

## **PSYCHOLOGICAL FUNCTIONING OF OUT-OF-TREATMENT DRUG USERS**

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### **ABSTRACT**

Co-occurrence of drug use and psychological disorders is prevalent in both clinical and population-based samples. Severity of drug use, including injection drug use, polydrug use, and frequency of drug use, may have negative consequences for psychological treatment outcomes. The current research examines the psychological functioning of 224 out-of-treatment drug users and demographically matched nonusers using the Brief Symptom Inventory (BSI). Results indicate that drug users are more psychologically impaired than nonusers on all 9 dimensions of the BSI. Comparisons of injectors to noninjectors and polydrug users to single-drug users reveal few differences. However, in examining the frequency of drug use, chronic drug users score higher on 7 of the 9 BSI dimensions. Our findings imply injection and polydrug use do not have as much effect on psychological functioning as compared with frequency of drug use.

Drug users, frequently characterized as exhibiting low self-esteem and achievement orientation, learned incompetence, negative outlooks, and heightened stress, are more likely to exhibit psychological dysfunction than are nonusers (Chein, Gerard, Lee, & Rosenfeld, 1964; Lang, 1983). The co-occurrence of substance use and psychiatric disorders is very common, with reported prevalence rates ranging anywhere from 21% to 65% in both clinical samples (Breakey, Calabrese, Rosenblatt, & Crum, 1998; Lin, Bai, Hu, & Yeh, 1998) and population-based studies (Kessler et al., 1994, 1996; Regier et al., 1990). Research has found

depression and drug use to be positively related (Dorus & Senay, 1980; Hall, Hando, Darke, & Ross, 1996; Stefanis & Kokkevi, 1986), with major depression being the most common psychiatric complaint among substance users (Regier et al., 1990; Rounsaville et al., 1991). The occurrence of obsessive-compulsive disorder (OCD) in drug users has been found to be as much as four times the rate of the general population (Eisen & Rasmussen, 1989; Fals-Stewart & Angarano, 1994; Friedman, Dar, & Shilony, 2000; Powell, Penick, Othmer, Bingham, & Rice, 1982; Reimann, McNally, & Cox, 1992), while anxiety disorder has been found to occur in 10% to 20% of drug users (Cox, Norton, Swinson, & Endler, 1990).

Dual diagnosis, when compared with either drug use or psychiatric disorders independently, has been found to contribute to additional complications, such as diminished compliance with both drug treatment and psychiatric treatment, as well as higher risk of relapse (Dixon, McNary, & Lehman, 1995; Drake & Wallach, 1989; Felker, Yazel, & Short, 1996; Gupta, Hendricks, Kenkel, Bhatia, & Haffke, 1996; Leon, Lyons, Christopher, & Miller, 1998; Stanislav, Sommi, & Watson, 1992; Swofford, Kasekow, Scheller-Gilkey, & Inderbitzin, 1996). Antisocial behavior in particular has been found to be associated with poorer treatment outcomes for drug users (Miller, Gold, & Mahler, 1940; Simpson, Joe, Rowan-Szal, & Greener, 1995), as patients diagnosed with antisocial personality disorder demonstrate greater resistance to treatment, a more severe substance abuse history, and poorer prognosis (Broome, Knight, Joe, Simpson, & Cross, 1997; Gerstley, Alterman, McLellan, & Woody, 1990; Griggs & Tyrer, 1981; Joe & Simpson, 1983; Rounsaville, Dolinsky, Babor, & Meyer, 1987; Woody, McLellan, Luborsky, & O'Brien, 1985).

Substance users have been found to differ in both their patterns of drug use and in their psychosocial functioning, depending on the primary drug of abuse (Schuckit, 1995). For example, stimulants ease depressive symptoms, while opiates control rage (Khantzian, 1985). Cocaine use predisposes the user to panic attacks (Rosen & Kosten, 1992), paranoid ideation (Post, 1975; Siegal, 1982), obsessive-compulsive disorder (Crum & Anthony, 1993; Fals-Stewart & Schafer, 1992; McDougale, Goodman, Delgado, & Price, 1989; Senjo, 1989), and psychoticism (Post, 1975; Siegal, 1982), while heroin use has been associated with depression (Dorus & Senay, 1980; Stefanis & Kokkevi, 1986).

