



## Review

# Personality assessment inventory (PAI) in forensic and correctional settings: A comprehensive review

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## ABSTRACT

As Forensic Psychology continues to expand as an independent field, professionals regularly resort to psychological assessment tools to assess people involved within the justice system. The Personality Assessment Inventory (PAI) is a 344-item, self-report inventory that aims to provide meaningful information for diagnosis and clinical decision-making, specifically relating to psychopathology, personality, and psychosocial environment. Its applicability in forensic settings has been increasingly recognized on account of its benefits in comparison to other self-report inventories (e.g., MMPI-2, MCMI-III), since it includes scales that are relevant to forensic settings (e.g., violence risk levels, psychopathy, substance abuse), and the existence of profile distortion indicators is useful when dealing with highly defensive and/or malingering populations. The goal of this paper is to conduct a thorough review of the PAI's utility in forensic settings, by focusing on the relevant forensic constructs assessed by the PAI (e.g., personality disorders, psychosis, substance abuse, aggression, recidivism risk, and response distortion), as well as its application to offender and inmate populations, intimate partner violence contexts, family law cases, and forensic professionals. Overall, the PAI continues to gather international recognition and its relevance and usefulness in forensic settings is generally accepted and acknowledged.

## 1. Introduction

Within the sphere of criminal law, forensic mental health evaluations mainly focus on the assessment of people involved with the justice system and may encompass the evaluation of the psychological state of an individual, their cognitive abilities, developmental history, level of dangerousness, and recidivism risk, all of which may influence the outcome of a case.<sup>1,2</sup> In civil law, forensic psychologists may play a role in the assessment of personal injury or in the evaluation of an individual's cognitive functioning (e.g., financial ability, testamentary capacity, ability to represent themselves in court).<sup>3</sup> Finally, within family law, forensic psychologists can be involved in the assessment of parental capacity in custody cases, either in the context of a divorce or in cases dealing with suspicion of abuse or negligence.<sup>1-3</sup>

Forensic psychologists have relied on psychological tests, especially those relevant to and with good reliability and validity concerning their

use in adversarial proceedings,<sup>4</sup> and that consider the special needs and requirements of forensic decision-making.<sup>5</sup> Although there has been a growth in scales and inventories dedicated to the assessment of issues specific to legal cases (e.g., parental capacity, personal injury, criminal responsibility), professionals still primarily use psychological assessment tools developed for general clinical practice, namely multiple-scale personality inventories.<sup>1-6</sup> In this framework, according to multiple authors, the most used tools for forensic purposes include the Minnesota Multiphasic Personality Inventory – 2 (MMPI-2),<sup>7</sup> the Millon Clinical Multiaxial Inventory – III (MCMI-III),<sup>8</sup> and the Personality Assessment Inventory (PAI).<sup>9-15</sup>

The PAI, developed in 1991 by Leslie C. Morey, is a 344-item, self-report inventory that aims to provide meaningful information for diagnostic and clinical decision-making, specifically relating to psychopathology and personality.<sup>16</sup> All items are distributed throughout four scale categories (i.e., four validity scales, 11 clinical scales, five

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treatment consideration scales, and two interpersonal scales) and organized in an inventory with a 4 point range (i.e., “false”, “slightly true”, “mainly true”, and “very true”). The PAI also includes numerous algorithmic and configural indicators of various important clinical concepts, such as suicide and violence potential and response distortion (e.g., defensiveness).<sup>17,18</sup>

The PAI’s popularity in forensic settings is not surprising when considering its benefits. First, the inclusion of several scales and configural indices directly relevant to the forensic referral questions, such as scales dealing with violence potential (e.g., the Aggression scale), personality disorders (e.g., Borderline Features scale), psychopathy (e.g., Antisocial Features scale), and substance abuse (e.g., Alcohol Problems scale; Drug Problems scale). The PAI also includes other scales that may be indirectly related to forensic issues, such as diagnostic categories (e.g., schizophrenia) that may be germane to legal topics such as competence to stand trial and insanity and other areas of functioning (e.g., trauma exposure) that may be relevant to case decision-making (e.g., mitigation, sentencing). All these features make the PAI relevant to a broad array of potential referral questions in forensic settings.<sup>19,20</sup>

Second, the PAI integrates profile distortion indicators (e.g., Inconsistency; Infrequency; Negative Impression; Positive Impression) which are useful in forensic contexts, not only due to the elevated likelihood of response distortion in these populations (e.g., where people search to give exaggeratedly positive or negative responses), but also due to the positive relationships found between response styles and dysfunctional conduct in correctional and other forensic settings.<sup>21–23</sup>

Lastly, the PAI has relatively fewer items, when compared to other commonly used measures, such as the MMPI-2 (e.g., 344 items vs 567 items of the MMPI-2) meaning that it takes less time to answer than other analogous tools (e.g., the PAI can be completed in 40–50 min, whereas the MMPI-2 is completed in 1–2 h by most people and in 3–4 h among psychiatric inpatients). Therefore, the PAI may be preferable in forensic settings, where psychological assessment processes are frequently limited by time constraints.<sup>1,24</sup> Nevertheless, a simultaneous application of different assessment inventories, such as the PAI, the MMPI-2, and its later versions (e.g., MMPI-2-RF or MMPI-3) is typically preferred, seeing that it would result in the assessment of several different personality dimensions through complementary measures.<sup>25</sup>

## 2. Relevant forensic constructs assessed by the PAI

### 2.1. Personality disorders

In many forensic and correctional settings, the assessment of personality disorders is pivotal, considering their high comorbidity with other pathologies, their strong association with different types of violent behavior and their high prevalence in forensic populations.<sup>11,26</sup> Moreover, the PAI is equipped with relevant scales in the assessment of personality pathology, namely the Borderline Features and the Antisocial Features scales, the Aggression scale, the Alcohol and Drug Abuse scales, and the Suicidal Ideation scale.<sup>11</sup>

The Borderline Features scale measures the characteristics which define borderline personalities, such as fluctuating and unstable interpersonal relationships, impulsivity, instability, emotional lability, and uncontrollable rage.<sup>17</sup> The Antisocial Features scale assesses illegal backgrounds, problems with authority, egocentrism, lack of empathy and loyalty, instability, and thrill-seeking traits,<sup>17</sup> making it especially relevant for the assessment of antisocial personality disorder traits.<sup>27</sup>

