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## Antisocial Behavioral Syndromes in Adulthood and Alcohol Use Disorder Treatment over Three-Year Follow-Up: Results from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions

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### Abstract

**Background**—Antisocial personality disorder (ASPD) is associated with poorer treatment outcomes, but more help seeking, for alcohol use disorders (AUDs); however, associations of ASPD with AUD treatment in the general population have not been studied prospectively.

**Objective**—To examine prediction of treatment over 3-year follow-up among adults with AUDs by baseline ASPD and syndromal adult antisocial behavior without conduct disorder before age 15 (AABS).

**Method**—Face-to-face interviews with 34,653 respondents to the National Epidemiologic Survey on Alcohol and Related Conditions, of whom 3875 had prevalent AUDs between Waves 1 and 2 and ASPD, AABS, or no antisocial syndrome at Wave 1.

**Results**—In unadjusted analyses, baseline ASPD predicted AUD treatment but AABS did not. After adjustment for additional need, predisposing, and enabling factors, antisocial syndromes did not predict treatment. Baseline predictors of treatment included more past-year AUD symptoms, and past-year nicotine dependence and AUD treatment.

**Conclusions**—That baseline antisocial syndrome did not predict AUD treatment may reflect strong associations of antisociality with previously identified predictors of help seeking.

### Keywords

antisocial personality disorder; alcohol use disorders; epidemiology; comorbidity; treatment

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Antisocial personality disorder (ASPD) is highly comorbid with alcohol use disorders (AUDs) in both epidemiologic (Compton, Conway, Stinson, Colliver, & Grant, 2005; Lewis, Bucholz, Spitznagel, & Shayka, 1996; Kessler et al., 1997) and clinical (Hesselbrock, Hesselbrock, & Stabenau, 1985; Morgenstern, Langenbucher, Labouvie, & Miller, 1997; Penick et al., 1994)

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samples. It is associated with greater AUD severity (Galen, Brower, Gillespie, & Zucker, 2000; Goldstein, Dawson, Saha, et al., 2007; Morgenstern et al., 1997) and poorer AUD treatment outcomes (Galen et al., 2000; Hunter et al., 2000; Kranzler, Del Boca, & Rounsaville, 1996; Powell et al., 1998). Despite its relationship to poorer treatment outcomes, ASPD has been associated with increased lifetime (Goldstein, Dawson, Saha, et al., 2007; Murray, Anthenelli, & Maxwell, 2000) and current (Glanz et al., 2002) help seeking for AUDs.

Associations of ASPD with increased AUD treatment seeking might reflect greater AUD severity, as well as high rates of additional psychiatric comorbidity, among individuals with both disorders (Galen et al., 2000; Goldstein, Dawson, Saha, et al., 2007; Morgenstern et al., 1997). AUDs comorbid with other psychiatric disorders are associated with more treatment utilization than “pure” AUDs (e.g., Cohen, Feinn, Arias, & Kranzler, 2007; Kessler et al., 1996). As well, behaviors symptomatic of antisocial syndromes, including criminal offenses and irresponsibility toward significant others that may be partly related to alcohol, may lead to coerced enrollment. However, the studies reporting these findings were not specifically investigations of AUD treatment, but rather broader examinations of the sociodemographic, biologic, and clinical characteristics of AUDs. Therefore, some respondent characteristics, e.g., insurance coverage and a current spouse or significant other with alcohol problems (Grant, 1996), that are relevant to utilization and could have confounded associations between antisocial syndromes and treatment, were not examined. In addition, these studies were cross-sectional, precluding inferences about temporal sequencing of respondent characteristics and treatment seeking. Studies relying on self-reported lifetime treatment utilization by respondents with AUDs (e.g., Goldstein, Dawson, Saha, et al., 2007) may also be prone to recall biases related to AUDs, comorbidity including antisociality, or treatment histories. To our knowledge, there have been no prospective studies of associations of ASPD with AUD treatment utilization among general population adults with diagnosed AUDs.

## Antisocial Personality Disorder versus Adult Antisocial Behavioral Syndrome

*Diagnostic and Statistical Manual - Version IV* (DSM-IV; American Psychiatric Association, 1994) criteria for ASPD require both syndromal antisocial behavior since, and conduct disorder (CD) before, age 15 years. However, the high prevalence of syndromal antisociality since age 15 years absent earlier evidence of CD (adult antisocial behavioral syndrome or AABS; not a DSM-IV diagnosis) has been well documented (e.g., Compton et al., 2005; Tweed, George, Blazer, Swartz, & MacMillan, 1994). Individuals with AABS differ little from those with ASPD on antisocial symptomatology in adulthood, prospectively assessed persistence versus desistance of antisocial behavior, psychiatric and general medical comorbidity, and hospital care utilization for medical conditions (Black & Braun, 1998; Compton et al., 2005; Cottler, Price, Compton, & Mager, 1995; Goldstein, Compton, et al., 2007; Goldstein, Dawson, Chou, et al., 2008; Goldstein, Dawson, Saha, et al., 2007; Goldstein & Grant, 2009; Goldstein et al., 1998; Marmorstein, 2006; Tweed et al., 1994). ASPD and AABS also bear similar associations with clinical presentation of AUDs, both in the general population (Goldstein, Dawson, Saha, et al., 2007) and in addiction treatment (Cecero, Ball, Tennen, Kranzler, & Rounsaville, 1999; Cacciola, Alterman, Rutherford, & Snider, 1995; Hesselbrock & Hesselbrock, 1994). Further, the limited available evidence suggests that individuals with ASPD and those with AABS may not differ meaningfully on addiction treatment outcomes (Cecero et al., 1999; Goldstein et al., 2001). However, to our knowledge, only one cross-sectional study (Goldstein, Dawson, Saha, et al., 2007) has examined associations of ASPD versus AABS with AUD treatment among general population adults with DSM-IV AUDs. This study found ASPD more strongly associated with lifetime utilization than AABS, but significantly so only among women. No prospective comparisons of associations between these 2 syndromes and help seeking for AUDs are available.

