

Antisocial Personality Disorder, Conduct Disorder, and Substance Abuse in Schizophrenia

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The validity of subtypes based on antisocial personality disorder (APD) or childhood conduct disorder without adult APD (CD only) in patients with schizophrenia (or schizoaffective disorder) and a substance use disorder (abuse or dependence) was examined. APD patients scored lower on personality measures related to socialization and higher on antisocial behavior, psychopathy, and aggression. APD patients also reported higher rates of aggression and legal problems. APD, and to a lesser extent CD only, was associated with more severe psychiatric symptoms, an earlier age of onset of substance abuse, more severe symptoms of substance abuse, and a stronger family history of substance abuse and psychiatric hospitalization. The findings suggest that schizophrenia patients with APD represent a high-risk subgroup vulnerable to more severe substance abuse, psychiatric impairment, aggression, and legal problems.

Despite the high prevalence of substance use disorders in schizophrenia (Regier et al., 1990), relatively little is known about which patient characteristics are most strongly associated with substance abuse. It is often hypothesized that substance abuse and schizophrenia are heterogeneous disorders with respect to etiology, presentation, and course. Patients with schizophrenia and substance abuse, therefore, may also comprise a heterogeneous population. Identifying subgroups of these patients who differ in course, severity, and family history of substance abuse could have important implications for understanding the etiology of these comorbid conditions.

Efforts to subtype patients with schizophrenia and substance

abuse may benefit from attention to subtypes examined in primary substance abusers. Two widely studied areas are conduct disorder (CD) in childhood and antisocial personality disorder (APD) in adulthood, which requires CD. Abundant research has shown that substance abusers with a history of CD or APD have an earlier age of onset of abuse; have more severe substance abuse, psychiatric symptoms, and psychosocial impairment; are more likely to abuse drugs; and have a stronger family history of psychiatric and substance use disorders compared with those without CD or APD (Alterman, 1988; Hesselbrock, 1986; Stabeanau, 1984). Although research has examined these subtypes in primary substance abusers, little attention has been paid to their validity in patients with schizophrenia and substance abuse.

The present investigation was conducted to evaluate the validity of the APD–CD subtypes in patients with schizophrenia and substance use disorders. On the basis of research on primary substance abusers, we hypothesized that CD or APD would be related to more severe substance abuse and psychiatric symptoms and a stronger family history of substance abuse and psychiatric illness.

Method

Patients

Participants included 109 patients with diagnoses of schizophrenia according to the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev.; *DSM-III-R*; American Psychiatric Association, 1987) and 47 patients with schizoaffective disorder. Axis I diagnoses were based on the Structured Clinical Interview for *DSM-III-R* (SCID; Spitzer, Williams, Gibbon, & First, 1988). All patients were participants in a study of case management for dual diagnosis (Mueser, Drake, & Miles, 1997). Patients met the following criteria: (a) over 17 years of age; (b) meets *DSM-III-R* criteria for alcohol or drug use disorder

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(abuse or dependence) within the past 6 months of living in the community; (c) absence of a known medical condition with psychiatric sequelae; (d) willingness to provide consent to participate in a treatment study of case management.

Patients were receiving services at one of seven community mental health centers in New Hampshire. Of the 158 patients, 133 (84%) were male, 153 (97%) were White, and 108 (68%) had never married. The average age was 32.69 years ($SD = 7.76$).

Measures

Assessments included measures of APD, personality, aggression, psychiatric symptoms, history and severity of substance abuse, and family history of psychiatric and substance use disorders. All assessments were conducted with interviews. Diagnostic assessments (psychiatric diagnosis, substance abuse, APD-CD) were done by different interviewers from those who conducted interviews of personality measures, aggression, symptoms, substance abuse, and family history. Interviewers were unaware of information obtained in the other interview.

