







The validity of the Violence Risk Scale (VRS) in a Portuguese sample of remand prisoners

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This study aims to test the psychometric properties of the Violent Risk Scale (VRS) in a sample of Portuguese remand prisoners. A total of 133 subjects participated in the present study. We carried out a Confirmatory Factor Analysis (CFA) to test the originally proposed two factor structure. Results showed evidence to support the VRS's psychometric qualities. The CFA tested the two-factor structure and showed evidence of the goodness of fit of the original two-factor model. Also, our findings indicated acceptable internal consistency for both subscales. The correlational analyses supported both convergent and discriminant validity of the VRS. Finally, this study also tested known-groups validity. The VRS score showed a satisfactory postdictive accuracy, which means that it is able to demonstrate distinctive scores for groups known to vary on the variables being measured. We consider this work represents an essential support for decision-makers to evaluate the appropriateness of different judicial measures.

Keywords: Confirmatory factor analysis; jail; pre-trial detention; psychometric properties; remand prisoners; risk assessment; violence.

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Introduction

Violence is one of the major concerns within prison walls. The prison population usually represents a problematic group regarding the use of violence (Calles-Rubiales & Ibáñez del Prado, 2020; McGuire, 2018; Mears et al., 2013; Sanhueza et al., 2021; Suedfeld, 1980). Many studies have found that violence-related problems are significant predictors of future anti-social and aggressive behavior (Singh & Fazel, 2010; Yang et al., 2010), and because of that, in the prison context, violence risk

assessment might be important to predict violence not only during detention (as most risk assessment tools allow), but also in the community, after release. Indeed, accurate violence risk assessments are crucial in inmates, particularly for those awaiting trial; they play a central role in predicting future violent behaviors in the community, which could be very helpful for the court to know. Indeed, the risk assessment of those who are awaiting trial can also be an important parameter for decision-makers to evaluate the appropriateness of different

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judicial measures (i.e. prison sentences or alternative sanctions) (Kennealy, 2018; Otto & Douglas, 2009). Also, it should be noted that, theoretically, remand prison is usually a response for those who represent a danger to the victim or the community, which reinforces the relevance of violence risk assessment.

Another reason why VRS might be a useful tool in the context of pre-trial detention is the support it could provide in prisoners' case management (Etzler et al., 2020; Randol & Campbell, 2017; Steiner, 2009). Since all inmates should have an individual plan of rehabilitation and readaptation, by knowing the individuals' risk and criminogenic needs, practitioners might be able to identify intervention targets, and then address such targets in the programs applied. As literature has been showing that interventions should be guided according to the individuals' risk, needs, and responsivity, such assessment becomes imperative to ensure that programs are effective (Andrews & Bonta, 2010). Considering the individuals in pre-trial detention, the VRS could be particularly relevant, as this group is usually neglected for the intervention efforts (Appleman, 2012; Pelvin, 2019; Weinrath et al., 2019), despite previous research having already noted the relevance to provide treatment to them (Weinrath et al., 2019). Moreover, the literature shows that remand prisoners are typically more likely to have violent infractions while in prison (Arbach-Lucioni et al., 2012), which may be explained by the specific difficulties of dealing with and adapting to confinement, and the uncertainty of their future (Gonçalves et al., 2016; Okoro et al., 2018; Roesch et al., 1995).

Many risk assessment tools have been developed over time. However, as previously noted by Bonta (1996), many of these consist of second-generation risk assessment tools—such as the Violence Risk Assessment Guide (VRAG; Harris et al., 1993) and the Statistical Information on Recidivism (SIR; Bonta et al., 1996) - and were characterized by focusing excessively on static factors (i.e. historic factors

that do not change). Wong and Gordon (2006) highlighted that these kinds of measures are not 'treatment friendly' and, in order to decrease the limitations of risk assessment, a new generation of instruments has been developed that include dynamic risk factors (i.e. factors that are changeable and offer the opportunity for intervention) (Lewis et al., 2013).

