



Personality and drugs of choice

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Received 16 October 2007; received in revised form 11 December 2007; accepted 14 December 2007

Available online 28 January 2008

Abstract

Although drug preference has been studied from the perspectives of individual differences and comorbid psychopathology, research incorporating both of these levels of analysis has been limited. In the current study, inpatients in a substance abuse treatment facility who reported preferences for alcohol, marijuana, methamphetamines, cocaine, heroin, or crack cocaine were compared in terms of their scores on measures of higher-order personality variables and psychopathology constructs representing lower-order elements of these factors. Results suggested that a broad externalizing dimension differentiated heroin users from alcohol, marijuana, and cocaine users. With the single exception that crack users remained more paranoid than alcohol users, psychopathology variables did not provide more specific discriminatory ability after broad personality factors were controlled. Implications for substance use research are discussed, with a focus on the utility of integrating individual differences and psychopathology constructs.

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Keywords: Substance use; Drugs of choice; Personality; Externalizing; Personality assessment inventory

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1. Introduction

Recent research has identified two broad personality dimensions that capture much of the relations between and represent heritable risk factors for psychiatric disorders including substance use (e.g., Achenbach, 1966; Krueger, 1999; Krueger, McGue, & Iacono, 2001; Krueger et al., 2002; Wolf et al., 1988). *Internalizing* relates to generalized psychological distress, is generally the first factor extracted from multi-scale measures of psychopathology, and tends to be sensitive to a wide range of problems in living. *Externalizing* is often more directly associated with behaviors that cause distress for others and (to a lesser extent or as a consequence) self, including substance use disorders. These integrative dimensions bear clear resemblance to broad dimensional models of personality (e.g., Eysenck, 1998; McCrae & Costa, 2003; see Markon, Krueger, & Watson, 2005).

Personality traits related to the internalizing and externalizing factors have been found to predict the type of substance likely to be used. For example, LeBon et al. (2004) showed that heroin addicts had higher levels of novelty seeking (a trait that is empirically related to externalizing; Markon et al., 2005), than alcoholics or controls, and that both heroin and alcohol users had higher levels of harm avoidance (related to internalizing; Markon et al., 2005) than controls, but were not different from one another. Conway, Swendsen, Rounsaville, and Merikangas (2002) found that constraint, a trait (negatively) related to externalizing (Markon et al., 2005), distinguished opioid and cocaine (lower constraint) from marijuana and alcohol (higher constraint) users.

Psychopathology constructs such as mood disorders are widely considered risk factors for substance abuse, and it is typically recommended that substance use must be stabilized before other disorders are treated. Whatever the clinical merits of these practices, they rest on the assumption that substance use and other forms of psychopathology represent discrete and quasi-independent constructs, and may not fully take their shared individual difference factors into account. Similarly, research demonstrating that psychopathology varies among individuals with different drugs of choice, such as a study by Donovan, Soldz, Kelley, and Penk (1998) indicating that heroin users were more depressed than alcohol and cocaine users and cocaine users were more manic than alcohol and heroin users, have tended not to take broader individual differences into account.

A better understanding of the influence of both broad personality dimensions and narrower symptom domains on drug choice would be useful for research on personality–behavior relations and would facilitate clinical assessment in substance using populations. For example, such research would enable a clearer understanding of personality as an etiological factor in substance use, as well as the influences of substances on personality. A clearer understanding may also improve predictions about likely correlates and risk factors for substance use. In addition, interventions may be targeted to treat underlying predispositions, thus ameliorating both psychopathological syndromes and the risk for substance use. Furthermore, it would provide a parsimonious explanation for the many “comorbidities” commonly observed between psychopathology and substance use.

Several possibilities exist with regards to the relations between personality, psychopathology and substance preference. Drugs of choice, given a temperamental predisposition to use, may be a function of factors not captured by personality dimensions (Krueger et al., 2001). Such factors might include psychopathology constructs, given that several studies using multi-scale self-report instruments have found that narrower trait/psychopathology constructs appear to differentiate substance users from non-users (e.g., Hopwood et al., 2007; Ruiz, Pincus, & Dickinson,

2003) and types of users from one another (e.g., Conway et al., 2002; Donovan et al., 1998; LeBon et al., 2004). Other potential factors that could influence substance of choice may include social influence, cultural mores, local availability of substances, demographic variables, or preferences related to personal conditioning histories.