APD, CD, personality, and aggression. APD and CD diagnoses were assessed using *DSM-III* criteria with the SCID-II.¹ For statistical analyses, three groups were derived from these interviews: APD ($n = 34$), CD only ($n = 33$), and no APD-CD ($n = 91$).²

Validity of APD diagnoses was examined with self-report personality measures related to APD, aggression, arrests, and time incarcerated. Personality measures included the Socialization Scale of the California Psychological Inventory (CPI-So; Gough, 1987), the Antisocial Behavior Checklist (ABC; Zucker, Noll, Ham, Sullivan, & Fitzgerald, 1994), and two scales of the Personality Assessment Inventory (Morey, 1991), Antisocial Features (ANTI) and Aggression (AGG). APD is related to low scores on CPI-So and high scores on ABC, ANTI, and AGG. These scales were administered to a sample of 24 patients with APD and 22 patients without APD, matched on diagnosis and gender. Coefficient alphas ranged between .62 and .96. Correlations between the scales (switching direction of CPI-So) ranged from .43 to .57 ($Mdn = .55$).

Aggression was rated (on the basis of the interview) from the Modified Overt Aggression Scale (MOAS; Kay, Wolkenfeld, & Murrill, 1988): aggression toward persons, aggression toward property, and verbal aggression. Interrater reliability of the MOAS subscales was high, with intraclass correlation coefficients (ICCs; Shrout & Fleiss, 1979, Formula 3) ranging from .95 to 1.00. The number of lifetime arrests was recorded, on the basis of the Addiction Severity Index (ASI; McLellan, et al., 1992), as well as the number of months the patient had spent incarcerated.

Psychiatric symptoms. Symptoms were assessed over the preceding 2 weeks with the expanded Brief Psychiatric Rating Scale (BPRS; Lukoff, Nuechterlein, & Ventura, 1986). Average ratings for five factor scores were employed in the analyses: affect, anergia, thought disorder, activation, and disorganization. Suicidal ideation was assessed by using an item from the MOAS (Kay et al., 1988). In addition, problems with independent and daily living skills were assessed by using the subscale from Lehman's (1988) Quality of Life Interview. Interrater reliabilities for the BPRS subscales, suicidal ideation, and living skills ratings were satisfactory (ICCs: .56–1.00).

Substance use. For alcohol abuse, the following variables were recorded from the ASI: age of onset of alcohol abuse, number of alcohol detoxifications, number of times in alcohol treatment, ASI Alcohol scale, days of excess alcohol use in the past 30 days, and lifetime months of excess alcohol. For drug abuse, the following variables were recorded from the ASI: age at onset of drug abuse, number of times in drug treatment, ASI Drug scale, days of drug use in the past 30 days, days of polydrug use in the past 30 days, and months of lifetime use of heroin, other opiates, barbiturates, sedatives, cocaine, amphetamines, marijuana, hallucinogens, inhalants, and polydrug use.

Family history. Family history of substance abuse and psychiatric illness was recorded with the ASI, with the patient as the informant. Four variables were recorded as present or absent separately for the patient's mother and father: alcohol abuse, drug abuse, psychiatric hospitalization, and psychiatric illness without hospitalization.

Reliability of patient reports was evaluated by independently administering the ASI family history to 89 relatives of patients. For mother's history of alcohol abuse, $\kappa = .54$, for father, $\kappa = .51$; for mother's history of drug abuse, $\kappa = .25$, for father, $\kappa = .25$. For mother's history of psychiatric hospitalization, $\kappa = .52$, and for father, $\kappa = .58$; history of psychiatric illness that was not based on hospitalization, for mother, $\kappa = .17$, and for father $\kappa = .12$. Except for the kappas for psychiatric illness not based on hospitalization, all kappas were statistically significant ($p < .05$). All family history measures with significant kappas were included in the analyses.³

Results

We first compared the number of CD symptoms for each group. The APD group had more CD symptoms ($M = 6.85$, $SD = 2.39$) than the CD only group ($M = 4.45$, $SD = 1.97$), $t(65) = 4.48$, $p < .001$. For the no APD-CD group, the mean was 0.80 ($SD = 0.86$).

Validity of APD Diagnoses

The three groups (no APD-CD, CD only, APD) were compared on personality measures, aggression, and legal history to evaluate validity of the diagnoses. A one-way multivariate analysis of variance (MANOVA) with the four personality scales as dependent variables (CPI-So, ABC, AGG, ANTI) and APD-CD diagnosis as the independent variable was significant, $F(8, 78) = 4.54$, $p < .001$. Analyses of variances (ANOVAs) were significant ($p < .05$) for each scale, $F_s(2, 43) = 5.63, 7.06, 13.31, 9.35$, respectively, $p_s < .01$. Tukey tests indicated that the APD group scored higher than no APD-CD on the ABC, AGG, ANTI, and lower of the CPI-So, with the CD group not different from either group.

