Progression From Conduct Disorder to Antisocial Personality Disorder Following Treatment for Adolescent Substance Abuse

Mark G. Myers, Ph.D., David G. Stewart, B.A., and Sandra A. Brown, Ph.D.

Objective: *This study investigated the progression from conduct disorder to antisocial personality disorder among individuals treated for adolescent substance abuse. This issue is important because of the poor outcomes observed among individuals with antisocial pathology after treatment for alcohol and drug problems. The utility of factors assessed at the time of treatment in predicting progression to adult antisocial personality disorder was evaluated in the context of developmental models of antisocial behavior.* *Method:* *This was a prospective longitudinal study of 137 substance-abusing adolescents (53 female and 84 male), whose average age was 15.9 years and who met the DSM-III-R criteria for conduct disorder. Consecutively admitted patients were recruited from two adolescent inpatient alcohol and drug treatment facilities. Participants were interviewed again 4 years after treatment.* *Results:* *Four years after treatment, 61% of the study group met the DSM-III-R criteria for antisocial personality disorder. Results of a logistic regression analysis indicated that onset of deviant behavior at or before age 10, a greater diversity of deviant behavior, and more extensive pretreatment drug use best predicted progression to antisocial personality disorder. At 4-year follow-up, the subjects with an antisocial personality disorder diagnosis exhibited more involvement with alcohol and drugs and poorer functioning across important life domains than the subjects without antisocial personality disorder.* *Conclusions:* *This study found a high rate of progression to antisocial personality disorder among substance-abusing adolescents and identified factors predictive of this progression. Careful assessment of conduct disorder history at the time of treatment may be valuable for treatment planning and intervention.*

(Am J Psychiatry 1998; 155:479–485)

Factors associated with the development and persistence of antisocial behavior have been extensively researched. Of particular concern is the observed concordance between antisocial behavior and substance abuse. Antisocial behavior is predictive of both adolescent and adult involvement in substance abuse (1–3). Further, conduct disorder is a strong prognostic indicator for both antisocial personality disorder and psychoactive substance use disorders in adulthood (4). Conduct disorder and antisocial personality disorder emerge as prevalent comorbid diagnoses in clinical samples of adolescent and adult substance abusers, respectively, and have been associated with poorer treatment outcome (5–7). These findings suggest that adult antisocial personality disorder and substance use disorders may share common etiological pathways.

The consequences of comorbid antisocial behavior and substance abuse have been studied primarily in adults and serve to highlight the concern surrounding this issue. Findings identify high base rates of antisocial behavior among substance abusers (1, 2), earlier and/or more rapid onset of substance use problems among substance abusers with antisocial personality disorder (1, 8), and a relationship between polysubstance abuse and antisocial personality disorder (8, 9). Findings regarding treatment outcomes with respect to substance use and life functioning among persons with an antisocial personality disorder diagnosis are mixed, with some studies reporting poorer outcomes (1) and others no differences (10) in comparison with individuals without antisocial personality disorder.

Received March 21, 1997; revision received July 8, 1997; accepted Sept. 18, 1997. From the School of Medicine, University of California, San Diego; the Department of Psychiatry, University of California, San Diego; and the San Diego VA Medical Center. Address reprint requests to Dr. Myers, Psychology (116B), VA Medical Center, 3350 La Jolla Village Dr., San Diego, CA 92161; mgmyers@ucsd.edu (e-mail).

Supported by grants from the National Institute on Alcohol Abuse and Alcoholism (AA-07033), the Research Service of the Department of Veterans Affairs, and the National Institute on Drug Abuse (DA-09181).

The literature describing the prevalence and influence of antisocial behavior in clinical populations of adolescent substance abusers is currently limited. Initial reports suggest a relationship between conduct disorder and adolescent substance abuse similar to that found for antisocial personality disorder among adult substance abusers (11). For example, the conduct disorder diagnosis is prevalent in clinical samples of adolescent substance abusers (5, 12) and has been associated with poorer substance use outcomes (5, 13). These studies suggest that conduct disorder behavior that precedes or occurs independent of substance abuse may indicate poorer long-term treatment outcome and a persistence of antisocial behavior among substance-abusing adolescents.