Conversely, personality dimensions may relate to both a propensity to engage in substance use and a relative propensity to use different kinds of substances. For example, individuals with moderate levels of internalizing and externalizing characteristics may use substances associated with less severe impact on functioning, or perhaps with greater social acceptability (e.g., alcohol, marijuana), whereas, individuals with extremely high levels of these factors may use a variety of substances, including drugs that can have more serious short- and long-term impact on functioning and are less socially acceptable (e.g., cocaine, heroin). Trait dimensions may also differentially predict substance preference. For example, individuals with a high level of internalizing may prefer drugs with anxiolytic properties whereas individuals with a high level of externalizing may prefer drugs with disinhibiting properties.

The current study was designed to investigate the influence of both broad personality domains and narrower syndromal constructs on drugs of choice by testing three hypotheses. First, based on previous literature, it was anticipated that substance users would have elevated levels of internalizing and externalizing symptoms relative to a community population. Second, the hypothesis that these factors would also differentiate groups of individuals defined by their substance of choice was tested. Third, lower-order psychopathology constructs related to internalizing and externalizing were tested for their ability to differentiate groups defined by substance of choice, after accounting for broader personality factors.

2. Method

2.1. Participants

Participants were individuals in an inpatient substance abuse treatment facility in the South Central United States. Of 753 potential participants, 722 stated a preference for one of the substances that represent the focus of the current study and had valid assessment data according to recommended cut scores for random responding (Morey, 1991). Of these, 218 were women; 536 were Caucasian, 109 were Hispanic, 70 were African–American, and 7 were of other ethnic descent; 165 were married, 164 were divorced or separated, 4 were widowed, and 420 were single. The average age was 33.56 ($SD = 9.97$). Of the 580 individuals for whom educational records were available, 312 completed high school, 77 had completed some college, and 15 had college degrees. All participants were court referred for treatment.

2.2. Measures

All participants were administered the *Personality Assessment Inventory* (PAI; Morey, 1991) at intake. The PAI is a self-report instrument with 344 items answered on a 4-point scale. It has 22 non-overlapping full scales with test–retest and internal consistencies above .70 in both community and forensic samples (Morey, 1991; Edens & Ruiz, 2005). Of these, 4 are validity scales, 11

measure psychopathology constructs, 5 measure non-diagnostic constructs relevant to clinical assessment (e.g., aggression, treatment motivation), and 2 measure interpersonal styles. The current study focused on data from the 11 clinical scales. Factor analytic research with these scales has shown that the first two factors are similar to those labeled internalizing and externalizing by Krueger and colleagues, with the first having large pattern coefficients on depression and anxiety, and the second having large pattern coefficients on antisocial characteristics and substance use (Morey, 1991). The use of the PAI therefore, allows for an examination of these factors as well as their lower-order elements.

Participants were asked to identify their substance of choice (specifically, the drug which they have the most difficulty not using) during the intake evaluation: 212 reported alcohol, 154 marijuana, 202 methamphetamine, 95 cocaine, 21 heroin, and 38 crack cocaine. Given that individuals had been identified by the legal system as substance users prior to admission and are not rewarded or punished in the facility depending on their use history, it is unlikely that they would be motivated to distort their preferences.

2.3. Analyses

Exploratory principal axis factor analysis (EFA) with oblimin rotation was used to extract oblique factors among PAI clinical scales, based on research suggesting that internalizing and externalizing are correlated (e.g., .51 in the national comorbidity study; Krueger, 1999). It was anticipated that these factors, as in previous samples, would reflect internalizing and externalizing. Substance abuse scales were excluded from factor analyses for several reasons. First, all participants were substance users and thus tended to have high scores on these scales, restricting the range and attenuating potential correlations. Second, having drug, as opposed to alcohol problems, was related to overall psychiatric severity. Thus, in this sample, alcohol use was positively related to psychological health and well-being, to the extent that it would indicate a lack of drug use, and alcohol and drug use scales were uncorrelated, despite showing strong correlations in other samples (e.g., $r = .55$ in community normative data). Finally, these scales measured, more or less directly, the dependent variables of interest. Although they were not factor analyzed, group differences on these scales were provided for descriptive purposes.

