

# Establishing the Validity of the Personality Assessment Inventory Drug and Alcohol Scales in a Corrections Sample

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## Abstract

Although not originally designed for implementation in correctional settings, researchers and clinicians have begun to use the Personality Assessment Inventory (PAI) to assess offenders. A relatively small number of studies have made attempts to validate the alcohol and drug abuse scales of the PAI, and only a very few studies have validated those scales in nonclinical correctional samples. The current study examined evidence of convergent and discriminant validity for the substance abuse scales on the PAI in a large, nonclinical sample of offenders. The net sample for the current study consisted of 1,120 federal inmates. Both the drug abuse and alcohol scales showed good convergent validity through high correlations with relevant proximal and distal indicators of substance use across multiple measures from several data sources. Discriminant validity was established as neither scale showed any “erroneous” correlations after controlling for the other scale. Implications for future research and practice are discussed.

## Keywords

PAI, corrections, drug assessment, alcohol assessment, validity

At year-end 2005, there were more than 2.2 million people incarcerated in U.S. prisons (Fellner, 2006; Harrison & Beck, 2006). During the decade between 1995 and 2005, incarceration in the United States had risen by an average of 3.3% per year: “[s]ince 1995, the total number of male prisoners has grown 34%; the total number of female prisoners, 57%” (Harrison & Beck, 2006, p. 4). Federal prisons in the United States were operating at 34% beyond their capacity at year-end 2005, and state prisons were between 1% and 14% beyond their capacity (Harrison & Beck, 2006). Related to this growth, corrections professionals have witnessed an increase in their public health responsibilities for the treatment and management of offenders with substance use disorders.

For example, it is known that nearly half of state and a third of federal offenders were using alcohol or drugs at the time of their offense (Mumola, 1999). Additionally, many offenses are found to be drug related (e.g., sale or possession of drugs, crimes commissioned to support drug use and lifestyles; Chandler, 2007; Mumola, 1999; Walters, 1999). From a diagnostic perspective, more than 70% of offenders have used substances, and a smaller yet significant portion meet criteria for substance use disorders (Mumola & Karberg, 2006). The requisite treatment and management of these

offenders must be built on effective screening and assessment instruments and processes.

Although population-based estimates such as those referenced above have been established by social scientists, the search continues for more efficient alcohol and drug use disorder screening instruments for use with offenders. Although not originally designed for implementation in correctional settings, researchers and clinicians have begun to use the Personality Assessment Inventory (PAI; Morey, 1996) to assess offenders (Edens & Ruiz, 2005). In part, the use of this instrument has grown because it is briefer than other popular instruments, the instrument is calibrated to a fourth-grade reading level (Edens, Cruise, & Buffington-Vollum, 2001), it has nonoverlapping scales that increase the discriminant validity of the test (Chambers & Wilson, 2007),

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and it has generally received wide support in terms of its psychometric properties (e.g., Boone, 1998; Hopwood, Baker, & Morey, 2008; Morey & Hopwood, 2004). Another advantage of the PAI is associated with the validity scales, which are intended to detect phenomena such as malingering and underreporting of symptoms (see, e.g., Baer & Wetter, 1997; Boccaccini, Murrie, & Duncan, 2006; Edens et al., 2001).

Of importance to correctional practice, there is a growing literature on the use of the PAI with corrections samples for assessing risk and screening for psychiatric diagnosis and suicidal ideation. With the recent emergence of standardized corrections norms (Edens & Ruiz, 2005), these areas of inquiry are expected to grow. To date, studies with correctional samples have explored or evaluated the performance of various PAI scales, including those measuring malingering and defensiveness (Edens & Ruiz, 2006; Wang et al., 1997), mental illness, personality disorders, assessing risk for suicidality (Rogers, Ustad, & Salekin, 1998; Wang et al., 1997), aggressive behavior (Diamond & Magaletta, 2006; Wang et al., 1997), psychopathy (Edens, Hart, Johnson, Johnson, & Olver, 2000), institutional adjustment (Walters, Duncan, & Geyer, 2003), and amenability to treatment (Caperton, Edens, & Johnson, 2004).