Developmental models of antisocial behavior (14–17) provide a framework for investigating the emergence of antisocial personality disorder in adolescent substance abusers. One model (14, 15) distinguishes two subtypes of deviant adolescents: the majority whose problem behavior begins and ends in adolescence and the relatively few whose antisocial behavior persists into adulthood. From this perspective, antisocial behavior is likely to persist among adolescents who demonstrate a stable history of deviant behavior since childhood, show a wide range of antisocial behavior, and fail to alter this behavior despite opportunities to desist. Another etiological model (17) highlights the presence of deviant behavior across multiple and diverse settings as predictive of a chronic and severe course of antisocial behavior. This conceptualization asserts that a diversity of antisocial behavior more likely represents enduring psychopathology. Thus, current etiological models suggest that early emergence of antisocial behavior and display of this behavior across diverse settings are prognostic indicators of persistence.

The extensive literature on the etiology of antisocial and delinquent behavior currently includes relatively few studies that have explored the progression of antisocial behavior in the context of substance abuse. Similarly, developmental models of the persistence of deviant behavior have yet to be tested in clinical populations of substance-abusing adolescents. It is therefore unclear how comorbid substance use and antisocial behavior may alter or influence the progression from adolescent conduct disorder to adult antisocial personality disorder. Adolescents treated for substance abuse represent a unique subgroup whose substance use has progressed to pathological levels (18) and who exhibit high rates of conduct disorder behavior (5, 12). Therefore, this population is particularly appropriate for examining the development of concomitant antisocial personality disorder and substance abuse. The current study extends previous investigations conducted with the same group of adolescents to 4 years after treatment and represents an initial prospective effort to evaluate the persistence of antisocial behavior in the context of substance abuse.

It was anticipated that the progression to antisocial personality disorder would be predicted by earlier age at the time of the first conduct disorder criterion behavior and a greater number (i.e., diversity) of conduct disorder behaviors independent of substance use reported at the time of treatment. We also explored the contribution of involvement in substance use prior to treatment in predicting progression to antisocial personality disorder. In addition, we expected the progression to a diagnosis of antisocial personality disorder to be associated with poorer long-term substance use outcomes. Finally, we predicted that individuals diagnosed with antisocial personality disorder as young adults would demonstrate poorer functioning in major life domains than those without antisocial personality disorder.

METHOD

One hundred sixty-six adolescents (40% of whom were female) were recruited from two inpatient substance abuse treatment programs in metropolitan San Diego as part of an ongoing longitudinal research project. Consecutively admitted patients were recruited if review of hospital records and structured interviews noted no evidence of a DSM-III-R axis I psychiatric disorder (other than conduct disorder) predating the onset of substance abuse. The inclusion criteria required 1) the participation of a resource person (usually a parent) to corroborate information regarding the adolescent and 2) residence within 50 miles of the research facility.

The current study used data from in-treatment interviews and interviews 4 years after treatment for those participants who met the criteria for conduct disorder at the time of treatment. Of the original study group, 88% (N=146) completed 4-year interviews. Of these, nine were excluded from the present study (five who were not 18 years old at the 4-year follow-up and four who did not meet the criteria for a diagnosis of conduct disorder), resulting in a final study group of 137 participants. The mean age of the participants at the 4-year follow-up time point was 20.0 years (SD=1.1). The study group was 39% female (N=53) and predominantly Caucasian (75%), with 6% Hispanic, 5% African American, and 14% from other ethnic subgroups. The socioeconomic status of the participating families ranged from unskilled laborer to college-educated professional.

Chart reviews were used to screen consecutively admitted patients to the inpatient treatment facilities for eligibility for the study, after which potential participants were recruited during the second week of treatment. Written informed consent was obtained separately from each adolescent and a parent or legal guardian after the procedures had been fully explained. A 90-minute confidential interview was administered separately to the teenager, after which a resource person was interviewed to provide corroborative information. Follow-up interviews were conducted separately with the adolescent subjects and the resource persons.

Instruments

The Structured Clinical Interview for Adolescents (18) was used to assess demographic and background information as well as academic, social, emotional, occupational, family, and health functioning at each interview time point.

