applied individually, and requires test takers to identify what the inkblots produced look like in response to the question: "What does this look like?". When performing this task, the individuals being evaluated express associative-perceptive and representative contents of their way of thinking, feeling and acting on a daily basis. The R-PAS is composed of five interpretive domains, and in the present study, two domains associated with the cognitive aspects were investigated. The first domain is Engagement and Cognitive Processing, composed of 21 variables (Complexity, R, F%, Blend, Sy, MC, MC-PPD, M, M/MC, CF+C/SumC, W%, Dd%, SI, IntCont, Vg%, V, FD, R8910%, WSumC, C, Mp/[Ma+Mp]), that are associated with the individuals' productivity, their psychological resources for problem solving, flexibility, motivation and commitment with the information processing. The second domain, the Perception and Thinking Problems, is composed of 9 variables (EII-3, TP-Comp, WSumCog, SevCog, FQ-%, WD-%, FQo%, Popular e FQu%), that assess how conventional is the way individuals perceive and interpret the reality, how much they are able to understand the consequences of their actions and how organized and coherent their way of thinking is.

## Procedures

Initially, the project was approved by the officers in charge of the prison unit and by the Research Ethics Committee (CEP-SGC/PUC Goiás) under CAAE 0110.0.168.168-11. Subsequently, the screening of potential participants began; they were called, following the alphabetical order of the cases screened in the penitentiary registry, and they were explained the purpose of the survey. The inmates who agreed to volunteer signed the Free and Informed Consent Form and participated in two sessions. In the first session, lasting approximately 120 minutes, the PCL-R semi-structured interview was carried out, and in the second, lasting approximately 60 minutes, the R-PAS was applied.

After data collection, the tests were assessed according to their respective manuals. The PCL-R scale was scored by two investigators, based on the clinical interview and data obtained in the criminal case. Then, the PCL-R precision studies were carried out, through the internal scale consistency and the reliability between evaluators.

The scale's internal consistency was measured using Cronbach's Alpha coefficient the mean was 0.93 for all items, a value considered acceptable for a clinical scale. For the inter-rater reliability study, ten test protocols (33%) were forwarded to another investigator, and the Intraclass Correlation Coefficient (ICC) was calculated. The mean value of the ICC was 0.89, with a standard deviation of 0.22, ranging from 0.62 to 0.96. The ICC found was similar that found in studies of the scale adaptation to the Brazilian context (Morana, 2004), for a sample of prisoners.

The R-PAS protocols were coded by two in training investigators, under the supervision of a third experienced investigator. Ten R-PAS protocols (33%) were also forwarded to two investigators

from another research group, for the reliability study through the ICC. The result obtained was an average ICC of 0.86, with a standard deviation of 0.22, a median of 0.92, with 83.8% of the test variables, obtaining an ICC considered excellent ( $ICC \geq 0.75$ ).

The socio-criminal data obtained at the registry office, and the results of the PCL-R and R-PAS, were entered into the SPSS®/IBM® software (version 24.0) for statistical analysis.

## Data Analysis

Descriptive (Means and Standard Deviations) and inferential statistical analyses were performed. The Student's *t* test was calculated for independent samples, comparing the results obtained by the two groups, and the effect size was measured using Cohen's *d*. Student's *t* test was used, even in the absence of normality for most variables. To justify its use, the bootstrap resampling technique was applied, a method that adjusts the variables normality in small samples (Curran-Everett, 2017). Differences at the 5% level ( $p < 0.05$ ) were considered significant. For the R-PAS variables, though, as multiple tests were performed, this criterion value was distributed among the 30 variables, obtaining an associated significance level of 0.17% ( $p < 0.0017$ ) for each variable. In addition, three models of multiple linear regression analysis were performed in order to explore the associations between variables in the Engagement and Cognitive Processing domain, and in the Rorschach Perception and Thinking Problems domain (independent variables), and the total score of the PCL-R (dependent variables). For the regression models, the age variable was included in order to verify the relationship between this variable and the total PCL-R score, as well as to adjust potential confounding variables. In all models, the bootstrapping resampling technique was also used, with 1,000 replications. All models met the assumptions of linear regression: normality of model residuals, homoscedasticity, linearity and absence of multicollinearity.

