

## Alcohol and Drug Abuse-Dependence Disorders in Psychopathic and Nonpsychopathic Criminal Offenders

Stevens S. Smith and Joseph P. Newman  
University of Wisconsin-Madison

Co-occurrence of psychopathy (assessed with the Psychopathy Checklist) and lifetime *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.) alcohol and drug disorders (assessed with the National Institute of Mental Health Diagnostic Interview Schedule) was examined in a sample of 360 male inmates. Consistent with previous research that used diagnoses of antisocial personality disorder, psychopaths were more likely than nonpsychopaths to have lifetime diagnoses of alcoholism, any drug disorder, and multiple drug disorders. We also examined the relation between substance abuse and the 2 factors of the Psychopathy Checklist. Substance abuse was significantly related to general social deviance (Factor 2) but was unrelated to core personality features of psychopathy (Factor 1). We present two possible models of psychopathy (unitary syndrome vs. dual-diathesis model) that may account for the association between psychopathy and substance abuse.

Criminality is strongly associated with alcoholism (e.g., Collins, 1982; Guze, Goodwin, & Crane, 1969) and other forms of substance abuse (Fry, 1985; Nurco, Ball, Shaffer, & Hanlon, 1985). In addition, significantly higher prevalences of alcoholism and drug abuse are found in offenders with antisocial personality disorder (ASP; Collins, Schlenger, & Jordan, 1988; Lewis, Cloninger, & Pais, 1983). For example, Collins et al. found that 71.3% of incarcerated offenders with ASP had lifetime diagnoses of alcohol abuse-dependence compared with 40.2% of the non-ASP offenders. Drug abuse-dependence was also higher among ASP offenders (28.3%) than among non-ASP offenders (10.4%). Thus, inmates with a lifetime ASP diagnosis had significantly higher co-occurrences of lifetime alcohol and drug disorders.

Several important questions about the relation between antisocial behavior and substance abuse have emerged from comorbidity studies and from studies that have examined the extent to which this relation is mediated by a family history of alcoholism, ASP, or both (e.g., Cloninger & Gottesman, 1987; McCord, 1981; Zucker, 1987). For example, high rates of co-occurrence

of substance abuse and ASP may reflect a common etiological factor that underlies both disorders (Gorenstein, 1987; Gorenstein & Newman, 1980; Lewis, 1984). However, genetic studies of the relation between primary alcoholism (in which onset of alcoholism precedes onset of other disorders such as ASP or depression) and ASP appear to indicate familial segregation of the disorders, which reflects separate genetic liabilities (Cadoret, O'Gorman, Troughton, & Heywood, 1985; Cadoret, Troughton, & O'Gorman, 1987; Cloninger & Reich, 1983). On the other hand, Alterman (1988) found evidence for higher rates of ASP in alcoholic men with bilineal (vs. nonlinear or unilineal) family history of alcoholism. In addition, Cloninger and his colleagues have identified a familial subtype of alcoholism that has prominent antisocial features (Bohman, Cloninger, Sigvardsson, & von Knorring, 1987; Cloninger & Gottesman, 1987). These findings suggest that diagnostic and nosological issues may have an important bearing on the relation between ASP and alcoholism.

Psychiatric disorders such as alcoholism and ASP probably have complex etiologies that may or may not be related, but the fact that ASP and substance abuse often co-occur (and share some features) has raised questions about the genotypic-phenotypic heterogeneity and overlap of these two disorders. For example, some researchers distinguish between *alcoholic sociopaths* and *sociopathic alcoholics* (Rada, 1978) and point to important differences in the onset and development of antisocial behavior and alcoholism. Such distinctions are important clinically (in terms of diagnosis and treatment) and for purposes of basic research on the etiology, developmental course, and psychological processes associated with these disorders.

One potential problem in understanding the relation between ASP and substance abuse concerns the diagnosis of ASP. Most recent studies of ASP and substance abuse disorders have used the diagnostic criteria and diagnoses described in the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.; *DSM-III*; American Psychiatric Association, 1980). Several

---

This research was supported by National Institute of Mental Health Grant MH37711 to Joseph P. Newman.

We thank Eric Howland, David Kosson, Mark Patterson, Randy Busse, and Peter Arnett for their contributions to this study. Tim Baker's helpful comments on an earlier version of this article are gratefully acknowledged. We also express our appreciation to the Wisconsin Division of Corrections and the social services staff at Oakhill Correctional Institution (Arnold Blahnik, Pam Waddell, Beverly Mares, Deborah March, and Jeff Wydeven) for their cooperation and help throughout this project.

Correspondence concerning this article should be addressed to Stevens S. Smith, who is now at the Addiction Research Center, National Institute on Drug Abuse, Box 5180, Baltimore, Maryland 21224, or to Joseph Newman, Department of Psychology, 1202 West Johnson Street, University of Wisconsin-Madison, Madison, Wisconsin, 53706.

writers have been critical of the *DSM-III* diagnosis of ASP for its emphasis on antisocial behavior and criminality to the exclusion of important personality features (Hare, 1985a; Millon, 1981). Many clinicians and researchers consider certain core personality features such as pathological egocentricity, poor judgment, poor insight, shallow affect, callousness, and absence of guilt or remorse to be integral to the diagnosis (Cleckley, 1976; Craft, 1966; Hare, 1985b; McCord & McCord, 1964). Because the *DSM-III* ASP diagnosis relies more heavily on behavioral indicators, it may fail to differentiate criminal offenders who display both the core personality features and antisocial behavior from those who display antisocial behavior only.

An alternative to the *DSM-III* ASP diagnosis is the construct of psychopathy exemplified in the work of Cleckley (1976) and operationalized by means of the Psychopathy Checklist (PCL; Hare, 1980, 1985b). The assessment of psychopathy with the PCL relies both on behavioral and personality features thought to be diagnostic of the disorder. Hare developed the PCL as a behavioral-clinical measure of psychopathy for use with male criminal offenders. The PCL has demonstrated very good reliability and validity (e.g., Hare, 1980, 1986; Hart, Kropp, & Hare, 1988; Kosson, Smith, & Newman, 1990; Schroeder, Schroeder, & Hare, 1983), and unlike the *DSM-III* diagnosis of ASP, ratings made with the PCL can be used dimensionally or categorically (i.e., assignment of subjects to low, moderate, and high psychopathy groups).

Recently Hare and his colleagues (Harpur, Hakstian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989) have identified two correlated factors in the PCL that correspond to core personality traits associated with psychopathy (Factor 1) and behavioral features characteristic of a chronically unstable and antisocial lifestyle (Factor 2).<sup>1</sup> Harpur et al. (1988) described Factor 1 as representing personality features central to psychopathy, which involve selfish, callous, and remorseless use of others, lying, and guiltlessness; Factor 2 taps primarily into general social deviance and corresponds closely to the criteria for the *DSM-III* diagnosis of ASP. These two factors can be used correlationally to investigate the nature of the putative association between components of psychopathy (core personality vs. social deviance) and other variables such as cognitive, perceptual, and interpersonal processes (see Harpur et al., 1989). Thus, for research purposes the PCL assessment of psychopathy offers several theoretical and methodological advantages over the *DSM-III* diagnosis of ASP.