Many studies, such as those discussed above, have found associations between the primary drug of abuse and mental health. It is also important to understand how severity of drug use may contribute to psychological functioning. For instance, a study of English and Italian young adults found that polydrug users generally exhibited poorer psychological functioning relative to nonusers and alcohol, tobacco, and marijuana users (Parrott, Milani, Parmar, & Turner, 2001).

Frequency of drug use has also been associated with psychological functioning. A study of adolescents undergoing outpatient drug treatment found that more frequent users of crack cocaine experienced symptoms of paranoia, such as

suspiciousness and mistrust, as well as depressed mood (Schwartz, Luxenberg, & Hoffman, 1991). Similarly, Royse and Drude (1984) found that frequent users at an outpatient drug treatment facility tended to score higher than less-frequent users on a general scale of psychological severity.

Route of administration is also a consideration in determining severity of drug use and its relationship with psychological functioning. Injection drug users have typically been found to be more drug dependent and to engage in more frequent drug use and in more extensive polydrug use than those who employ other routes of administration, such as intranasal use, oral use, or smoking/inhalation (Darke & Hall, 1995; Gossop, Griffiths, Powis, & Strang, 1992; Kaye & Darke, 2000; Ross, Cohen, Darke, Hando, & Hall, 1994).

A study of heroin users found that injectors experienced more severe symptoms of physical withdrawal than smokers who used an equivalent dosage (Smolka & Schmidt, 1999), suggesting that injection may also be related to more severe psychological symptoms as well. In fact, a study of individuals with HIV/AIDS found that those suffering from schizophrenia or a major affective disorder were more likely to be injection drug users than those with no serious mental illness (Walkup, Crystal, & Sambamoorthi, 1999). Though no non-injection control group was available for comparison, Darke and Ross (1997) found that the prevalence of anxiety and depressive disorders among injection heroin users was very high (51% and 30%, respectively).

Self-report is often utilized to screen individuals for psychiatric disorders, as this mode of assessment can be concise, inexpensive, and sensitive to the symptoms of psychopathologies and stress (Derogatis & Coons, 1993). One such commonly used self-report measure of psychiatric distress is the Brief Symptom Inventory (BSI), a shortened version of the SCL-90-R. The BSI is designed to reflect multidimensional psychological symptom patterns of respondents. It is considered a valid measure for screening purposes (Derogatis & Cleary, 1977), and has the advantage of taking as little as 6 minutes to administer.

The BSI is profiled in terms of nine primary symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Somatization measures distress from bodily dysfunction by focusing mainly on cardiovascular, gastrointestinal, and respiratory complaints. The Obsessive-Compulsive dimension focuses on thoughts, impulses, and actions that compel the individual, though they are unwanted. Interpersonal Sensitivity, best thought of as the reverse of self-esteem, represents feelings of personal inadequacy and inferiority. Symptoms of dysphoric mood and affect, lack of motivation, and loss of interest in life are represented in the Depression dimension. The Anxiety dimension measures nervousness and tension, as well as panic attacks, feelings of terror, apprehension, and somatic correlates of anxiety. The negative affect state of anger, measured by the Hostility dimension, can be likened to antisocial personality, which in general manifests itself in abnormally aggressive or seriously irresponsible

conduct (Campbell, 1989). The items of the Phobic Anxiety dimension focus on the avoidance or escape behaviors experienced with persistent fear responses that are irrational and disproportionate to the stimulus. Primary aspects of the Paranoid Ideation dimension include projective thought, hostility, suspiciousness, grandiosity, centrality, fear of loss of autonomy, and delusions. The Psychoticism dimension consists of items indicative of a withdrawn, isolated, and schizoid lifestyle, as well as first-rank symptoms of schizophrenia, such as thought control.