Although not yet highlighted as an area of inquiry for the PAI in corrections, it is critical to understand the value of the instrument in screening for substance use disorders. In this regard, the PAI contains two scales of particular relevance, the Alcohol Problems Scale (ALC) and the Drug Abuse Scale (DRG). The ALC consists of 12 items that observe multiple behaviors and experiences strongly related to alcohol use disorders. Levels of endorsement range from complete abstinence from alcohol to dependence, along with the effects of such dependence (Boyle & Lennon, 1994; Fals-Stewart, 1996). A relatively small number of studies have made attempts to validate the ALC and DRG (Fals-Stewart, 1996; Morey, 2007).

For example, Parker, Daleiden, and Simpson (1999) evaluated the convergent and discriminant validity of the DRG and ALC scales of the PAI in a sample of residential substance abuse treatment clients. They compared the PAI scales against relevant scales on the Addictions Severity Index (ASI) and found that the PAI's ALC and DRG had very good convergent and discriminant validity when compared with the Addictions Severity Index. Their findings provided support for the validity of the PAI substance abuse scales. In part, the representativeness of their sample with regard to substance abusers allowed them to conclude that these scales have stronger validity than had been previously reported by Alterman et al. (1995) in a less representative sample of 160 methadone patients who were low in socioeconomic status.

Schinka and colleagues have published a series of studies exploring the PAI substance use scales as they relate to

more general personality characteristics in clinical samples (Schinka, 1995a, 1995b; Schinka, Curtiss, & Mulloy, 1994). In a large sample of substance abuse inpatients, Hopwood et al. (2008) found clear support for the validity of DRG and ALC in terms of self-reported drug of choice. One study of a clinical sample of past and current drug users supported the validity of the DRG scale for identifying drug problems (Kellogg et al., 2002). In addition, Ruiz, Dickinson, and Pincus (2002) found support for the concurrent validity of the ALC scale in a sample of 200 college students. Collectively, the findings generally support the internal consistency and validity of the two scales. Given the numerous ways that drugs, alcohol, and crime mutually influence one another, it is surprising and unfortunate that studies examining the validity of the PAI substance abuse scales within criminal justice settings are lacking. In the most comprehensive review of studies on the use of the PAI in corrections, Edens and Ruiz (2005) provided correctional scale norms by combining several state Department of Corrections offender samples and an inpatient forensic sample believed to be representative of correctional populations from multiple areas throughout the United States. Of the four samples used, all but one was a clinical sample. From this large aggregated sample, Edens and Ruiz (2005) were able to provide new data supporting the reliability of both the ALC and the DRG scales across each of the samples used. However, on the point of developing further evidence for the validity of the DRG and ALC scales within nonclinical offender samples, the review is silent. There has not yet been a contemporary exploration of the validity of these scales within a broad correctional population.

Thus, the purpose of the current study is to evaluate the convergent and discriminant validity for the substance abuse scales on the PAI in a large, nonclinical sample of offenders. Specifically, we examined the ALC and DRG scales and correlated those scales with relevant drug use indicators over the lifetime and across numerous types of drugs, including alcohol, as well as with more distal substance abuse and mental health indicators such as prior receipt of substance abuse and/or mental health services, symptoms, suicide attempt, and violence history. Importantly, these indicators were culled from multiple measures from several different sources of data, including offender self-report, corroborated data from presentence investigations, and data from doctoral-level clinicians' intake interviews. Together, these measures provide a picture of the offender and their substance use, which allows an examination of the convergent validity of the ALC and DRG scales. In addition, given the range of data that were available to explore, discriminant validity is tested by examining the relationships of ALC on these indicators while controlling for DRG. Conversely, while controlling for ALC, we are able to examine the relationships between the DRG scale and other drug use and distal

substance abuse and mental health indicators (the Antisocial Features [ANT] and Aggression [AGG] scales were also included as covariate controls). Additionally, we explored the Estimated Alcohol Problems Scale (EstALC) and the Estimated Drug Abuse Problems (EstDRG). This represents a critical next step in the development of this literature on the use of the PAI as a screening and assessment tool in corrections.