In contrast to the *DSM-III* diagnosis of ASP, there are few studies that have systematically examined the co-occurrence of alcohol and drug disorders with psychopathy (as assessed with the PCL). Hart and Hare (1989) reported point-biserial correlations between PCL total, Factor 1, and Factor 2 scores and the presence or absence of *DSM-III* alcohol disorders and the presence or absence of other substance (nonalcohol) disorders in a sample of 80 forensic psychiatric subjects. A diagnosis for "other substance use" (i.e., drug abuse; Hart & Hare, 1989, p. 213) was found to be significantly correlated with the PCL total score ( $r = .31$ ) and with PCL Factor 2 ( $r = .40$ ) but not with Factor 1. A similar pattern was reported for alcohol diagnoses, but the correlations for PCL total and Factor 2 failed to attain statistical significance because of a conservative alpha level (to control for familywise error rate). The results of this study suggest a significant association between psychopathy and sub-

stance abuse, but the subjects in this study were not from a general prison population. In addition, only 10 subjects out of 80 were classified as psychopaths. Thus, no firm conclusions can be drawn from this study because of its methodological limitations.

One purpose of our study is to provide data about the co-occurrence of psychopathy (assessed with the PCL) and alcohol and drug diagnoses in a nonpsychiatric sample of incarcerated offenders. Substance abuse diagnoses were made from the subset of questions in the National Institute of Mental Health Diagnostic Interview Schedule (NIMH-DIS; Robins, Helzer, Croughan, & Ratcliff, 1981) that pertains to *DSM-III* alcohol and drug disorders. The NIMH-DIS has been used in several recent studies of *DSM-III* ASP and alcohol and drug disorders (e.g., Collins et al., 1988) and has provided a means for comparing comorbidity across different conceptions of ASP (i.e., *DSM-III* ASP vs. psychopathy).

Cleckley (1976) distinguished between the pattern of drinking typical of psychopaths and the pattern associated with primary alcoholism. In the psychopath, alcohol serves as a catalyst that facilitates the expression of antisocial behavior, but "alcohol is not likely to bring out any impulse that is not already potential in a [psychopathic] personality" (Cleckley, 1976, p. 356). Thus, psychopaths' alcohol and drug use is regarded as symptomatic of a general style of behavioral deviance. In contrast, alcoholics often drink to excess for other reasons (e.g., as a means of escape from some emotionally distressing aspect of reality), and when they display deviant behavior, it is likely because of excessive intake of alcohol rather than underlying antisocial proclivities. Therefore, another purpose of our study is to examine the relation between substance abuse and the aspects of personality (PCL Factor 1) and deviant behavior (PCL Factor 2) associated with psychopathy.

On the basis of Cleckley's (1976) characterization of psychopaths' alcohol use and the limited findings of Hart and Hare (1989), we predicted that substance abuse (operationalized primarily as the number of lifetime alcohol symptoms and the number of lifetime drug symptoms as assessed with the NIMH-DIS) would be more related to general social deviance (PCL Factor 2) than to core personality traits (PCL Factor 1). To facilitate interpretation of our results, we also examined age at onset of substance abuse and two other indicators of early social deviance, age at first arrest and age at first sexual intercourse.

## Method

### Subjects

Three hundred eighty-four White<sup>2</sup> inmates at a minimum security state correctional facility in southern Wisconsin were tested. Inmates

<sup>1</sup> Psychopathy Checklist Factor 1 items include: glibness/superficial charm; grandiose sense of self-worth; pathological lying; conning/manipulative; lack of remorse or guilt; shallow affect; callous/lack of empathy; and failure to accept responsibility for own actions. Factor 2 items include: need for stimulation/proneness to boredom; parasitic lifestyle; poor behavioral controls; early behavior problems; lack of realistic long-term goals; impulsivity; irresponsibility; juvenile delinquency; and revocation of conditional release.

<sup>2</sup> Most of the subjects used in the development and validation of the Psychopathy Checklist have been White (Hare, 1980; Harpur, Haks-

were nominated by selecting every fifth name on the institution's roster. Before this selection procedure a brief review of each inmate's institution file was conducted to establish eligibility for participation. Only inmates between the ages of 18 and 40, inclusive, were nominated. In addition, to ensure that subjects who participated in the research would be able to understand the procedures and questionnaires, inmates who were identified as having borderline intelligence (or below) or testing below the 4th-grade level on standardized achievement tests were not nominated. Inmates on psychotropic medication or identified as actively psychotic were also excluded. Twenty-four subjects who participated in the research were found to be ineligible<sup>3</sup> and were excluded from all analyses. Thus, 360 inmates compose the sample in the current study. Approximately 10% of the inmates who were contacted about participation refused to participate after hearing a description of the study.

### Measures

**Psychopathy Checklist.** Psychopathy was assessed with the Revised Psychopathy Checklist (PCL-2; Hare, 1985b). The PCL-2 was developed by Hare as a successor to the original 22-item PCL (Hare, 1980). Both versions are based primarily on Cleckley's (1976) conception of psychopathy and are designed to be used for the assessment of psychopathy in male criminal offenders. The PCL-2 consists of 20 items, each of which taps a different behavioral or trait disposition related to psychopathy. The items are completed by a trained rater after a semistructured interview (described later) with the inmate and a review of his institutional file. They are scored 0, 1, or 2 to indicate the absence, partial presence, or presence of the disposition; total PCL-2 scores range from 0 to 40.

Consistent with the PCL-2 cutoffs used by Hare (1986), each subject was assigned to one of three groups: (a) subjects with scores of 20 or below were classified as control subjects; (b) subjects with scores between 21 and 29 inclusive were classified as middle subjects; and (c) subjects with scores of 30 or above were classified as psychopaths. By the use of these cutoffs, 124 subjects were assigned to the control group, 123 subjects were assigned to the middle group, and 113 subjects were assigned to the psychopath group. Hare (1984) reported that middle subjects "exhibit many of the features of psychopathy but . . . do not fit the complete clinical syndrome" (p. 14). According to Hare (1984), these subjects appeared to be more psychologically maladjusted as evidenced by elevated scores on Minnesota Multiphasic Personality Inventory scales of Depression, Schizophrenia, and Psychasthenia. In the current study the middle group is included in the group analyses to provide additional information about these subjects in relation to control subjects and psychopaths.