The current research utilizes the BSI in order to investigate the psychological functioning of out-of-treatment drug users. Based on the above-presented evidence, it is hypothesized that drug users have lower levels of psychological functioning than both matched nonusers in the same sample and in population norms. In examining how severity of drug use may be related to psychological functioning, we wish to consider mode of administration as a measure of severity, in addition to polydrug use and frequency of drug use. It is hypothesized that more severe drug users, defined as injection drug users, polydrug users, and more frequent drug users, will show lower levels of psychological functioning than those with less severe manifestations of drug use.

## METHOD

The sample of 224 male and female participants completed the BSI as part of the ongoing Risk Networks Study. This study was designed to examine relationships, drug use, and HIV transmission among a community recruited sample of drug users and matched nonusers residing in low-income and high drug using communities in Houston, Texas. Because the study targeted a hidden population consisting mainly of out-of-treatment drug users and similar nonusers, methods designed to approximate randomness were utilized. Details of the sampling design and recruitment methods are described elsewhere (Bell & Trevino, 1999).

Briefly, the recruitment strategy for drug users involved a “two-step random walk” (Klov Dahl, 1989; Liebow et al., 1995) and “peer-driven recruitment” (Broadhead, Heckathorn, Grund, Stern, & Anthony, 1995; Heckathorn, 1997) to locate and interview drug using index participants and their risk (sex and injection) partners. Eligibility requirements included chronic current drug use (defined as use of cocaine, heroin, or methamphetamine at least three times per week). If the persons selected met eligibility criteria (including a positive drug screen for cocaine or heroin or current track marks), they were interviewed as drug using “index participants.” Nonusers were also recruited for study using a “matching” method of recruitment; nonusers were matched on gender, race/ethnicity, age (within 5 years), and residence (within three blocks). Eligibility requirements included self-reporting no drug use (cocaine, heroin, or methamphetamine) for the previous 2 years. Participants were informed of the study requirements and of the risks and benefits associated with participation. In addition, participants

were informed that all information gathered would be confidential. To improve the accuracy of drug use reporting, urine drug screens were performed to detect cocaine and opiate metabolites. Participants gave written informed consent before the interview session, and were reimbursed at the end of the interview. All procedures were approved by an institutional Review Board.

Though the BSI, to assess psychological functioning, was self-administered, an interviewer was present as a monitor, but did not participate in the process. Participants responded to the items on a 5-point Likert scale from “0” (not at all) to “4” (extremely). In addition, the interviewer-administered Network Risk Assessment (NRA) instrument was used to collect demographic and drug use information, as well as data on sex and injection behaviors.

- *Drug Use*—Participants reported how often they used crack, cocaine, heroin, or methamphetamine in the 30 days prior to interview. A dichotomous drug use variable was created. Those who reported using crack, cocaine, heroin, or methamphetamine at all in the previous 30 days were classified as drug users, those participants that reported no use of these drugs in the 30 days prior to the interview were classified as nonusers. In addition, the maximum frequency of crack, cocaine, heroin, and methamphetamine use was calculated for each respondent. Using the frequency scale, respondents were classified as infrequent users (one to four times in the last 30 days), weekly users (two to six times per week in the last 30 days), daily users (one to three times per day), or chronic users (four or more times per day).
- *Injection Use*—Injection use was defined as the use of any drugs by means of injection in the 30 days prior to the interview. Participants who reported injection at all in the 30 days prior to interview were classified as injectors. Those participants who reported no use of drugs by means of injection were characterized as non-injectors. Nonusers were not used in analyses involving injection.
- *Polydrug Use*—Polydrug use was defined as the use of more than one type of drug (heroin, cocaine, crack, speedball—a mixture of cocaine and heroine—or methamphetamine) in the 30 days prior to the interview. Participants who used two or more types of drugs in the 30 days prior to interview were classified as polydrug users. All speedball users were considered polydrug users for the purpose of this study. Those participants that reported use of only one drug in the 30 days prior to the interview were classified as single-drug users. Nonusers were not used in analyses involving polydrug use.