## Method

Data for the present study were drawn from the Federal Bureau of Prison's Mental Health Prevalence Project (MHPP). The purpose and methodology of MHPP are described in detail elsewhere (Diamond & Magaletta, 2006; Magaletta, Diamond, Faust, Dagest, & Camp, 2009). To summarize, over an 18-month period, MHPP staff gathered a host of operational data from a sample of newly committed male and female federal inmates. Inmates were sampled from 14 different federal facilities across five geographic regions and three different security levels. The total sample size was 2,855 inmates who were properly identified as new commitments and for whom operational data were collected. These inmates were fluent in either Spanish or English. From within this group of inmates, 1,692 consented to complete an assessment battery that included the PAI. The present study was based on that subsample. Additional details on the relevant measures from the MHPP operational data and assessment battery are outlined below. No incentives were offered for participation in the research, and the national Institution Review Board of the Bureau of Prisons approved all procedures. Relevant demographic and criminal history data were extracted from a master database called SENTRY.

## Measures

*The Presentence Investigation and Coding Form (PSI-CF)* consists of a detailed coding of data contained in the individual Presentence Investigation (PSI) reports for each inmate. PSI reports are ordered by the judge prior to sentencing. The investigation is conducted by a probation officer who follows a set format and conducts an in-depth interview with the defendant that is then corroborated through a combination of official records and interviews with family and associates. Data recorded on the PSI-CR and extracted for use in the present study included a host of inmate characteristics, including history of drug and alcohol use and prior substance abuse treatment. Each of these was measured from the lifetime perspective. For the MHPP, trained coders completed a coding form (PSI-CF) designed to extract specific data points from the PSIs. The training protocol for coders was an intensive 2-day session. Coders

were required to attain at least a 90% agreement with established coding protocols under supervision before proceeding with individual coding.

*The Psychological Services Intake Questionnaire (PSIQ)* is a two-page self-report form that provides information relevant to mental health and substance abuse screening (Federal Bureau of Prisons, 1993). Prior to the intake interview mentioned below, the inmate completes this form. A psychologist reviews the form in conjunction with other mental health and institutional data and then interviews the inmate. Most PSIQ items are yes/no questions. Variables from the PSIQ included in the present study were self-reported mental health and substance use histories, physical and mental health symptoms, and current or past treatment for substance abuse and mental illness, as well as history of suicide attempts or ideation. The substance use history items are for the 2-year period prior to incarceration.

*The Psychology Data System (PDS)* is contained within the Federal Bureau of Prisons as an electronic mental health record. The data fields extracted for the present study were from the intake interview in this database and consisted of specific items entered into the system by a doctoral-level psychology services staff member following an intake interview. The intake data fields extracted for the present study included several mental health variables including diagnosis for substance abuse and mental illness, as well as recommendations for initial screening for placement in a drug abuse treatment or education program.

*The PAI* is a 22-scale personality measure containing 344 items that make up the nonoverlapping scales (Morey, 1996). The instrument includes 4 validity scales for assessing malingering or dishonest responding; 11 clinical scales for measuring personality, mood, and anxiety symptoms; 5 scales for measuring amenability to treatment including a measure of aggression and hostility; and 2 interpersonal scales (Morey, 2007). Morey (2007) recently published an updated professional manual for the instrument, which includes a detailed, authoritative review of the body of research on the instrument.

## Sample Characteristics

As recommended by Morey (2007), cases were screened for aberrant scores on the inconsistency (ICN) and infrequency (INF) scales to eliminate participants who were inattentive or responded inconsistently to the PAI scale items. In addition, because of prior indications that the Spanish-language version of the PAI may not be psychometrically equivalent to the original English-language PAI (Fernandez, Boccaccini, & Noland, 2008; Rogers, Flores, Ustad, & Sewell, 1995), only English-speaking participants were selected for the current study. Participants who scored outside the recommended range (i.e., *T*-score of 73 or higher)