In addition to the total PCL-2 scores used for classification (group analyses) and for correlational analyses, summative scores were calculated to represent the two factors identified in the PCL-2 (Hare et al., 1989). The two-factor structure of the PCL-2 has been replicated across several independent samples (including subjects from our research program; Sample 3 in Hare et al., 1989) and appears to be highly congruent across those samples. More specifically, the two-factor solution obtained for our subjects in Hare et al.'s study demonstrated high factor congruence with two-factor solutions obtained for other samples of subjects from Canadian correctional institutions in British Columbia, Quebec, and Ontario. The construct validity of the two factors has been extensively documented by Harpur et al. (1989) for the original PCL. Although the two factors are moderately correlated ( $r = .55$ ), they

tian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989). In addition, Kosson, Smith, and Newman (1990) raised questions about the appropriateness of using the Psychopathy Checklist in non-White populations. For these reasons, only data for White subjects are reported.

appear to be associated with different aspects of the psychopathy syndrome (Harpur et al., 1989).

Hare et al. (1989) studied the psychometric characteristics of the PCL-2 across five prison samples and three forensic psychiatric samples. Interrater reliability for the PCL-2 (assessed with the intraclass correlation coefficient) ranged from .78 to .94 and internal consistency as measured by Cronbach's alpha coefficient ranged from .85 to .89. For our sample of subjects, interrater reliability for the total PCL-2 scores was assessed two ways: (a) The correlation between total scores for two raters for a subset of 56 subjects was .84, and, (b) kappa (Fleiss, 1981) for a categorical diagnosis (control group, middle group, and psychopath group) for the subset of 56 subjects was .62. For PCL Factor 1, interrater reliability (correlation between two raters' scores) was .74; for PCL Factor 2, interrater reliability was .78. Internal consistency (Cronbach's alpha) for PCL-2 ratings for a subset of 241 subjects (those with no omitted items) was .86 for the total score, .84 for Factor 1, and .76 for Factor 2.

**Assessment of alcohol and drug abuse-dependence.** During the semi-structured interview (described later), each subject answered a set of questions about alcohol and drug use derived from the NIMH-DIS. The NIMH-DIS (Version III-A) is a highly structured diagnostic interview developed for use in epidemiological studies (Robins & Helzer, 1985; Robins et al., 1981). Questions in the NIMH-DIS are closed-ended, and answers are recorded by the interviewer according to specified coding options. For a given disorder, most or all of the diagnostic criteria are evaluated and symptoms are determined on a lifetime basis. The structure and format of the NIMH-DIS allows for its use by nonclinician, lay interviewers, and computer programs are available for making diagnoses according to *DSM-III* criteria. In this study, only the questions from the NIMH-DIS that cover *DSM-III* alcohol and drug disorders were asked.

NIMH-DIS questions for determining substance use disorders are divided into two sets, one set for alcohol disorders and the other set for drug disorders. In the alcohol section the questions pertain to pathological alcohol use, impairment in social or occupational functioning, and symptoms of tolerance or withdrawal. Computer scoring of these subsets of questions conforms to the *DSM-III* criteria for alcohol abuse and alcohol dependence diagnoses.<sup>4</sup> In addition, a count of lifetime alcohol symptoms (range, 0-17) is provided by the computer-scoring program.

In the drug section the NIMH-DIS probes for abuse or dependence symptoms of eight classes of substances with eight primary questions. Computer scoring of responses provides specific abuse and dependence diagnoses for six classes of substances (tobacco was omitted, and

<sup>3</sup> Hare (1985b) noted that the Psychopathy Checklist was "developed with samples that contained no inmates who were psychotic, mentally retarded, or clearly brain-damaged and that we [Hare's research group] routinely exclude such individuals from our research program" (p. 4). In our study, 24 subjects were found to be ineligible after their participation in the research had begun. These subjects were excluded for the following reasons: taking psychotropic medication (9), actively psychotic (4), history of very serious head injury (6), other medical problems that precluded participation (2), and previous participation in our research (3).

<sup>4</sup> The National Institute of Mental Health Diagnostic Interview Schedule (NIMH-DIS) does not assess Criterion C for the Diagnostic and Statistical Manual of Mental Disorders (3rd ed.; *DSM-III*) diagnosis of alcohol abuse: "Duration of disturbance of at least one month" (American Psychiatric Association, 1980, p. 170). The same is true for NIMH-DIS *DSM-III* drug abuse diagnoses. Note that NIMH-DIS *DSM-III* alcohol and drug diagnoses are made on a lifetime basis, and for a diagnosis of abuse of drugs, a minimum of five times of drug use is required for an abuse diagnosis.

hallucinogens and phencyclidine were combined into one class) and a count of the number of lifetime drug abuse and dependence symptoms (total of seven). These drug diagnoses include cannabis abuse and dependence, amphetamine abuse and dependence, barbiturate abuse and dependence, cocaine abuse, opioid abuse and dependence, and hallucinogen abuse. (In the *DSM-III*, no dependence diagnoses are made for cocaine or hallucinogens.)

Several researchers have questioned the usefulness of differentiating *DSM-III* alcohol abuse and *DSM-III* alcohol dependence diagnoses (e.g., Hasin & Grant, 1987; Schuckit, Zisook, & Mortola, 1985), and most research with the NIMH-DIS combines abuse and dependence (e.g., Collins et al., 1988). The same is true for NIMH-DIS *DSM-III* diagnoses for cannabis, amphetamines, barbiturates, and opioids. In our study, alcohol or drug diagnoses were assigned if the criteria for either abuse or dependence were met. As noted earlier, the *DSM-III* does not provide for dependence diagnoses for cocaine and hallucinogens, and therefore, diagnoses for these two drugs were assigned if abuse criteria were met for these drugs.

*Shipley Institute of Living Scale (SILS; Zachary, 1986).* The SILS is a self-administered measure of general intellectual functioning, which consists of a 40-item Vocabulary subtest and a 20-item Abstraction subtest. Test-retest reliability for the full SILS has been reported by Zachary to range from .62 to .82 (*Mdn* = .78) across eight studies. Recent revised scoring procedures (see Zachary, 1986) provide for estimates of Wechsler Adult Intelligence Scale-Revised (WAIS-R) Full Scale IQ, which in our study were used to assess general intellectual functioning.

### Procedure

Each subject who was nominated for selection was given a detailed description of the project, which included an overview of the purpose of the project, a description of the semistructured interview, information on follow-up studies, and policies about participation. In addition, the subjects were told that participation would be voluntary and strictly confidential and that they would be paid \$3 for participating. Written informed consent was obtained from inmates who agreed to participate, and the semistructured interview began immediately after their endorsement of the consent form.

All subjects participated in a semistructured interview that consisted of several sections about education, family life, relationships, parenthood, sexual history, work history, criminal history, medical history, and alcohol and drug use and abuse (as assessed by the NIMH-DIS). The interviews generally lasted between 75 and 100 min, and after the interview, each subject completed a few self-report questionnaires in a separate room. During this time the interviewer read sections of the inmate's social services file to augment and check information obtained during the interview. After the file review the interviewer made PCL-2 ratings according to the guidelines recommended by Hare (1985b).