### **Plan of Analysis**

The first analysis compared the psychological functioning of drug users and nonusers. Nonusers were then compared to nonpatient norms and drug users were compared to psychiatric inpatient norms. To examine whether BSI scores vary by severity of drug use, we then looked for differences in BSI scores by

injector status, polydrug use status, and frequency of drug use. *T*-tests were used to test for differences in BSI scores by injector status and polydrug use status. ANOVAs were used to test the relationship between drug use frequency and BSI scores, with each of the BSI dimensions as the dependent variable and drug use frequency as the independent variable.

## RESULTS

The sample consisted largely of minorities (45% African American and 25% Hispanic) between the ages of 31 and 50. About two-thirds (65%) of the total sample were male. Most (53%) were not high school graduates, and nearly half (49%) had part time jobs in the 30 days prior to interview. Nonusers made up 18% of the sample, while single-drug users and polydrug users each accounted for 41% of the total sample. Results of Chi square analyses revealed significant differences between users and nonusers with respect to age ( $\chi^2 = 12.20$ ,  $df = 4$ ,  $p < .05$ ) and employment ( $\chi^2 = 32.93$ ;  $df = 2$ ,  $p < .001$ ); nonusers were more likely to be older and employed full time.

Cocaine was the most frequently used drug among our sample; 84% of drug users had used crack cocaine and 46% had used powder cocaine in the 30 days before interview. Almost one-third (32%) had used heroin, about one-fifth (19%) had used methamphetamine, and 14% had used speedball. Table 1 describes the sample of nonusers, single-drug users, and polydrug users. Results of Chi square analyses revealed significant differences between polydrug users and single-drug users with respect to age ( $\chi^2 = 20.33$ ,  $df = 4$ ,  $p < .001$ ), gender ( $\chi^2 = 5.94$ ,  $df = 1$ ,  $p < .05$ ), and race ( $\chi^2 = 60.36$ ,  $df = 2$ ,  $p < .001$ ), with polydrug users being more likely to be younger and male and less likely to be African American.

In a separate analysis, drug users were also divided into injectors and non-injectors. Results of Chi square analyses revealed significant differences between injectors and noninjectors with respect to race and education; injectors were less likely to be African American ( $\chi^2 = 63.17$ ,  $df = 2$ ,  $p < .001$ ) and less likely to have completed high school ( $\chi^2 = 4.77$ ,  $df = 1$ ,  $p < .05$ ) than noninjectors.

The first test of the hypothesis that drug users have impaired psychological functioning was conducted by comparing the BSI scores of drug users and nonusers in the RNS sample. Results of *t*-tests showed significant differences between drug users and nonusers on all nine of the BSI dimensions, indicating that among our sample, drug users were significantly more psychologically impaired (see Table 2).

Next we conducted analyses to compare the BSI dimension scores of the RNS sample to the normative mean dimension scores (data for normative mean scores available in Derogatis, 1993). When our sample of nonusers was compared to adult nonpatients, significant differences were found on all nine of the BSI dimensions, with RNS nonusers scoring significantly higher than the population

Table 1. Sample Characteristics

Variable	Nonusers ( <i>n</i> = 40, 18%)	Single-drug users ( <i>n</i> = 91, 41%)	Polydrug users ( <i>n</i> = 93, 41%)
<b>Age</b>			
20 or younger	—	3 (3)	5 (5)
21 to 30	2 (5)	5 (5)	23 (25)
31 to 40	13 (33)	35 (38)	38 (41)
41 to 50	14 (35)	33 (36)	23 (25)
51 or older	11 (28)	15 (16)	4 (4)
<b>Gender</b>			
Female	16 (40)	39 (43)	24 (26)
Male	24 (60)	52 (57)	69 (74)
<b>Race</b>			
African American	16 (40)	67 (74)	17 (18)
Caucasian	11 (28)	9 (10)	48 (52)
Hispanic	12 (30)	15 (16)	28 (30)
Asian	1 (3)	—	—
<b>Education</b>			
Not high school graduate	21 (54)	46 (51)	51 (55)
High school graduate	18 (46)	45 (49)	42 (45)
<b>Job</b>			
None	14 (35)	44 (48)	34 (37)
Part time	12 (30)	42 (46)	55 (59)
Full time	14 (35)	5 (5)	4 (4)
<b>Drug Use Last 30 Days (multiple responses)</b>			
Crack cocaine		75 (82)	80 (86)
Powder cocaine		2 (2)	82 (88)
Speedball		—	25 (27)
Heroin		13 (14)	46 (49)
Methamphetamine		1 (1)	33 (35)