The Customary Drinking and Drug Use Record (19) was administered to the adolescent participants at each time point to assess alcohol and other drug use patterns. This instrument incorporated the DSM-III-R criteria for psychoactive substance abuse, dependence, and withdrawal. This interview has demonstrated good internal consistency, high test-retest reliability, excellent interrater reliability, and strong convergent and discriminant validity (20).

Substance use information was gathered for cigarettes, alcohol (beer, wine, liquor), marijuana, amphetamines, hallucinogens, cocaine, opiates, barbiturates, and inhalants. The initial interview collected information on history (age at first use, onset of weekly regular use), lifetime use, and current (previous 3 months) quantity and frequency of use.

The Conduct Disorder/Antisocial Personality Disorder Questionnaire (5) is a structured interview designed to comprehensively assess the DSM-III-R criteria for conduct disorder and antisocial personality disorder. The questionnaire was independently administered to each adolescent participant and a resource person (usually a parent). The diagnoses of conduct disorder and antisocial personality disorder were determined according to standard DSM-III-R criteria. The questionnaire also evaluated each conduct disorder criterion behavior in relation to involvement with alcohol or drug use. Behavior that occurred exclusively during periods of substance intoxication was scored as being directly related to substance use; behavior that occurred while the subject was trying to obtain substances (e.g., stealing money to buy drugs) was scored as being indirectly related to substance use, and behavior that occurred in the absence of any substance involvement was scored as independent of substance use.

The reliability and validity of the Conduct Disorder/Antisocial Personality Disorder Questionnaire have been demonstrated through associations with other assessment procedures (5, 18). The use of a corroborative interview with a resource person to provide objective information on conduct disorder and antisocial personality disorder behaviors adds to confidence in the validity of the Conduct Disorder/Antisocial Personality Disorder Questionnaire for diagnosing antisocial personality disorder. In support of the present approach, Hare (21) found that clinical-behavioral measurement of antisocial personality disorder with the use of DSM criteria was reliable when compared to the use of other checklists and ratings.

TABLE 1. Demographic, Substance Use, and Conduct Disorder Variables at Study Intake for Subjects With and Without a Diagnosis of Antisocial Personality Disorder 4 Years After Treatment

Variable	Subjects With Antisocial Personality Disorder (N=84)		Subjects Without Antisocial Personality Disorder (N=53)	
	N	*%*	*N*	*%*
Male gender[a]	60	71	24	45
Caucasian race	60	71	42	79
Exhibited conduct disorder criterion behaviors at or before age 10[a]	63	75	23	43
	Mean	*SD*	*Mean*	*SD*
Age at intake (years)	15.93	1.15	16.22	1.07
Hollingshead socioeconomic status index	31.10	12.54	28.38	12.63
Lifetime days of alcohol use	600.90	579.74	380.11	530.00
Lifetime days of drug use	1269.82	666.07	960.58	606.35
Lifetime drug types used[a]	4.64	1.14	3.89	1.24
Recent alcohol use (quantity/frequency index for prior 3 months)	34.16	53.76	17.20	41.25
Recent drug use (average days per month in prior 3 months)[a]	41.19	16.33	32.11	18.38
Age at first use of hard drugs (years)	13.44	1.55	13.91	2.02
Number of conduct disorder criteria met independent of substance use[a]	5.26	2.16	3.36	2.04

[a]Significant difference between groups reflecting a 5% probability of type I error.

Measurement of 4-Year Treatment Outcome

Substance use. Alcohol use at intake and at the 4-year time point was represented by a quantity/frequency index of recent alcohol use (average days per month on which drinking occurred multiplied by the average number of drinks per occasion for the past 3 months summed across alcohol types). The drug use scale reflected the average number of days per month of substance use summed across drug types for the 3 months preceding the interview. Substance dependence at the 4-year interview was assessed for alcohol and for the other drug most frequently used by each participant on the basis of DSM-III-R criteria. In addition, at the 4-year time point a time-line follow-back procedure (22) was used to provide an estimate of the number of days on which alcohol and/or other drug use occurred in the 2-year interval before the interview (23, 24). Although this time-line follow-back interval is longer than the one that is typically used, these data were included to provide an estimate of aggregate substance use over the entire time period.