Some studies have analyzed the convergent validity of the Antisocial Features scale as a measure of psychopathic traits in forensic settings, having found moderate correlations with the Hare’s Psychopathy Checklist – Revised (PCL-R) total scores ( $r = 0.40$ ) and strong correlations with the screener version of Psychopathy Checklist – Screening Version (PCL-SV) ( $r = 0.54$ ).<sup>19</sup> However, concerning the PCL-SV, the Antisocial Features scale appears to correlate more strongly with the behavioral factor of PCL-R than with its affective/interpersonal

domains, and the suggested cut-off score (i.e.,  $>70T$ ) showed low to moderate sensibility (44%) and specificity (84%) values for the correct identification of psychopathy, leading authors to conclude that the Antisocial Features scale should not be used alone for the diagnosis of psychopathy.<sup>17,19,28</sup>

Regarding its ability to diagnose people with borderline personality disorder, a study by Bell-Pringle et al.,<sup>29</sup> with 24 borderline personality disorder inpatients, conducted a stepwise discriminant analysis, by including the PAI’s Depression, Borderline Features, Somatization, Schizophrenia, and Anxiety scales in a discriminant function. Results of this study revealed that the proposed function correctly classified 86% of the participants with borderline personality disorder. Another study, conducted by Stein et al.,<sup>30</sup> revealed moderate correlations between the Borderline scale and the presence of borderline personality disorder according to the Diagnostic and Statistical Manual of Mental Disorders – IV (DSM-IV) ( $r = 0.31$ ), and between the Self-Harm subscale and the presence of borderline personality disorder according to the DSM-IV ( $r = 0.31$ ).

Moreover, the PAI has shown significant correlations with other measures of personality disorders, including the Shedler-Western Assessment Procedure (SWAP-200).<sup>31</sup> A study by Bradley et al.<sup>32</sup> revealed moderate to strong correlations between the PAI’s Affective Instability subscale and the SWAP’s Borderline Personality Disorder score ( $r = 0.40$ ), between the PAI’s Antisocial Behavior, Aggressive Attitude, Verbal Aggression, and Drug Problems scales and the SWAP’s Antisocial Personality Disorder score ( $r = 0.44$ ,  $r = 0.45$ ,  $r = .42$ , and  $r = .46$ , respectively), and between the PAI’s Stimulus-Seeking subscale, the Drug Problems scale and the SWAP’s Obsessive-Compulsive Disorder scores ( $r = 0.54$  and  $r = -0.49$ , respectively).

In general, available evidence about the PAI’s utility in the assessment of personality traits and disorders is promising.<sup>11,27</sup> Nevertheless, it is important to take response styles into account, especially if elevated scores are found on the Positive Impression scale, because people with personality disorders may be motivated to omit or minimize antisocial or pathological traits,<sup>27</sup> doubly so if they are involved in criminal cases.

### 2.2. Psychotic-spectrum disorders

The diagnostic accuracy of the PAI, in general terms, is quite strong as it relates to various types of mental health problems. In relation to psychotic-spectrum disorders, however, which are frequently relevant to legal decisions concerning competence to stand trial and insanity, peer-reviewed published research studies and information documented in the PAI professional manual indicate a sub-optimal performance. The primary indicator of Schizophrenia symptoms on the PAI is the SCZ (Schizophrenia) scale. Published research indicates two important concerns with this scale (1) individuals suffering from disorders (e.g., substance abuse, depression): *other than* schizophrenia oftentimes produce very elevated scores on the SCZ scale, and (2) individuals who *do* suffer from Schizophrenia oftentimes do *not* produce clinically elevated scores on the SCZ scale.<sup>18,33,34</sup> Another PAI scale that is conceptually relevant to psychosis, Paranoia, suffers from the same general pattern of limitations. There are numerous potential explanations for these findings, including that schizophrenia is a difficult disorder to detect when relying on self-report scales. Lack of insight into the nature of their mental disorder is a common feature among individuals suffering from schizophrenia, which can make their self-report of their symptoms intrinsically unreliable.

Published research has also examined the diagnostic accuracy of the PAI in relation to psychotic-spectrum diagnoses specifically in forensic and criminal justice samples. In three early published studies,<sup>35–37</sup> the diagnostic accuracy of SCZ was better than chance, although it was far from perfect. In a more recent study, Edens and Ruiz<sup>38</sup> found that the SCZ scale performed at no better than chance-level accuracy in identifying schizophrenia-spectrum diagnoses among forensic psychiatric inpatients. There are numerous potential explanations for the

modest-at-best diagnostic accuracy of SCZ across these studies. Noted earlier, schizophrenia is a complex disorder that is difficult to diagnose purely by reliance on self-report questionnaires. Additionally, individuals in criminal justice settings may be motivated *not* to disclose their symptoms (e.g., due to concerns about being labeled as “crazy” within the criminal justice system).<sup>39,40</sup> We return to this issue in a later section addressing the ability of the PAI to identify positive impression management and the minimization of mental health problems.

### 2.3. Substance abuse

The assessment of substance misuse is meaningful in forensic settings, especially in cases where alcohol or drug abuse is related to criminal behavior.<sup>11</sup> For example, a meta-analytic review found strong associations between substance abuse and intimate partner violence perpetration and victimization.<sup>41</sup> Other authors have studied the prevalence of substance abuse in other types of criminal cases, such as property offenses, violent offenses, and public-order offenses.<sup>42</sup>

The PAI includes two scales dedicated to the appraisal of alcohol and drug consumption – the Alcohol Problems and Drug Problems scales – and both assess the negative consequences of abuse and dependence.<sup>17</sup> The Drug Problems scale assesses areas related to drug use, peers involved in drug abuse, drug consumption as a coping mechanism, and social, financial, work, and health consequences of drug use.<sup>17,20</sup> The Alcohol Problems and Drug Problems scales were correlated with the Alcohol Dependence scale of MCMI-II ( $r = 0.64$ ), and with the Drug Dependence scale of MCMI-II ( $r = 0.52$ ).<sup>17</sup>