**Note:** The education level of 1 nonuser was missing.

Table 2. Comparing Psychological Functioning by Drug Use Status

BSI dimensions	Nonusers ( <i>n</i> = 40)	Drug users ( <i>n</i> = 184)
Somatization	.64	1.00*
Obsessive-compulsive	.83	1.40***
Interpersonal sensitivity	.63	1.25***
Depression	.67	1.34***
Anxiety	.57	1.21***
Hostility	.65	1.30***
Phobic anxiety	.33	.80***
Paranoid ideation	.88	1.59***
Psychoticism	.51	1.10***

\**p* < .05. \*\*\**p* < .001.

norm (see Table 3). RNS drug users were then compared to adult psychiatric inpatients. RNS drug users were found to have significantly higher Hostility and Paranoid Ideation scores and significantly lower Depression and Anxiety scores when compared to population norms.

Next, we examined whether severity of drug use affects psychological functioning. Severity of drug use was defined by injector status, polydrug status, and frequency of drug use. The BSI scores of injectors were compared to those of non-injectors. Table 4 shows results of these analyses, which reveal significant differences between the two groups. Non-injectors were found to have higher scores on the Paranoid Ideation and the Psychoticism scales. When single-drug users were compared to polydrug users, also shown in Table 4, polydrug users scored significantly higher on the Hostility scale only.

Analyses of variance were then used to compare the effects of infrequent, weekly, daily, and chronic drug use for each of the nine BSI dimensions. Significant differences were found for the Somatization, Obsessive-Compulsive, Depression, Anxiety, Phobic Anxiety, and Paranoid dimensions. However, post hoc tests revealed no significant differences between infrequent, weekly, and daily users. Therefore, these three groups were combined into a “non-chronic” group for comparison to the chronic drug user group. Table 5 shows results of these *t*-tests. Significant differences were found between non-chronic and chronic drug users on seven of the nine dimensions; chronic users scored higher than non-chronic users on the Somatization, Obsessive-Compulsive, Depression, Anxiety, Hostility, Phobic Anxiety, and Psychoticism dimensions.



Table 3. Comparison of BSI Mean Scores—  
RNS Sample vs. Population Norms

BSI dimensions	RNS nonusers ( <i>n</i> = 40)	Nonpatient norms ( <i>n</i> = 719)	RNS drug users ( <i>n</i> = 184)	Inpatients ( <i>N</i> = 423)
Somatization	.64	.29**	1.00	.90
Obsessive-compulsive	.83	.43**	1.40	1.32
Interpersonal sensitivity	.63	.32**	1.25	1.29
Depression	.67	.28**	1.34	1.52*
Anxiety	.57	.35*	1.21	1.49***
Hostility	.65	.35*	1.30	.87***
Phobic anxiety	.33	.17*	.80	.92
Paranoid ideation	.88	.34***	1.59	1.10***
Psychoticism	.51	.15***	1.10	1.09

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

## DISCUSSION

The current research examines the psychological functioning of drug users and nonusers to support one hypothesis and test a second: that drug users show lower levels of psychological functioning than nonusers, and that those with greater severity of drug use show lower levels of psychological functioning than less severe drug users. The sample, consisting of 184 drug users and 40 matched nonusers, was obtained from the Risk Networks Study, a study of drug use and HIV transmission risk. Drug use was defined as any self-reported use of crack, cocaine, heroin, and/or methamphetamine in the previous 30 days. Drug use and demographic data were collected using the Network Risk Assessment, a measure developed for this study; data regarding psychological functioning were collected using the Brief Symptom Inventory (BSI).