Data on drug and alcohol use were based on the adolescent's self-report and independent corroborative interviews with a resource person. Previous studies have established that alcohol and drug abusers can provide reliable drinking and drug use data with use of similar procedures (assurance of confidentiality, multiple sources of data, corroborative interviews).

Major domains of functioning. We compared the functioning of the subjects with and without antisocial personality disorder in the following major life domains: school/work, interpersonal functioning, emotional well-being, and illegal behavior. These domains reflect functioning over the 2 years before the 4-year interview time point. The influence of involvement with drugs and alcohol on functioning was assessed for each domain. School/work functioning was represented by high school graduation status, current employment, and the presence of alcohol and/or drug related problems at school or at work. Interpersonal functioning was measured by evaluating marital status, interpersonal problems, and problems with partner/spouse that were related to alcohol and/or other drug use. Emotional health was examined by using variables assessing substantial depression and anxiety that interfered with daily functioning and by whether individuals received counseling for emotional problems. The data on anxiety and depression were based on participants' and collateral reports and do not reflect formal diagnoses. Finally, legal issues were represented by participants' reports of arrests or jail time during the prior 2 years.

RESULTS

Eighty-four (61%) of the participants met the DSM-III-R criteria for the antisocial personality disorder diagnosis. The significance level for comparisons of baseline characteristics was set at 0.006 so as to provide a type I error rate of ≤5% for multiple analyses. Table 1 displays demographic data, baseline alcohol and drug use characteristics, and variables included in the logistic regression for the two diagnostic outcome groups. Male subjects were disproportionately represented in the antisocial personality disorder group (71%, N=60) compared to female subjects (29%, N=24) (χ^2=9.37, df=1, p<0.005); however, the two groups were comparable in race/ethnicity, age, and socioeconomic status at the time of admission to treatment. The subjects meeting the criteria for antisocial personality disorder had significantly greater drug use but not alcohol use during the 3 months before treatment; they did not differ on lifetime use of alcohol or drugs.

Prediction of Antisocial Personality Disorder

The antisocial personality disorder diagnosis was used as the criterion measure in a hierarchical logistic regression analysis to evaluate the hypothesized predic-

TABLE 2. Substance Involvement of Groups With and Without Antisocial Personality Disorder 4 Years After Treatment

Variable	Subjects With Antisocial Personality Disorder (N=84)		Subjects Without Antisocial Personality Disorder (N=53)		Analysis		
	Mean	SD	Mean	SD	F	df	p
Recent alcohol use (quantity/frequency index for prior 3 months)	40.40	54.93	9.92	17.78	11.04	1, 109	<0.01[a]
Recent drug use (days per month in prior 3 months)	10.75	15.30	4.60	12.07	4.82	1, 111	<0.03
Alcohol dependence (number of symptoms)	1.56	2.14	0.56	1.21	7.21	1, 110	<0.01[a]
Drug dependence (number of symptoms)	1.93	2.63	0.60	1.60	8.36	1, 111	<0.01[a]
Total number of days on which alcohol and/or drugs were used in past 2 years	381.68	248.95	158.83	214.63	28.52	1, 134	<0.001[a]

[a]Significant difference reflecting a 5% probability of type I error corrected for multiple analyses ($p<0.01$).

tors of progression to antisocial personality disorder. Gender and age were entered as covariates in the first step of the logistic regression. The second step, reflecting early onset and diversity of antisocial behavior, included the lifetime number of conduct disorder criterion behaviors reported to have occurred independent of substance use at the initial interview and a dichotomous variable reflecting whether the earliest conduct disorder criterion behavior was reported as having occurred at or before age 10 or after age 10. The latter variable was dichotomized to reflect childhood onset of antisocial behavior and is similar to the distinction used in DSM-IV. The third step of the regression included frequency of drug use and a quantity/frequency index of alcohol use in the 3 months preceding admission to treatment. The distributional properties of all variables were assessed and found acceptable.

