Alcohol and Drug Abuse—Dependence Disorders in Psychopathic and Nonpsychopathic Criminal Offenders

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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 will 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: the Schizotypy Syndrome vs. the dual-diagnosis model that may account for the association between psychopathy and substance abuse.

Criminality is strongly associated with alcoholism (e.g., Collins, 1982; Gue, Goodwin, & Crane, 1969) and other forms of substance abuse (Fry, 1985; Nurco, Ball, Stuffle, & Hanlon, 1985). In addition, significantly higher prevalences of alcoholism and drug abuse are found in offenders with antisocial personality disorder (ASP; Collins, Schlenker, & Jordan, 1988; Levis, 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 & Gottsman, 1987; McCord, 1984; Zucker, 1981). For example, high rates of co-occurrence of substance abuse and ASP may reflect a common etiologic factor that underlies both disorders (Gorenstein, 1987; Gorenstein & Newman, 1980; Lewis, 1984). However, genetic studies of the relation between primary alcoholism (as 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 (Ca- doriet, O’Gorman, Troupthin, & Heywood, 1985; Cadoret, Troupthin, & O’Gorman, 1987; Cloninger & Reich, 1981). On the other hand, Allman (1988) found evidence for higher rates of ASP in alcoholic men with bilateral vs. nonbilateral (vs. unilateral) family history of alcoholism. In addition, Cloninger and his colleagues have identified a familial subtype of alcoholism that has prominent antisocial features (Boehman, Clonin- ger, Sparrsoradon, & von Knorring, 1987; Cloninger & Gottsman, 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 genetic—phe- notypic heterogeneity and overlap of these two disorders. For example, some researchers distinguish between alcoholic sociopath and sociopathic alcoholics (Rada, 1978) and point to im- portant differences in the onset and development of antisocial behavior and alcoholism. Such distinctions are important cli- nically (in terms of diagnosis and treatment) and for purposes of basic research on the etiology, developmental course, and psy- chological processes associated with these disorders.

One potential problem in understanding the relation be- tween 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
writers have been critical of the DSM-III diagnosis of ASP for its conceptualization of ASP as a crime and the conflation of important personality features. Hare (1985a; Million, 1981). Many clinicians and researchers consider certain core personality features such as pathological narcissism, poor judgment, poor insight, shallow affect, callousness, and absence of guilt or remorse to be integral to the diagnosis (Cleckley, 1976; Craft, 1986; 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 enmeshed in the work of Cleckley (1976) and operationalized by Osius of the Psychopathy Checklist (PCL; Hare, 1980, 1985). 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-Received measure of psychopathy for use with male criminal offenders. The PCL has demonstrated very good reliability and validity (e.g., Hare, 1980; 1986; Hart, Krepp, & 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, 1985; Harpur, Hare, & Hakstian, 1985) have identified significant differences in the PCL that correspond to core personality traits associated with psychopathy (Factor 1) and behavioral features characteristic of a chronic unstable and antisocial lifestyle (Factor 2). Harpur et al. (1988) described Factor 1 as representing personality features central to psychopathy, which involves lack of guilt, remorse, and embarrassment when lying, guilt, and callousness. 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 to validly investigate the nature of the putative association between components of psychopathy (core personality vs. social deviance and antisocial) 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 poor to minimal 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 DSM-III drug (alcohol and drug) 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 related to 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 substance 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 is been used in several recent studies of DSM-III and alcohol and drug disorders (e.g., Coons et al., 1988) and has provided a means for comparing comorbidity across different conceptions of ASP (i.e., DSM-III ASP vs. psychopathy).

Cleckley's (1976) distinction 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 disturbing 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 subjects 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 operationally primary 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 men at a maximum security state correctional facility in southern Wisconsin were tested. Inclusion

1 Psychopathy Checklist Factor 1 items include: glibness/superficial charm: guileless sense of self-worth; pathological lying; manipulative; lack of remorse or guilt; shallow affect; callous/break of empathy; and failure to accept responsibility for one's actions. Factor 2 items include: need for stimulation/need to be boredom; parasitic lifestyle; poor behavioral control; early behavior problems; lack of realistic long-term goals; impulsivity; irresponsibility; immature delinquency; and reservoir of conditional release.