Most subjects were called back for additional participation in various ongoing experiments within several weeks. During these testing sessions the subjects completed various questionnaires and scales including the SILS. Not all subjects completed these instruments because of the special requirements of the various studies and because some subjects left the institution before being called for particular studies. Of the 360 subjects in the study, 290 (81%) completed the SILS.

For purposes of interrater reliability, a second rater (an observer) was present in the interview room during the interviews of 56 subjects. During these interviews the interviewer asked most of the questions and wrote down information independent of the observer's recording of the information obtained from the subject. The interviewer and observer also separately read the subject's social services file. On completion of the interview and the file review, the interviewer and observer made independent psychopathy ratings on the PCL-2 (see previous section for PCL-2 reliability information).

### Results

Table 1 provides group means and standard deviations for control, middle, and psychopath groups for various subject variables. One-way analyses of variance were computed for each variable. The three groups did not differ in age, education, or estimated WAIS-R IQ. As expected, psychopaths scored significantly higher than control subjects on alcohol and drug symptoms. Post hoc comparisons (Scheffé test,  $\alpha = .01$ ) revealed that each group significantly differed from the others for alcohol symptoms and that middle subjects scored midway between control subjects and psychopaths. The mean number of drug symptoms for middle subjects was significantly lower than the mean for psychopaths, but middle subjects did not differ from control subjects for drug symptoms.

### Co-Occurrence of Psychopathy and Alcohol and Drug Disorders

The percentages of subjects in each of the groups with lifetime NIMH-DIS alcohol and drug diagnoses are provided in Table 2. Bartholomew's test for ordered proportions was computed for each individual substance and for the presence of any nonalcohol drug abuse or dependence. This statistic provides a test of the hypothesis that the three proportions (numbers of control vs. middle vs. psychopathic subjects) are arrayed in a prespecified order (Fleiss, 1981). In our analysis the control subjects were hypothesized to have a lower percentage of diagnoses for any alcohol diagnosis as compared with psychopaths; percentages for middle subjects were predicted to be between the values for control and psychopathic subjects. The same prediction was made for any drug abuse or dependence. Predictions about the six individual drug categories were not made, although results for specific drug categories are presented in Table 2. For both alcohol and any drug diagnosis, Bartholomew's tests were significant, which indicates an increasing gradient in the proportion of diagnoses from control (lowest proportion) to middle to psychopathic (highest proportion) subjects.<sup>5</sup> Similarly, Bartholomew's tests were significant for amphetamine abuse or dependence, barbiturate abuse or dependence, and opioid abuse or dependence but not for cannabis abuse or dependence, cocaine abuse, or hallucinogen abuse.

In order to assess comorbidity of psychopathy and substance disorders, odds ratios were computed for each substance on the basis of the presence or absence of specific substance diagnoses and the presence or absence of psychopathy. Absence of psychopathy included subjects who were categorized as control or middle subjects on the PCL-2. The odds ratio is a measure of association for  $2 \times 2$  tables that indexes the increase in the odds

<sup>5</sup> Given that a very high percentage of the psychopaths had either lifetime alcohol abuse or dependence diagnoses (92.9%), we computed the percentages of subjects in each group who had both lifetime alcohol abuse and dependence diagnoses. For control, middle, and psychopath groups, the percentages were 35.5%, 54.5%, and 73.5%, respectively. Bartholomew's test statistic was 34.50 ( $p < .005$ ), which indicates a statistically significant increase in the proportions of alcohol diagnoses.

Table 1  
Group Means and Standard Deviations for Subject Variables

Variable	Group						F	dfs
	Control (n = 124)		Middle (n = 123)		Psychopath (n = 113)			
	M	SD	M	SD	M	SD		
Age	27.63	6.10	26.57	6.11	26.43	5.83	1.43	2, 357
Years of education	10.77	1.70	10.46	1.84	10.08	1.88	4.41	2, 357
Education and GED <sup>a</sup>	11.71	1.34	11.59	1.50	11.64	1.34	0.22	2, 357
Estimated WAIS-R <sup>b</sup>	96.97	11.46	96.04	11.02	97.38	11.75	0.41	2, 287
NIMH-DIS alcohol symptoms <sup>c</sup>	4.40	4.03	6.27	4.41	8.23	4.30	24.12*	2, 357
NIMH-DIS drug symptoms <sup>d</sup>	1.82	2.06	2.42	1.98	3.43	2.10	18.61*	2, 357

Note. GED = General Educational Development test; WAIS-R = Wechsler Adult Intelligence Scale-Revised; NIMH-DIS = National Institute of Mental Health Diagnostic Interview Schedule.

<sup>a</sup> Years of education corrected for completion of GED. <sup>b</sup> Estimated WAIS-R IQ based on Shipley Institute of Living Scale (Zachary, 1986). For this measure,  $n_s = 113, 73,$  and  $104,$  respectively for control, middle, and psychopathic groups. <sup>c</sup> Total number of symptoms of alcohol abuse and dependence. <sup>d</sup> Total number of symptoms of drug abuse and dependence.

\*  $p < .001.$

of having one disorder (e.g., alcohol abuse or dependence) given the presence of another disorder (e.g., psychopathy).

The odds ratio for psychopathy and alcohol abuse-dependence was 5.088 ( $p < .001$ ), which indicates that the odds for a lifetime alcohol diagnosis to co-occur with psychopathy was about five times that for an alcohol diagnosis to occur in the absence of psychopathy. For psychopathy and any drug abuse-dependence, the odds ratio was 2.74,  $p < .001$ , which indicates significant co-occurrence of these diagnoses. For specific drug categories and psychopathy, the odds ratios were as follows: for cannabis abuse-dependence, 1.34,  $ns$ ; for amphetamine abuse-dependence, 2.83,  $p < .001$ ; for barbiturate abuse-dependence, 3.09,  $p < .001$ ; for opioid abuse and dependence, 3.92,  $p < .001$ ; for cocaine abuse, 1.75,  $ns$ ; and for hallucinogen abuse, 2.05,  $ns$ .

To explore further the extent of nonalcohol drug disorders in psychopaths versus nonpsychopaths, the percentages of subjects in each group with no drug diagnoses, one drug diagnosis, and more than one drug diagnosis were computed (see Table 3).

We predicted that the psychopath group would have a significantly higher proportion of subjects with multiple drug diagnoses (polydrug abuse) than the control group; the middle group was expected to fall between the control and psychopath groups. No clear prediction could be generated for group proportions of subjects with one diagnosis only; the test for differences in group proportions for no drug diagnosis is the same as that reported for any drug abuse or dependence (see Table 2). For polydrug abuse Bartholomew's test was significant ( $p < .005$ ), which indicates an increasing gradient in the proportion of subjects with polydrug abuse from the control to the psychopath group. The groups did not differ in the proportion of subjects with one drug diagnosis only.