## Behavioral Model of Health Services Use

The Behavioral Model of Health Services Use (Andersen & Newman, 1973; Andersen, 1995, 2008) conceptualizes predictors of treatment utilization as reflecting predisposing, enabling, and need factors. Predisposing factors include sociodemographic characteristics, past histories of disorder and help seeking, and family members with the target condition: in this case, AUDs. Predisposing characteristics define an individual's propensity to seek help, e.g., with respect to differential risk of disorder or attitudes toward or past experiences with treatment systems (Andersen, 1995). Enabling factors, including barriers to care, concern affordability and accessibility of treatment, such as income, insurance coverage, and urbanicity. Marriage to or cohabitation with a currently alcoholic spouse or partner and presence of minor children in the household also fall in the enabling domain because each may impede treatment entry (Grant, 1996). In addition to AUD diagnoses and antisocial syndromes, potentially relevant need factors include severity of AUD symptoms or related impairment and additional psychiatric comorbidity (Andersen, 1995; Grant, 1996). The Behavioral Model would posit that AUD treatment is equitably distributed when its utilization predominantly reflects AUD severity or need. If predisposing, particularly those reflecting social structures or health beliefs, or enabling factors such as insurance coverage, availability of providers, or aspects of care system organization, importantly affect utilization, efforts to minimize their influence are warranted.

## Implications of Prediction of AUD Treatment by Antisocial Syndromes

Similarities or differences in prediction of help seeking for AUDs by antisocial syndrome as a need factor could have implications for case finding, AUD treatment referral practices, and treatment planning. Because of their greater AUD severity and high rates of additional comorbidity (Galen et al., 2000; Goldstein, Dawson, Saha, et al., 2007; Morgenstern et al., 1997), patients with AUDs plus ASPD or AABS tend to be more complex to treat and may require a broader range of clinical interventions. In addition, the disregard for norms and rules that is a hallmark of antisocial syndromes may be associated with poorer engagement with or adherence to treatment, even if enrollment is coerced by significant others or law enforcement authorities (e.g., Polcin & Weisner, 1999; Gregoire & Burke, 2004), and more disruptive behavior in the treatment setting. Clinicians attending antisocial patients with AUDs may therefore need to address behavioral contingencies in ways that discourage disruptive acts and foster engagement with and adherence to the treatment program. Antisocial syndromes are rarely patients' chief complaints (e.g., Robins, Tipp, & Przybeck, 1991), and are poorly responsive to available interventions. Therefore, clinicians attending antisocial patients for other presenting problems, including AUDs and comorbid psychopathology, may need to "work around" the antisociality to build working relationships and accomplish goals valued by both patients and important others (e.g., Ward, 2004).

DSM criteria for antisocial syndromes emphasize overtly aggressive behaviors more prevalent in men, giving limited attention to covert behaviors and relational aggression that may be more typical manifestations in women (Cale & Lilienfeld, 2002; Ohan & Johnston, 2005). The relevance of CD onset before age 15 to antisociality in women has also been debated (Keenan, Loeber, & Green, 1999; Loeber, Burke, Lahey, Winters, & Zera, 2000; Silverthorn & Frick, 1999), in part because onsets tend to be later in women (Eme, 2007; Odgers et al., 2008; Lahey et al., 2006). If the diagnostic criteria contain sex biases, then associations of antisocial syndromes in adulthood with AUD treatment seeking, and their implications for treatment programs, may also differ by sex. Women tend to utilize more health care than men in general (Owens, 2008), though evidence specifically concerning AUD treatment includes higher utilization by men (Cohen et al., 2007; Kaskutas, Weisner, & Caetano, 1997; Weisner, Greenfield, & Room, 1995), higher utilization by women (Teesson, Baillie, Lynskey, Manor,

& Degenhardt, 2006), and no sex differences (Kessler et al., 2001). However, antisocial women with AUDs exhibit higher rates of comorbidity than antisocial men (Goldstein, Dawson, Saha, et al., 2007). In addition, antisocial women with AUDs tend to exhibit particularly severe problems in the domains of employment, vocational skills, and family and social relationships, including parenting and child custody issues (Grella, 2009). This multiplicity of problems may weigh particularly heavily on antisocial women with AUDs, leading to increased utilization.

## Purpose of the Present Study

Accordingly, this report examines prediction of AUD treatment utilization by Wave 1 antisocial syndrome among respondents with prevalent AUDs during the 3-year prospective follow-up of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant, Kaplan, & Stinson, 2005). The relatively restricted length of follow-up, while the longest to date in a nationally representative sample, minimizes the potential for recall biases. In this study we consider additional Wave 1 (Grant, Moore, Shepard, & Kaplan, 2003) need, predisposing, and enabling characteristics that have been identified in the literature (e.g., Andersen & Newman, 1973; Andersen, 1995, 2008; Grant, 1996) both as potential confounders or effect modifiers, and secondarily as independent predictors. We hypothesized that (1) antisocial behavioral syndromes diagnosed at baseline would predict increased AUD treatment over follow-up, (2) associations with AABS would be numerically more modest than those with ASPD, but these differences would not be statistically significant, and (3) associations of treatment with antisociality would be stronger in women than in men.