We performed a MANOVA on the three subscales of the MOAS to compare the APD/CD groups on aggression. The MANOVA was significant, $F(6, 220) = 4.33$, $p < .001$. All three ANOVAs for each subscale were significant ($p_s < .01$). Tukey tests indicated higher aggression toward persons and verbal aggression for APD than the CD only and no APD-CD

¹ The *DSM-III* criteria of CD and APD were used, rather than the *DSM-III-R* criteria, because at the initiation of the study this was the version of the SCID-II currently available at the research center.

² Adult antisocial behavior was assessed only in patients who met criteria for CD. Therefore, we were unable to determine the number of patients in the no APD-CD group who met criteria for "adult antisocial behavior."

³ Family history variables with low but statistically significant kappas (i.e., $< .60$) were included in the analyses because the context for rating family history differed from most other contexts in which the reliability of ratings are evaluated. Interrater reliability is usually assessed with judges who have access to the exact same information (e.g., two raters observing the same interview). In contrast, the patients and relatives who provided judgments about family history in this study were not privy to the same types of information, hence resulting in lower levels of interrater reliability.

Table 1

Alcohol Use Behavior in Patients With Antisocial Personality Disorder (APD), Conduct Disorder (CD) Only, and No APD-CD

Variable	No APD-CD			CD only			APD			dfs	F	p	Tukey HSD
	n	M	SD	n	M	SD	n	M	SD				
Age at onset of alcohol abuse	71	20.14	5.53	30	16.37	3.49	30	15.73	3.80	2, 128	12.10	.000	1 > 2, 3
Times in alcohol treatment	87	1.68	1.90	32	1.22	1.31	34	6.82	19.13	2, 150	4.46	.010	3 > 2, 1
No. of alcohol detoxifications	63	0.71	1.34	21	0.33	0.73	25	5.16	14.02	2, 106	4.38	.020	3 > 2, 1
Days of excess alcohol use (past 30 days)	89	6.78	9.48	33	5.46	8.19	34	9.68	11.47	2, 153	1.73	.180	—
Months of excess alcohol use (lifetime)	84	119.02	102.75	31	82.74	79.61	34	165.77	120.01	2, 146	5.38	.010	3 > 2

Note. HSD = honestly significant difference. Dash indicates that there was no difference.

groups. For aggression toward property, APD was higher than no APD-CD, with CD only not different from either group.

ANOVAs were significant for number of arrests, $F(2, 155) = 14.06, p < .0001$, and months incarcerated, $F(2, 153) = 6.59, p < .002$. Tukey tests indicated that the APD and CD only groups (which did not differ) had more arrests than no APD-CD, whereas APD spent more months incarcerated than either CD only or no APD-CD, which did not differ.

Demographic and Clinical Variables

We compared the three APD-CD groups on age, gender, education, marital status, race, and schizophrenia or schizoaffective diagnosis using ANOVAs and chi-square tests. Significant effects were present for age, $F(2, 155) = 7.68, p < .0007$, and education, $F(2, 152) = 5.24, p < .006$, but not the other variables. Tukey tests indicated that the no APD-CD group was older than the CD only group, with the APD group not different from either group, whereas the APD group had lower educational attainment than no APD-CD, with CD only not different from either group.

Differences in symptoms on the BPRS were evaluated by performing a MANOVA, which was significant, $F(10, 276) = 2.15, p < .03$. ANOVAs were significant for affect, $F(2, 151) = 5.72, p < .005$, and activation, $F(2, 154) = 2.74, p = .04$, but not the other subscales. ANOVAs were also significant for suicidal ideation, $F(2, 153) = 5.43, p < .01$, living skills, $F(2, 149) = 6.38, p < .002$, and age at first psychiatric hospitalization, $F(2, 150) = 3.04, p < .05$. Tukey tests indicated that the APD group had worse scores on affect, living skills, suicidal ideation, and an earlier age at first hospitalization than no APD-CD, with CD only not different from either group. For activation, APD was worse than CD only, with no APD-CD not different from either group.

Substance Use Behavior

We examined differences between the APD-CD groups in alcohol use by performing a MANOVA on the five measures, which was significant, $F(10, 172) = 3.11, p < .001$. These findings, including the ANOVAs, are summarized in Table 1.