**Table 1.** Sample Demographics

Variable	Percentage (n)	Valid N
Sex		1,120
Male	74.2 (831)	
Female	25.8 (289)	
Marital status		1,054
Married/common law	37.7 (398)	
Divorced/separated/widowed	22.3 (235)	
Never married	39.9 (421)	
Number of children		1,086
None	23.2 (252)	
One	20.5 (223)	
Two to three	38.4 (417)	
Four or more	17.9 (194)	
Education		1,090
Eighth grade or less	5.7 (62)	
Some high school	28.0 (305)	
Completed high school	35.5 (387)	
Some college/vocational school	30.8 (336)	
Race/ethnicity		1,094
African American	44.2 (484)	
White	33.3 (364)	
Hispanic	16.7 (183)	
Other	5.8 (63)	
Security level		1,120
Low	52.7 (590)	
Medium	25.8 (289)	
High	21.5 (241)	

on ICN numbered 217; and 255 inmates scored higher than the recommended range for INF (*T*-score of 75 or higher). There were 325 Spanish-speaking inmates (who chose to complete the instrument in Spanish) in the original data pool. Participants who met one or more of the three criteria for screening out of the final sample were excluded from the following analyses. The net sample for the current study consisted of 1,120 inmates. The mean age for the sample was 33.85 (*SD* = 9.4). Half the participants were African American. In terms of citizenship, the majority (92.5%) were citizens of the United States. See Table 1 for other inmate demographics. These demographics are very similar to the ones reported in the corrections sample by Edens and Ruiz (2005).

## Results

### Sample ALC and DRG Scores as Compared With Previously Established Normative Samples

The *T*-score scale averages for ALC in this sample (*M* = 59.25, *SD* = 15.86) were similar to the Morey (1991, 2007) clinical norms, single-sample  $t(1,119) = -1.49$ ,  $p = .137$ , Cohen's  $d = -0.04$ , but slightly elevated in comparison with

the Edens and Ruiz (2005) correctional norms mean, single-sample  $t(1,119) = 4.12$ ,  $p < .001$ , Cohen's  $d = -0.13$ . The DRG *T*-scores (*M* = 68.05, *SD* = 18.29) were elevated compared with the Morey (1991, 2007) clinical norms, single-sample  $t(1,119) = 16.11$ ,  $p < .001$ , Cohen's  $d = 0.49$ , but somewhat lower than Edens and Ruiz's (2005) corrections sample, single-sample  $t(1,119) = -12.77$ ,  $p < .001$ , Cohen's  $d = -0.37$ .

### Correlations Between ALC and DRG and MHPP Operational Data

Tables 2 and 3 present correlations between the ALC and DRG scales from the PAI with both drug use and more distal substance abuse and mental health indicators. Specifically, Table 2 includes lifetime problematic use of various types of substances from the PSI and drug use 2 years prior to arrest from the PSIQ. Table 3 includes indicators of problematic substance use that remain distal to the substance use itself. Examples include having received substance abuse services or being recommended for services during intake by a doctoral-level clinician. Bivariate point-biserial correlations are presented in these tables to examine convergent validity. Partial correlations controlling for the other PAI scale (DRG or ALC) are also presented to specifically test for discriminant validity. These partial correlations are presented to give a clearer sense of unique relationships between each PAI scale and the criterion MHPP variables because of the high level of covariance between the ALC and DRG scales on the PAI:  $r(1,120) = .540$ ,  $p < .001$ . Given the number of correlations and corresponding possibility of inflated Type I errors, a conservative criterion of  $p \leq .005$  was used to determine statistical significance.

Tables 2 and 3 also show a pair of columns for the Estimated DRG (EstDRG) and Estimated ALC (EstALC) scales. EstDRG and EstALC are supplementary indices intended to measure alcohol and drug habits indirectly; scores are derived from computations based on the same five subscales: BOR-S (Borderline Features–Self Harm), ANT-A (Antisocial Features–Antisocial Behaviors), ANT-E (Antisocial Features–Egocentricity), ANT-S (Antisocial Features–Stimulus-Seeking), and AGG-P (Aggression–Physical Aggression; see Morey, 2007).<sup>1</sup> Because both EstALC and EstDRG scores are weighted sums of the same five subscales, they correlate perfectly with each other. Therefore, because the EstALC and EstDRG scales are completely redundant at the aggregate level, each table includes a single pair of correlation columns for the Estimated ALC/DRG scores. These correlations are presented to (a) test the suitability of these estimated drug and alcohol scales as valid substitutes for the more direct measures of ALC and DRG and (b) to test their incremental validity above and beyond ALC and DRG. Both simple point-biserial