The Violence Risk Scale (VRS) is a third-generation risk assessment tool designed to assess the risk of violence in adult forensic clients. Contrary to the second-generation VRS, which focused only on static factors, the third-generation tools include both static and dynamic risk factors. VRS includes six static risk factors (e.g. age of the first conviction, violence throughout the life span, stability of family upbringing) and 20 dynamic risk factors (e.g. criminal attitudes, violence during institutionalization, impulsivity) that predict future violence when released. The VRS allows for the calculation of the total static risk factors, the total dynamic risk factors, and an overall risk of violence. Also, contrarily to most risk assessment tools, VRS aims to predict not only the risk of violence during imprisonment but (primarily) the risk of violence after release, which is particularly relevant for those who are awaiting a decision about their sentence.

Validation studies of the VRS have been conducted in Canada (Gordon, 1998; Lewis et al., 2013; Olver et al., 2022; Wong & Gordon, 2006; Wong & Parhar, 2011), in the United Kingdom (Dolan et al., 2008; Dolan & Fullam, 2007), and in Australia (Klepfisz et al., 2022; Woldgabreal et al., 2022). These studies showed that VRS is a reliable and valid measure to predict future violence in the forensic population. The Canadian validation studies in particular showed that VRS outperforms other risk assessment instruments in the prediction of violent convictions, underlining that the tool demonstrated predictive validity, and the dynamic predictors can be used to assess treatment progress. In addition, validation studies from the UK offered preliminary evidence that the VRS is a reasonably valid

measure of the risk of violence, with the dynamic component of this instrument showing the most promise. Finally, recent validation studies conducted in Australia provided the basis for a series of observations about the use of the VRS in the correctional setting by demonstrating measurement invariance across both pretreatment and posttreatment moments.

Two further versions of the instrument have also been developed: one targeting sexual offenders, which was validated in Canada (Canales et al., 2009; Olver, 2003; Olver et al., 2007, 2018; Rojas & Olver, 2020) and in New Zealand (Beggs & Grace, 2010; Olver et al., 2014); and other targeting young offenders (Stockdale et al., 2014). The sexual offenders' version comprised 7 static items (i.e. criminal history, victim, and offender demographics) and 17 dynamic items that are empirically, theoretically, or conceptually related to increased risk for sexual recidivism (e.g. cognitive distortions, interpersonal aggression, deviant sexual preference, intimacy deficits).

The present study aims to further test the psychometric properties of the VRS in a Portuguese sample of remand prisoners. Our work adds to the existing literature, since it is the first validation targeting inmates awaiting trial. Earlier literature had shown that being on remand is a significant predictor of violence during detention (Arbach-Lucioni et al., 2012). Also, as previously mentioned, a comprehensive assessment of remand prisoners is crucial regarding information about their intervention needs. Considering this, this paper intends to provide a valid and reliable tool to assess the risk of violence with Portuguese remand prisoners. The purpose of this study is to examine the psychometric properties of VRS by testing the two-factor structure and examining the internal consistency of the scale. In addition, we tested the convergent and discriminant validity, using the Aggression Questionnaire (AQ) and Clinical Self-concept Inventory (ICAC), respectively. We expected the VRS scores to correlate positively with the AQ, considering the link between violence and aggression; on

the other hand, we anticipated that VRS scores would not correlate with self-concept, since these constructs are theoretically expected to have low interrelationships with one another. Finally, we tested known-group validity, to assess whether the measure possesses the ability to accurately differentiate between groups that are already known to vary in terms of the construct being measured (i.e. past violence and past convictions). We consider our work to be particularly relevant as, to the best of our knowledge, this is the first study to assess the risk of violence in Portuguese remand prisoners.