#### Psychopathy Checklist Factor Correlates

As described earlier, Hart and Hare (1989) found that nonalcohol substance abuse was significantly correlated with the

Table 2  
Percentages of Subjects in Control, Middle, and Psychopathic Groups With Lifetime National Institute of Mental Health Diagnostic Interview Schedule Alcohol and Drug Diagnoses

Diagnosis	Group			$\chi^2$
	Control (n = 124)	Middle (n = 123)	Psychopath (n = 113)	
Alcohol abuse or dependence	65.3	78.9	92.9	31.12*
Any drug abuse or dependence <sup>a</sup>	43.5	56.9	73.5	21.91*
Cannabis abuse or dependence	30.6	43.9	44.2	6.15
Amphetamine abuse or dependence	11.3	17.1	31.9	16.46*
Barbiturate abuse or dependence	9.7	13.0	28.3	16.31*
Opioid abuse or dependence	7.3	8.9	25.7	22.06*
Cocaine abuse	12.9	13.8	21.2	3.61
Hallucinogen abuse	4.8	3.3	8.0	2.33

Note.  $\chi^2$  was computed as Bartholomew's test for ordered proportions ( $m = 3$  and  $c = 0.5$ ; Fleiss, 1981).

<sup>a</sup> Excludes alcohol diagnoses.

\*  $p < .005.$

Table 3  
*Percentages of Subjects with Lifetime National Institute of Mental Health Diagnostic Interview Schedule Drug Diagnoses by Group*

Diagnosis	Group			$\chi^2$
	Control ( <i>n</i> = 124)	Middle ( <i>n</i> = 123)	Psychopath ( <i>n</i> = 113)	
No drugs	56.5	43.1	26.5	21.91*
One drug	25.0	32.5	32.7	2.23
>1 drug	18.5	24.4	40.7	15.40*

Note. A drug diagnosis for individual drug categories was given if abuse or dependence criteria were met for the substance.  $\chi^2$  was computed as Bartholomew's test for ordered proportions (*m* = 3 and *c* = 0.5; Fleiss, 1981).

\* *p* < .005.

PCL total score and PCL Factor 2 but not with Factor 1. The correlations for alcohol abuse showed a similar pattern but failed to attain statistical significance. We attempted a partial replication of these findings by computing the intercorrelations of PCL-2 total, Factor 1, and Factor 2 scores and NIMH-DIS alcohol and drug symptoms.<sup>6</sup> These correlations are presented in Table 4.

Consistent with the findings reported by Hart and Hare (1989), the number of NIMH-DIS drug symptoms correlated significantly<sup>7</sup> with the total PCL-2 score and with Factor 2 but not with Factor 1. In addition, the number of NIMH-DIS alcohol symptoms correlated significantly with the total PCL-2 score and with Factor 2 but not with Factor 1. For drug symptoms the correlation with Factor 2 was significantly higher than the corresponding correlation with Factor 1,  $t(357) = -5.89$ ,  $p < .001$ ; the same pattern was true for alcohol symptoms,  $t(357) = -5.66$ ,  $p < .001$ . Thus, in our sample of subjects, both alcohol and drug symptoms were associated with a chronically unstable and antisocial lifestyle but not with the personality traits that characterize psychopathy.

Given that the PCL factors share approximately 30% of their variance, we also conducted hierarchical multiple regression analyses to assess the independent contribution of personality features (PCL Factor 1) to the variance in the symptom indexes after partialing out PCL Factor 2. The purpose of these regression analyses was to examine the association between substance abuse and features of psychopathic personality (as represented in PCL Factor 1) after overlapping variance between Factor 1 and Factor 2 (i.e., the semipartial correlations) had been controlled for. Table 5 provides semipartial correlations and squared semipartial correlations that correspond to the regression analyses for alcohol symptoms and drug symptoms (treated as separate dependent measures).

For alcohol symptoms Factor 1 did not contribute significantly ( $s^2 = .01$ , *ns*) to the overall variance accounted for by both factors ( $R^2 = .17$ ). The same values were obtained for drug symptoms. In addition, after Factor 2 was partialled out, the semipartial correlations for Factor 1 reversed sign for both dependent measures; however, these semipartial correlations ( $sr = -.10$ ) were statistically nonsignificant. These regression analy-

ses indicated that we could not reject the hypothesis that personality traits associated with psychopathy were significantly related to substance abuse independent of social deviance.

We also examined age at first intoxication and other indicators of early-onset deviance because of their relevance in interpreting the association between substance abuse and the PCL factors. Table 4 provides intercorrelations for age at first intoxication,<sup>8</sup> age at first arrest, and age at first sexual intercourse with NIMH-DIS symptom indexes and the PCL-2 scores. (Age at first arrest and age at first sexual intercourse were obtained during the semistructured interview.)

All correlations between the three age-at-onset variables and the number of NIMH-DIS alcohol and drug symptoms were significant ( $p < .001$ ), except for the correlation between age at first sexual intercourse and alcohol symptoms. For the correlations of these variables with the PCL scores, all correlations were significant ( $p < .001$ ), except for the correlation between age at first intoxication and Factor 1. In addition, for all three variables the correlations with Factor 2 were significantly higher than the correlations with Factor 1 (see Table 4). Thus, deviance at an early age was associated with the PCL factor for antisocial lifestyle and general deviance rather than with the factor for the core psychopathic personality.

Finally, hierarchical multiple regression analyses (patterned after the regressions described earlier) were computed for the age-at-onset variables (see Table 5). For age at first intoxication and age at first sexual intercourse, PCL Factor 1 did not contribute significantly ( $s^2 < .02$ , *ns*) to the overall squared multiple correlation for each measure; PCL Factor 1 significantly contributed to the overall squared multiple correlation for age at first arrest. In addition, for age at first intoxication and age at first arrest, the semipartial correlations for Factor 1 were opposite in sign to the zero-order correlations. Only the Factor 1 semipartial correlation for age at first arrest was statistically significant ( $sr = .17$ ,  $p < .001$ ).

## Discussion

The results of the co-occurrence analyses clearly indicate that incarcerated psychopaths are at increased risk for lifetime alcohol and drug disorders. In addition, a higher percentage of psychopaths have abused multiple types of drugs compared with

<sup>6</sup> We did not compute correlations for the categorical alcohol and drug diagnoses (as did Hart & Hare, 1989) because the use of categorical variables in correlational analyses generally attenuates the magnitude of the correlations. For this reason we made use of the continuous-level National Institute of Mental Health Diagnostic Interview Schedule symptom counts in our correlational analyses.

<sup>7</sup> Because of the number of correlations and *t* tests presented in Table 4, we set a more stringent alpha level of .001 for statistical significance in order to control for Type I error inflation.