Studies have emphasized the validity of the Drug Problems scale as an effective measure of drug abuse-related problems, such as medical, employment, alcohol misuse, drug use, and legal, family/social, and psychiatric difficulties.<sup>43</sup> However, it is important to note that items about substance abuse are easily identifiable, meaning respondents can easily omit the use of illicit substances in their responses.<sup>44</sup> Furthermore, the Drug Problems scale is unable to find the difference between current and past substance users.<sup>11</sup>

Edens and Ruiz<sup>22</sup> developed the Addictive Characteristics Scale, which employs scores from the Affective Instability, Self-Harm, and Egocentricity subscales to assess the personality traits most linked to addictive behaviors. Limited research has been published thus far on this scale, but a study by Edens and Ruiz<sup>38</sup> revealed it has a poor discriminant power, presenting low correlations, as well as unacceptable area under the curve (AUC) values for inpatient groups diagnosed with mood disorders ( $r = 0.04$ ; AUC = 0.52), psychotic-spectrum disorders ( $r = -0.29$ ; AUC = 0.32), and substance related disorders ( $r = 0.11$ ; AUC = 0.57). The Addictive Characteristics Scale only presented acceptable correlations and AUC with inpatient groups diagnosed with PTSD ( $r = 0.44$ ; AUC = 0.86). None of these analyses was performed on samples where there would be a strong likelihood that respondents would necessarily be minimizing or suppressing their history of substance use or abuse, however, making these findings a relatively weak test of the utility of these scales in the types of populations where they might be of most use.

### 2.4. Aggression and recidivism

Even though the PAI was not developed specifically to be used as part of violence risk assessments, it can aid psychologists in evaluating this type of risk.<sup>21</sup> The PAI offers multiple useful scales and indices for the evaluation of aggression, violence risk, and the possibility of recidivism. For example, the Aggression scale was designed to measure the aggression potential of an individual, assessing characteristics and attitudes related to anger, assertiveness, hostility, and aggressiveness.<sup>17,18</sup> The Aggression scale comprises three subscales, including (i) Aggressive Attitude, which measures hostility, poor rage control, and the use of force as an expression of rage; (ii) Verbal Aggression, which assesses rage expressions, from the more assertive to the more offensive ones, as

well as readiness to express anger towards others; and (iii) Physical Aggression, which analyses the tendency to physically manifest anger/rage, including property damages, physical altercations, and threats of violence.<sup>17,18</sup>

Concerning its ability to predict violent episodes or criminal recidivism, findings have been mixed, with studies presenting AUCs ranging from 0.52 to 0.79.<sup>21,45</sup> In this regard, a study by Battaglia et al.<sup>21</sup> analyzed the utility of the PAI in predicting aggressive behavior in forensic psychiatric inpatients and found that the Aggression scale effectively differentiated between violent offenders and healthy controls. Boccaccini et al.,<sup>46</sup> on the other hand, examined the PAI's ability to predict post release arrests in sex offenders and found that the Aggression scale was a significant predictor of all types of recidivism (i.e., violent nonsexual recidivism, violent or sexually violent recidivism, sex offender registry violation, and nonviolent nonsexual recidivism), with an exception concerning sexually violent recidivism. Lastly, a meta-analytic review by Gardner et al.<sup>47</sup> concluded that the Aggression scale scores' predictive effects were stronger for predicting institutional misconduct than recidivism, and among offenders who completed the PAI while incarcerated when compared to those who completed it in a treatment setting. Particularly, the Aggression scores reached effect sizes  $d = 0.46$  in predicting institutional misconduct among incarcerated offenders, immediately followed by the Antisocial Features scores, in which predictive effects were as large as  $d = 0.44$  in predicting institutional misconduct in incarcerated offenders.

Concerning other clinical scales relevant to the aggression domain, the Antisocial Features and the Borderline Features scales deserve to be mentioned, due to their significant correlations with aggressive behaviors and criminal recidivism. In a study by Newberry and Shuker,<sup>48</sup> correlations of 0.41 were found between the Antisocial Features scale and scores from the Offender Group Reconviction Scale (OGRS), and correlations of 0.48 were found between the Antisocial Behavior subscale and scores from the OGRS. Similarly, a study by Salekin et al.<sup>49</sup> found that the Antisocial Behavior subscale correlated with several types of institutional misconduct, such as violence ( $r = 0.31$ ), verbal aggression ( $r = 0.31$ ), manipulateness ( $r = 0.45$ ), and dangerousness ( $r = 0.33$ ) among incarcerated women.

Regarding its ability to predict recidivism, the Antisocial Features scale has shown modest classification accuracy (e.g., AUC = 0.65, with a sensitivity of 0.36 and a specificity of 0.80, in a study by Walters and Duncan)<sup>50</sup> to strong classification accuracy (e.g., for a cut-off point of 70T, the Antisocial Features scale accurately predicted physical aggressive disciplinary offenses with a sensitivity of 1.00 and a specificity of 0.72, in a study by Buffington-Vollum et al.).<sup>51</sup> A study by Newberry and Shuker<sup>48</sup> has also revealed modest classification accuracy of general infractions, violent infractions, and nonviolent infractions for the Drug Problems scale (e.g., AUC = 0.67 with a sensitivity of 0.45 and a specificity of 0.80; AUC = 0.58 with a sensitivity of 0.36 and a specificity of 0.44; and AUC = 0.64, with a sensitivity of 0.10 and a specificity of 0.86, respectively). In terms of effect size, in the meta-analysis by Gardner et al.,<sup>47</sup> the largest predictive effects belonged to the Antisocial Features ( $d = 0.31$ ) and Aggression ( $d = 0.23$ ) scales, whereas the remaining PAI scales revealed somewhat smaller recidivism effects ( $d < 0.20$ ).