## Methods

### Sample

The entire NESARC protocol, including informed consent procedures, was approved by the U.S. Office of Management and Budget and the institutional review board of the U.S. Census Bureau. Wave 2, conducted in 2004–2005, is the longitudinal follow-up of the Wave 1 NESARC, conducted in 2001–2002 by the National Institute on Alcohol Abuse and Alcoholism and described in detail elsewhere (Grant et al., 2009; Ruan et al., 2008). The Wave 1 NESARC was a nationally representative survey of 43,093 respondents 18 years and older. The target population was the civilian, noninstitutionalized U.S. adult population residing in households and group quarters. Blacks, Hispanics, and individuals 18 to 24 years old were oversampled, with an overall Wave 1 response rate of 81.0% (Grant, Moore, et al., 2003).

In Wave 2 (Grant, Kaplan, et al., 2005), face-to-face reinterviews were attempted with all Wave 1 respondents. Excluding those ineligible due to death, emigration, active military duty throughout the follow-up period, or physical or mental incapacity, the Wave 2 response rate was 86.7%, reflecting 34,653 completed interviews. The cumulative response rate at Wave 2, the product of the Wave 1- and Wave 2- specific rates, was 70.2%. As in Wave 1, the Wave 2 NESARC data were weighted to reflect survey design characteristics and account for oversampling. Adjustment was performed for household- and person-level nonresponse across sociodemographic and Wave 1 diagnostic variables to ensure that the sample approximated the original sample minus attrition between the 2 waves due to death, institutionalization or incapacitation, permanent departure from the U.S., and military service for the entire Wave 2 interviewing period. Weighted Wave 2 data were adjusted to be representative of the civilian population on sociodemographic variables including region, age, respondent-reported race/ethnicity, and sex, based on the 2000 Decennial Census.

## Alcohol Use Disorder Treatment over Follow-Up

Respondents were asked if they had gone anywhere or seen anyone since their Wave 1 interview specifically for a reason related to their drinking. An affirmative answer led to specific queries concerning 13 categories of agencies and professionals, including 12-step meetings, family or social service agencies, detoxification wards or clinics, and dedicated alcohol or drug rehabilitation programs. Low prevalences in most categories, however, precluded treatment type-specific analyses. Therefore, the study outcome was defined as any versus no AUD treatment.

## Antisocial Behavioral Syndromes

The diagnostic interview used in the NESARC was the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV), for Wave 1 (Grant, Dawson, & Hasin, 2001) and Wave 2 (Grant, Dawson, & Hasin, 2004). Antisocial behavioral syndromes were diagnosed on a lifetime basis at Wave 1. An AUDADIS-IV diagnosis of ASPD required the specified numbers of DSM-IV CD symptoms with onset before, and adult antisocial behaviors since, age 15 years. Consistent with DSM-IV, at least 1 CD symptom before age 15 must have caused social, academic, or occupational impairment. AABS was operationalized as meeting all ASPD criteria except CD before age 15. Test-retest reliability of the AUDADIS-IV ASPD diagnosis was good ( $\kappa=0.67$ ; Grant, Hasin, Stinson, et al., 2004); convergent validity of ASPD was good to excellent (Grant, Hasin, Stinson, et al., 2004; Compton et al., 2005).

## Alcohol and Other Substance Use Disorders

Extensive AUDADIS-IV questions covered DSM-IV criteria for alcohol abuse and dependence, drug-specific abuse and dependence for 10 categories of substances, and nicotine dependence. A DSM-IV abuse diagnosis required at least 1 of 4 abuse criteria, while a DSM-IV dependence diagnosis required at least 3 of 7 dependence criteria, to be met within the same 12-month period. Wave 1 substance use disorders considered as need characteristics and potential predictors of AUD treatment over follow-up were those occurring in the 12 months before the Wave 1 interview. Past-year rather than lifetime Wave 1 diagnoses were considered as predictors because the former are temporally closer to the follow-up period and their recency may reduce the potential for recall biases (Grant, Stinson, et al., 2004). The good to excellent test-retest reliability, and good to excellent convergent, discriminant, and construct validity, of AUDADIS-IV substance use disorder diagnoses are documented in general population and clinical samples, as described in detail elsewhere (e.g., Compton, Thomas, Stinson, & Grant, 2007; Grant, Dawson, et al., 2003; Grant et al., 1995; Grant, Hasin, Chou, et al., 2004; Hasin, Stinson, Ogburn, & Grant, 2007).

## Other Psychiatric Disorders

Wave 1 past-year mood disorders included DSM-IV primary major depressive disorder (MDD), dysthymia, and bipolar I and bipolar II disorders. Anxiety disorders included DSM-IV primary panic disorder with and without agoraphobia, social and specific phobias, and generalized anxiety disorder. AUDADIS-IV methods to diagnose these disorders are described in detail elsewhere (Grant, Stinson, et al., 2004; Hasin, Goodwin, Stinson, & Grant, 2005; Grant, Hasin, Blanco, et al., 2005; Grant et al., 2006; Grant, Hasin, Stinson, Dawson, Chou, et al., 2005; Grant, Hasin, Stinson, Dawson, Ruan, et al., 2005; Grant, Stinson, Hasin, et al., 2005; Stinson, 2007). Consistent with DSM-IV, primary AUDADIS-IV diagnoses excluded disorders that were substance induced or due to general medical conditions. Diagnoses of MDD additionally ruled out bereavement.