T-scores were also computed using community normative data for each PAI scale. Groups of participants defined by drug of choice were then compared for their score on the broad personality factors, PAI clinical scales, and demographic markers including age, gender, and ethnicity. Demographic factors were covaried in analyses of personality factors to address potential confounds. Broad personality factors were covaried in analyses of psychopathology constructs because the focus of the current study involved their ability to increment internalizing and externalizing in discriminating drug use groups.

3. Results

As expected, EFA results (presented in Table 1) suggested an internalizing factor with the highest scale level pattern coefficients for depression and anxiety and an externalizing factor with the highest scale level pattern coefficient for antisocial features. Kaiser's rule, scree test, and parallel

Table 1
Factor coefficients for oblique PAI clinical scale factors

	Internalizing		Externalizing	
Eigenvalue	5.16		1.18	
% Variance explained	57.34		13.05	
Factor coefficients	Pattern	Structure	Pattern	Structure
Somatic complaints	.691	.656	−.067	.297
Anxiety	.951	.903	−.092	.410
Anxiety-related disorders	.746	.764	.033	.427
Depression	.916	.876	−.076	.408
Mania	.002	.296	.558	.559
Paranoia	.489	.653	.311	.569
Schizophrenia	.740	.833	.176	.566
Borderline features	.594	.811	.412	.726
Antisocial features	.000	.420	.796	.796

Note. Internalizing and externalizing were correlated .54.

analysis all converged on the extraction of two factors. The similarity of correlations observed between these factors in the current ($r = .54$) and previous samples ($r = .51$; Krueger, 1999) provides further support that they represent internalizing and externalizing.

Consistent with the first hypothesis, individuals in the community normative sample had substantially lower internalizing and externalizing factor scores than those in the current sample ($z = -2.71$ and -1.65 , respectively). Table 2 shows the within-sample z -scores of each group along these factor dimensions. Both externalizing ($F = 5.57$, $p < .001$) and internalizing ($F = 2.96$, $p < .01$) significantly distinguished the groups, supporting the second hypothesis. Post-hoc testing (Tukey's HSD) indicated that the individuals who reported crack as their substance of choice had a group mean on internalizing that was significantly greater than those who reported a preference for alcohol and individuals who preferred heroin had a higher mean externalizing score than those who preferred alcohol, marijuana, and cocaine. However, internalizing was no longer significant after externalizing was covaried, ($F = 2.25$, $p > .01$), suggesting that its capacity to discriminate groups was due to its relation to externalizing.

Table 2 also shows group differences on demographic variables and PAI clinical scales. Age, gender, and ethnicity were all significantly associated with drug of choice. Individuals who stated a preference for alcohol and crack tended to be the oldest individuals in the sample, marijuana users the youngest, and the other groups somewhere in between. Women tended to be over-represented among crack and heroin users, and to a lesser extent, methamphetamine users. African-Americans were over-represented among crack and marijuana users, and Hispanics among alcohol, marijuana, and cocaine users.

Gender correlated modestly but significantly with internalizing ($r = .26$, $p < .001$; the positive correlation indicates greater levels of internalizing among women) and age correlated with the externalizing factor ($r = -.34$, $p < .001$). Given this latter correlation, an ANCOVA was used to test the ability of externalizing to distinguish groups with age as a covariate, and externalizing remained significant ($F = 3.40$, $p < .01$). Ethnicity was unrelated to internalizing and externalizing factor scores.