Interestingly, some validity scales may also be useful in the assessment of risk for aggressive misconduct. Edens and Ruiz<sup>22</sup> suggested that elevations in the Positive Impression scale significantly predicted aggressive behavior in a correctional sample (see also Reidy et al.).<sup>23</sup> This may be related with the fact that responses in these settings are more likely to impact the lives of the respondents, for better or for worse, leading to higher levels of positive distortions.<sup>52</sup>

In 1996, Morey designed the Violence Potential Index (VPI) through the extraction of 20 features of the PAI thought to be most likely to be associated with violence and dangerousness (e.g., anger, hostile control in relationships, thrill-seeking, impulsivity, agitation, antisocial behavior, grandiosity, and alcohol and drug abuse).<sup>53</sup> However, in one

study, the VPI revealed a poor ability to discriminate non-sexual violent recidivism (AUC = 0.59), non-violent recidivism (AUC = 0.58), and sexual violent recidivism (AUC = 0.57).<sup>46</sup> Concerning institutional violence, it also appears to have a limited predictive power, although the meta-analysis by Gardner et al.<sup>47</sup> showed effect sizes ranging from  $d = .01$  to as high as  $d = 0.86$ .<sup>54,55</sup>

In summary, many are the scales and indices that can aid in the assessment of the risk of aggression, institutional misconduct, and criminal recidivism, but special attention should be given to the Aggression scale and subscales, as well as to the Antisocial Features scale. Their ability to correctly discriminate between different types of recidivism varies, but an examination of published effect sizes suggests that the Aggression scale is the most consistent predictor of various forms of violent and aggressive behavior.

## 2.5. Malingering

One of the most studied topics regarding the forensic application of the PAI concerns its ability to identify negative response distortion, given that it is generally believed that people involved in forensic settings are likely to exaggerate or mangle mental health symptoms to obtain some desired outcome (e.g., receive compensation for personal injury) or to avoid negative consequences (e.g., prison sentences).

Originally, the PAI included the Negative Impression scale, dedicated to the identification of malingered psychopathology.<sup>17</sup> The original manual indicated reasonable internal consistency values for the community sample (Negative Impression scale;  $\alpha = 0.71$ ) and an identification rate of 98.6% for malingered profiles at 84T and an identification rate of 96.5% for malingered profiles at 92T.<sup>17</sup> Despite the original proposal, however, the cut-off points proposed by Boccaccini and colleagues<sup>56</sup> (>81T) appear to garner the most precision, with reasonable sensitivity (91%) and specificity (72%) (see also the meta-analysis by Hawes & Boccaccini).<sup>57</sup> The Negative Impression scale appears to be a good malingering predictor, especially when compared to other malingering scales, such as the *F* scale (i.e., denominated as Infrequency) of the MMPI-2.<sup>39,56</sup>

In 1996, Morey developed the Malingering Index to provide complementary information to that offered by the Negative Impression scale concerning the identification of malingering.<sup>53</sup> This index also considered the Negative Impression scale's tendency towards elevated scores in the presence of cognitive distortion related to genuine psychopathology.<sup>18</sup> The Malingering Index is comprised of eight configurational traits of the PAI which are more frequent in individuals who have been instructed to mangle mental disorders than in people with genuine clinical problems.<sup>18,53</sup> In clinical samples, studies have shown mixed results regarding its predictive ability, with Morey reporting, for a cut-off point >3, a sensitivity of 86.4% and specificity of 94% for the clinical standardization sample, but a specificity ranging from 81% to 91.1% in samples restricted to psychiatric inpatients.<sup>18</sup> In a study by Edens et al. with a forensic sample, when using a cut-off score >5, the Malingering Index demonstrated a significant and acceptable effect for detecting the malingerers (AUC = 0.76), thus suggesting a reasonable predictive ability.<sup>57,58</sup>

The Rogers Discriminant Function was developed as a supplement to the Malingering Index.<sup>36</sup> It is not focused on psychopathology, but rather on its ability to differentiate between a conscious symptom simulation and malingering related to genuine clinical problems.<sup>53</sup> Initially, this function showed considerable ability to differentiate between invalid protocols in clinical malingering studies,<sup>17,58,59</sup> with good sensitivity (95%) and specificity (96%) values for a cut-off score >65T. However, in forensic settings, the Rogers Discriminant Function demonstrated modest discriminative abilities, with Rogers et al. reporting a sensitivity of only 51% and a specificity of 71%, with an overall hit rate of 62%.<sup>37</sup> These results led many authors to conclude that this function is not adequate in forensic samples. These claims have been subject to some criticism, however, as they have almost exclusively

been found when the 'malingering' criterion group is identified based on the results of the Structured Inventory of Reported Symptoms (SIRS). It is clear that the Rogers Discriminant Function and the SIRS are at best only modestly correlated with each other.<sup>18</sup>

More recently, the Negative Distortions Scale<sup>60</sup> was constructed from 15 of the most infrequently selected PAI items by clinical samples. This scale shows considerable sensibility (82%) and specificity (71%) for a cut-off score of 13, leading some authors to consider it superior to other PAI indices in the ability to detect malingering in forensic settings.<sup>60-62</sup> More research is needed on this experimental scale, as questions remain as to the extent to which it shows any incremental predictive validity beyond the more traditional PAI negative distortion indicators.

In 2001, Hong and Kim, based on the Korean version of PAI, developed the Hong Malingering Index by combining the Inconsistency, Negative Impression, Anxiety-Related, Paranoia, and the Warmth scales. This formula allows psychologists to discriminate between genuine and simulated psychopathology and was included in the PAI-plus manual.<sup>63,64</sup> Studies have shown that this index presents medium to large effect sizes between feigning and honest groups (e.g.,  $d = 0.95$  in a study by Russell and Morey.<sup>65</sup>  $d = 2.51$  in a study by Meyer et al.<sup>66</sup>) and a cut-off score of 73T can identify malingering with a reasonable amount of sensitivity (88%) and specificity (87%).<sup>67</sup>

Computed through the mean of seven of PAI's clinical scales (i.e., Somatic Complaints; Anxiety; Anxiety-Related Disorders; Depression; Mania; Paranoia; Schizophrenia), the Multiscale Feigning Index was specially designed for forensic settings, aiming to assess the tendency to report simulated severe mental disorders in correctional settings.<sup>68</sup> A cut-off score >77T is related to the identification of malingerers with a sensitivity of 69% and a specificity of 94%.<sup>68</sup> Concerning its effect size, studies suggest large values:  $d = 2.61$  and  $d = 2.95$  among clinical samples,<sup>67</sup> and  $d = 1.39$  among community samples.<sup>65</sup>

The Cognitive Bias Scale was developed by Gaasedelen et al. to identify people who exhibit cognitive response bias.<sup>69</sup> It includes the 10 items (including items from the Depression, Anxiety, Somatic Complaints, Negative Impression, Positive Impression, Anxiety-Related Disorders, and Treatment Rejection scales) of the PAI that best differentiated between individuals who passed or failed Performance Validity Tests. Cut-off points >19 lead to a sensitivity of 69% and a specificity of 96% and a large effect size ( $d = 0.96$  in the study with clinical samples who completed performance validity tests.<sup>69</sup>  $d = 0.92$  in a study with clinical samples who completed performance validity tests<sup>70</sup>).