Each step in the hierarchical regression added significantly ($p\leq0.05$) to the prediction of membership in the groups with and without antisocial personality disorder. The model that best fitted the data (–2 log likelihood $\chi^2=134.26$; model $\chi^2=12.50$, $p<0.01$; goodness of fit index=123.58, df=130) correctly classified 77% of the participants as having or not having antisocial personality disorder (87% of the subjects with antisocial personality disorder and 62% of those without antisocial personality disorder). Of the variables in the final model, onset of conduct disorder behavior at age 10 or earlier (beta=–1.37, $p<0.01$), greater diversity of conduct disorder behavior (beta=0.30, $p<0.05$), and heavier drug use prior to admission (beta=0.04, $p\leq0.01$) emerged as the best predictors of the antisocial personality disorder diagnosis.

Substance Use

The hypothesis that the antisocial personality disorder diagnosis would be associated with poorer substance use outcome was tested by examining the diagnostic groups' recent substance involvement and dependence symptoms with the use of analysis of variance, separately for alcohol and drugs. Alpha was set at 0.01 to account for multiple analyses. Table 2 displays 4-year substance use outcome by antisocial personality disorder classification. As predicted, the subjects in the antisocial personality disorder group had significantly more alcohol involvement at the 4-year time point, reported more alcohol and drug dependence symptoms, and tended to report greater recent drug use than those not meeting the criteria for antisocial personality disorder. In addition, the participants with antisocial personality disorder reported using alcohol and/or drugs on more days during the preceding 2 years than did those without antisocial personality disorder.

Major Domains of Functioning

To compare the participants with and without antisocial personality disorder on important domains of young adult functioning, chi-square analyses were conducted with the alpha level set so as to provide a 0.95 probability of avoiding type I error.

In examining work and school status, we found no significant differences between groups in current employment or completion of high school education. However, the group with antisocial personality disorder more frequently reported school and/or work problems related to their alcohol and drug involvement (54% versus 20%; $\chi^2=15.64$, df=1, $p<0.001$).

In the realm of interpersonal functioning, a significantly larger proportion of the group with antisocial personality disorder reported interpersonal problems at home, school, or work (76% versus 50%; $\chi^2=9.84$, df=1, $p<0.001$). Although no differences between groups were evident for marital status (single versus married/living with partner), the group with antisocial personality disorder had a five times greater incidence of problems with a spouse/partner that were related to alcohol and/or drug use (61% versus 13%; $\chi^2=29.39$, df=1, $p\leq0.001$).

Significant differences between groups were also found across diverse measures of emotional functioning. Individuals in the antisocial personality disorder group were four times more likely to report requiring professional help for emotional problems overall (51% versus 12%; $\chi^2=20.60$, df=1, $p<0.001$), but not for problems unrelated to alcohol or drug use (26% versus 11%; $\chi^2=4.64$, df=1, $p=0.03$). The participants who

met the criteria for antisocial personality disorder were also significantly more likely to report experiencing serious depression (38% versus 14%; χ^2=8.93, df=1, p< 0.01) and anxiety (68% versus 37%; χ^2=12.46, df=1, p<0.001). However, these differences were not significant when we considered only depression and anxiety reported as occurring independent of alcohol and/or drug use (χ^2=4.05, df=1, p=0.06, and χ^2=3.57, df=1, p=0.45, respectively).

Finally, antisocial personality disorder was significantly associated with legal problems. Specifically, the subjects with antisocial personality disorder had a significantly greater likelihood of being arrested (48% versus 8%; χ^2=23.58, df=1, p<0.001) and serving time in jail (36% versus 6%; χ^2=17.56, df=1, p<0.001) than those without the disorder. However, diagnostic status was not significantly associated with arrests or incarcerations that were unrelated to alcohol or drug involvement (χ^2=2.68, df=1, p=0.10, and χ^2=2.46, df=1, p= 0.12, respectively).

DISCUSSION

This study examined prospectively the development of antisocial personality disorder during the 4 years following treatment for adolescent substance abuse. The results largely supported hypotheses derived from developmental models for the persistence of antisocial behavior and previous empirical evidence of the relationship between substance abuse and progression of antisocial behavior. In addition, these findings are consistent with retrospective studies of adult substance abusers that have demonstrated an association between early onset of antisocial behavior and a greater extent and severity of antisocial behavior (25, 26).