The first model included age and Engagement and Cognitive Processing variables as independent variables. The second model included age and the variables of the Perception and Thinking Problems dimension. In case of highly correlated independent variables ( $r > 0.60$ ), the variables were included in separate models. Only those variables of the Rorschach dimensions with  $p < 0.20$  in the correlation analysis were included in the multiple linear regression models. In all analyses, variables with  $p < 0.05$  were considered statistically significant.

## Results

Table 1 presents the statistical analyses and the comparison between the groups of PSVs, with regard to their performance in the R-PAS for the variables in the Engagement and Cognitive Processing domain and in the Perception and Thinking Problems domain. Regarding the Engagement and Cognitive Processing domain, the performance of PPSV and PSV showed no significant difference. In other words, the two groups tend to have similar ways of solving problems and getting involved with the reality around them.

For the multiple linear regression analysis, only the age variables and those with  $p < 0.20$  in the correlation analysis with the PCL-R were included: R8910% ( $r = 0.33$ ;  $p = 0.072$ ), Dd% ( $r = -0.30$ ;  $p = 0.112$ ), MC-PPD ( $r = 0.29$ ;  $p = 0.117$ ), Mp/Ma+Mp ( $r = 0.31$ ;  $p = 0.094$ ), IntCont ( $r = 0.34$ ;  $p = 0.066$ ). For this domain of Engagement and Cognitive Processing, the independent variables presented a correlation coefficient lower than 0.60 among themselves, and were included in a single model.

**Table 1**

Descriptive and comparative statistics of Rorschach Performance Assessment System variables for G1 and G2

Variables	Group	M	SD	t <sup>1</sup>	p	d <sup>2</sup>
<b>Engagement and Cognitive Processing</b>						
Complexity	G1	54.70	10.90	0.413	0.683	0.174
	G2	57.45	19.46			
R	G1	20.30	3.26	-0.126	0.901	0.048
	G2	20.15	2.97			
F%	G1	55.60	18.72	-0.468	0.643	0.188
	G2	51.60	23.47			
Blend	G1	2.20	2.09	0.721	0.447	0.298
	G2	3.00	3.16			
Sy	G1	4.80	1.98	0.259	0.797	0.092
	G2	5.05	3.26			
MC	G1	3.25	2.57	0.559	0.580	0.217
	G2	3.82	2.69			
MC-PPD	G1	-2.40	1.64	-1.444	0.161	0.447
	G2	-4.32	5.48			
M	G1	1.60	1.17	0.805	0.427	0.341
	G2	2.20	2.19			
M/MC	G1	26.60	33.73	0.995	0.328	0.392
	G2	40.65	37.69			
CF+C/ SumC	G1	-3.99	18.97	1.440	0.161	0.511
	G2	9.35	31.60			
W%	G1	41.10	18.36	-1.592	0.113	0.617
	G2	29.70	18.54			
Dd%	G1	9.30	9.08	1.846	0.075	0.775
	G2	19.20	15.60			
SI	G1	1.60	1.77	-1.280	0.228	0.552
	G2	0.85	0.74			
IntCont	G1	1.20	1.13	-1.065	0.296	0.410
	G2	0.75	1.06			
Vg%	G1	0.20	0.63	-0.588	0.561	0.201
	G2	0.10	0.31			
V	G1	0.00	0.00	3.249	0.004	*
	G2	0.50	0.68			
FD	G1	0.10	0.31	2.626	0.015	0.866
	G2	0.80	1.10			
R8910%	G1	32.80	6.26	-1.780	0.086	0.629
	G2	29.55	3.76			
WSumC	G1	1.35	1.15	0.464	0.646	0.188
	G2	1.62	1.67			
C	G1	0.20	0.63	-1.000	0.343	*
	G2	0.00	0.00			
Mp/(Ma+Mp)	G1	24.30	31.02	-2.170	0.039	0.781
	G2	3.65	20.82			
<b>Thought and Perception Problems</b>						
EII-3	G1	1.46	0.70	-4.062	< 0.001	1.645
	G2	0.17	0.86			
TP-Comp	G1	2.37	0.93	-4.254	< 0.001	1.652
	G2	0.85	0.91			
WSumCog	G1	20.60	6.89	-5.551	< 0.001	2.032
	G2	8.35	5.02			
SevCog	G1	1.90	0.99	-4.399	< 0.001	1.650
	G2	0.40	0.82			
FQ-%	G1	14.50	7.47	-0.314	0.756	0.129
	G2	13.30	10.82			
WD-%	G1	14.00	7.95	-0.905	0.373	0.355
	G2	11.05	8.62			
FQo%	G1	54.30	15.73	-1.418	0.167	0.547
	G2	45.75	15.48			
Popular	G1	5.50	1.71	-2.044	0.050	0.842
	G2	3.70	2.49			
FQu%	G1	30.90	11.68	2.064	0.049	0.783
	G2	40.70	13.27			