Currently, the seven aforementioned malingering measures appear to be promising, with large effect sizes and an ability to correctly identify symptom simulation, depending on the type of sample and malingered psychopathology. Thus, despite evidence pointing to the ability of the PAI to provide relevant information concerning malingered psychopathology, there is a lack of consensus regarding the predictive abilities of the existing scales and indices, as well as uncertainty surrounding which of the aforementioned scales are most efficient in detecting malingering.

## 2.6. Positive impression management

In addition to the need to identify individuals who may be exaggerating or malingering mental health problems in legal cases, the potential for individuals to minimize or deny mental health problems also is an important issue in some types of cases. For example, there are numerous U.S. case examples of defendants who seem to have obvious psychotic-spectrum diagnoses who refuse to consider or pursue insanity defenses. In civil arenas, positive impression management may be a particular concern in child custody and parenting capacity evaluations, where there are strong external incentives to minimize any mental health problems that an examinee may be genuinely experiencing.

There is a wealth of peer-reviewed, published scientific research indicating that individuals who are motivated to minimize or deny



mental health problems (i.e., engage in positive impression management) can successfully produce profiles on the PAI and similar instruments (such as the MMPI) that are “within normal limits” (i.e., appearing as psychologically undisturbed).<sup>18,71</sup> Fortunately, the PAI includes scales that are designed to identify respondents who are attempting to minimize psychological problems and exaggerate their psychological health. The PIM (Positive Impression) scale is the primary indicator of such a response style on the PAI and numerous published studies have shown that the PAI profiles of individuals who produce elevated PIM scores do not appear to be portraying an accurate representation of their mental health status or psychological functioning.<sup>22,72,73</sup> That is, when an examinee produces a PIM score beyond the recommended cut-off, the accuracy of the remainder of the PAI evaluation has to be interpreted with considerable caution due to the likelihood that the examinee is not accurately describing his or her mental health status.

It should be noted that the influence of defensiveness on the PAI may be scale-specific. That is, an examinee with an elevated PIM score may be attempting to minimize certain mental health issues (e.g., paranoia, schizophrenia) while also being willing to acknowledge certain problem areas (e.g., depression, stress). As an example, an elevated DEP (Depression) scale score on a defensive profile may be somewhat informative about an examinee’s experience of depressive symptoms, but scores in the normal range or lower on other scales may not be valid or accurate indicators of their functioning in those areas.<sup>18</sup>

### 3. Studies of the PAI in forensic samples

In a discussion regarding the PAI’s utility in forensic settings, it is also important to focus on its applicability to different forensic populations. Therefore, this section will address the PAI’s suitability to offender and inmate populations, as well as its use in intimate partner violence contexts and in family law cases. Finally, we will review recent studies regarding its applicability in the psychological assessment of forensic professionals.

#### 3.1. Offender and inmate populations

Psychological assessment in forensic and correctional settings aims to study topics related to competence, criminal responsibility, and risk of recidivism.<sup>74</sup> In inmate populations, the PAI has been mostly used to evaluate aggression, institutional misconduct, and the risk of criminal recidivism.<sup>75</sup>

Elevated scores in Antisocial Features and Aggression scales have been related to disciplinary problems in inmates.<sup>46,48</sup> These scales have also been shown to be good predictors of adherence or resistance to treatment of offenders, surpassing other scales especially developed to measure these constructs (e.g., Treatment Rejection; Treatment Process Index).<sup>54,75</sup> Likewise, scales such as the Dominance scale, other scales related to externalizing behaviors (e.g., Borderline Features, Drug Problems, Alcohol Problems, Mania, and Paranoia), as well as the Violence Potential Index have been found to be associated with non-compliance to intervention programs and dysfunctional conduct within these populations.<sup>23,75,76</sup>

At the same time, and as it was mentioned above, risk assessment is critical in inmate samples and the PAI has shown to be an adequate tool in this regard, especially when taking into account the Aggression and Antisocial Features scales, as well as the Violence Potential Index.<sup>46,48</sup>

Most studies dealing with inmate populations have focused solely on male samples, but a rising number of studies have begun to address female inmate samples, mostly aiming to compare sex differences about criminal needs, adaptation to reclusion, and institutional misconduct.<sup>77,78</sup> In a study conducted by Davidson et al., the PAI scales with the strongest predictive ability of infractions in female inmates were the Aggression, Antisocial Features, and Paranoia scales, as well as the Violence Potential Index (these findings are consistent with male

samples),<sup>78</sup> suggesting that PAI can efficiently predict general misconduct and aggressiveness in female inmates.<sup>55,79</sup>

In comparison to other personality assessment instruments (e.g., MMPI-2) and risk assessment tools (e.g., Historical-Clinical-Risk Management–20, HCR–20; PCL-R), which have been pointed out by research as weak in predicting inmate violence,<sup>80,81</sup> the PAI appears to be advantageous thanks to its ability to effectively predict institutional misconduct.<sup>23</sup> Similarly, the MMPI-2-RF also showed a significant predictive effect of aggressiveness in inmates and forensic inpatients<sup>82,83</sup>

#### 3.2. Intimate partner violence contexts

Because intimate partner violence (IPV) is a public health problem,<sup>84</sup> the assessment of risk factors associated with perpetration and victimization in these contexts is relevant in forensic psychology.<sup>85</sup> Although the most commonly inventories used for the assessment of domestic violence are the MMPI-2<sup>10,86</sup> and the MCMI-III,<sup>10,14,87</sup> the PAI has also shown to be an important measure in the evaluation of the personality characteristics of these groups, on account of its non-overlapping scales and superior discriminant validity.<sup>10,88</sup>

The administration of the PAI to victims of intimate partner violence (IPV) has shown a tendency for elevated scores in Negative Impression, Depression, Anxiety-Related Disorders, Anxiety, Paranoia, and Borderline Features,<sup>89,90</sup> which are comparable to the scores observed in the MMPI-2, particularly in Hypochondriasis, Depression, Hysteria, Psychopathic Deviate, Paranoia, Psychasthenia, and Schizophrenia scales.<sup>89</sup> These findings may not only help examiners in understanding the effects of IPV in its victims but can also be used to identify victims who may benefit from psychological treatment, and which areas should be treated, thus helping them develop adequate treatment plans.