<sup>8</sup> Only a subset of our subjects had complete data for age at first intoxication (alcohol). In our administration of the National Institute of Mental Health Diagnostic Interview Schedule alcohol questions, age at first intoxication was coded categorically (1 = 15 or older or 5 = younger than 15) for the first 30% of the subjects; thus, for these subjects, we only have the categorical information for this question. For the remaining 70% of the subjects, interviewers recorded the actual age at first intoxication reported by the subjects.

Table 4

Correlations for National Institute of Mental Health Diagnostic Interview Schedule (NIMH-DIS) Symptom Indexes and Psychopathy Checklist Scores With Ages at First Intoxication, First Arrest, and First Sexual Intercourse

Variable	n	NIMH-DIS symptom		Psychopathy Checklist			t	df
		Alcohol	Drugs	Total	Factor 1	Factor 2		
NIMH-DIS index								
Alcohol Symptoms	360	—	—	.34*	.14	.40*	-5.66*	357
Drug Symptoms	360	.38*	—	.33*	.13	.40*	-5.89*	357
Age at first intoxication	249	-.27*	-.29*	-.33*	-.16	-.43*	5.04*	246
Age at first arrest	360	-.29*	-.29*	-.47*	-.20*	-.62*	10.87*	357
Age at first sexual intercourse	357	-.17	-.20*	-.35*	-.21*	-.38*	3.47*	354

Note. We computed *t* tests to determine the significance of the difference between correlations (see Cohen & Cohen, 1983) for Factor 1 and Factor 2 with each of the variables.

\*  $p < .001$ .

nonpsychopaths. The results are generally consistent with findings reported for the co-occurrence of *DSM-III* ASP with alcohol and drug disorders (e.g., Collins et al., 1988; Hart & Hare, 1989). These co-occurrence estimates are important to document given the implications of serious substance abuse for the diagnosis and treatment of psychopaths. However, those studies investigated co-morbidity in offender populations, and the extent to which the results generalize to nonoffenders is an important question for future study.

Apart from the clinical relevance of significant co-morbidity, our results raise important questions about the influence of serious substance abuse on various measures used in psychopathy research. For example, chronic substance abuse alone (especially alcoholism) has been linked to neuropsychological deficits (e.g., Carlin, 1986; Grant, 1987). Given that current research on psychopathy emphasizes cognitive, perceptual, and psychophysiological processes associated with the disorder (e.g., Hare & Connolly, 1987; Jutai & Hare, 1983; Kosson & Newman, 1986), it seems important to take into account the extent of substance disorders in offenders used in research on psychopa-

thy. In this regard our results provide evidence that drug and alcohol abuse-dependence in psychopaths is pervasive enough to warrant investigation of their possibly confounding influences on measures used in psychopathy research.

Analyses of the association between substance abuse and the PCL factors were conducted to examine the relations of substance abuse to the psychological processes (personality and social) thought to constitute the full syndrome of psychopathy. Such a strategy may provide insight into the nature of psychopathy in addition to elucidating the relation between psychopathy and substance abuse. Without exception, substance abuse was significantly more related to the PCL factor of general social deviance and antisocial lifestyle (Factor 2) than to the PCL factor of personality traits associated with psychopathy (Factor 1). This general finding was evident in the analyses that involved zero-order correlations (Table 4) and in the hierarchical regression analyses (Table 5). Although the zero-order correlations between substance abuse variables and PCL Factor 2 were positive in sign and statistically significant ( $p < .001$ ), the correlations between PCL Factor 1 and the substance abuse variables

Table 5

Correlations and Semipartial Correlations for Psychopathy Checklist (PCL) Factor Scores With National Institute of Mental Health Diagnostic Interview Schedule (NIMH-DIS) Symptom Indexes and Ages at First Intoxication, First Arrest, and First Sexual Intercourse

Dependent variable	PCL Factor 2			PCL Factor 1			$R^2$
	<i>r</i>	<i>sr</i>	<i>sr</i> <sup>2</sup>	<i>r</i>	<i>sr</i>	<i>sr</i> <sup>2</sup>	
NIMH-DIS index <sup>a</sup>							
Alcohol symptoms	.40*	.40*	.16	.14	-.10	.01	.17
Drug symptoms	.40*	.40*	.16	.13	-.10	.01	.17
Age at first intoxication <sup>b</sup>	-.43*	-.43*	.18	-.16	.10	.01	.19
Age at first arrest <sup>a</sup>	-.62*	-.62*	.39	-.20*	.17*	.03	.42
Age first had sex <sup>c</sup>	-.38*	-.38*	.14	-.21*	-.01	.00	.14

Note. All values are based on hierarchical multiple regression analyses with PCL Factor 2 entered as the first independent variable, followed by PCL Factor 1 as the second independent variable; *r* is the zero-order correlation of an independent variable with a dependent variable; *sr* is the semipartial correlation; *sr*<sup>2</sup> is the semipartial correlation squared (unique variance);  $R^2$  is the unadjusted squared multiple correlation.

<sup>a</sup>  $n = 360$ . <sup>b</sup>  $n = 249$ . <sup>c</sup>  $n = 357$ .

\*  $p < .001$ .

were positive in sign but small in magnitude and statistically nonsignificant. Furthermore, regression analyses indicated that after the variance in the PCL due to Factor 2 was removed, Factor 1 was inversely related to substance abuse (though the semipartial correlations were statistically nonsignificant). Thus, substance abuse appears to be symptomatic of general deviance from an early age.

Our results for the correlations between alcohol (and drug) symptoms and PCL scores were fairly consistent with those reported by Hart and Hare (1989). Unlike Hart and Hare, however, we obtained significant odds ratios for the association between psychopathy and substance abuse diagnoses. Several factors may explain the disparity between our results and those of Hart and Hare: differences in composition of the samples (general prison setting vs. forensic psychiatric setting), differences in sample sizes ( $N = 360$  vs.  $N = 80$ ), and differences in dependent measures (dimensional substance abuse measures vs. categorical substance abuse diagnoses). In addition, the base rate of psychopathy was somewhat low in Hart and Hare's sample: Only 10 of 80 subjects were diagnosed as psychopaths.

The results of our study may have important implications for speculation about the relations among psychopathy, alcoholism, and other syndromes of disinhibition. Some researchers have proposed that these disorders share a predisposing factor related to brain functioning, temperament, or personality (e.g., Cloninger, 1987a, 1987b; Gorenstein, 1987; Gorenstein & Newman, 1980; Lewis, 1984; Tarter, 1988). Accordingly, some children may be predisposed to the type of impulsive, risk-taking behavior commonly found in syndromes of disinhibition including some forms of alcohol abuse. For example, Cloninger, Sigvardsson, and Bohman (1988) found that children rated as high in novelty seeking (i.e., impulsive, exploratory, distractible, etc) and low in harm avoidance (i.e., uninhibited, confident, carefree, etc) at age 11 were at increased risk to develop early-onset alcoholism. Within Cloninger's (1987b) neurobiological theory of personality, this pattern (high novelty seeking and low harm avoidance) is associated with higher risk for externalizing disorders such as ASP, histrionic personality disorder, and early-onset, male-limited alcoholism (Cloninger, Reich, Sigvardsson, von Knorring, & Bohman, 1988). Thus, there appears to be emerging evidence for a predisposing personality or temperament factor or pattern that underlies several kinds of disinhibitory psychopathology.