In examining the first hypothesis, we compared drug users to nonusers to replicate findings that drug users show lower levels of psychological functioning. As expected, drug users scored significantly higher on all nine of the BSI symptom dimensions, indicating lower psychological functioning. The next test involved comparing the study sample to population norms in order to gauge the level of functioning relative to nonpatients and psychiatric inpatients. When nonusers were compared to the population norms for adult nonpatients, our sample of nonusers scored significantly higher on all nine of the BSI dimensions. When we compared our sample of drug users to population norms for psychiatric inpatients,

Table 4. Comparing Psychological Functioning by Injector Status and by Polydrug Use Status

BSI dimensions	Non-injecting drug users (n = 88)		Injecting drugs users (n = 96)		Single-drug users (n = 91)		Polydrug users (n = 93)	
	M	t	M	t	M	t	M	t
Somatization	.98		1.02	-.314	.89		1.10	-1.749
Obsessive-compulsive	1.42		1.39	.257	1.36		1.45	-.624
Interpersonal sensitivity	1.32		1.17	1.034	1.17		1.31	-.962
Depression	1.33		1.35	-.155	1.22		1.46	-1.577
Anxiety	1.23		1.19	.366	1.14		1.28	-1.062
Hostility	1.30		1.31	-.086	1.10		1.50	-2.889**
Phobic anxiety	.87		.74	.878	.77		.83	-.437
Paranoid ideation	1.77		1.43	2.491*	1.58		1.60	-.138
Psychoticism	1.25		.96	2.268*	1.11		1.09	.184

\*p &lt; .05. \*\*p &lt; .01.

Table 5. Psychological Functioning by Drug Use Frequency

BSI dimensions	Non-chronic users ( <i>n</i> = 139)	Chronic drug users ( <i>n</i> = 45)	<i>t</i>
Somatization	.85	1.42	-3.99**
Obsessive-compulsive	1.28	1.8	-3.38**
Interpersonal sensitivity	1.17	1.48	-1.60
Depression	1.21	1.76	-2.95**
Anxiety	1.07	1.65	-4.08**
Hostility	1.22	1.56	-2.08*
Phobic anxiety	.65	1.28	-3.41**
Paranoid ideation	1.52	1.81	-1.84
Psychoticism	.94	1.59	-4.01**

\**p* < .05. \*\**p* < .01.

significant differences were found on only four of the nine symptom dimensions, with drug users scoring significantly higher on the Hostility dimension and the Paranoid Ideation dimension, and lower on the Depression and Anxiety dimensions. Because nonusers were matched to drug users by gender, age, race, and area of residence, these results suggest that the stress of living in a high drug use neighborhood may contribute to lower levels of psychological functioning. It is also suggested that, within the realm of psychological functioning, drug users may have more in common with psychiatric patients than with the general population, a finding that is consistent with prior research (Hodgins, Pennington, El-Guebaly, & Dufour, 1996; Magura, Rosenblum, & Rodriguez, 1998).

To determine if differential aspects of drug use are associated with elevated BSI scores, three measures of drug use severity were used: injection drug use, polydrug use, and frequency of drug use. It was hypothesized that injection drug users would exhibit lower psychological functioning than non-injection users. This hypothesis was not supported. In fact, injection drug users had significantly *lower* scores on the Paranoid Ideation and the Psychoticism scales than non-injection drug users. This may be due to the fact that injection drug users were less likely to use crack cocaine than nonusers ( $\chi^2 = 27.17$ , *df* = 1), *p* < .001).

In a separate analysis (results not shown), crack cocaine users were found to have significantly higher Paranoid Ideation dimension scores than heroin users (*t* = 2.338, *df* = 144, *p* < .05), which supports the finding that crack cocaine use is associated with increased paranoia (Post, 1975; Siegal, 1982).

Polydrug users were found to differ from single-drug users on only one of the nine dimensions (Hostility). The hypothesis that polydrug users would exhibit impaired psychological functioning relative to single-drug users was not fully supported.

Next, we tested the hypothesis that the frequency of drug use would affect psychological functioning—that more frequent drug use would be associated with higher BSI scores. Results of analyses of variance indicate that chronic drug users (drug use four or more times per day) did in fact have higher BSI scores than persons with lower frequencies of drug use. However, post hoc tests revealed no significant differences between infrequent, weekly, and daily users.