Of the variables included in the logistic regression, early onset of conduct disorder behavior (at age 10 or earlier), greater diversity of conduct disorder behavior occurring independent of substance involvement, and greater recent use of drugs were significant predictors of the antisocial personality disorder diagnosis in late adolescence/early adulthood. Our findings are largely consistent with theoretical models of the persistence of antisocial behavior that emphasize the importance of early, severe, and diverse deviant behavior in predicting lifelong antisocial behavior (14, 16). In addition, the fact that involvement with drugs prior to treatment was found to add to the prediction of antisocial personality disorder highlights the role of substance use in the progression of antisocial pathology among youths with a history of substance abuse.

As anticipated, study participants who developed antisocial personality disorder by 4 years after treatment for adolescent substance abuse had poorer alcohol and drug use outcomes than did those not diagnosed with antisocial personality disorder. Our results indicated significantly higher overall levels of involvement with alcohol, more symptoms of alcohol and drug dependence, and more days on which substances were used in the group with an antisocial personality disorder diagnosis. A reliance on alcohol and drug use for coping with life stress may be particularly likely given the history of polysubstance abuse in this study group (18, 27). This finding also appears consistent with the notion of "snares" as discussed by Moffitt (15) and her colleagues, in which certain consequences or features of antisocial behavior serve to limit options for escaping an antisocial lifestyle. In the present study, heavier involvement with alcohol and drugs following treatment may have served to limit options for engaging in more prosocial activities or behavior, restricted environmental contexts to more "risky" settings, and functioned to perpetuate a deviant lifestyle.

Examination of antisocial personality disorder in relation to functioning in major life domains yielded results largely consistent with our predictions. In the domains of school/work, interpersonal relations, and legal difficulties, the greater extent of problems reported by the subjects with antisocial personality disorder appears largely related to involvement with alcohol and/or drugs. While completion of schooling and current employment status did not differ between the groups, problems attributed to alcohol and/or drug use were significantly more common among the participants with antisocial personality disorder in each of the aforementioned domains. Thus, the greater substance involvement by those progressing to antisocial personality disorder appears to exacerbate difficulties in functioning across these important domains of young adult functioning. When we examined emotional functioning, subjects in the group with antisocial personality disorder reported more overall help seeking for psychological problems and greater overall anxiety and depression. Therefore, it may be that the persistence of antisocial behavior in this study group was influenced by additional psychopathology. The substance abuse and emotional difficulties apparent in the group with antisocial personality disorder may well be reciprocally related in such a way that each serves to exacerbate the other. The current results indicate the prominence of substance use in relation to poorer overall functioning, suggesting that alcohol and drug abuse may be inextricably involved in the progression of antisocial pathology among young people with a history of substance abuse.

The present data on the progression of antisocial behavior suggest continued difficulties for the participants diagnosed with antisocial personality disorder. Moffitt (15) has proposed that the persistence of antisocial behavior reflects in part the limited options for change available to antisocial individuals. The results of the present study can be interpreted to support this conceptualization. For example, the poorer relationship functioning that was apparent among the subjects with antisocial personality disorder may reflect various deficits in interpersonal and cognitive functioning as well as the negative consequences of continued substance involvement. The likelihood of remediation or improvement of skills critical to successful functioning appears rather

limited for individuals with antisocial personality disorder who have passed the critical period during which many cognitive and interpersonal skills are typically acquired and refined. In addition, continued substance involvement exhibited by youths with antisocial personality disorder may serve to limit future opportunities for acquisition of skills and is likely to create new problems, the consequences of which may further promote substance involvement and restrict opportunities for emerging from an antisocial lifestyle.