2 Most of the subjects were in the development and validation of psychopathy were selected for study because of their high rates of violent offenses. However, they were not selected specifically for their substance abuse problems.
were nominated by selecting every fifth name on the institution's rota-
tele. This selection procedure is a brief review of each inmate's insti-
tution 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, in-
mates were identified as having baseline intelligence (as below or testing below the 4th grade level on standardized achievement tests were not nominated. Inmates on psychotropic medication or identi-
fied as actively psychotic were also excluded. Twenty-four subjects who participated in the research were found to be ineligible and were ex-
cluded from all analyses. Thus, 360 inmates compose the san francisco 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 Psychoysis Checklist (PCI-L2; Hare, 1980). The PCI-L2 was devel-
oped by Hare as a successor to the original 22-item PCI (Hare, 1980). Both versions are based primarily on Cleckley's (1941) conception of psychopathy and are designed to be used for the assessment of psychopa-
ty in male criminal offenders. The PCI-L2 consists of 20 items, each of which taps a different behavioral or trait disposition related to psy-
chopathy. The items are compiled by a trained reader after a semiistra-
ted interview administered 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 PCI-L2 scores range from 0 to 40. Consistent with the PCI-L2 cutoffs used by Hare (1980), each subject was assigned to one of three groups: a) subjects with scores of 20 or below were classified as nonpsychopathic; 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 psychopathic group. Hare (1980) reported that mid-
dle 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 malad-
informed or less competent than elevated scores on Minnesota Multiphase Per-
sonality Inventory scales of Depression, Schizophrenia, and Psychotic-
ism. In the current study the middle group is included in the group of subjects who did not provide additional information about these subjects in rela-
tion to control subjects and psychopaths.

In addition to the total PCI-L2 scores used for classification (group analysis) and for correlational analyses, summative scores were calcu-
lated to represent the two factors identified in the PCI-L2 (Hare et al., 1989). The two-factor structure of the PCI-L2 has been replicated across several independent sam-
studies, and appeared to be highly consistent. More specifically, the two-factor solu-
tion obtained for our subjects in Hare et al.'s study demonstrated high valid-
factor congruence with two-factor solutions obtained for other samples of subjects from Canadian correctional institutions in British Colum-
bia, Quebec, and Ontario. The construct validity of the two factors has been extensively documented by Harpur et al. (1989) for the original PCI. Although the two factors are moderately correlated (p - .55), they

appear to be associated with different aspects of the psychopathy syn-
drome (Hare et al., 1989).

Hare et al. (1989) studied the psychometric characteristics of the PCI-L2 across five prison samples and three forensic psychiatric samples. Inter-rater reliability for the PCI-L2 assessed with the intraclass correlation coefficient ranged from .78 to .84 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 PCI-L2 score was assessed using two raters. The correlation between total scores for two raters for a subset of 56 subjects was .84, and (01 kappa (Fleiss, 1981) for a categorical diagnosis (control group, middle group, and psychopath group) for the subset of 56 subjects was .42. For PCI Factor 1, interrater reliability correlation between two raters' scores was .74; for PCI Factor 2, interrater reliability was .78. Internal consistency (Cronbach's alpha) for PCI-L2 ratings for a subset of 24 subjects whose file had not been reviewed 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 NIMHDS (NIMHDS Version III-A). A highly structured diagnostic inter-
view developed for use in epidemiological studies (Robins & Helzer, 1985, Robins et al., 1981). Questions in the NIMHDS are closed-
ended, and answers are recorded by the interviewer according to speci-
cified coding options. For each disorder, most or all of the diagnostic criteria are evaluated and symptoms are determined on a lifetime ba-
sis. The structure and format of the NIMHDS 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 NIMHDS that cover DSM-III alcohol and drug disorders were asked.

NIMHDS 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 patholog-
ical alcohol use, a specific alcohol use disorder (i.e., alcohol abuse or alcohol dependence diagnosis). In addition, a stunt of life-
time alcohol symptoms (range, 0-17) is provided by the computer-
scored program. In the drug section the NIMHDS probes for abuse or dependence symptoms of eight classes of substances with eight primary questions. Computer scoring of responses provides specific abuse and depen-
dence diagnoses for six classes of substances (tobacco was omitted, and

2 Hare (1980) 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: neurotic psychopathology (2), organic brain in-

cere (4), history of very serious head injury (6), other medical prob-

els that precluded participation (2), and previous participation in our

3 The National Institute of Mental Health Diagnostic Interview Schedule (NIMHDIS) does not assess Criteria 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 NIMHDS DSM-III alcohol and drug abuse diagnoses. Note that NIMHDS 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 a abuse diagnosis.
bhallomagnos and phencyclidine were combined into one class and a control group. Results are expressed as means ± standard deviations.