Note: \*Not calculated, standard deviation must be greater than zero. <sup>1</sup>Student's t test for independent samples. <sup>2</sup>Cohen's d. <sup>3</sup>Estimate not generated due to the zero prevalence of this variable. M: Mean; SD: Standard Deviation; G1: PPSV (PCL-R ≥ 30) (N = 10); G2: PSV (PCL-R < 30) (N = 20). R: Number of Responses; F%: Form Percent; Blend: Blend Response; Sy: Synthesis; MC: Sum of Human Movement and Weighted Sum of Color determinants; MC-PPD: The MC to PPD (Potentially Problematic Determinants) Difference Score; M: Human Movement; M/MC: Human Movement Proportion; CF+F/SumC: Color Dominance Proportion; W%: Whole Percent; Dd%: Unusual Detail Percent; SI: Space Integration; IntCont: Intellectualized content; Vg%: Vague percent; FD: Form Dimension; R8910%: The Percentage of responses on Cards VIII, IX, and X; WSumC: Weighted Sum of Color determinants; C: Color (no form); Mp/(Ma+Mp): The Passive Human Movement Proportion; EII-3: Ego Impairment Index-3<sup>rd</sup> version; TP-Comp: Thought and Perception Composite; WSumCog: Weighted Sum of Cognitive Codes; SevCog: Sum of Severe Cognitive Codes; FQ-%: Form Quality Minus Percent; WD-%: Sum of Whole and Detail responses with Form Quality Minus codes Percent; FQo%: Form Quality Ordinary Percent; FQu%: Form Quality Unusual Percent.

Table 2 presents the multiple regression analysis of the Engagement and Cognitive Processing and PCL-R dimension factors. It is observed that the adjusted model explained 32.0% (adjusted R<sup>2</sup>: 0.32) of the variance of the PCL-R scores, considering the variable Dd% ( $\beta$ : -0.19;  $p$ -value = 0.012) negatively associated to the PCL-R, and the variable MC-PPD positively associated with it ( $\beta$ : 0.47;  $p$ -value = 0.024). In other words, the higher the degree of psychopathy (PCL-R), the lower the tendency to dwell on insignificant details of the situation (Dd%), and the greater the feeling of stability, unconcern, tendency to maintain self-control and not being shaken by tensions and stress (MC-PPD).