In addition to ASPD, personality disorders (PDs) assessed at Wave 1 and described in detail elsewhere (Grant, Hasin, et al., 2004) included avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and histrionic PDs. Borderline, schizotypal, and narcissistic PDs were measured at Wave 2 (Grant et al., 2008). All PDs were diagnosed on a lifetime basis. Because PD diagnoses require evaluation of long-term patterns of functioning, all NESARC respondents were asked a series of PD symptom questions about how they felt or acted most of the time throughout their lives, regardless of the situation or whom they were with. They were instructed to exclude symptoms occurring only when they were depressed, manic, anxious, drinking heavily, using medicines or drugs, experiencing withdrawal, or physically ill. To receive a PD diagnosis, respondents had to endorse the requisite number of symptom criteria, at least 1 of which must have caused psychosocial impairment or distress.

Test-retest reliabilities for AUDADIS-IV mood, anxiety, and personality disorder diagnoses in the general population and clinical settings were fair to good (Ruan et al., 2008; Grant, Dawson, et al., 2003; Canino et al., 1999). Convergent validity was good to excellent for all affective, anxiety, and personality disorder diagnoses (Grant, Hasin, et al., 2004; Hasin et al., 2005; Grant, Hasin, Blanco, et al., 2005; Grant et al., 2006; Grant, Hasin, Stinson, Dawson, Chou, et al., 2005; Grant, Hasin, Stinson, Dawson, Ruan, et al., 2005; Grant, Stinson, Hasin, et al., 2005; Stinson et al., 2007), and selected diagnoses showed good agreement with psychiatrist reappraisals (Canino et al., 1999).

### **Additional Predisposing, Enabling, and Need Factors**

In addition to past-year AUD, respondent-reported predisposing factors assessed at Wave 1 included sex, age, race or ethnicity, marital status, education, and family histories of alcoholism and drug problems. AUD and drug use disorder (DUD) treatment were examined for the 12 months preceding the Wave 1 interview.

Enabling factors, including potential barriers, that were ascertained at Wave 1 included region and urbanicity of residence, both of which can be regarded as proxies for the availability of services (Phillips, Morrison, Andersen, & Aday, 1998). Marriage to or cohabitation with an alcoholic spouse or partner, number of children 15 years of age or younger living in the household, past-year employment and personal income, and current health insurance coverage were also examined. Respondents were classified as having public, private, or no insurance, based on whether they reported 4 types of coverage: Medicare; Medicaid; CHAMPUS, CHAMPVA, the Veterans Affairs system, or other military health care; and health insurance obtained by the respondent, a spouse, or a family member privately or through a current or former employer or union. Respondents reporting both public (Medicare, Medicaid, or military sources) and private coverage were coded as privately insured.

In addition to antisocial syndromes and other psychiatric comorbidity, need factors assessed in the NESARC included age at first AUD onset, Wave 1 past-year AUD symptom count (obtained by summing the numbers of past-year abuse and dependence symptoms), past-year drug use, and average daily volume (ADV) of ethanol intake during the 12 months preceding the Wave 1 interview. Respondents were asked to indicate their frequency of drinking, typical and largest quantities consumed, usual drink size, and main brand consumed, for each beverage type (coolers, beer, wine, and spirits). Ethanol intake per day was estimated for each beverage type based on quantity, frequency (incorporating information for atypically heavy drinking days), and ethanol content per drink, and summed across beverage types.

### **Statistical Analysis**

The analysis sample for this report consists of the 3875 respondents to both waves of the NESARC who had prevalent AUDs during follow-up and were diagnosed with ASPD (n=358),

AABS (n=1035), or no antisocial syndrome (n=2482) at Wave 1. The decision to focus on prevalent rather than incident AUDs over follow-up reflected sample size considerations and the often substantial delays in seeking AUD treatment after first onset of disorder (Wang et al., 2005; Kessler, Olfson, & Berglund, 1998). Categorical predisposing, enabling, and need characteristics and treatment utilization were compared by antisocial syndrome using standard contingency table approaches and  $\chi^2$  statistics. Continuous predictors were compared using normal-theory one-way analyses of variance. Multivariable logistic regression was used to predict AUD treatment utilization over follow-up by antisocial syndrome, controlling for predisposing, enabling, and additional need characteristics (Hosmer & Lemeshow, 2000). All main effects were entered into the models simultaneously and odds ratios (ORs) and 95% confidence intervals (CIs) were estimated. To test whether associations of antisocial syndrome with treatment differed between men and women, a sex by antisocial syndrome product term was added to the main effects model with an  $\alpha$  to stay of 0.05. All analyses were conducted using SUDAAN (Research Triangle Institute, 2006), which adjusts for design characteristics of complex surveys like the NESARC using Taylor series linearization.

## Results

### Wave 1 Predisposing, Enabling, and Need Characteristics by Antisocial Syndrome

Baseline characteristics of respondents with AUDs by antisocial syndrome are given in Table 1. In these unadjusted analyses, highly significant associations with antisocial syndrome were observed for almost all predisposing factors, including male sex, age less than 45 years old, and high school or less education, as well as past-year AUD, family histories of alcoholism and drug problems, and past-year AUD or DUD treatment. In general, the highest prevalences of these characteristics were observed in respondents with ASPD and the lowest among nonantisocial respondents.