Several researchers have questioned the usefulness of differentiating DSM-III-R alcohol and DSM-III-R drug-use dependence diagnoses (e.g., Hamel & Grant, 1987; Schuckit, Zacchio, & Mavrula, 1989; and most recently with the NIMHDS by combine abuse and dependence (e.g., Collins et al., 1988). The same is true for NIMHDS DSM-III-R diagnoses for cannabis, amphetamines, barbiturates and resins. 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-R does not provide for dependence diagnoses for cocaine and hallucina-
gens, and therefore, diagnoses for these two drugs were assigned if abuse criteria were met for these drugs.

Shelley Institute of Living Scale (SLS; Zachary, 1986). The SLS 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 total SLS has been reported by Zachary to range from .60 to .82 (Spearman's r) across eight studies. Recent revised scoring procedures (Zachary, 1986) provide for estimates of Wechsler Adult Intelligence Scale-Rev (WAIS-R) Full Scale IQ, which in our study were used to assess gross 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 semi-structured interview, information on the method of data collection and data confidentiality regulations. In addi-
tion, the subjects were told participation would be voluntary and strictly confidential and that they would be paid $5 for participating. Written informed consent was obtained from inmates who agreed to participate and the semi-structured interview began immediately after their endorsement of the consent form. All subjects participated in a semi-structured interview that consisted of sections about education, family life, relationships, previous drug use, current social, work history, criminality, medical history, and alcohol and drug use and assessed by the NIMHDS. The interview generally lasted between 75 and 100 minutes after the interview, each subject completed a self-report questionnaire in a separate room. During this time the interviewer read sec-
tions of the interview form to the accuracy of the consent and if inaccurate an interview obtained during the interview. After the file review the inter-
view made PCL-2 ratings according to the guidelines recommended by Hare (1985).

Most subjects were called back for additional participation in various drug-related projects within the next week. During these test-
ings the subjects completed various questionnaires and scales including the SLS. Not all subjects completed these instruments be-
cause 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 SLS.

For purposes of scale reliability, a series other (not observed) was present in the interview room during the interviews of 5% subjects. During these interviews the interviewer asked most of the questions and wrote down information independently of the observer's recording of the information obtained from the subject. The interviewer and observer also separately read the subject's social service file. On com-
pletion of the interview and the file review, the interviewer and ob-
server made independent psychiatry 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 vari-
bles. One-way analyses of variance were computed for each variate. The three groups did not differ in age, education, or estimated WAIS-R IQ. As expected, psychopaths scored significa-
tly lower on mean control subjects on alcohol and drug symp-
toms. Post hoc comparison (Scheffe test; p = .05) revealed that each group significantly differed from the other for alcohol and drug symptoms. That is, 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 NIMHDS alcohol and drug diagnoses are provided in Table 2. Bartholomew's test for ordered proportions was comp-
pared for each individual substance and for the presence of any alcohol 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 prospec-
ted order (Finney, 1981). In our analysis the control subjects were hypothesized to have a lower percentage of diag-
noses for any alcohol diagnosis as compared with psychopathic; percentage for middle subjects were predicted to be between the values for control and psychopathic subjects. The same pre-
diction was made for any drug abuse or dependence. Predic-
tions 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. Barthol-
omaew's test was significant, which indicates an increasing gra-
dient in the proportion of diagnoses from control (lowest pro-
gression) to middle to psychopathic (highest proportional sub-
groups). Bartholomew's test was significant for amphetamines use or dependence, barbiturates use or dependence, and opioids abuse or dependence but not for cannabis abuse or dependence, cocaine abuse, or hallucinogens 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 diagnosis and the presence or absence of psychopathy. Absence of psych-
opathy included subjects who were categorized as control or middle subjects on the PCL-2. The odds ratio is a measure of association for 2 x 2 tables that indexes the increase in the odds

* 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 or dependence diagnoses. For control, middle, and psycho-
path groups, the percentages were 35.5%, 54.5%, and 73.5%, respec-
tively. Bartholomew's test statistic was 34.50 (p < .005), which indi-
cates a statistically significant increase in the proportions of alcohol diagnoses.
Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (n = 129)</th>
<th>Middle (n = 123)</th>
<th>Psychopath (n = 113)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Age</td>
<td>27.63</td>
<td>6.10</td>
<td>26.57</td>
</tr>
<tr>
<td>Years of education*</td>
<td>10.77</td>
<td>1.70</td>
<td>10.46</td>
</tr>
<tr>
<td>Education and GED*</td>
<td>11.31</td>
<td>1.34</td>
<td>11.58</td>
</tr>
<tr>
<td>Estimated WAIS-R</td>
<td>96.97</td>
<td>11.46</td>
<td>95.54</td>
</tr>
<tr>
<td>NIMH-DS-alcohol symptomfree*</td>
<td>4.40</td>
<td>6.03</td>
<td>4.23</td>
</tr>
<tr>
<td>NIMH-DS drug symptomfree*</td>
<td>1.82</td>
<td>2.06</td>
<td>2.42</td>
</tr>
</tbody>
</table>