When it comes to its application to IPV offenders, a study conducted by Nedegaard and Cronin suggested that elevations in the Nonsupport, Antisocial Features, Alcohol Problems, and Positive Impression scales may aid in treatment program delineation.<sup>88</sup> Other authors have noticed that batterers with borderline traits are also likely to present elevated scores in Alcohol Problems, Drug Problems, Aggression, and Depression scales.<sup>10</sup> An understanding of the most common profiles of batterers may aid technicians in treatment selection, by informing them of which offenders may be open to psychological intervention, and which areas of concern must receive greater emphasis.

#### 3.3. Family law

The PAI is the third most used personality test in custody contexts, following the MMPI-2 and the MCMI-III.<sup>91,92</sup> In terms of the assessment of parental capacity, research has stressed the importance of taking validity scales into account, and, in particular, the Positive Impression scale, given that parents in these contexts tend to positively distort their answers to obtain certain gains (e.g., have custody), or avoid negative consequences (e.g., losing custody).<sup>92,93</sup> The most common profiles show elevations in the Anxiety-Related Disorders scale and, when accounting for sex differences, studies have pointed to higher scores in the Treatment Rejection, Dominance, Mania, and Antisocial Features scales for men, and higher scores in the Warmth scale for women.<sup>92,94</sup>

Compared to other response distortion scales commonly used in custody cases (e.g., Lie scale – *L* – of MMPI-2; Faking Good scale of the Child Abuse Potential Inventory – CAPI; Desirability Scale of the MCMI-III), the Positive Impression scale of the PAI tends to be more restrained in determining positively distorted responses, leading to a smaller rate of identification of invalid profiles.<sup>93,95</sup> This may be due to a lower capacity in detecting invalid responding or, alternatively, due to differences in test difficulty and construction.<sup>93,96</sup> These findings have practical implications. Firstly, the PAI may identify fewer invalid parent profiles due to positive impression management when compared to other response distortion scales; therefore, it is important to consider complementary direct and functional methods to assess parental

capacity. Secondly, when applying a self-report test, such as the PAI, positive distorted profiles from parents who are being assessed for parental capacity may be expected. Carr et al. propose that psychologists inform the examinee of their invalid profile after the test results have been obtained and offer the opportunity to complete the testing again, following the recommendations of other tests' authors (e.g., CAPI and MMPI-2), thus reducing the number of excluded profiles.<sup>95</sup>

### 3.4. Forensic professionals

Traditionally, the MMPI-2 has been the gold-standard inventory for the assessment of personality and psychopathology in police, where studies have been focused on analyzing antisocial behavior, aggression control, and validity indices, specifically the *L* scale.<sup>97,98</sup>

Even so, authors such as Weiss et al. have used the PAI to investigate the utility of the Negative Impression and Positive Impression scales, as well of the Antisocial Behavior, Egocentricity, and Stimulus-Seeking subscales in police enforcement agents.<sup>99,100</sup> They found that elevations in the Egocentricity subscale positively correlated with insubordination complaints, misconduct, and problems with anger and impulse management in police officers. On the other hand, elevations in the Stimulus-Seeking subscale (ANT-S) and in the Negative Impression scale associated with negligence of duty, whereas elevations in the Self-Harm subscale were related to impulsive behaviors at work.<sup>99,101</sup> Elevations were found in the Obsessive-Compulsive subscale, which was related to intrusive thoughts, attention to detail, and perfectionism. This subscale then proceeded to be positively associated with good performance at work for police officers.<sup>101</sup>

Overall, the PAI appears to have a predictive effect on misconduct, insubordination, and abuse of power in police.<sup>101,102</sup> Of particular importance in regards to the adverse effects of defensiveness (and the importance of validity scales), Lowmaster and Morey also reported that predictive validity was significantly attenuated among examinees who produced clinically elevated scores on the Positive Impression scale.<sup>102</sup>

Table 1 shows the main findings about the PAI in forensic and correction settings.

**Table 1**  
PAI forensic studies and main findings.

Reference	Samples	Measures	Results/Conclusions
Cherepon, 1994	44 female abuse survivors 41 women diagnosed with primary affective disorders	PAI	Significant differences were found between groups. The abuse survivor group presented higher NIM, ARD, PAR, BOR scores and lower ALC and RXR scores
Salekin et al., 1997	103 female inmates	PAI PCL-R	The convergent and divergent validity of the measures was established. PAI scores were related with staff ratings of violence, verbal aggression, manipulateness, lack of remorse, and noncompliance.
Wang et al., 1997	334 inmates	PAI SIRS Suicide Risk Assessment OAS	Approximately one-third of inmates suspected of malingering were clearly identified as feigners. The study supports the use of the PAI for the assessment of malingering, suicide risk, and aggression in male inmates receiving or requesting psychiatric treatment
Rogers et al., 1998	115 forensic and correctional sites patients	PAI SIRS	The RDF was not applicable to forensic referrals, but the NIM scale appeared to be useful in the detection of malingering in forensic samples.
Edens et al., 2000	46 forensic psychiatric inpatients 55 sex offenders	PCL:SV PCL-R PAI	Correlations between ANT scale of the PAI, the PCL:SV, and PCL-R support its concurrent validity as a dimensional feature of psychopathic traits
Douglas et al., 2001	129 forensic psychiatric patients	PAI	Moderate support for the validity of the PAI was found
Buffington-Vollum et al., 2002	58 sex offenders	PAI PCL-R	Significant correlations were obtained between ANT and the PCL-R. The ANT scale presented overall better classification accuracy compared to the PCL-R
Kellogg et al., 2002	100 substance-using and substance-abusing individuals	PAI ASI	There were significant correlations among the PAI DRG scale and the ASI scales
Walters et al., 2003	185 inmates	PAI PCL-R	ANG displayed incremental validity by successfully predicting future disciplinary reports
Caperton et al., 2004	137 inmates	PAI	ANT predicted various forms of general and major infractions. RXR was modestly correlated with treatment noncompliance
Carr et al., 2005	91 biological mothers and 73 fathers from 93 cases assessed at Family Court Center	MMPI-2 PAI CAPI CBCL	Substantial positive self-presentation bias was apparent

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## 4. PAI limitations

Despite the utility of the PAI as an objective, direct and comprehensive tool for the assessment of personality, and regardless of its utility in forensic settings, it is important to recognize some relevant limitations.