In discussing the factor structure of the PCL, Hare and his colleagues have asserted that in criminal offenders, evidence for both the personality traits and antisocial behavior associated with psychopathy is probably necessary for the full clinical syndrome (Harpur et al., 1989). Although they recognized that "psychopathy itself need not be conceptually unidimensional" (p. 14), Harpur et al. (1989) also noted that their results did not necessarily argue against a unitary model of psychopathy. Our correlational results suggest that substance abuse is significantly related to one aspect of the psychopathic syndrome, namely, the factor for general social deviance (Factor 2); we failed to find evidence that substance abuse was positively related to the personality traits regarded by Harpur et al. (1988; Harpur et al., 1989) as the core of psychopathy (Factor 1). Depending on the relation between Factors 1 and 2 of the PCL,

different conclusions with regard to the relation of substance abuse and psychopathy are possible. In the following sections, we examine two such models of psychopathy.

One possibility is that psychopathy is a unitary syndrome. According to this model, a predisposition for Factor 1 (i.e., callous egocentricity and pathological narcissism), which is viewed as the core of psychopathy, represents the diathesis that sets the stage for the possible development of psychopathy. Given the right combination of this diathesis and social and developmental disadvantage, the likelihood of psychopathy is high. In this diathesis-stress model, the social deviance symptoms of psychopathy (including substance abuse) are more likely to be consequences of this core diathesis. Thus, according to this model, early-onset social deviance (operationalized by PCL Factor 2) may be an indirect manifestation of the underlying risk factor (diathesis). In addition, this model is consistent with the notion that psychopathy and substance abuse are not causally related but, rather, share certain phenotypic features associated with PCL Factor 2.

Another interesting and potentially important possibility is that Factor 2 of the PCL taps into a pattern of behavior related to a general disinhibitory diathesis that underlies social deviance (cf. Gorenstein & Newman, 1980). This model of psychopathy is similar to the first model in that the hypothesized diathesis of core personality traits is necessary for the development of psychopathy. In addition to this diathesis, the second model specifies a separate diathesis for impulsive and disinhibited behavior associated with social deviance. In this dual-diathesis model, the full expression of the psychopathic syndrome (i.e., callous egocentricity and a tendency toward acting out) only occurs when both diatheses are present. According to this model, substance abuse and social deviance are primarily associated with the disinhibitory diathesis. Moreover, the anti-social lifestyle and social deviance characteristics of psychopathy are hypothesized to be relatively independent of the diathesis for callous egocentricity. Within this dual-diathesis model, substance abuse and other forms of social deviance may be as fundamentally characteristic of the overall syndrome as is callous egocentricity.

Although our analyses of the relation between substance abuse and the components of psychopathy yielded unambiguous evidence with regard to the specific importance of PCL Factor 2, it is not possible to address issues of causality with our data. In addition, our data are not sufficient to provide strong support for either of the models of psychopathy presented. In fact, our results may be consistent with other models, such as social process models in which social deviance leads to substance abuse or vice versa. However, recent work on the biological basis of deviance (cf. Mednick, Moffitt, & Stack, 1987) and other research that links substance abuse with inherited predispositions to engage in disinhibited behavior (e.g., Tarter, 1988) suggest that further research on biopsychological factors holds promise. Prospective studies that focus on identifying predisposing biological and psychosocial risk factors for various syndromes of disinhibition are obviously necessary to address more adequately the complex, possibly multifactorial, etiological bases of psychopathy, substance abuse, and related disorders.