The findings of this study must be considered in light of several limitations. First, the current method of determining an antisocial personality disorder diagnosis from the Conduct Disorder/Antisocial Personality Disorder Questionnaire has not been validated in comparison with standardized diagnostic measures. However, this instrument has demonstrated validity and utility for obtaining a diagnosis of conduct disorder (5, 18), thereby increasing our confidence in the antisocial personality disorder diagnoses in this study. Another issue concerns the accuracy of retrospective information used to assess the onset of early conduct disorder behavior. The utilization of multiple reporters has been found useful in retrospective assessment of childhood problem behavior and may mitigate some of the concerns regarding potential recall bias (28). The hypothesized variables successfully predicted progression to antisocial personality disorder on the basis of information collected during adolescence, suggesting that careful assessment of retrospective information can be used to predict continuity of antisocial behavior. Further, the results of this study are supported by the convergence of findings across our three investigations that have demonstrated a relationship between early conduct disorder behavior and treatment outcome. The reliance on self-report data for assessment of anxiety, depression, and illegal behavior suggests caution in interpreting our findings. Future studies that use more formal diagnostic procedures for assessing these variables are needed to replicate the present findings. Another limitation of this study is that not all factors believed to be important to the progression of antisocial behavior are considered in the present model. Finally, the inclusion of male and female subjects in the present analyses represents a distinction from the predominantly male-based body of literature on the development of antisocial behavior.

The ability of variables assessed during treatment to significantly predict antisocial personality disorder status 4 years later has important clinical implications. Adolescents who present for treatment of substance abuse may appear to be uniformly conduct disordered, and thus attention to conduct disorder behavior may seem to add little information for prognosis or treatment planning. However, the findings of this study suggest that careful assessment of the extent of conduct disorder behavior and identification of behavior that occurs prior to and independent of substance abuse may serve to identify individuals at risk of persisting in antisocial behavior. Adolescents whose conduct disorder behavior occurs primarily in the context of substance use or appears following the onset of substance abuse, and who demonstrate such behavior across few settings, are likely to desist from antisocial behavior and thus may not require as much intervention beyond treatment for substance abuse. In contrast, those who appear to be on a lifetime course of antisocial behavior may benefit from more intensive targeted interventions. For example, it has been shown that multisystemic therapy (29) is effective in producing long-term reductions in violent and criminal offenses among serious juvenile offenders, and as such it may represent a useful adjunct intervention for substance-abusing youths at risk for persistent antisocial behavior.

In summary, this investigation is one of the first to examine prospectively the development of antisocial personality disorder in the context of concomitant adolescent substance abuse and conduct disorder. These data illustrate some of the developmental factors that underlie the poor prognosis that accompanies comorbid antisocial personality disorder and substance abuse; they also demonstrate how the matrix of problems encountered by antisocial youths may function to sustain problem behavior and limit options for change. However, our findings should not be interpreted to suggest that antisocial youths do not benefit from treatment. Those with persistent antisocial psychopathology may enter treatment with poorer overall functioning, and thus between-group differences may reflect more limited improvement rather than treatment failure. Future research on the factors that interact to maintain and reinforce the concordance between antisocial behavior and substance abuse is needed to further our understanding of mechanisms underlying this process.

REFERENCES

1. Liskow B, Powell BJ, Nickel E, Penick E: Antisocial alcoholics: are there clinically significant diagnostic subtypes? J Stud Alcohol 1991; 52:62–69
2. Schuckit MA: The clinical implications of primary diagnostic groups among alcoholics. Arch Gen Psychiatry 1985; 42:1043–1049
3. Windle M: A longitudinal study of antisocial behaviors in early adolescence as predictors of late adolescent substance use: gender and ethnic group differences. J Abnorm Psychol 1990; 99: 86–91
4. Robins LN, Price RK: Adult disorders predicted by childhood conduct problems: results from the NIMH Epidemiologic Catchment Area project. Psychiatry 1991; 54:116–132
5. Brown SA, Gleghorn A, Schuckit M, Myers MG, Mott MA: Conduct disorder among adolescent substance abusers. J Stud Alcohol 1996; 57:314–324
6. Carroll KM, Power MD, Bryant K, Rounsaville BJ: One-year follow-up status of treatment-seeking cocaine abusers—psychopathology and dependence severity as predictors of outcome. J Nerv Ment Dis 1993; 181:71–79
7. Rounsaville BJ, Dolinsky ZS, Babor TF, Meyer RE: Psychopathology as a predictor of treatment outcome in alcoholics. Arch Gen Psychiatry 1987; 44:505–513
8. Carroll KM, Ball SA, Rounsaville BJ: A comparison of alternate systems for diagnosing antisocial personality disorder in cocaine abusers. J Nerv Ment Dis 1993; 181:436–444
9. O'Boyle M: Personality disorder and multiple substance dependence. J Personality Disorders 1993; 7:342–347
10. Cacciola JS, Alterman AI, Rutherford MJ, Snider EC: Treatment