Method

Participants

We used a convenience sampling method to recruit the participants. A total of 133 individuals were interviewed, out of 150 who had been invited, representing a response rate of 88%. Considering the particularities of our sample, the only two eligibility criteria were to be held on remand and to speak and understand Portuguese. Participants were adult men detained in two Portuguese prisons between July 2021 and March 2022. They were mainly Portuguese nationals (95.5%, $n = 127$), aged between 18 and 66 years ($M = 38.44$, $SD = 10.79$). Demographic and criminal variables are given in Table 1.

Measures

Violence risk scale

The VRS (Wong & Gordon, 2006) aimed to assess the risk of violence in incarcerated people. This scale assesses the prisoners' criminogenic needs, responsivity, and treatment changes. The VRS is composed of 6 static and 20 dynamic variables scored on a 4-point response format (0, 1, 2, or 3) based on file reviews and a semi-structured interview. Considering the particularities of our sample (i.e. in contrast to sentenced prisoners, those on remand do not know whether they will be released or institutionalized), we excluded

Table 1. Demographic and criminal variables.

	<i>N</i>	%
Marital status		
Single	65	48.9
Married	40	30.1
Divorced	25	18.8
Widower	3	2.3
Parental situation		
With children	84	63.2
Type of alleged crime		
Drug trafficking	46	34.6
Domestic violence	16	12
Illegal possession of weapon	11	8.3
Property and/or economic	44	33.1
Against society or against the state	8	6
Sexual crimes	18	13.5
Driving-related crimes	4	3
Offences against the physical integrity	6	4.5
Crime against liberty	11	8.3
Murder	15	11.3
Violent crime		
Yes	70	52.6
Penal situation		
1st crime	49	36.8
2nd crime	27	20.3
3rd crime	57	42.9
Past violent crime		
Yes	44	33.1

Note. The frequencies of the type of alleged crime are not mutually exclusive.

item 20 (i.e. *the security level of the anticipated release institution*), since we did not have enough information about the court's definitive judgment. Higher rates on the static variables (i.e. variables that are related to historical dimensions that are not malleable and cannot change with any intervention) mean that individuals have worse early experiences related to criminality, and because of that they are more likely to engage in criminal or violent behavior in the future. On the other hand, higher rates on the dynamic variables (i.e. changeable dimensions that could be minimized or eliminated through effective treatment) are related to appropriate targets for intervention. The total score is obtained from the sum of static and dynamic variable ratings and indicates the overall risk of violence.

Aggression Questionnaire (AQ)

The AQ (Buss & Perry, 1992; Portuguese version from Cunha & Gonçalves, 2013) consists of 29 items that provide a global measure of aggression, which includes four subscales: physical aggression, verbal aggression, anger, and hostility. The items are scored on a 5-point Likert-type scale (1, 2, 3, 4, or 5). Higher scores indicate higher levels of aggression. The Portuguese version of the BPAQ achieved a Cronbach's alpha of .88 for the total scale.

Clinical self-concept Inventory (ICAC)

The Clinical Self-concept Inventory (Serra, 1986) is a 20-item inventory to assess self-concept emotional and social aspects.

It assesses four dimensions, namely self-efficacy, social acceptance/rejection, psychological maturity, and impulsivity. This is a self-report scale with a 5-point Likert-type response format (from 1 = *I do not agree* to 5 = *I strongly agree*). The higher the scores, the higher the levels of self-concept. The validation study showed an internal consistency of .79 (as measured by the Spearman-Brown test), and a test–retest reliability coefficient of .84.

Criminal activity

Participants' criminal activity was measured through the official records. In our sample, most participants were accused of having committed a single crime (74.4%, $n = 99$) ($M = 1.41$, $SD = 0.88$)—mainly crimes that involve some degree of violence (52.6%, $n = 70$). The majority of the individuals had already been sentenced in the past (63.2%, $n = 84$), even though most of them were serving a prison sentence for the first time (57.1%, $n = 76$). In addition, most of those who had committed offenses in the past were shown to have a history of violence (52.4%, $n = 44$).