**Table 2**

*Multiple regression analysis of engagement dimension factors and cognitive processing and Psychopathy Checklist-Revised*

Variables	$\beta$	Standardized $\beta$	Bootstrap Standard Error	$t$	$p$ -value
Age	-0.15	-0.21	0.13	-1.20	0.243
R8910%	0.40	0.32	0.24	1.61	0.115
Dd%	-0.19	-0.27	0.07	-2.47	0.012
MC-PPD	0.47	0.30	0.19	2.42	0.024
Mp/Ma+Mp	0.03	0.11	0.06	1.40	0.584
IntCont	1.17	0.11	1.40	2.12	0.410
Intercept-y	19.83				
R <sup>2</sup>	0.46				
R <sup>2</sup> Adjusted	0.32				

Note:  $\beta$ : Regression coefficient; R<sup>2</sup>: Determination coefficient. R8910%: Percentage of responses on Cards VIII, IX, and X; Dd%: Unusual Detail Percent; MC-PPD: The MC (Sum of Human Movement and Weighted Sum of Color determinants) to PPD (Potentially Problematic Determinants) Difference Score; IntCont: Intellectualized content.

Considering the Perception and Thinking Problems domain, there were significant differences for the variables EII-3, TP-Comp, WSumCog and SevCog, among G1 and G2 individuals (see Table 1). Such differences point to the fact that the PPSV group (G1), compared to the PSV group (G2), has greater vulnerability to the general personality disruption, which includes impairments in the reality test, general disruption of thoughts, coarse and disturbed thoughts and conflicted relationships (EII-3). In addition, there is a predisposition to thoughts disruption (WSumCog), which eventually pointed to a slightly more severe or even typical psychotic disorders (SevCog).

Linear regression analyses were also performed for this domain, which explored the association between age variables and those that make up the aforementioned domain and the overall PCL-R score (Table 3). Only the age variables, and those with  $p < 0.20$  in the correlation analysis, were included in a linear regression model: EII-3 ( $r = 0.59$ ;  $p = 0.001$ ). TP-Comp ( $r = 0.57$ ;  $p = 0.001$ ). WSumCog ( $r = 0.63$ ;  $p < 0.001$ ). SevCog ( $r = 0.58$ ;  $p = 0.001$ ). WD-% ( $r = 0.28$ ;  $p = 0.13$ ). Popular ( $r = -0.25$ ;  $p = 0.179$ ) e FQu% ( $r = -0.32$ ;  $p = 0.083$ ). For this domain, four models were performed due to the high correlation between some of the covariates ( $r \geq 0.60$ ), removing one or more correlated variables from each model. The following variables were highly correlated with each other: EII-3 and TP-Comp ( $r = 0.79[86]$ ;  $p < 0.001$ ), WSumCog and EII-3 ( $r = 0.74[72]$ ;  $p < 0.001$ ), SevCog and EII-3 ( $r = 0.65[0.68]$ ;  $p < 0.001$ ), TP-Comp and WD-% ( $r = 0.80[73]$ ;  $p < 0.001$ ) and WSumCog and SevCog ( $r = 0.75[85]$ ;  $p < 0.001$ ). Therefore, Models 1, 2, 3 and 4 included the following variables: (i) Model 1: Age, EII-3, WD-%, FQu% and Popular; (ii) Model 2: Age, WSumCog, WD-%, FQu% and Popular; (iii) Model 3: Age, SevCog, WD-%, FQu% and Popular; (iv) Model 4: Age, TP-Comp, SevCog, FQu% and Popular.

Model 1 explained 55% (adjusted R<sup>2</sup>: 0.55) of the PCL-R variability. There was a negative association between psychopathy scores and age ( $\beta$ : -0.26;  $p$ -value = 0.004), and a positive association with EII-3 ( $\beta$ : 4.77;  $p$ -value < 0.001). This result suggests that 55% of psychopathy is explained by joviality, distorted perceptions of reality, a greater predisposition to more conflicted relationships and, especially, by thoughts disorders (Table 3).