## References

- Alterman, A. I. (1988). Patterns of familial alcoholism, alcoholism severity, and psychopathology. *The Journal of Nervous and Mental Disease*, 176, 167-175.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.
- Bohman, M., Cloninger, C. R., Sigvardsson, S., & von Knorring, A. (1987). The genetics of alcoholisms and related disorders. *Journal of Psychiatric Research*, 21, 447-452.
- Cadoret, R. J., O'Gorman, T. W., Troughton, E., & Heywood, E. (1985). Alcoholism and antisocial personality: Interrelationships, genetic and environmental factors. *Archives of General Psychiatry*, 42, 161-167.
- Cadoret, R. J., Troughton, E., & O'Gorman, T. W. (1987). Genetic and environmental factors in alcohol abuse and antisocial personality. *Journal of Studies on Alcohol*, 48, 1-8.
- Carlin, A. S. (1986). Neuropsychological consequences of drug abuse. In I. Grant & K. M. Adams (Eds.), *Neuropsychological assessment of neuropsychiatric disorders* (pp. 478-497). New York: Oxford University Press.
- Cleckley, H. (1976). *The mask of sanity* (5th ed.). St. Louis: Mosby.
- Cloninger, C. R. (1987a). Neurogenetic adaptive mechanisms in alcoholism. *Science*, 236, 410-416.
- Cloninger, C. R. (1987b). A systematic method for clinical description and classification of personality variants. *Archives of General Psychiatry*, 44, 573-588.
- Cloninger, C. R., & Gottesman, I. I. (1987). Genetic and environmental factors in antisocial behavior disorders. In S. A. Mednick, T. E. Moffitt, & S. A. Stack (Eds.), *The causes of crime: New biological approaches* (pp. 92-109). Cambridge, England: Cambridge University Press.
- Cloninger, C. R., & Reich, T. (1983). Genetic heterogeneity in alcoholism and sociopathy. In S. B. Kety, L. P. Rowland, R. L. Sidman, & S. W. Matthyse (Eds.), *Genetics of neurological and psychiatric disorders* (pp. 145-165). New York: Raven Press.
- Cloninger, C. R., Reich, T., Sigvardsson, S., von Knorring, A., & Bohman, M. (1988). Effects of changes in alcohol use between generations on influence of alcohol abuse. In R. M. Rose & J. Barrett (Eds.), *Alcoholism: Origins and outcome* (pp. 49-74). New York: Raven Press.
- Cloninger, C. R., Sigvardsson, S., & Bohman, M. (1988). Childhood personality predicts alcohol abuse in young adults. *Alcoholism: Clinical and Experimental Research*, 12, 494-505.
- Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Collins, J. J. (Ed). (1982). *Drinking and crime: Perspectives on the relationships between alcohol consumption and criminal behavior*. London: Tavistock.
- Collins, J. J., Schlenger, W. E., & Jordan, B. K. (1988). Antisocial personality and substance abuse disorders. *Bulletin of the American Academy of Psychiatry and Law*, 16, 187-198.
- Craft, M. (1966). *Psychopathic disorders and their assessment*. Oxford, England: Pergamon Press.
- Fleiss, J. L. (1981). *Statistical methods for rates and proportions* (2nd ed.). New York: Wiley.
- Fry, L. J. (1985). Drug abuse and crime in a Swedish birth cohort. *British Journal of Criminology*, 25, 46-59.
- Gorenstein, E. E. (1987). Cognitive-perceptual deficit in an alcoholism spectrum disorder. *Journal of Studies on Alcohol*, 48, 310-318.
- Gorenstein, E. E., & Newman, J. P. (1980). Disinhibitory psychopathology: A new perspective and a model for research. *Psychological Review*, 87, 301-315.
- Grant, I. (1987). Alcohol and the brain: Neuropsychological correlates. *Journal of Consulting and Clinical Psychology*, 55, 310-324.
- Guze, S. B., Goodwin, D. W., & Crane, J. B. (1969). Criminality and psychiatric disorders. *Archives of General Psychiatry*, 20, 583-591.
- Hare, R. D. (1980). A research scale for the assessment of psychopathy in criminal populations. *Personality and Individual Differences*, 1, 111-119.
- Hare, R. D. (1984). Performance of psychopaths on cognitive tasks related to frontal lobe function. *Journal of Abnormal Psychology*, 93, 133-140.
- Hare, R. D. (1985a). Comparison of procedures for the assessment of psychopathy. *Journal of Consulting and Clinical Psychology*, 53, 7-16.
- Hare, R. D. (1985b). *The Psychopathy Checklist*. Unpublished manuscript, University of British Columbia, Vancouver, Canada.
- Hare, R. D. (1986). Criminal psychopaths. In J. C. Yuille (Ed.), *Police selection and training: The role of psychology* (pp. 187-206). Dordrecht, the Netherlands: Martinus Nijhoff.
- Hare, R. D., & Connolly, J. F. (1987). Perceptual asymmetries and information processing in psychopaths. In S. A. Mednick, T. E. Moffitt, & S. A. Stack (Eds.), *The causes of crime: New biological approaches* (pp. 218-238). Cambridge, England: Cambridge University Press.
- Hare, R. D., Harpur, T. J., Hakstian, A. R., Forth, A. E., Hart, S. D., & Newman, J. P. (1989). *The revised Psychopathy Checklist: Descriptive statistics, reliability, and factor structure*. Manuscript submitted for publication.
- Harpur, T. J., Hakstian, A. R., & Hare, R. D. (1988). Factor structure of the Psychopathy Checklist. *Journal of Consulting and Clinical Psychology*, 56, 741-747.
- Harpur, T. J., Hare, R. D., & Hakstian, A. R. (1989). Two-factor conceptualization of psychopathy: Construct validity and assessment implications. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 1, 6-17.
- Hart, S. D., & Hare, R. D. (1989). Discriminant validity of the Psychopathy Checklist in a forensic psychiatric population. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 1, 211-218.
- Hart, S. D., Kropp, P. R., & Hare, R. D. (1988). Performance of male psychopaths following conditional release from prison. *Journal of Consulting and Clinical Psychology*, 56, 227-232.
- Hasin, D. S., & Grant, B. F. (1987). Psychiatric diagnosis of patients with substance abuse problems: A comparison of two procedures, the DIS and the SADS-L: Alcoholism, drug abuse/dependence, anxiety disorders and antisocial personality disorder. *Journal of Psychiatric Research*, 21, 7-22.
- Jutai, J. W., & Hare, R. D. (1983). Psychopathy and selective attention during performance of a complex perceptual-motor task. *Psychophysiology*, 20, 146-151.
- Kosson, D. S., & Newman, J. P. (1986). Psychopathy and the allocation of attentional capacity in a divided-attention study. *Journal of Abnormal Psychology*, 95, 257-263.
- Kosson, D. S., Smith, S. S., & Newman, J. P. (1990). Evaluating the construct validity of psychopathy in Black and White male inmates: Three preliminary studies. *Journal of Abnormal Psychology*, 99, 250-259.
- Lewis, C. E. (1984). Alcoholism, antisocial personality, narcotic addiction: An integrative approach. *Psychiatric Developments*, 3, 223-235.
- Lewis, C. E., Cloninger, C. R., & Pais, J. (1983). Alcoholism, antisocial personality and drug use in a criminal population. *Alcohol and Alcoholism*, 18, 53-60.
- McCord, J. (1981). Alcoholism and persistent criminality: Confounding and differentiating factors. *Journal of Studies on Alcohol*, 42, 739-748.
- McCord, W., & McCord, J. (1964). *The psychopath*. Princeton, NJ: Van Nostrand.

- Mednick, S. A., Moffitt, T. E., & Stack, S. A. (Eds.). (1987). *The causes of crime: New biological approaches*. Cambridge, England: Cambridge University Press.
- Millon, T. (1981). *Disorders of personality: DSM-III, Axis II*. New York: Wiley.
- Nurco, D. N., Ball, J. C., Shaffer, J. W., & Hanlon, T. E. (1985). The criminality of narcotic addicts. *The Journal of Nervous and Mental Disease*, 173, 94-102.
- Rada, T. T. (1978). Sociopathy and alcohol abuse. In W. H. Reid (Ed.), *The psychopath: A comprehensive study of antisocial disorders and behaviors* (pp. 223-233). New York: Brunner/Mazel.
- Robins, L. N., & Helzer, J. E. (1985). *Diagnostic Interview Schedule (DIS) Version III-A*. St. Louis: Washington University Department of Psychiatry.
- Robins, L. N., Helzer, J. E., Croughan, J., & Ratcliff, K. S. (1981). National Institute of Mental Health Diagnostic Interview Schedule: Its history, characteristics, and validity. *Archives of General Psychiatry*, 38, 381-389.
- Schroeder, M. L., Schroeder, K. G., & Hare, R. D. (1983). Generalizability of a checklist for the assessment of psychopathy. *Journal of Consulting and Clinical Psychology*, 51, 511-516.
- Schuckit, M. A., Zisook, S., & Mortola, J. (1985). Clinical implications of DSM-III diagnoses of alcohol abuse and alcohol dependence. *American Journal of Psychiatry*, 142, 1403-1408.
- Tarter, R. E. (1988). Are there inherited behavioral traits that predispose to substance abuse? *Journal of Consulting and Clinical Psychology*, 56, 189-196.
- Zachary, R. A. (1986). *Shipley Institute of Living Scale: Revised manual*. Los Angeles: Western Psychological Services.
- Zucker, R. A. (1987). The four alcoholisms: A developmental account of the etiologic process. In P. C. Rivers (Ed.), *Nebraska Symposium on Motivation: Vol. 34. Alcohol and addictive behavior* (pp. 27-83). Lincoln: University of Nebraska Press.

Received December 18, 1989

Revision received April 27, 1990

Accepted April 27, 1990 ■