**Table 2.** ALC and DRG Correlations With Substance Use Indicators by Substance Type and Data Source

Variable	Percentage of Sample (N)	ALC $R_{pb}$	ALC $R_{pr}$	DRG $R_{pb}$	DRG $R_{pr}$	EstALC/DRG $R_{pb}$	EstALC/DRG $R_{pr}$
<b>Alcohol</b>							
PSI	47.7 (534)	.337*	.274*	.206*	.031	.173*	.044
PSIQ	63.2 (708)	.349*	.301*	.186*	-.004	.195*	.077
<b>Drugs</b>							
<b>Marijuana</b>							
PSI	64.9 (727)	.190*	.029	.309*	.250*	.236*	.093*
PSIQ	57.4 (643)	.153*	-.001	.284*	.242*	.184*	.054
<b>Hallucinogens and inhalants</b>							
PSI	20.8 (233)	.102*	-.038	.323*	.229*	.179*	.078
PSIQ	9.5 (106)	.098*	-.036	.247*	.218*	.165*	.074
<b>Stimulants</b>							
PSI	54.7 (613)	.212*	-.036	.443*	.400*	.133*	-.025
PSIQ	43.5 (487)	.254*	-.031	.511*	.459*	.198*	-.034
<b>Opiates and depressants</b>							
PSI	17.9 (201)	.117*	-.044	.281*	.261*	.144*	.029
PSIQ	21.4 (240)	.157*	-.028	.332*	.298*	.287*	-.018
<b>General/other substance use</b>							
PSI, substance use generally	77.0 (862)	.271*	.065	.409*	.324*	.287*	.093*
PSI, other substance use	7.5 (84)	.020	-.042	.102*	.108*	.078	.037
PSIQ, other substance use	4.7 (53)	.005	-.055	.095*	.110*	.046	.007

Note. ALC = Alcohol Problem Scale; DRG = Drug Abuse Scale;  $R_{pb}$  = point-biserial correlation (bivariate);  $R_{pr}$  = partial correlation (controlling for ALC or DRG; controlling for both ALC and DRG for the last column, EstALC/DRG); EstALC = Estimated Alcohol Problem Scale; EstDRG = Estimated Drug Abuse Scale; PSI = presence investigation; PSIQ = Psychological Services Intake Questionnaire. Only a single pair of correlation columns are reported for the EstALC/DRG scores because those scores are derived from the same five subscales (i.e., they correlate perfectly with each other). The pattern of partial correlations holds when AGG and ANT are also added as covariates.

\* $p \leq .005$ .

and partial correlations are reported, partial correlations control for both ALC and DRG. EstALC and EstDRG showed strong correlations with their target scales ( $r = .384$  and  $r = .507$ , respectively).

Generally, ALC and DRG show strong convergent validity with relevant substance-related variables from multiple sources within the MHPP. Specifically, the ALC and DRG scales correlated with past usage of alcohol and drugs, respectively (see Table 2). In addition, the scales show relatively strong cross-scale discriminant validity. Controlling for DRG, ALC showed a relatively strong correlation with alcohol use. ALC also did show some small, yet significant, correlations with most drug histories (i.e., marijuana, hallucinogens, and inhalants; stimulants, opiates, and depressants; and general substance use as measured on the PSI). However, those relationships were all diminished to nonsignificance when controlling for DRG, which indicates strong discriminant validity. DRG showed robust relationships with substance abuse variables across multiple measures and sources of data, all of which remained when controlling for ALC. The DRG scale was correlated with history of alcohol use from both the PSI and PSIQ, but those relationships diminished to nonsignificance when controlling for ALC.

The EstALC/DRG scale showed robust simple correlations with most of the MHPP substance use measures. Incremental validity beyond DRG and ALC (i.e., partial correlations controlling for both ALC and DRG) was limited except for a small relationship with marijuana use as measured on the PSI and also the general substance use measure from the PSI. Finally, discriminant validity was further supported in additional analyses (not reported here) that controlled for ANT and AGG, two PAI scales that are particularly relevant for correctional samples. The pattern of partial correlations did not change when ANT and AGG were added as covariates.