**Table 3***Multiple regression analysis of factors in the thought and perception dimension and Psychopathy Checklist-Revised*

Variables	$\beta$	Standardized $\beta$	Bootstrap Standard Error	t	p-value
<b>Model 1</b>					
Age	-0.26	-0.42	0.09	-2.85	0.004
EII-3	4.77	0.55	1.26	3.78	< 0.001
WD-%	-0.12	0.05	0.16	-0.76	0.445
FQu%	-0.10	-0.25	0.08	-1.28	0.200
Popular	0.49	0.07	0.45	1.10	0.273
Intercept-y	37.23				
R <sup>2</sup>	0.63				
R <sup>2</sup> Adjusted	0.55				
<b>Model 2</b>					
Age	-0.18	-0.42	0.09	-2.01	0.044
WSumCog	0.49	0.32	0.14	3.43	0.001
WD-%	0.15	0.05	0.12	1.20	0.229
FQu%	-0.11	-0.30	0.08	-1.39	0.166
Popular	0.39	0.11	0.44	0.89	0.372
Intercept-y	34.27				
R <sup>2</sup>	0.61				
R <sup>2</sup> Adjusted	0.53				
<b>Model 3</b>					
Age	-0.17	-0.32	0.10	-1.66	0.096
SevCog	3.14	0.42	1.07	2.94	0.003
WD-%	0.14	0.25	0.14	1.01	0.313
FQu%	-0.07	-0.19	0.09	-0.77	0.441
Popular	0.67	0.14	0.47	1.44	0.149
Intercept-y	22.38				
R <sup>2</sup>	0.54				
R <sup>2</sup> Adjusted	0.44				
<b>Model 4</b>					
Age	-0.18	-0.38	0.09	-1.89	0.058
TP-Comp	1.84	0.33	1.09	1.69	0.091
SevCog	2.38	0.26	1.19	2.00	0.046
FQu%	-0.06	-0.17	0.09	-0.66	0.509
Popular	0.43	0.05	0.48	1.14	0.255
Intercept-y	31.19				
R <sup>2</sup>	0.58				
R <sup>2</sup> Adjusted	0.50				

Note:  $\beta$ : Regression coefficient; R<sup>2</sup>: Determination coefficient. EII-3: Ego Impairment Index-3<sup>rd</sup> version; TP-Comp: Thought and Perception Composite; WSumCog: Weighted Sum of Cognitive Codes; SevCog: Sum of Severe Cognitive Codes; FQ-%: Form Quality Minus Percent; WD-%: Sum of Whole and Detail responses with Form Quality Minus codes Percent; FQo%: Form Quality Ordinary Percent; FQu%: Form Quality Unusual Percent.

Model 2 explained 53% (adjusted R<sup>2</sup>: 0.53) of the PCL-R variance. A negative association was observed between PCL-R and age ( $\beta$ : -0.18;  $p$ -value = 0.044), and a positive association with WSumCog ( $\beta$ : 0.49;  $p$ -value = 0.001). That is, disturbed and disrupted thinking, and a greater propensity to be arrested at a young age, would explain 53% of psychopathy (Table 3).

Adjusted models 3 and 4 explained respectively 44.0% (adjusted R<sup>2</sup>: 0.44) and 50% (adjusted R<sup>2</sup>: 0.50) of the PCL-R variance. Thus, the results show that the variable SevCog was positively associated with psychopathy in both models, with  $\beta$ : 3.14;  $p$ -value = 0.003 for Model 3 and  $\beta$ : 2.38;  $p$ -value = 0.046 for Model 4. That is, more serious alterations in thought processes, lapses of psychotic level in the conceptualization, reasoning, communication and thought organization would explain 44% to 50% of psychopathy (Table 3).

In summary, there was a greater association between psychopathy and the fact that participants were arrested at a younger age, as well as between psychopathy and the tendency to have the greatest impairments in the organization of thought and in the predisposition to produce situational judgments. Together, all these aspects can explain 32% to 55% of psychopathy.