Enabling characteristics associated with antisocial syndrome included low past-year income and a currently alcoholic spouse or significant other. Respondents with ASPD were least likely to report current private health insurance but most likely to report public or no coverage, whereas the opposite was true for respondents with no antisocial syndrome. Similarly, respondents with ASPD were most likely and nonantisocial respondents least likely to report a currently alcoholic spouse or partner. Though differences were modest, respondents with AABS were most likely and nonantisocial respondents least likely to report past-year employment. Among need characteristics other than antisociality, prevalences of each class of comorbid disorders and any drug use, as well as AUD symptom count and ADV of past-year ethanol intake, were highest among respondents with ASPD, intermediate among those with AABS, and lowest among nonantisocial respondents. Conversely, age at first onset of AUD was lowest among respondents with ASPD and highest among respondents with no antisocial syndrome.

### AUD Treatment Over Follow-Up

**Unadjusted**—As shown in Table 1, prevalences of treatment over follow-up ranged from 8.2% among nonantisocial respondents to 18.1% among those ASPD. As shown in Table 2, ASPD (OR=2.5, 95% CI=1.67–3.65) but not AABS (OR=1.4, 95% CI=0.97–1.87) predicted AUD treatment during follow-up in the unadjusted analysis; the sex by antisocial syndrome interaction was not significant. Predisposing predictors of treatment included age at least 65 years (versus 18–29 years), separated, divorced, or widowed marital status, a past-year AUD, family histories of alcoholism and drug problems, and past-year AUD and DUD treatment. Enabling predictors positively associated with AUD treatment included past-year personal income  $\leq$  \$19,999 and public insurance coverage; residence in the Northeast predicted reduced odds of utilization. Almost all need characteristics other than antisocial syndrome predicted

treatment, including past-year mood, anxiety, nicotine dependence, and drug use disorders, additional PDs, AUD symptom count, ADV of ethanol, and drug use.

**Adjusted**—In multivariable analyses, neither antisocial syndrome predicted treatment; the sex by antisocial syndrome interaction was not significant. The strongest independent predictor of treatment was Wave 1 past-year AUD treatment; male sex was also a predisposing predictor. Among enabling characteristics, residence in the Northeast (negatively), and among need characteristics, past-year nicotine dependence and AUD symptom count (each positively), predicted help seeking.

## Discussion

Contrary to study hypotheses and findings from previous cross-sectional studies (Glanz et al., 2002; Goldstein, Dawson, Saha, et al., 2007; Murray et al., 2000), neither ASPD nor AABS predicted AUD treatment during follow-up after adjustment for additional need, predisposing, and enabling characteristics. The 5 respondent characteristics that did independently predict utilization included 2 reflecting need, i.e., greater severity or complexity of respondents' addictive disorders (nicotine dependence and AUD symptom count; Falk, Yi, & Hiller-Sturmöfel, 2006; Grant, 1996). One was an enabling factor (residence in the Northeast), and 2 were predisposing factors (male sex and Wave 1 past-year AUD treatment).

### Possible Mediators and Moderators of Associations between Antisociality and Treatment

In attempting to understand our findings, we examined a number of potential mediators, as well as moderators (or effect modifiers), of associations between antisociality and prospectively observed treatment. We chose our candidate mediators and effect modifiers based primarily on associations we observed with antisocial syndrome or with treatment, or on subject-matter considerations from prior literature.

Because the strongest predictor of treatment over follow-up was Wave 1 past-year treatment, and because it was highly associated with antisocial syndrome, we first considered whether this predisposing factor could have mediated associations between antisociality and prospectively ascertained treatment, comparing ORs obtained from models with and without Wave 1 past-year treatment included as a covariate. ORs were virtually identical across models for all predictors except Wave 1 past-year DUD treatment (OR=1.4 in the model with, and OR=2.4 in the model without, Wave 1 past-year AUD treatment); however, the ORs for DUD treatment were nonsignificant in both models. We also tested for modification of associations with antisociality by Wave 1 past-year AUD treatment, fitting a model that included a Wave 1 past-year AUD treatment x antisocial syndrome interaction. This interaction was not significant, indicating similar lack of association of antisociality with AUD treatment over follow-up regardless of whether or not respondents had Wave 1 past-year treatment.

Though it did not independently predict AUD treatment over follow-up, the need factor of age at first AUD onset was strongly associated with baseline antisocial syndrome, earliest in respondents with ASPD and latest in nonantisocial respondents. We therefore investigated whether age at onset might modify associations of antisocial syndromes with AUD treatment over follow-up by testing for an age at first onset x antisocial syndrome interaction. The interaction was nonsignificant, indicating no evidence for differential associations of antisociality with prospectively ascertained treatment by age at first AUD onset.