Turning to the distal indicators (see Table 3), both ALC and DRG showed no significant relationships to prior participation in self-help, but they did reveal modest, significant correlations with history of substance abuse treatment and mandated substance abuse treatment. Those relationships diminished to nonsignificance when controlling for the other scale, with the exception that DRG was related to history of substance abuse treatment when controlling for ALC. Additionally, DRG and ALC were both related to the presence of one or more physical health/medical symptoms from the PSIQ; the relationship between presence of medical symptoms and DRG remained significant when controlling for

**Table 3.** ALC and DRG Correlations With Distal Substance Abuse and Mental Health Indicators

Variable (Data Source)	Percentage of Sample (N)/Mean (SD)	ALC $R_{pb}$	ALC $R_{pr}$	DRG $R_{pb}$	DRG $R_{pr}$	EstALC/DRG $R_{pb}$	EstALC/DRG $R_{pr}$
Distal substance abuse							
Lifetime participation self-help group (PSI)	8.5 (95)	.071	.030	.084	.055	.072	.030
Lifetime history of drug and alcohol abuse treatment (PSI)	40.2 (450)	.193*	.018	.330*	.273*	.194*	.031
Was any drug and alcohol treatment mandated? (PSI)	11.1 (124)	.097*	.055	.095*	.051	.075	.023
Current Clinician Recommendation for Drug Program (PDS)	51.3 (575)	.199*	.017	.344*	.286*	.155*	-.027
Current Clinician Axis 1A Substance Abuse Diagnosis (PDS)	52.5 (588)	.185*	.023	.309*	.253*	.109*	-.062
Clinician Notes Substance Abuse History (PDS)	74.1 (830)	.299*	.072	.454*	.364*	.249*	.013
Distal mental health							
Current health/mental health symptoms (one or more; PSIQ) <sup>a</sup>	57.3 (642)	.094*	.015	.150*	.119*	.159*	.096*
Lifetime history suicide attempts (PDS)	10.0 (112)	.084*	.049	.079*	.040	.145*	.116*
Convictions for violent acts (from SENTRY database) <sup>b</sup>	M = 2.34 (SD = 2.73)	.107*	.105*	.036	-.026	.137*	.125*

Note. ALC = Alcohol Problem Scale; DRG = Drug Abuse Scale;  $R_{pb}$  = point-biserial correlation (bivariate);  $R_{pr}$  = partial correlation (controlling for ALC or DRG; controlling for both ALC and DRG for the last column: EstALC/DRG); EstALC = Estimated Alcohol Problem Scale; EstDRG = Estimated Drug Abuse Scale; PSI = presentence investigation; PDS = Psychology Data System. Only a single pair of correlation columns are reported for the EstALC/DRG scores because those scores are derived from the same five subscales (i.e., they correlate perfectly with each other). The pattern of partial correlations holds when AGG and ANT are also added as covariates.

a. Any endorsement of one or more of the following symptoms during the past 2 weeks: nervousness, depression, loss of appetite, sleeping problems, hopelessness, memory problems, concentration problems, dizziness, headaches, racing thoughts, hallucinations, other problems; or a lifetime history of self-reported head injury.

b. Quantitative (nonbinary) variables: range of scores for violent convictions = 0 to 7. Correlations for this variable are standard Pearson correlations and partial correlations.

\* $p \leq .005$ .

ALC, but medical symptoms were not related to ALC when controlling for DRG. ALC was related to Axis 1A substance abuse diagnosis, substance abuse history, and intake clinician recommendation for participation in a drug abuse program (from the PDS). However, those relationships were nonsignificant when controlling for DRG. DRG, on the other hand, was related to the same three variables (Axis 1A substance abuse diagnosis, substance abuse history, and intake clinician recommendation for substance abuse programming). As seen in Table 3, those relationships remained when controlling for ALC. Both ALC and DRG were associated with having attempted suicide, before controlling for the other scale. ALC was associated with convictions for violent acts, a robust relationship that remained when controlling for DRG; DRG was not associated with convictions for violent acts. The EstALC/DRG scale had a similar pattern of correlations with distal indicators as ALC (save the mandated treatment measure from the PSI) and showed incremental validity beyond the ALC and DRG scales (i.e., partial correlations controlling for both ALC and DRG) for each of the three distal mental health measures:

convictions for violent acts, history of suicide attempts, and health/mental health symptoms.