Procedure

First, ethical approval for this study was granted. Permission to translate and validate the VRS was obtained from the authors. Following the guidelines proposed by Beaton et al. (2000), we conducted all stages of the Cross-Cultural Adaptation Process: (i) translation, (ii) syntheses, (iii) back translation, (iv) expert committee review, and (v) pretesting. Data collection was carried out in a single phase. Participants were invited to voluntarily participate in the study, and informed consent was requested from those who agreed to collaborate. No incentive or benefit was given to the participants for their cooperation. Prison files were also accessed in order to collect legal data (e.g. type and number of offenses allegedly committed, and type and number of previous crimes). All procedures were

followed to guarantee the confidentiality of the data and the anonymity of the participants.

Data and statistical analysis

We carried out a Confirmatory Factor Analysis (CFA) in order to test the psychometric qualities of the VRS. Particularly, we tested the originally-proposed two-factor structure composed of static and dynamic risk factors. It is important to note that these are not really meant to be 'factors' in the sense that the listed items are not necessarily conceptually similar. Instead, items are grouped based on their changing or not-changing nature. Preliminary analyses revealed that VRS items violated the assumption of normal distribution ($Kumult = 67.62 > 10$). Accordingly, the CFA was carried out using the Unweighted Least Squares (ULS) method. The goodness of fit was assessed via several adjustment indicators, specifically the Normed Fit Index (NFI) and the Goodness-of-Fit Index (GFI) (NFI and GFI values higher than .90 indicate good model fit) (Arbuckle, 2019); the Parsimony Normed Fit Index (PNFI) and the Parsimony Goodness-of-Fit Index (PGFI) (PNFI and PGFI scores higher than .60 indicate good model fit) (Arbuckle, 2019); as well as the Standardized Root Mean Square Residual (SRMR scores close to .08 indicate good model fit) (Hu & Bentler, 1999). Internal consistency was assessed by Cronbach's alphas considering a cut-off point of .70 (Field, 2017). Convergent validity was tested by the inter-correlation analyses between the VRS factors, as well as the correlational analyses between VRS factors and the AQ scores (Buss & Perry, 1992) and the number (i.e. frequency) of participants' offenses. Discriminant analysis was assessed by the correlational analyses between VRS factors and self-concept. Finally, we tested known-groups validity by carrying out discriminant analysis by testing the VRS subscales' ability to postdict belonging to a group with previous convictions, and previous convictions for violent offenses. All analyses were carried out using

SPSS v28 software and Amos Version 28 (IBM SPSS, Chicago, IL).

Results

The mean scores of VRS, AQ, and ICAC are shown in Table 2.

Confirmatory factor analysis

We carried out a CFA to test the two-factor structure (i.e. Static and Dynamic risk factors) proposed by Wong and Gordon (2006). As illustrated in Figure 1, the two-factor solution for VRS came up with scores that indicate good model fit, except for RSMR (NFI = .90, PNFI = .82, GFI = .93, PGFI = .79, RSMR = .092). Consequently, we considered the modification indices higher than a threshold of 11 (Maroco, 2021) and covariated the errors. The final solution with covariation of errors resulted in scores indicating good model fit (NFI = .93, PNFI = .81, GFI = .95, PGFI = .77, RSMR = .080).

Internal consistency

Table 3 illustrates the reliability analysis for the two factors of VRS. Both static ($\alpha = .71$) and dynamic ($\alpha = .88$) risk factors presented Cronbach’s alphas indicating acceptable internal consistency. The total VRS scale showed good internal consistency ($\alpha = .90$).

Convergent validity

As expected, the inter-correlation analysis between the two VRS subscales showed a

large positive correlation ($r = .64, p < .001$). The total risk score, as well as the two subscales of static and dynamic risk, showed positive correlations with all types of aggression, indicating that as risk increases, so does aggression, and vice-versa. Furthermore, all scores of VRS showed positive correlations with the number of participants’ offenses (i.e. the greater the risk of violence, the greater the number of offenses). The correlations are presented in Table 4.