Firstly, the PAI is a self-report instrument with face validity, which means that item responses can be manipulated and distorted, especially in forensic settings, where symptom malingering or dissimulation may be particularly advantageous to respondents.<sup>11</sup> Conversely, individuals motivated to minimize their mental health problems, though commonly identifiable as engaging in positive impression management, can produce protocols that seriously underestimate the severity of their psychological disturbance. Secondly, although the PAI is an easy-to-understand inventory, it requires that the respondents be literate (i.e., a reading ability at the fourth-grade level is needed). Thus, illiterate people will not be able to respond to the inventory. This is a common problem with self-report instruments, but its impact is, nonetheless, important to note, especially when considering its application to forensic samples, where there is a greater prevalence of illiterate individuals.<sup>20</sup> Thirdly, the PAI's ability to correctly identify symptom simulation and malingering has been contested, particularly when compared to other assessment tools (e.g., MMPI-2, CAPI, and MCMI-III) and does not gather consensus in literature.<sup>103,104</sup> Lastly, some issues remain regarding the PAI's ability to identify positive impression distortion, which may have implications in family law cases, particularly in custody evaluations, where parents tend to present themselves in an overly positive manner. In regards to both positive and negative response distortion, there also is limited research on how client characteristics (e.g., intelligence level) might impact the PAI's to detect these types of distortion. There is some evidence, for example, that more intelligent respondents may be more adept at successfully malingering mental health problems,<sup>105</sup> but to our knowledge no such research has been conducted on the PAI itself.

Table 1 (continued)

Reference	Samples	Measures	Results/Conclusions
Walters & Duncan, 2005	91 inmates	PCL-R PAI	PAI ANT and AGG successfully predicted recidivism. Incremental validity of both scales confirmed
Weiss et al., 2005	800 police officer candidates	PAI	The ANT-E subscale is a predictor of insubordination and excessive citizen complaints
Boccaccini et al., 2006	166 defendants sent for pretrial forensic evaluations	PAI MMPI SIRS	NIM was the most effective PAI screening measure, performing as well as the MMPI-2 F and F-K scales
Chambers & Wilson, 2007	93 male batterers	PAI CTS-2	PAI is a potentially useful instrument in assessing male batterers
Edens et al., 2007	115 inmates	PAI SIMS SIRS	Correlations among measures were high and all PAI measures revealed an adequate percentage of classification accuracy (NIM = 70%; MAL = 69%; RDF = 70%). Compared to other scales, only the PAI significantly discriminated between psychiatric patients and suspected malingers
Kucharski et al., 2007	116 criminal defendants referred for competency to stand trial evaluations	PAI SIRS	NIM, but not RDF nor MAL significantly differentiated the malingering from the not malingering group
Skopp et al., 2007	113 female inmates	PAI	ANT was the most consistent and effective predictor of misbehavior
Kucharski et al., 2008	98 criminal defendants	PCL-R PAI	PAI is useful in the assessment of behavioral but not the affective/interpersonal aspects of psychopathy
Edens, 2009	1062 inmates	PAI	Low WRM and high DOM were associated with antisocial and paranoid traits, whereas BOR and internalizing psychopathology were associated with low WRM. High DOM and low WRM predicted general and aggressive institutional misconduct, whereas DOM predicted staff ratings of treatment noncompliance/failure
Boccaccini et al., 2010	1412 sex offenders	PAI SATC-99 Pre- and post-release arrests	Several PAI measures demonstrated small to medium effect sizes in differentiate violent nonsexual recidivism, nonviolent recidivism, and sex offender registry violations
Patry et al., 2010	Inmates	PAI PSIQ	Convergent and discriminant validity of the PAI were established.
Magyar et al., 2011	311 male offenders	PAI	ANT and BOR predicted various forms of problematic conduct and subjective and objective ratings of treatment progress. AGG demonstrated incremental validity for general noncompliance and aggressive behavior, and interpersonal scales predicted selected treatment behavior
Gaines et al., 2012	98 inmates	SIRS PAI	The study presented the Multiscale Feigning Index (MFI) and compared it with existing PAI feigning indices. MFI was a stronger predictor of SIRS outcome than NIM, MAL, and RDF
Lowmaster & Morey, 2012	85 law enforcement officer candidates	PAI	The PAI scales and subscales can predict law enforcement officers' performance.
Newberry & Shuker, 2012	268 offenders	PAI OGRS	Moderate positive correlations were found between ANT and general institutional misconduct, and between ANT, AGG, and DRG and risk of reconviction
Boccaccini et al., 2013	76 sex offenders	PAI	ANT and BOR scores were the strongest predictors of program misconduct and noncivil commitment program convictions
Hynan, 2013	250 child-custody litigants	PAI	Moderate defensive underreporting was exhibited. The PAI revealed adequate gender fairness
Percosky et al., 2013	34 sex offenders	PAI	BOR may be useful in predicting noncompliance and unsuccessful outcomes in sex offenders mandated into treatment.
Harper et al., 2014	195 parents or grandparents in parenting capacity assessments	PAI MCMI-III AAPI-2 STAXI-2	Strong concurrent validity was found between the PAI and the MCMI-III validity scales. The PAI appeared to identify fewer positively distorted responses when compared to the MCMI-III.
Davidson et al., 2015	2000 female inmates	PAI	AGG, ANT, PAR, and the VPI present the strongest relationship to general and assaultive disciplinary infractions
Reidy et al., 2015	15,546 inmates	PAI	The scales most strongly related to general rule infractions were ANT, AGG, and the VPI. The PAI can make a substantial contribution to institutional risk assessments and security classification
Boccaccini et al., 2017	1483 sex offenders in a screener sample and 643 offenders in an evaluation sample	PAI	PAI scores were small to moderate predictors of diagnoses among offenders who underwent evaluations
Matlasz et al., 2016	61 inmates	PAI WAIS-IV	Low WAIS-IV score predicted invalid PAI profiles. PAI validity scales may be informative in detecting cognitive concerns
Gardner & Boccaccini, 2017	477 offenders	PAI PCL-R	PAI is valid measure of simulated adjustment, overstated pathology, and respondent disengagement
Jung et al., 2018	158 sex offenders	PAI	ANT was associated with risk constructs and recidivism
Tatman, 2019	97 correctional officer candidates	CH-S PAI	CH-S and PAI predicted job performance
Battaglia et al., 2021	45 (20 healthy controls and 25 forensic psychiatric patients)	PAI AIS	AGG-A and AGG-V were positively associated with severe aggressive incidents in hospital
Nedegaard & Cronin, 2021	154 intimate partner violence perpetrators	PAI	IPV treatment programs' facilitators believed the PAI to be a useful tool as a pre-treatment assessment tool.
Tylicki et al., 2021	588 consecutive civil disability claimants	MMPI-2-RF PAI WMT MSVT NV-MSVT TOMM CARB RDS CVLT-II	The Cognitive Bias Scale (CBS), developed as a PAI indicator of poor performance of Performance Validity Tests is considered an effective validity scale for detecting malingered neurocognitive dysfunction groups