## Discussion

The PAI has many promising utilities within correctional facilities. Although a small number of prior research studies have attempted to validate the PAI in correctional contexts, most of them have not been able to use large, nonclinical offender samples. The present study was designed to test, using a large federal inmate sample, the validity of the ALC and DRG scales from the PAI. Promising data on these scales help reinforce the general utility of these scales.

Overall, DRG and ALC showed very good convergent and discriminant validity. Both scales were highly correlated with multiple, relevant measures of substance use history from two timeframes and multiple data sources, and neither scale showed any "erroneous" correlations after controlling for the other scale (i.e., ALC not correlated with any drug abuse history variables after controlling for DRG; DRG was not correlated with any alcohol abuse history

measures after controlling for ALC). This pattern holds when controlling also for AGG and ANT, two scales that are particularly salient for correctional samples. This is important because it gives strong validity evidence for these scales independent of one another in a large nonclinical correctional sample, using multiple convergent validity indicators. Across a variety of data sources, from corroborated data in the presentence report to later self-report of the offender and the perspective of doctoral-level clinicians, these two PAI scales stand up to rigorous empirical testing.

In addition, both scales performed exceptionally well at identifying their respective, independent areas of substance use and abuse tendencies, without spillover to indicators of the opposing category once statistical controls were introduced. In other words, the partial correlations between ALC and DRG, controlling for the other scale, with other MHPP measures of alcohol and drug use and abuse, were quite clean. Furthermore, when more general or distal indicators were used, some of the DRG and all of the ALC received weak, nonsignificant partial correlations. For example, in the absence of being able to determine if prior substance abuse treatment was mandated for a drug or alcohol problem, both the ALC and DRG partial correlations were nonsignificant. Considering prior work on the validity of these scales, both with clinical and normative samples (Morey, 1991, 2007) as well as within correctional environments (Edens & Ruiz, 2005), the present study offers a substantial addition to the literature in terms of supporting the validity of the ALC and DRG scales for use with offenders.

The current study supports the validity of the EstDRG and EstALC scales as well. EstDRG/ALC was correlated with most MHPP measures of drug and alcohol use, as well as most distal substance abuse and mental health measures. The EstALC and EstDRG scores may serve as generally valid proxies for ALC or DRG in a clinical context where there is clear reason to question the honesty of the respondent on the ALC or DRG scales. For example, misconduct charges where it may be in the inmates' best interest to deny having a substance use disorder (Fals-Stewart, 1996; Fals-Stewart & Lucente, 1997). Future research might directly test these scales by asking substance abusers to make intentional denials of abuse on the PAI and then compare their estimated substance abuse scores with actual nonusers'.

Furthermore, and more interesting, there were several ways in which the EstDRG/ALC measure showed incremental validity above and beyond both ALC and DRG. Specifically, EstALC/DRG had a modest positive correlation with one of the marijuana use measures and with one of the general substance use measures (both from the PSI) after controlling for both ALC and DRG. In addition, EstALC/DRG was incrementally predictive of all three distal mental health measures: lifetime suicide attempts, health/mental health symptoms, and convictions for violent acts. EstDRG

and EstALC are valid indicators of substance use, and these scales also seem to capture some important variance in substance use beyond what is measured directly by the ALC and DRG scales. This variance appears related to substance use disorders as disorders of lifestyle (DeLeon, 2000; Walters, 1999). They have predictable impacts on the lifestyle of the addict in general, and this may be manifest as comorbid mental health problems and other forms of acting out, such as violence toward self and/or others. This is consistent with the EstDRG findings from Edens and Ruiz (2008), which indicated that EstDRG was most closely related to posttraumatic stress disorder and psychotic spectrum disorders in their sample of in-patient prison hospital inmates. Collectively, these findings strongly suggest the need for further research on EstALC and EstDRG.

The importance of validity as it applies to substance abuse services in corrections is critical. Because substance use disorders often emerge and continue through a lifestyle of deceit and denial, it is imperative that thorough psychometric studies be conducted to establish the validity properties of various alcohol and drug use scales and their ability to detect drug and alcohol problems when they are present. Because drug abuse treatment services in correctional settings may be mandated or may even offer incentives for participation, measures that can produce an accurate determination of treatment need are necessary and useful.