response of antisocial substance abusers. J Nerv Ment Dis 1995; 183:166–171
11. McKay JR, Buka SL: Issues in the treatment of antisocial adolescent substance abusers. J Child and Adolescent Substance Abuse 1994; 3:59–81
12. Stowell RJA, Estroff TW: Psychiatric disorders in substance-abusing adolescent inpatients: a pilot study. J Am Acad Child Adolesc Psychiatry 1992; 31:1036–1040
13. Myers MG, Brown SA, Mott MA: Preadolescent conduct disorder behaviors predict relapse and progression of addiction for alcohol and drug abusers. Alcohol Clin Exp Res 1995; 19:1528–1536
14. Moffitt TE, Caspi A, Dickson N, Silva P, Stanton W: Childhood-onset versus adolescent-onset antisocial conduct problems in males: natural history from ages 3 to 18 years. Developmental Psychopathology 1996; 8:399–424
15. Moffitt TE: Adolescence-limited and life-course persistent antisocial behavior: a developmental taxonomy. Psychol Rev 1993; 100:674–701
16. Loeber R: Antisocial behavior: more enduring than changeable? J Am Acad Child Adolesc Psychiatry 1990; 30:393–397
17. Loeber R, Wung P, Keenan K, Giroux B, Stouthamer-Loeber M, Van Kammen W, Maughan B: Developmental pathways in disruptive child behavior. Developmental Psychopathology 1993; 5:103–133
18. Stewart DG, Brown SA: Withdrawal and dependency symptoms among adolescent alcohol and drug abusers. Addiction 1995; 90:627–635
19. Brown SA, Vik PW, Creamer VA: Characteristics of relapse following adolescent substance abuse treatment. Addict Behav 1989; 14:291–300
20. Brown SA, Myers MG, Lippke L, Tapert SF, Stewart DG, Vik PW: Psychometric evaluation of the Customary Drinking and Drug Use Record (CDDR): a measure of adolescent alcohol and drug involvement. J Stud Alcohol (in press)
21. Hare RD: Comparison of procedures for the assessment of psychopathy. J Consult Clin Psychol 1985; 53:7–16
22. Sobell LC, Sobell MB: Time-line follow-back: a technique for assessing self-reported alcohol consumption, in Measuring Alcohol Consumption: Psychosocial and Biochemical Methods. Edited by Litten RZ, Allen JP. Totowa, NJ, Humana Press, 1992, pp 73–98
23. Babor TF, Del Boca FK: Just the facts: enhancing measurement of alcohol consumption using self-report methods. Ibid, pp 3–19
24. Sobell LC, Maisto SA, Sobell MB, Cooper AM: Reliability of alcohol abusers' self-reports of drinking behaviour. Behav Res Ther 1979; 17:157–160
25. Brooner RK, Schmidt CW, Felch LJ, Bigelow GE: Antisocial behavior of intravenous drug abusers: implications for diagnosis of antisocial personality disorder. Am J Psychiatry 1992; 149:482–487
26. Cacciola JS, Rutherford MJ, Alterman AI, Snider EC: An examination of the diagnostic criteria for antisocial personality disorder in substance abusers. J Nerv Ment Dis 1994; 182:517–523
27. Mott MA, Brown SA, Myers MG: Alcohol and polydrug relapse: evaluation of relapse models. Alcohol Clin Exp Res 1992; 16: 403
28. Windle M: A retrospective measure of childhood behavior problems and its use in predicting adolescent problem behaviors. J Stud Alcohol 1992; 54:422–431
29. Borduin CM, Mann BJ, Cone LT, Henggeler SW, Fucci BR, Blaske DM, Williams RA: Multisystemic treatment of serious juvenile offenders: long-term prevention of criminality and violence. J Consult Clin Psychol 1995; 63:569–578