The drug use measures tended to be skewed because of frequent zeros. Therefore, we examined differences between the

APD-CD groups in drug use with nonparametric tests. These analyses are summarized in Table 2. It can be seen from this table that most of the measures of drug use differed across the APD-CD groups, with either the APD group or CD group scoring higher than the no APD-CD group.⁴

Family History

Chi-square tests were computed to determine whether APD-CD diagnosis was related to six measures of family history of substance abuse and psychiatric hospitalization. Significant chi-squares were found for mother's alcohol abuse, $\chi^2(2, N = 118) = 15.51, p < .0005$, father's drug abuse, $\chi^2(2, N = 112) = 18.23, p < .0002$, and father's psychiatric hospitalization, $\chi^2(2, N = 112) = 9.65, p < .009$, but not for the other measures. Patients with APD were most likely to have a mother with history of alcohol abuse (46%), a father with drug abuse (33%), and a father with history of psychiatric hospitalization (36%), followed by patients with CD only (26%, 11%, and 12%, respectively), followed by patients with no APD-CD (9%, 1%, and 9%, respectively). The percentage of fathers with history of alcohol abuse for APD, CD only, and no APD-CD was 73%, 46%, and 55%, respectively. History of mother's drug abuse for the three groups was 12%, 15%, and 3%, respectively, and history of mother's psychiatric hospitalization was 12%, 26%, and 15%, respectively.

⁴ One of the *DSM-III* criteria for CD is tobacco, alcohol, or drug abuse prior to the age of 15. Because this criterion could represent a confound for analyses of age of onset of substance abuse, we evaluated the number of patients who would not have met CD only or APD criteria had this symptom been excluded. Among the 33 patients who met criteria for CD only, 10 would not have met criteria if substance abuse before the age of 15 were excluded. Among the 34 patients with APD, only one would not have met criteria for CD (and hence APD) had this symptom been excluded. Two one-way ANOVAs performed on the age of onset of alcohol problems and age of onset of drug problems, excluding the 11 patients who would not have met CD only or APD criteria, resulted in similar findings to the ANOVAs performed on the complete sample. Thus, the difference in age of onset of substance abuse between the groups was not affected by the inclusion of early substance abuse as a criterion for the diagnosis of CD.

Table 2

Drug Use Behavior in Patients With Antisocial Personality Disorder (APD), Conduct Disorder (CD) Only, and No APD-CD

Continuous variables	No APD-CD			CD only			APD			Kruskal-Wallis ^a		Mann-Whitney U tests
	n	M	SD	n	M	SD	n	M	SD	χ^2	p	
Age at onset drug abuse	60	17.88	4.45	30	15.27	4.43	21	16.43	3.61	15.91	.000	1 > 2 = 3; 1 = 3
Times in drug treatment	89	0.96	2.74	32	0.69	1.20	33	5.88	19.57	5.55	.062	—
Days of drug use (past 30 days)	91	3.24	7.67	33	6.09	9.37	34	5.12	9.08	6.72	.034	2 = 3 > 1; 2 > 1
Days of polydrug use (past 30 days)	88	1.00	2.48	33	3.63	7.20	31	3.32	6.84	10.17	.006	2 = 3 > 1; 2 > 1
Lifetime months of use												
Heroin	91	0.01	0.11	33	0.12	0.70	34	6.59	24.72	11.25	.003	3 > 1 = 2; 2 = 3
Other opiates	90	2.00	11.78	32	5.13	19.67	34	16.85	41.37	6.19	.045	3 > 1 = 2; 2 = 3
Barbiturates	91	0.81	4.31	33	2.91	11.24	34	10.97	33.04	8.44	.014	3 > 1 = 2; 2 = 3
Sedatives	81	105.98	75.83	32	79.69	62.48	34	112.18	88.56	2.8	.245	—
Cocaine	90	8.73	29.99	33	11.18	22.06	34	37.41	10.58	12.62	.002	3 > 1 = 2; 2 = 3
Amphetamines	90	9.08	26.48	33	12.00	35.11	34	15.24	36.20	0.14	.929	—
Marijuana	89	75.11	78.10	33	109.09	68.58	34	111.32	96.48	6.72	.034	2 > 1 = 3; 2 = 3
Hallucinogens	90	9.11	35.10	33	14.79	28.89	34	24.41	43.43	7.91	.019	2 = 3 > 1; 2 > 1
Inhalants	91	0.65	4.06	33	2.06	6.75	34	8.18	27.52	8.63	.013	2 > 1 = 3; 2 = 3
Polydrug	88	66.39	65.26	32	94.88	63.25	34	109.00	95.41	8.49	.014	2 = 3 > 1; 2 > 1

Note. Dash indicates that there was no difference.