Table 2

Demographic, personality, and psychopathology differences between substance users with different drugs of choice

	Alcohol	Marijuana	Methamphetamine	Cocaine	Heroin	Crack	Entire sample
<i>N</i>	212	154	202	95	21	38	722
<i>Personality factors</i>							
Internalizing*	−0.12 ^b	−0.10 ^{a,b}	0.07 ^{a,b}	0.06 ^{a,b}	0.28 ^{a,b}	0.41 ^a	0.00
Externalizing*	−0.23 ^b	0.07 ^b	0.09 ^{a,b}	0.01 ^b	0.55 ^a	0.21 ^{a,b}	0.00
<i>Demographic variables</i>							
Age*	39.05 ^a	28.14 ^c	31.34 ^{b,c}	33.38 ^b	30.70 ^{b,c}	38.64 ^a	33.56
% Women*	22.16	23.38	38.61	27.37	52.38	52.63	30.19
% Caucasian*	77.83	54.55	92.08	65.26	85.71	55.26	74.24
% African–American*	2.83	23.38	1.49	11.58	0.00	36.84	9.70
% Hispanic*	18.87	20.13	4.95	23.16	14.29	7.89	15.10
<i>Psychopathology constructs</i>							
Somatic complaints	50.04	49.03	50.14	50.23	54.40	54.78	50.23
Anxiety	55.44	54.57	57.21	57.68	58.80	60.46	56.37
Anxiety disorders	55.99	56.07	57.14	58.03	59.65	62.81	57.04
Depression	54.97	55.67	56.82	57.12	59.20	60.46	56.30
Mania	52.88	54.53	53.87	53.99	56.35	53.57	53.82
Paranoia*	53.14 ^b	57.45 ^{a,b}	57.36 ^{a,b}	56.75 ^{a,b}	55.20 ^{a,b}	59.54 ^a	56.11
Schizophrenia	54.21	54.33	56.20	54.43	57.65	58.41	55.13
Borderline	59.61	60.99	63.18	63.32	67.75	66.27	61.95
Antisocial	60.10	64.14	63.38	62.38	70.85	64.22	62.75
<i>PAI substance abuse scales</i>							
Alcohol problems*	84.33 ^a	57.44 ^{c,d}	56.09 ^d	68.45 ^b	67.55 ^b	65.46 ^{b,c}	67.10
Drug problems*	71.71 ^d	81.23 ^c	89.13 ^b	84.78 ^{b,c}	97.30 ^a	88.16 ^{b,c}	82.04

Note. * $p < .01$. Personality factor, substance abuse scales, and age analyses were tested with univariate ANOVAs. Gender and ethnicity were tested with χ^2 analyses. Psychopathology construct analyses reflect ANCOVAs with personality factors covaried. Superscripts indicate post-hoc (Tukey's HSD; $p < .05$) tests.

Although somatic complaints, anxiety, anxiety-related disorders, depression, paranoia, borderline features, and antisocial features significantly discriminated groups defined by drug of choice (univariate F -tests, $p < .01$), only paranoia remained significant with internalizing and externalizing factors covaried. Furthermore, only two groups differed: individuals who stated a preference for crack had the higher levels of paranoia than those who preferred alcohol. Thus, there was limited support for the third hypothesis.

4. Discussion

The purpose of this study was to test three hypotheses: that (a) substance users would have elevated levels of both internalizing and externalizing personality characteristics relative to community norms, (b) internalizing and externalizing characteristics would distinguish between individuals defined by their substance of choice, (c) narrower psychopathology elements would provide finer differentiations between the groups than could be provided by broad personality

domains. Data were consistent with the first hypothesis, corroborating support for the relevance of these domains to substance use. The effects were stronger for externalizing than internalizing, consistent with previous reports (e.g., Krueger et al., 2002). Both factors could also distinguish users of different substances, with crack users having the highest levels of internalizing and heroin users the highest levels of externalizing. These results are similar to those found in previous research on the relation of personality to drug of choice (e.g., Conway et al., 2002; LeBon et al., 2004) in finding that heroin and cocaine users tend to have higher levels of internalizing and externalizing than controls or alcohol/marijuana users. However, consistent with research suggesting that the substance use is primarily related to externalizing (e.g., Krueger, 1999), the relation between internalizing and substance of choice was no longer significant with externalizing covaried.