Discriminant validity

As expected, results for discriminant validity demonstrated that total risk ($r = -.08, p = .363$), static risk ($r = .07, p = .454$), and dynamic risk ($r = -.12, p = .161$), showed no statistically significant correlation with the measure of self-concept. The correlations are shown in Table 4.

Known groups validity

We tested know-groups validity by the development of discriminant analysis in order to test whether the VRS is able to postdict which participants belong or do not belong to (a) a group with previous convictions; and (b) a group with previous convictions of violent offenses. Table 5 illustrates the results of the discriminant analysis, showing that both static and dynamic factors were able to place correctly, with statistical significance ($p < .001$), 57.6–58.3% of participants with past convictions and 66.9–70.7% of participants convicted for violent offenses in the past. The overall VRS score showed a postdictive accuracy of

Table 2. Mean scores of VRS, AQ, and ICAC.

	<i>M</i>	<i>SD</i>
VRS		
Static risk	4.86	3.57
Dynamic risk	18.33	10.23
Total Risk	23.19	12.80
AQ	73.14	18.52
ICAC	65.03	6.56

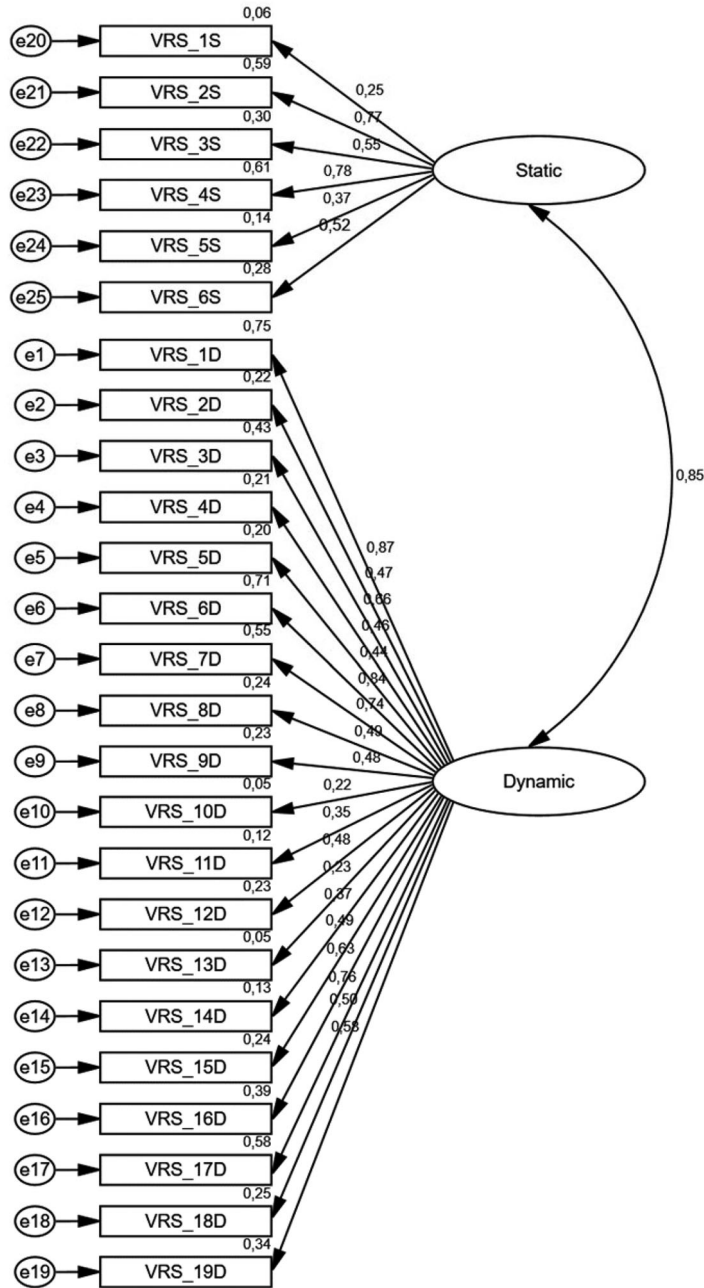


Figure 1. Confirmatory factor analysis.