While at least half of individuals with AUDs in the general population eventually seek treatment for these disorders, substantial delays are common (Wang et al., 2005; Kessler et al., 1998). These delays may reflect affected individuals' avoidance of treatment until they have experienced substantial and severe dysfunction (Bucholz, Homan, & Helzer, 1992), or are



coerced by the criminal justice system or significant others (e.g., Polcin & Weisner, 1999; Gregoire & Burke, 2004). Delays might be shorter among antisocial respondents because behaviors symptomatic of antisocial syndromes, including alcohol-related criminal offenses and irresponsibility toward significant others, may lead to coerced enrollment. We examined this possibility by conducting ancillary analyses in which we replaced age at first onset with years since AUD onset, defined as the difference between Wave 1 age and age at first AUD onset. Values were set to 0 for respondents whose first onset of diagnosable AUD occurred during follow-up (i.e., incident cases). ORs for antisocial syndromes and all other predictors remained virtually identical. Time since onset also did not independently predict treatment, nor did it interact significantly with antisocial syndromes.

Despite the lack of interaction of age at first AUD onset or time since onset with antisociality, the lack of prediction of AUD treatment over follow-up by Wave 1 antisocial syndrome could reflect differential associations of antisociality with utilization across the lifespan or clinical course of AUDs. Only limited proportions of respondents' lifespans and clinical AUD trajectories could be observed prospectively in the NESARC. However, as a partial test of possibly differential phase-specific associations of antisociality with AUD treatment, we fit logistic regression models in which we replaced Wave 1 past-year diagnostic, treatment, drug use, and ethanol intake covariates with their lifetime counterparts. ORs for antisocial syndromes and other predictors were similar regardless of the time frames for the psychiatric and substance use covariates. Thus, while previous cross-sectional findings of increased lifetime AUD treatment among NESARC respondents with ASPD and AABS (Goldstein, Dawson, Saha, et al., 2007) may be real and specific to life stages or to phases in clinical trajectories of AUDs, they could also reflect retrospective recall or reporting biases or residual confounding. Future investigations of AUD treatment utilization in the general population would benefit from longer periods of prospective follow-up, preferably starting in adolescence.

### **Independent Predisposing and Enabling Predictors**

Concerning independent predisposing predictors, the association of treatment over follow-up with Wave 1 past-year treatment is consistent with the well-documented role of past help seeking in subsequent utilization (Andersen, 1995, 2008). Conversely, and as noted previously, evidence regarding help seeking by sex includes higher utilization by men (Cohen et al., 2007; Kaskutas et al., 1997; Weisner et al., 1995), higher utilization by women (Teesson et al., 2006), and no sex differences (Kessler et al., 2001). In this study, while the sex differential was modest, it suggests that women may still face unique barriers to AUD treatment. Previous studies have identified child care issues and lack of support from significant others as barriers to AUD treatment for women (Grant, 1997; Wu and Ringwalt, 2004), but neither an alcoholic significant other nor minor children in the household at baseline independently predicted treatment over follow-up among NESARC respondents. As expected, given the lack of significant main effects of these variables, no significant interactions of either one with sex were observed in ancillary analyses. A detailed prospective examination of a broad range of barriers to AUD treatment, including sex differences, is being conducted separately (Goldstein et al., in preparation).

### **Study Limitations**

Limitations of the study include its relatively short follow-up period. While reducing the potential for recall biases, it also constrained the time "at risk" for help seeking and limited the proportions of respondents' life course and AUD trajectories that could be observed. As well, most specific sources of help were utilized at low rates, precluding separate analyses by provider type. In addition, while previous studies (Edlund, Booth, & Feldman, 2009; Edlund, Unützer, & Curran, 2006; Mojtabai, Olfson, & Mechanic, 2002) have identified perceived need for AUD treatment as a key correlate of utilization, NESARC respondents were only asked

about perceived need with respect to subjective unmet need (thinking they should see someone for help with drinking, *but* not doing so). Some previous studies (e.g., Edlund et al., 2009; Mojtabai et al., 2002) defined perceived need as either actual utilization or subjective unmet need. However, this definition may overestimate perceived need for AUD treatment because respondents may have been court stipulated or coerced by significant others into treatment even when they did not believe they needed it (Polcin & Weisner, 1999; Gregoire & Burke, 2004); the NESARC did not distinguish voluntary from nonvoluntary utilization.

## Implications

That Wave 1 antisocial syndrome did not independently predict treatment seeking over follow-up among adults with prevalent AUDs may reflect the strong associations of both antisociality and treatment with other predisposing, enabling, and need characteristics, particularly Wave 1 past-year AUD treatment and additional psychiatric comorbidity. As noted previously, cross-sectional studies (e.g., Cohen et al., 2007; Kessler et al., 1996) have found that individuals with AUDs plus additional psychiatric disorders are more likely to seek AUD treatment than individuals with pure AUDs. In addition, while ASPD and most other comorbid Wave 1 past-year disorders predicted treatment in unadjusted analyses, only nicotine dependence did so in the multivariable models. Thus, while ASPD and AABS are documented as severity factors and negative prognostic factors for treatment outcomes in AUDs, it is unclear whether antisocial syndromes have unique implications relative to other comorbid disorders with respect to treatment seeking. As noted previously, additional prospective studies with longer periods of follow-up are warranted to examine whether antisociality and treatment utilization are associated in ways dependent on age, developmental phase, or stage in AUD trajectory.