With the exception of paranoia, the psychopathology constructs did not appear to yield a significantly finer-grained picture than the broad personality factors of individuals who use different kinds of substances. Notably, several psychopathology constructs thought to be relevant to substance use and found to differentiate drugs of choice in previous research differentiated the groups before controlling for internalizing and externalizing. Thus, research in this area that does not account for broad personality factors is likely to demonstrate specific “comorbidities” between psychiatric conditions and drugs of choice. However, the results of the current study suggest that these relations are better explained by the shared relation of both certain forms of psychopathology and substance choice to broad personality factors. Thus, the results of the current study suggest that future investigations on drug of choice should take an integrative perspective that incorporates both broader and narrower levels of personality/psychopathology. Such an approach views psychiatric “comorbidity” as a natural and expected fact of nature due to an underlying genotypic predisposition, and thus models that predisposition directly (Krueger, 1999).

The finding of a specific relation between paranoia and crack cocaine use is consistent with the well-documented finding that cocaine, and in particular smoked cocaine, precipitates paranoid phenomena (Manschreck et al., 1988; Satel, Southwick, & Gawin, 1991). Such states can continue after cocaine use has remitted (Satel & Edell, 1991), perhaps explaining paranoid symptomatology in this formerly, but not currently, using sample. While the mechanism of this relation remains unclear, a likely explanation involves the dopaminergic system, given that both psychotic symptoms and cocaine use are associated with this neurotransmitter.

Groups differed on all demographic variables, and age and gender correlated with internalizing and externalizing factors. However, demographic differences may relate to a host of factors particular to the sample, and these results should be considered cautiously. Furthermore, personality factors remained able to significantly differentiate groups defined by substance of choice after controlling for the demographic variables associated with them. Nevertheless, high levels of externalizing only differentiated heroin users and high levels of internalizing only differentiated crack users. It remains a likely possibility that factors unrelated to personality may influence substance preferences. Future research should investigate this possibility.

Results from the current study differed from previous studies using externalizing and internalizing in that symptoms of schizophrenia and mania were included in analyses. Schizophrenic symptoms related to both factors, whereas mania was primarily related to externalizing. Although the results here suggest that the strongest correlates of both factors were similar here as in previous studies (depression and anxiety with internalizing, antisocial features with externalizing), the

need for future research regarding the structure of all psychopathology, with a focus on mania and psychotic disorders, is indicated by current results.

The use of a sample with significant drug problems and the comparison of higher- and lower-order elements of personality were strengths of this study. However, the cross-sectional design makes it impossible to differentiate personality predispositions to use substances from the effect of substances on personality features. A reciprocal relation may generally exist between substance use and personality. For example, heroin users may have had higher externalizing features because the nature of the substance is causal in antisocial behavior (e.g., cravings led to theft). Longitudinal studies are needed to test more specific hypotheses regarding this relation.

Another limitation of this study was that poly-substance use was not specified. One possible explanation for the observed effects is that individuals who use substances that are less commonly used and are associated with greater levels of dysfunction also tend to use substances that are more common and associated with less functional severity, whereas the converse may not be true (e.g., Markon & Krueger, 2005). Thus, personality dimensions tested here may be less relevant for drug choice than the tendency to use multiple substances. Future research that can differentiate users of more severe substances from poly-substance users would thus be beneficial to further test personality-substance choice relations.

The use of a clinical sample with elevated levels of both internalizing and externalizing pathology was a strength of the study in that tested relations had to overcome this general propensity. However, similar research with non-clinical samples, and among individuals who use substances but do not have legal problems, is needed to test the generalizability of current findings. History of drug use was also not specified, although results may vary with chronicity of use, particularly given the potential that long-term substance use can affect personality and psychopathology. In addition, the current study differentiated drug use groups according to which substance users report having the most difficulty discontinuing. Results may vary if this question were slightly different (e.g., most commonly used drug) and future research investigating such differences may extend and clarify current findings.

Acknowledgement

This research was supported by NIMH Grant MH75543 (Hopwood).

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