Note: GED = General Educational Development test; WAIS-R = Wechsler Adult Intelligence Scale-Revised; NIMH-DS = National Institute of Mental Health Diagnostic Interview Schedule.
* Years of education corrected for completion of GED.  Estimation WAIS-R IQ based on Shipley Institute of Living Scale (Zachary, 1986). For this measure, n = 113, 73, and 104, respectively for control, middle, and psychopathic groups.  Total number of symptoms of alcohol 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 2.72, 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, 3.92, 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 threat of nonspecific drug disorders in psychopaths versus nonpsychopaths, the percentages of such groups 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 Hale (1989) found that social-cob substance abuse was significantly correlated with the

Table 2

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Control (n = 124)</th>
<th>Middle (n = 123)</th>
<th>Psychopath (n = 113)</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol abuse or dependence</td>
<td>65.3</td>
<td>78.9</td>
<td>92.9</td>
<td>31.12*</td>
</tr>
<tr>
<td>Any drug abuse or dependence*</td>
<td>43.5</td>
<td>56.9</td>
<td>73.5</td>
<td>21.9*</td>
</tr>
<tr>
<td>Cannabis abuse or dependence</td>
<td>38.6</td>
<td>43.9</td>
<td>44.2</td>
<td>6.15*</td>
</tr>
<tr>
<td>Amphetamine abuse or dependence</td>
<td>11.3</td>
<td>17.1</td>
<td>31.9</td>
<td>16.40*</td>
</tr>
<tr>
<td>Barbiturate abuse or dependence</td>
<td>9.7</td>
<td>13.0</td>
<td>28.3</td>
<td>16.31*</td>
</tr>
<tr>
<td>Opioid abuse or dependence</td>
<td>7.3</td>
<td>8.9</td>
<td>25.7</td>
<td>22.06*</td>
</tr>
<tr>
<td>Cocaine abuse</td>
<td>12.9</td>
<td>13.8</td>
<td>21.2</td>
<td>3.61</td>
</tr>
<tr>
<td>Hallucinogen abuse</td>
<td>4.8</td>
<td>3.3</td>
<td>8.5</td>
<td>2.33</td>
</tr>
</tbody>
</table>

Note: χ² was computed at Bartholomew's test for ordered proportions (n = 3 and = 0.5; Fleiss, 1981).
* Excludes alcohol diagnoses.

p < .005.
### Table 3

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

<table>
<thead>
<tr>
<th>Group</th>
<th>Diagnosis</th>
<th>Control (n = 124)</th>
<th>Middle (n = 123)</th>
<th>Psychopath (n = 113)</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>No drugs</td>
<td>56.5</td>
<td>43.1</td>
<td>26.5</td>
<td>21.9*</td>
<td></td>
</tr>
<tr>
<td>One drug</td>
<td>25.0</td>
<td>32.2</td>
<td>32.7</td>
<td>2.23</td>
<td></td>
</tr>
<tr>
<td>&gt;1 drug</td>
<td>18.5</td>
<td>24.4</td>
<td>40.7</td>
<td>15.8*</td>
<td></td>
</tr>
</tbody>
</table>

Note: A drug diagnosis for individual drug categories was given if abuse or dependence criteria were met for the substance. χ² was computed as features Burrows’s test for ordered proportions (n = 3) and ( < 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. These correlations are presented in Table 4.

Consistent with the findings reported by Hart & Hart (1989), the number of NIMH-DIS drug symptoms correlated significantly 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, (357) = −5.89, p < .001; the same pattern was true for alcohol symptoms, (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 are 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 index after parcelling 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 (e.g., 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 (p > .01), n to the overall variance accounted for by both factors (R² = .17). The same values were obtained for drug symptoms. In addition, after Factor 2 was parcellated out, the semipartial correlations for Factor 1 reversed sign for both dependent measures; however, these semipartial correlations (R² = .10) were statistically nonsignificant. These regression analyses 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, 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 interviews). 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 (p > .02, n) 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 2 were opposite in sign to the zero-order correlations. Only the Factor 1 semipartial correlation for age at first arrest was statistically significant (p = .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

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*We did not compute correlations for the categorical alcohol and drug diagnoses (as Hart & Hart, 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.