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Table 1 (continued)

Reference	Samples	Measures	Results/Conclusions
Akl et al., 2022	27 women charged with killing their abusive partner	PAI MMPI MMPI-2 TSI TSI-2 DAPS	Elevations were found across the NIM, DEP, ARD, BOR, and ANX scales of the PAI. Similar results were found across all other applied measures.

PCL-R = Psychopathy Checklist-Revised; SIRS = Structured Interview of Reported Symptoms; OAS = Overt Aggression Scale; PCL:SV = Hare Psychopathy Checklist: Screening Version; ASI = Addiction Severity Index; MMPI-2 = Minnesota Multiphasic Personality Inventory – 2; CAPI = Child Abuse Potential Inventory; CBCL = Child Behavior Checklist; CTS = Conflict Tactics Scale; SIMS = Structured Inventory of Malingered Symptomatology; OGRS = Offender Group Reconviction Scale; MCMI-III = Millon Clinical Multiaxial Inventory-III; AAPI-2 = Adult Adolescent Parenting Inventory-2; STAXI-2 = State-Trait Anger Expression Inventory-2; PSIQ = Psychological Services Intake Questionnaire; WAIS-IV = Wechsler Adult Intelligence Scale-IV; CH-S = Critical Hire-Screen; AIS = Aggressive Incidents Scale; MMPI-2-RF = MMPI-2-Restructured Form; WMT = Word Memory Test; MSVT = Medical Symptom Validity Test; NV-MSVT = Nonverbal Medical Symptom Validity Test; TOMM = Test of Memory Malingering; CARB = Computerized Assessment of Response Bias; RDS = Reliable Digit Span; CVLT-II = California Verbal Learning Test-Second Edition; TSI = Trauma Symptom Inventory; TSI-2 = Trauma Symptom Inventory-2; DAPS = Detailed Assessment of Posttraumatic Stress.

## 5. Discussion

The PAI is a comprehensive, objective, and direct measure that allows for the evaluation of several characteristics of personality with special utility in forensic settings, overcoming many of the limitations presented by other personality assessment tests. Its potentialities in personality forensic assessment include scales that measure relevant constructs for forensic psychology (e.g., personality disorders, substance abuse, and aggression), as well as with indices that were specially designed to deal with particularly challenging problems in forensic context (e.g., recidivism and symptom malingering). The inclusion of validity scales is remarkably relevant in the forensic field, despite some of the limitations associated with them.<sup>93</sup>

Its applicability in offender and inmate populations is of particular interest, especially regarding its ability to assess risk of misconduct, aggressiveness, and recidivism in male and female inmates. The presence of elevations in the Antisocial Features, Aggression, and Dominance scales, as well as in the Borderline Features, Drug Problems, Alcohol Problems, Mania, Paranoia scales and the Violence Potential Index seem to be the strongest predictor of non-compliance to intervention programs and dysfunctional conduct in inmate populations.<sup>23,75,106,107</sup>

In other forensic settings, such as intimate partner violence cases, it is also a powerful tool to assess the psychological impact of victimization and scale elevations related to batterers' psychological functioning. Understanding the most common elevations in these samples (i.e., Negative Impression, Depression, Anxiety-Related Disorders, Anxiety, Paranoia, and Borderline Features in victims and Nonsupport, Antisocial Features, Alcohol Problems, Positive Impression, Drug Problems, Aggression, and Depression scales in offenders) can aid clinicians in treatment planning and delineation, by informing them of which subjects are open or resistant to psychological intervention, and by informing them of which areas must be the focus of the intervention.<sup>10,88–90</sup>

The PAI is also a useful measure in family law cases, where it is mainly used in the evaluation of positive distortion responding. However, it is more restrained in determining positively distorted responses, when compared to other inventories (e.g., MMPI-2, CAPI or the MCMI-III), which means that a complementary application of other assessment methods for the evaluation of parental capacity or a later re-application of the PAI (after informing the respondents of validity problems) is required to obtain the most robust results.<sup>93,95</sup>

The PAI is a good predictor of misconduct, insubordination, and abuse of power in police officers. Furthermore, although there is a lack of studies focused on its application in other types of forensic professionals (e.g., judges, lawyers, and public attorneys), the existing one

shows that it is a valuable tool for the assessment of judicial stress in these occupations. The analysis of the PAI's scales may help professionals in the decision-making process, intervention planning, and understanding of which risk factors may contribute to aggressive behaviors, misconduct, resistance to treatment, and criminal recidivism.<sup>21</sup>

Overall, the utility of the PAI in forensic settings is generally accepted and its growing recognition is evident in the exponential dissemination to other countries that, in the last couple of years, have adapted it to their populations and forensic realities.

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## Data availability

No data was used for the research described in this article.

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