When the “non-chronic” drug users were combined into one group and compared to chronic drug users, significant differences were found on most of the BSI dimensions. These results indicate that chronic drug users were more likely to display symptoms of somatization, obsessive-compulsiveness, depression, anxiety, phobic anxiety, and psychoticism than either daily or weekly users. These results are consistent with Royse and Drude (1984), who found that more frequent drug use was associated with higher BSI scores.

A number of limitations must be considered in interpreting the results of this study. The subsamples of injectors and polydrug users were relatively small ( $n = 96$  and  $n = 93$ ), as was the subsample of chronic users ( $n = 45$ ). Small sample sizes may have contributed to Type II errors, so that moderate or small effects were not detected. Because this sample was recruited as part of a larger study investigating HIV transmission risk, the question arises as to whether the interaction of drug use and distress arising from the possibility of HIV contraction would result in elevated BSI scores (see Kalichman, 1999). However, this is not apparent in the test between injection and non-injection drug users. In fact, the exact opposite is the case, and it appears that the possibility of HIV transmission did not contribute significantly to the distress level in this sample.

In addition, in an article like this, where the comparison of drug users and nonusers plays a central role, the question of sampling may be critical. The random walk and peer-driven recruitment methods have been designed to achieve representative samples within “hidden populations,” such as drug user populations where standard random sampling methods are either inappropriate or inordinately expensive (Watters & Biernacki, 1989). Earlier samples of drug users generally consisted of street drug users. The random walk and peer-driven recruitment methods were used to provide better approximations to random sampling of this population. Regardless of these improvements, however, the representativeness of the sample cannot be known for certain. Since both random walk and peer-driven recruitment are network-based, people with larger drug use networks have more opportunity to be recruited. Similarly, matched nonusers who were recruited into the study may have been more well known than nonusers who were not recruited. Furthermore, although we believe we have achieved a relatively

representative sample of inner city drug users, the nonusers we sampled were not representative of all nonusers in the city as a whole or even of the inner city. Instead, the nonusing sample was drawn so as to be sociodemographically similar to the drug user sample. Thus, drug user-nonuser comparisons allowed us to examine the independent effects of drug use while controlling for socio-demographic factors.

We set out to test the hypothesis that severity of drug use is negatively related to psychological functioning. The expected differences were not salient in our tests of this hypothesis. The finding that our sample of matched nonusers exhibited greater psychological impairment than the population of nonpatients leads us to suspect that poor psychological functioning in this sample may be attributable to environment rather than drug use per se. However, it is also important to consider the widespread alcohol use among our sample. Because 80% of the total sample were alcohol users, it was not possible to examine the independent effects of alcohol on psychological functioning. It is unclear whether lower levels of psychological functioning can be best attributed to environment, drug use other than that examined in this study, or some other factor.

Injection drug use and polydrug use are assumed to be more severe forms of drug use, potentially leading to more severe psychopathology. However, results of this study point to the conclusion that psychopathology is largely unattributable to mode of administration or use of multiple drugs versus a single drug. Rather, our results indicate psychological functioning appears more likely to be related to *frequency* of drug use. While drug type more than likely also affects psychological functioning, we were unable to test for these effects among our sample as most drug users used crack cocaine to some extent and as numbers of participants using only cocaine, heroin, or methamphetamine were very low.

Though we cannot determine directionality—whether drug use led to psychopathology or vice versa—it is obvious that comorbidity of drug addiction and psychological symptoms constitutes a significant problem in this population. Drug users are much more comparable to psychiatric inpatients than to nonpatients, based on population norms. Our results suggest that drug interventions targeting psychological health are indeed appropriate adjuncts to improving the treatment outcomes for drug users. Because drug use may affect psychological functioning and vice versa, it is important to consider both aspects of the drug abuser's addiction. Substance abuse treatment that involves psychological assessment and psychological treatment as needed may contribute both to the effectiveness of addiction treatment, as well as to the patient's overall mental well being.

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