*Because of the number of correlations and 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.*

*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 (0 = 15 or older and 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.*
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, these 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 alcoholics) has been linked to neuropsychological deficits (e.g., Carfi, 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 on research on psychopathy.

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 psychopathic processes (personality and social) thought to constitute the full syndrome of psychopaths. 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). 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

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### Table 5

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

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>PCL Factor 2</th>
<th>PCL Factor 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMHDIS index</td>
<td>r</td>
<td>sr</td>
</tr>
<tr>
<td>Alcohol symptoms</td>
<td>.40*</td>
<td>.40*</td>
</tr>
<tr>
<td>Drug symptoms</td>
<td>.40*</td>
<td>.40*</td>
</tr>
<tr>
<td>Age at first intoxication</td>
<td>- .41*</td>
<td>- .41*</td>
</tr>
<tr>
<td>Age at first arrest</td>
<td>-.52*</td>
<td>-.52*</td>
</tr>
<tr>
<td>Age first had sex</td>
<td>-.38*</td>
<td>-.38*</td>
</tr>
</tbody>
</table>

Note: All values are based on hierarchical multiple regression analyses with PCL Factor 1 centered as the first independent variable, followed by PCL Factor 2 as the second independent variable. r is the zero-order correlation of an independent variable with a dependent variable; sr is the semipartial correlation; s² is the semipartial correlation squared (unique variance); R² is the unadjusted squared multiple correlation.

*= 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 invariantly related to substance abuse (though the semi-partial correlations were statistically nonsignificant). Thus, we conclude that there appear to be symptoms of general deviance from an early age.

Our results for the correlations between alcohol (and drug) consumption and PCL scores were documented with data reported by Hart and Hare (1989). Unlike Hart and Hare, however, we obtained significant odds ratios for the association between PCL scores and substance abuse (as indicated by reported by Hart and Hare). Differences in composition of the samples (women prison serving vs. forensic psychiatric serving), differences in sample sizes (N = 200 vs. N = 40), 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 relation 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; Gottron, 1987; Gottron & Newman, 1980; Louis, 1984; Tartter, 1980). Accordingly, some chil-
dren may be predisposed to the type of impulsive, risk-taking behavior commonly found in syndromes of disinhibition in-
cluding some forms of alcohol abuse. For example, Cloninger, Sigvardsson, and Bohman (1985) found that children rated as high in novelty seeking (i.e., impulsive, exploratory, distractible, etc.) and low in harm avoidance (i.e., unshakable, confident, careful, etc.) at age 11 were at increased risk to develop early-
 onset alcoholism. Within Cloninger's (1987) neurobiological theory of personality, this pattern (high novelty seeking and low harm avoidance) was fitted best for alcohol disorders. Other researchers have suggested analogous disorders such as ASP, histrionic personality disorder, and early-onset, male-limited alcoholism (Cloninger, Reich, Sig-
vardsson, & Bohman, 1987). Thus, these find-

erings may be emerging evidence for a predisposing personality or temperament factor or pattern that underlies several kinds of deviant behavior.

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-clini-
cal syndrome (Harpur et al., 1989). Although they recognized that "psychopathy itself need not be conceived universally..." (p. 14), Harpur et al. (1989) concluded that their results did not necessarily argue against a unitary model of psychopa-
thy. Our correlation results suggest that substance abuse is significantly related to one aspect of the psychopathic syn-
drome, namely, the factor for general social deviance (Factor 2). We failed to find evidence that substance abuse was positively related to the personality traits indicated by Harpur et al. (1989; Harpur et al., 1989) as the core of psychopathy (Factor 1). Dep-

dending 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., cal-
losoocial deviation), which is characterized as a lack of responsiveness to (or viewing as a core of psychopathy) measures that sets the stage for the possible development of psychopathy. Given this, substance abuse is viewed as a consequence of higher levels of psychopathy (as viewed as the core of psychopathy), which sets the stage for the possible development of psychopathy. If psychopathy is viewed as the core of psychopathy, there is a strong likelihood that the likelihood of psychopathy is high. In this distress-stress model, the social deviance symptoms of psychopathy (e.g., impulsivity) are likely to be consequences of the core distress. Thus, according to this model, early-onset social deviance (operationalized by PCL Factor 2) may be an indirect manifestation of the underlying risk factor (factor 1). 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 dev-


iag et al., 1989) as the core of psychopathy (Factor 1). Depend-
dependent on the relation between Factors 1 and 2 of the PCL,