Clinical and programmatic implications, including those specifically for psychiatric nurses, reflect the fact that treatment utilization overall was low and, while predicted in part by need, was also predicted in part by predisposing and enabling sociodemographic factors. Strides have been made in addressing treatment barriers specific to women (e.g., Grella, 2009), but further efforts to understand and eliminate sex-related disparities appear indicated. Attempts to promote equitable distribution of AUD treatment might also beneficially focus on characterizing and eliminating regional disparities. More generally, continued efforts to improve AUD case finding, and provision of or referral to appropriate, evidence-based treatment within inpatient, outpatient, and public behavioral health practice settings are warranted. Given the substantial comorbidity between AUDs and other psychiatric diagnoses, including antisocial syndromes as well as mood, anxiety, other substance use, and other personality disorders, an important component of this approach involves comprehensive diagnostic assessment, regardless of the presenting complaint and regardless of whether patients present to mental health, addiction, or general medical settings, with appropriate treatment offered for all identified disorders. This may be particularly crucial for women, who present disproportionately to settings other than addiction treatment with addictive disorders as significant aspects of their clinical situation (e.g., Chander & McCaul, 2003; Mojtabai, 2005; Weisner & Schmidt, 1992). Because nurses are likely to have more contact time with particular patients than psychiatrists or other practitioners, and because of the patient-centered, whole-person perspectives of nursing practice (e.g., Clark, 2004), psychiatric nurses in diverse practice settings are uniquely positioned to identify and intervene with patients who have or are at high risk for diagnosable AUDs. Therefore, increased emphasis in nursing education on developing proficiency in state-of-the-science screening, diagnostic, and intervention approaches, and their applications within clinical and ethical frameworks most appropriate to nursing practice, is indicated.

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**Table 1**

Wave 1 Sociodemographic and Clinical Characteristics of NESARC Respondents with a DSM-IV Alcohol Use Disorder During the Follow-Up Period by Wave 1 Antisocial Behavioral Syndrome

Characteristic, % or Mean (SE)	ASPD <sup>a</sup> (n=358)	AABS <sup>b</sup> (n=1035)	No Antisocial Syndrome (n=2482)	$\chi^2$ or F (d.f.)	p-value
<b>Predisposing</b>					
Male	79.5% (2.55)	73.2% (1.63)	66.8% (1.20)	18.24 (2)	0.0003
Race/ethnicity				7.87 (8)	0.4566
White	70.3% (3.46)	76.2% (1.86)	75.1% (1.61)		
Black	10.3% (1.97)	10.3% (1.15)	9.7% (0.88)		
Native American	5.8% (1.88)	2.5% (0.62)	2.0% (0.41)		
Asian/Pac. Isl.	2.2% (0.98)	2.0% (0.61)	2.1% (0.54)		
Hispanic	11.3% (2.24)	9.0% (1.37)	11.1% (1.25)		
Age, years				48.62 (6)	<0.0001
18–29	50.3% (3.11)	39.9% (1.86)	39.1% (1.24)		
30–44	31.5% (2.88)	38.4% (1.87)	33.3% (1.23)		
45–64	17.7% (2.49)	20.6% (1.51)	23.3% (0.98)		
≥ 65	0.4% (0.33)	1.1% (0.35)	4.2% (0.44)		
Marital status				9.56 (4)	0.0599
Married/cohabiting	42.0% (3.32)	45.8% (1.87)	49.9% (1.24)		
Separated/divorced/widowed	16.3% (2.19)	15.6% (1.22)	12.2% (0.69)		
Never married	41.8% (3.34)	38.7% (1.89)	37.9% (1.26)		
Education				32.27 (4)	<0.0001
Less than high school	23.0% (2.71)	12.3% (1.23)	10.3% (0.82)		
High school graduation	37.5% (3.19)	28.1% (1.82)	28.7% (1.18)		
Postsecondary education	39.5% (3.09)	59.6% (2.04)	61.0% (1.25)		
Any past-year alcohol use disorder	60.4% (3.49)	54.9% (1.71)	28.6% (1.09)	102.96 (2)	<0.0001
Family history of alcoholism	80.8% (2.50)	73.6% (1.70)	56.3% (1.47)	67.58 (2)	<0.0001
Family history of drug problems	52.4% (3.36)	36.4% (1.80)	22.9% (0.97)	66.38 (2)	<0.0001
Any past-year alcohol use disorder treatment	8.9% (1.74)	6.2% (0.86)	2.0% (0.34)	31.10 (2)	<0.0001
Any past-year drug use disorder treatment	5.9% (1.65)	1.9% (0.55)	0.3% (0.12)	18.70 (2)	0.0003
<b>Enabling</b>					
Region of residence				10.68 (6)	0.1171
Northeast	13.6% (3.10)	15.8% (2.58)	19.3% (3.32)		
Midwest	27.3% (4.07)	29.3% (3.32)	26.6% (3.83)		
South	30.9% (4.02)	32.0% (3.16)	34.0% (3.34)		
West	28.2% (4.25)	23.0% (3.33)	20.1% (3.42)		
Urban residence	80.1% (3.10)	78.4% (2.16)	79.5% (1.90)	0.57 (2)	0.7534
Employed in past year	90.0% (2.06)	92.2% (1.01)	89.2% (0.73)	6.52 (2)	0.0448
Past-year personal income				25.74 (6)	0.0011
≤ \$19,999	55.8% (3.56)	42.0% (1.86)	41.2% (1.31)		
\$20,000–\$34,999	23.7% (2.84)	25.6% (1.54)	24.2% (1.07)		