## Discussion

This study aimed to assess through the R-PAS whether the cognitive aspects of PPSVs against children and adolescents are different from those of PSVs. However, it is noteworthy that the PPSV group (G1) was significantly younger than the PSV group (G2) at the time of their arrest. According to Reidy et al. (2015), there is evidence that violent behaviors, predicted by psychopathic traits, remain stable throughout the life cycle. Thus, such traits have a direct effect on this early onset, since it is a pernicious psychological condition, with a strong predisposition for conduct disorders in childhood and delinquency in youth.

It was observed that there were no significant differences between the PPSV and PSV groups with regard to the variables of the Engagement and Cognitive Processing domain of the R-PAS. In order to verify how the group would perform in relation to the general population, a supplementary statistical analysis was performed, the t test for a sample, comparing the results obtained for the Complexity variables ( $M = 56.53$  and  $SD = 16.94$ ) and MC ( $M = 3.63$  and  $SD = 2.62$ ), compared with the normative data (Complexity  $M = 74.6$  and  $SD = 23.1$ ; MC,  $M = 7.3$  and  $SD = 3.8$ ). These variables were selected because they represent the predisposition of involvement, cognitive resources and sensitivity to the environment, respectively. The analysis showed that the total group presents compromised intellectual performance: Complexity ( $t = -5.84$ ;  $p < 0.001$ ), MC ( $t = -7.65$ ;  $p < 0.001$ ). In a literature review study on PSVs against children and adolescents, who were evaluated using the Rorschach method, Zilki et al. (2020) found evidence that these individuals have some type of deterioration of the neuropsychological and intellectual functions, that impair the way they engage and process the surrounding information. In addition, the co-occurrence of Antisocial Personality Disorder and paraphilia would be associated with poor cognitive performance (Azizian et al., 2016). It is noteworthy that failures in cognitive processing can predispose psychopaths to criminality, since they would be unable to understand the suffering of the other, and would be interested only in satisfying their needs. In this sense, psychopaths would be part of a more dangerous and unpredictable group. However, such cognitive processing failures appear to be a characteristic of incarcerated criminals, not specifically of the psychopath (Guay et al., 2005), which was also observed in this study when comparing PPSV and PSV.

Thus, the hypotheses that PPSVs would have a lower performance than PSVs in connection with Engagement and Cognitive Processing, are refuted. In the present study, the two groups showed coping and engagement resources (hypothesis 1.1) as well as similar processing styles (hypothesis 1.2) but indicating immature and simplistic cognitive performance in both groups. In other words, both the group with psychopathy and the group without psychopathy showed similar performance in the assessed scope, which corroborates the study by Guay et al. (2005), which suggests that incarcerated criminals, in general, tend to have cognitive processing failures.

Another aspect that stood out in the PPSV group, when compared to the PSV group, was the general personality disruption of PPSVs, as well as thought disorders. The data suggest that it is precisely the disturbance in the organization of thoughts that has the greatest impact on the psychopaths' damage. It is worth mentioning that research had shown that the Rorschach test is a useful instrument in the assessment of thought disorders, such as psychoses. The test allows assessing how individuals interpret reality and how they organize and communicate what they thinks (Eblin et al., 2018; Mihura et al., 2013), which points to the relevance of this finding.

In the R-PAS, general personality disruption is captured by the Ego Impairment Index (EII-3). This is an index composed of variables that assess three different aspects: the cognitive,

which includes thought disturbance and reality testing; interpersonal issues linked to maladaptive, conflicted and immature relationships; and intrusive thoughts of severe traumatic experiences (Meyer et al., 2017). When this index is high, it should be verified whether this escalation is due to the increase in any of those specific aspects. What was observed in this study was that general personality disruption (EII-3) seems to be associated with the cognitive aspect, more specifically with the thought disorder (WSumCog), which was significantly higher in the PPSV group.

These thinking impairments, as well as the general personality impairment, were central points of psychopathic personality disruption, as indicated by the regression models performed for the Perception and Thinking Problems domain. Thus, the results confirm the hypotheses that predicted general personality disruption (hypothesis 1.3), as well as greater thought disruption (hypothesis 1.5) in PPSVs.