Prior research has provided evidence of the reliability of the PAI, including the ALC and DRG scales, in several different clinical and nonclinical samples, including some from within correctional contexts (see, e.g., Edens & Ruiz, 2005; Morey, 2007). However, it is important that researchers and practitioners continue to carefully evaluate these contextual norms for the PAI. Data for the current study performed as expected in comparison with previously established clinical and correctional norms. However, there were some small, yet significant, differences between the raw ALC and DRG scale scores from this data set and the correctional norms published by Edens and Ruiz (2005). Specifically, the ALC scores in this sample were higher than the correctional norms, and the DRG scores were lower. The magnitude of these differences was small to moderate, but these differences are noteworthy in terms of highlighting the importance of context-specific norms such as jurisdiction (i.e., state vs. federal). The present study shows there is more work to be done in terms of establishing context-specific norms for the PAI in correctional settings.

Both ALC and DRG showed modest, but statistically significant, raw positive correlations with having attempted suicide. Although suicide completion is a rare yet significant event in correctional contexts, the severity and finality of these events warrant an extraordinary level of attention from correctional psychologists, administrators, and security personnel (Magaletta, Patry, Wheat, & Bates, 2008). Given

that drug and alcohol addiction can be conceptualized and manifest as a disorder of lifestyle (DeLeon, 2000), the finding of a relationship between DRG, ALC, and suicide attempt histories is not surprising. It serves as a cogent reminder that those involved in screening for drug and alcohol abuse and those who provide substance abuse treatment remain on the front lines of the suicide prevention and intervention efforts within the correctional system. The correlations between elevated ALC and DRG scales and suicide attempts in the current study, as well as the incremental validity added by EstALC/DRG, highlight a direction for additional research, with the promising possibility that the PAI could be useful as an early warning sign for later suicidality.

There were several interesting relationships between ALC and DRG and the mental health indicators (see Table 3). For one, ALC was related to convictions for violent acts. This finding highlights the relationship between alcohol abuse and violent criminality, a topic that researchers and clinicians have studied for decades (McMurrin, 2002). These findings point to a need to consider potential interactions among alcoholism and violence and its relationship to prison violence. In addition, reflection needs to be given as to whether or not substance abuse treatment programs that target alcohol use specifically reduce prison misconduct.

Some limitations within the current study should be noted. Although the sample was large, further work needs to be done to establish how representative this sample is to an entire prison population. Of note, the offenders who participated were new commitments to custody, and a standing, general population of offenders may look different on the PAI. Also, these data were drawn from federal inmates, and may not generalize to offenders housed in state correctional facilities. In addition, because of residential drug abuse programming incentives in the BOP that include the possibility of a sentence reduction for qualified inmates who complete the program, it is possible that participants may have been more honest in responding to items about their alcohol and drug histories, patterns, and consequences of use. Finally, it is worth noting that, with the exception of the PSI, there are no reliability scores available for the validity data presented in this study; unreliability in the validity data could be suppressing the PAI validity scores.

Future research should build on these findings and proceed with an added degree of assurance regarding the validity of these particular scales. An example of such work could concern itself with the prevalence of drug and alcohol use disorders with this sample. Also of promise is exploring how predictive the various substance use and other relevant PAI scales are of entry, engagement, and completion of various types of drug abuse and psychology treatment programming, misconduct, and segregated housing status with this offender sample as they move through their incarceration.

## Authors' Note

The views and opinions expressed in this article are those of the authors only and do not necessarily represent the policies or opinions of the Federal Bureau of Prisons or the Department of Justice.

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## Note

1. The formula for computing EstALC *T*-score is  $((BORSts + ANTAts + ANTEts + ANTSts + AGGPts) * .162184) + 14.39$ ; for computing EstDRG *T*-score it is  $((BORSts + ANTAts + ANTEts + ANTSts + AGGPts) * .199293) + 3.07$  (Morey, 2007, p. 20). Correlations between the *T*-scores for ALC, DRG, EstALC, and EstDRG are as follows:

	EstDRG	ALC	DRG
EstALC	1.0	.37	.50
EstDRG		.37	.50

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