61.4% for past convictions, ($\Lambda = .89$), $\chi^2(1) = 15.05$, $p < .001$, and 71.4% for past violent convictions ($\Lambda = .85$), $\chi^2(1) = 21.80$, $p < .001$.

Discussion

The present study examined the psychometric properties of VRS (Wong & Gordon, 2006) among Portuguese remand prisoners.

Table 3. Cronbach’s alphas.

	Min	Max	M	SD	α
1. Static risk	0	15	4.86	3.57	.71
2. Dynamic risk	2	46	18.33	18.33	.88
Total risk	3	60	23.19	12.80	.90

Table 4. Correlations for convergent and discriminant validity.

	Static risk	Dynamic risk	Total risk
Convergent validity			
Total aggression	.49***	.60***	.61***
Verbal aggression	.36***	.54***	.53***
Physical aggression	.53***	.65***	.66***
Hostility	.24**	.33***	.33***
Anger	.34***	.34***	.36***
Number of offenses	.34***	.27**	.31***
Discriminant validity			
Self-concept	.07	-.12	-.08

** $p < .01$; *** $p < .001$.

Table 5. Discriminant analysing using known groups validity.

Subscales	Past convictions		Past violence	
	N	%	N	%
Each group				
No	49		89	
Yes	83		44	
VRS total	%	61.4***		71.4***
Static risk	%	57.6***		66.9***
Dynamic risk	%	58.3***		70.7***

*** $p < .001$.

The VRS comprises 25 items that assess the inmates’ risk of violence, criminogenic needs, responsivity, and treatment changes. For the current validation, the last dynamic variable (i.e. the security level of anticipated release or institution) was omitted, since the item did not apply to our sample (i.e. remand prisoners do not know whether they are going to be released or institutionalized).

Prisons are well-known contexts in which violence is one of the major concerns (McGuire, 2018; Sanhueza et al., 2021), and those on remand might represent a significant

risk, since previous evidence has shown that being on remand may be a source of additional stress due to the uncertainty of their future (Gonçalves et al., 2016). In this sense, in order to minimize such problems and provide effective interventions, it has been emphasized that there is a need to conduct accurate violence risk assessments (Etzler et al., 2020; Steiner, 2009). Considering that, as far as we know, no previous assessment tool of violence risk had been developed in Portugal to assess the inmates who are awaiting trial, this work represents an important contribution to

the penalties' enforcement practice in correctional settings.

For the Portuguese validation, we tested the psychometric properties of the VRS through factor analysis, internal consistency, convergent validity, discriminant validity, and known-groups validity. Results showed evidence in support of the VRS's psychometric qualities for Portuguese remand prisoners.

The confirmatory factor analysis tested the two-factor structure and showed evidence of the goodness of fit of the original two-factor model (i.e. Static risk factors subscale and Dynamic risk factors subscale). Furthermore, our findings indicated acceptable internal consistency for both subscales. In conformity with the original study, the Static risk factors resulted in a slightly lower score of internal consistency, despite both factors showing acceptable coefficients in the present study.