^a Kruskal-Wallis analysis of variance ($df = 2$).

Discussion

Little research has examined the validity of APD diagnoses in patients with schizophrenia. All four personality scales related to APD in the general population (Gough & Bradley, 1992; Morey, 1991; Zucker et al., 1994) were related to APD-CD in this sample of patients with schizophrenia and substance abuse. Also, APD patients reported higher rates of aggression on the MOAS and had more arrests and spent more time incarcerated. All corroborating evidence was obtained by interviewers unaware of SCID (APD) diagnoses. These findings support the validity of APD diagnoses on the basis of SCID interviews in schizophrenia.

APD was related to substance abuse, clinical variables, and family history in a manner similar to research on primary substance abuse populations. Patients with APD, and to a lesser extent with CD only, had an earlier onset of alcohol and drug abuse, abused greater quantities of substances, were more likely to have a history of drug and polydrug abuse, and had received more treatment for substance abuse, consistent with findings in primary substance abuse (Alterman & Cacciola, 1991). The APD and CD only patients also had more severe psychiatric symptoms and social impairment, in line with research on APD in primary substance abusers (Jaffe & Schuckit, 1981; Stabenau, 1984).

These findings have important implications for the identification of subgroups of schizophrenia. CD and other problem behaviors in childhood are a common antecedent to schizophrenia (Robins, 1966; Watt, 1978), and schizophrenia patients are more likely than the general population to develop APD in adulthood (Bland, Newman, & Orn, 1987; Jackson, Whiteside, Bates, Rudd, & Edwards, 1991). Caton et al. (1994, 1995) showed that homeless schizophrenia patients with APD are more likely to abuse substances than those without APD. However, few other

studies have examined the developmental course of schizophrenia preceded by childhood problem behaviors such as CD (Roff & Knight, 1981). These results suggest CD and APD may be related to vulnerability to substance abuse (or more severe substance use disorders) as well as more severe symptoms and psychosocial dysfunction.

One factor that may contribute to the high rate of CD in childhood and adult APD in schizophrenia is assortative mating between people with schizophrenia and psychopathy (Kallmann, 1938). The high likelihood of women with schizophrenia to mate with criminals (Kirkegaard-Sørensen & Mednick, 1975) suggests that their offspring may be more vulnerable to develop both schizophrenia and APD, as well as clinical correlates of APD such as substance abuse. In line with this interpretation, the parents of patients with APD were more likely to be affected with a variety of different disorders, including alcoholism, drug abuse, and psychiatric illness. The substance use disorders in these parents may have been due to either CD or APD.

Although the CD only group tended to fall between the no APD-CD and APD groups on substance abuse, for some measures they resembled the former group, whereas for others they resembled the latter. For example, CD only patients were lower in lifetime alcohol abuse and lifetime use of most "hard" drugs (e.g., heroin, cocaine) than APD patients, whereas they were equal or higher in use of marijuana and hallucinogens. These differences could reflect the higher risk for substance abuse in more chronic APD patients. Alternatively, it is possible that individuals who abuse alcohol and hard drugs are more likely to display adult symptoms of APD.

The results suggest that schizophrenia patients with APD represent a high-risk subgroup by virtue of the additional risk of APD for aggressive and generally noncompliant behavior and by virtue of the heightened risk for substance abuse. The find-

ings also suggest that APD may be related to substance use disorders in the broader population of patients with schizophrenia not preselected for substance abuse. We recently found support for this hypothesis in a study of patients admitted to a psychiatric hospital (Mueser et al., in press). APD and CD were related to higher rates of alcohol and drug use disorders in patients with schizophrenia-spectrum or major affective disorders. The increased risk for substance abuse in patients with APD may have important treatment implications. Research is needed to explore whether patients with schizophrenia, substance abuse, and APD differ in their response to treatment compared with patients without APD.

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