Regarding the hypothesis that PPSVs would have more impairments in the reality test than PSVs (hypothesis 1.4), this hypothesis was partially confirmed. In other words, there was a significant difference in the expected direction for thoughts disorders and perception (TP-Com), much more for thought disorders (WSumCog) and less for perception (FQ-% and WD-%) between PPSVs and PSV. The index that assesses impairments in thoughts and perception (TP-Comp) has some of the best empirical foundations of the R-PAS (Meyer et al., 2017; Mihura et al., 2013). Elevations in this index can occur due to increased losses, both in thoughts and perception. Apparently, the increase in losses in these two areas was more related to thought disruption than failures in the reality test of psychopaths.

Hypothesis 2 of this study, which predicted that psychopathy in PSVs would be associated with cognitive performance, was also confirmed. The result of the regression model for the dataset referring to processing and cognitive engagement, showed that the low predisposition to process stressful stimuli (MC-PPD) is positively associated with psychopathy. In other words, failing to process stressful stimuli, psychopaths tend to have a sense of stability, unconcern and the ability to maintain self-control, and not to become upset by the tensions that would affect most people in their daily life. This result is in line with studies that claim that psychopaths tend not to feel the need to change their way of thinking, feeling and acting, and, consequently, not learning from experience (Blair, 2017). Thus, an arrest would be processed as a fortuitous event, which would not prevent PPSVs from committing crimes again after serving their sentence, since the aversive aspect of incarceration would not be processed. Low stress reactivity, as a characteristic attributed to psychopathy, would be related to low sensitivity to aversive stimulation, which predisposes psychopaths to become calmer and more focused in situations involving pressure or threat. This favors their involvement and predilection for situations involving high adrenaline load and risky behaviors (Brown et al., 2015; Yildirim & Derksen, 2015). Therefore, the feeling of stability and self-control in the face of stressful situations would be the consequence of this failure in processing such situations.

In addition, it was observed that the more people tend to pay attention to or get entangled in situations with insignificant details (Dd%), the lower is their predisposition to exhibit traces of psychopathy. In this sense, psychopathy could be somehow associated with attention deficits, which, once present in the individual, would make it difficult for that individual to perceive signs of environmental threats, which would imply, in some way, in his/her low reactivity to stress (Patrick, 2018).

Finally, although the findings of this study corroborate research that focused on the topic of psychopathy, the most relevant aspect was the identification of general personality

disruption (EII-3), as the variable that best explains psychopathy. In addition, the efficiency of the R-PAS is observed in the identification of cognitive failures in PPSV and PSV, and its usefulness is enhanced, when associated with other behavioral measures in the identification of this type of personality profile.

It is worth mentioning that the sample of this study was limited to individuals serving time in a penitentiary in the Brazilian Midwest. Regional cultural differences may constitute a limitation of the study, as well as the limited sample size, given the difficulties in accessing it. Such limitations prevent categorical generalizations from being made. However, this study offers suggestive data that could support future studies.

We suggest the inclusion of a general population control group, with similar age and educational level, or another group of non-PSV criminals, or even both. Such a methodological design may favor a better understanding of the distinctive characteristics of the PPSV group, since, by pairing it with other groups, it would be possible to identify what is the characteristic associated with psychopathy, or criminality in general, or even what is specific to the PSV audience. Another suggestion for future studies would be the integration of other instruments that specifically assess cognition for comparison with the R-PAS data. The use of multi-methods in psychological assessment is of fundamental importance, especially in the forensic context, since, considering that different assessment methods involve different behavioral processes, their use would allow a better understanding of the individual's psychological profile (Bornstein, 2015, 2017).

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## Contributors

R. PERISSINOTTO contributed to the conception and writing of the article, and to the collection, analysis and discussion of data. A.C. RESENDE was responsible for the research project, contributed to the writing, review and approval of the final version of the article.