The correlational analyses supported both the convergent and the discriminant validity of the VRS. The two VRS subscales showed a large inter-correlation; VRS scores (i.e. Total risk scores, as well as the two subscales of Static and Dynamic risk) showed a positive correlation with all types of aggression as measured by the AQ (Buss & Perry, 1992). Indeed, previous literature reinforced the correlation between aggression (as measured by AQ) and many risk factors shown by the VRS (Camlibel et al., 2021; Kolla et al., 2017; Ramírez & Andreu, 2006). Our results also confirmed the positive correlation between all VRS scores and the number of participants' offenses. Indeed, in line with previous studies, this work corroborated the notion that a higher number of offenses might mean a greater risk of violence and violent recidivism (Eisenberg et al., 2019; Mulder et al., 2011). Furthermore, discriminant validity was demonstrated, since our findings showed no statistical correlation with the self-concept as measured by the Clinical Self-concept Inventory (Serra, 1986).

Finally, this study also tested known-groups validity. VRS score showed a satisfactory postdictive accuracy, which means that it

can demonstrate distinctive scores for groups known to vary on the variables being measured. As expected, the total score of the tool is able to differentiate between groups with and without previous convictions as well as with and without previous convictions of violent crimes. Nevertheless, we need to mention that, given that we tested known-groups validity using measures that are covered in the static risk subscale, this could establish a circularity to this interrelationship.

We consider this work to be particularly relevant for correctional practice, since it provides a valid and reliable tool that might support future decisions about the sentence (i.e. considering the individuals' risk of violence). Moreover, considering the lack of interventions targeting this group (Andrade et al., 2022; Appleman, 2012; Pelvin, 2019; Weinrath et al., 2019), and knowing that such efforts should be oriented by their criminogenic needs (Andrews & Bonta, 2007, 2010), this tool might inform practitioners about intervention targets that are important to address. As previous VRS validation studies have shown, the instrument has contributed to the prediction of violent crime in the future (Dolan et al., 2008; Dolan & Fullam, 2007; Gordon, 1998; Lewis et al., 2013) and has been effective to guide violence reduction treatment (Wong & Gordon, 2006).

While this study successfully tested the psychometric properties of the VRS in a Portuguese sample of remand prisoners, there were some limitations. The size of the sample is a limitation, since it does not allow a generalization of results. We used convenience sampling due to the difficulties of accessing our target population, and we cannot be certain that our participants are representative of the Portuguese remand prisoner population as a whole. However, despite there being no consensus regarding the number of participants for validation studies, a classic work of Cattell (1978) suggested three to six subjects per item, and this was the case in our collection. In addition, another limitation was caused by

the removal of item 20 of VRS (i.e. ‘Security level at release’) for the CFA, as it did not apply to our sample. Moreover, we did not have access to information regarding the violent misconduct of the participants after their participation, and therefore we could not confirm whether the VRS score was predictive of future infractions. Finally, for the present study, we assessed criminal data from the official records, which is known to be a measure that could have several biases and could underestimate actual criminal activity (Gomes et al., 2018).

The present study may have important implications for the practice, as well as for future research. Considering the lack of tools validated for remand prisoners, VRS may allow a valid measure for risk assessment, which could support intervention planning and treatment progress monitoring, as well as support court decisions regarding temporary licenses and conditional release. In the particular case of Portugal, there are no structured assessment procedures for this group, and because of that, there are several fragilities in the process of assessing the criminogenic needs as well as the risk that each individual represents. Bearing this in mind, the validation of the VRS embodies an important step to improve the assessment of remand prisoners, which could enhance the capacity to provide effective interventions. Nevertheless, further studies should endeavor to achieve a representative sample, including remand prisoners from the whole country, as well as female remand prisoners. We also recommend future research should test the known-group validity using other measures to corroborate the conclusions of the present study.

Ethical standards

Declaration of conflicts of interest

Joana Andrade has declared no conflicts of interest.

Hugo Gomes has declared no conflicts of interest.

Rui Abrunhosa Gonçalves has declared no conflicts of interest.

Stephen Wong has declared no conflicts of interest.

Andreia de Castro Rodrigues has declared no conflicts of interest.

Ethical approval

This study was conducted at Psychology Research Centre (UID/PSI/01662/2013), University of Minho. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee [University of Minho Ethics Commission (CEICSH 051/2021)] and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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