Characteristic, % or Mean (SE)	ASPD <sup>a</sup> (n=358)	AABS <sup>b</sup> (n=1035)	No Antisocial Syndrome (n=2482)	$\chi^2$ or F (d.f.)	p-value
\$35,000-\$69,999	15.9% (2.29)	25.4% (1.64)	24.5% (1.09)		
≥ \$70,000	4.7% (1.40)	7.0% (0.99)	10.1% (0.81)		
Current health insurance coverage				34.67 (4)	<0.0001
Private	51.8% (3.28)	66.9% (1.72)	72.0% (1.30)		
Public	13.3% (2.23)	9.0% (1.01)	5.7% (0.51)		
None	35.0% (3.27)	24.1% (1.62)	22.4% (1.22)		
Currently married to or cohabiting with alcoholic spouse or partner	3.5% (1.64)	2.0% (0.45)	1.0% (0.20)	6.93 (2)	0.0372
Children age 15 or younger in household				6.68 (4)	0.1540
None	58.4% (3.11)	62.1% (1.75)	65.6% (1.29)		
One	21.3% (2.53)	17.1% (1.52)	15.8% (0.86)		
2+	20.3% (2.60)	20.8% (1.38)	18.6% (0.93)		
<b>Need</b>					
Any past-year mood disorder	35.0% (2.89)	21.3% (1.35)	8.5% (0.74)	81.73 (2)	<0.0001
Any past-year anxiety disorder	31.4% (3.16)	19.2% (1.51)	9.0% (0.72)	52.34 (2)	<0.0001
Any past-year drug use disorder	31.6% (3.10)	12.7% (1.24)	2.9% (0.35)	70.45 (2)	<0.0001
Past-year nicotine dependence	58.5% (3.17)	38.6% (1.90)	17.5% (1.05)	105.65 (2)	<0.0001
Past-year pathological gambling	1.7% (0.78)	1.0% (0.39)	0.2% (0.09)	7.30 (2)	0.0315
Additional personality disorder	62.5% (3.01)	42.9% (1.90)	25.7% (1.11)	82.26 (2)	<0.0001
Age at first onset of alcohol use disorder	21.2 (0.59)	22.6 (0.31)	29.2 (0.32)	121.11 (2,65)	<0.0001
Total past-year alcohol use disorder symptoms	6.1 (0.46)	4.1 (0.16)	2.0 (0.09)	110.40 (2,65)	<0.0001
Average daily ethanol intake, oz., past year	2.31 (0.38)	1.23 (0.07)	0.91 (0.04)	17.09 (2,65)	<0.0001
Any drug use, past year	50.0% (3.56)	32.5% (1.72)	11.1% (0.80)	101.42 (2)	<0.0001
Any alcohol use disorder treatment over follow-up	18.1% (2.46)	10.7% (1.16)	8.2% (0.72)	14.47 (2)	0.0015

<sup>a</sup> ASPD: antisocial personality disorder.

<sup>b</sup> AABS: adulthood antisocial behavioral syndrome

**Table 2**

Odds Ratios and 95% Confidence Intervals for Alcohol Use Disorder Treatment by Wave 1 Predisposing, Enabling, and Need Characteristics (n=3875)

Wave 1 Predictor	Odds Ratios (95% Confidence Intervals)	
	Unadjusted <sup>a</sup>	Adjusted <sup>b</sup>
Antisocial behavioral syndrome		
ASPD <sup>c</sup>	2.5 (1.67–3.65)	0.9 (0.49–1.67)
AABS <sup>d</sup>	1.4 (0.97–1.87)	0.8 (0.53–1.14)
None (referent)	1.0	1.0
<b>Predisposing</b>		
Male	1.2 (0.91–1.56)	1.4 (1.01–1.93)
Race/ethnicity		
White (referent)	1.0	1.0
Black	1.0 (0.64–1.46)	0.9 (0.51–1.48)
Native American	1.0 (0.45–2.25)	0.7 (0.29–1.59)
Asian/Pac. Isl.	1.1 (0.31–3.87)	1.1 (0.24–5.14)
Hispanic	1.0 (0.66–1.45)	0.8 (0.48–1.27)
Age, years		
18–29(referent)	1.0	1.0
30–44	1.2 (0.91–1.65)	1.3 (0.84–2.01)
45–64	1.1 (0.75–1.65)	1.3 (0.74–2.27)
≥ 65	0.4 (0.17–0.97)	0.3 (0.10–1.13)
Marital status		
Married/cohabiting (referent)	1.0	1.0
Separated/divorced/widowed	1.5 (1.03–2.08)	1.0 (0.70–1.50)
Never married	1.2 (0.88–1.67)	0.9 (0.60–1.44)
Education		
Less than high school	1.4 (0.95–1.92)	0.9 (0.57–1.43)
High school graduation	1.3 (0.94–1.74)	1.0 (0.66–1.40)
Postsecondary education (referent)	1.0	1.0
Any Wave 1 past-year alcohol use disorder	1.7 (1.33–2.18)	0.8 (0.54–1.15)
Family history of alcoholism	1.5 (1.08–1.94)	1.0 (0.71–1.38)
Family history of drug problems	1.4 (1.05–1.84)	1.0 (0.75–1.40)
Any past-year alcohol use disorder treatment	9.8 (6.35–14.99)	4.5 (2.38–8.63)
Any past-year drug use disorder treatment	6.9 (3.13–15.06)	1.4 (0.43–4.37)
<b>Enabling</b>		
Region of residence		
Northeast	0.6 (0.39–0.88)	0.5 (0.32–0.86)
Midwest	1.0 (0.70–1.33)	1.0 (0.66–1.42)
South	0.7 (0.50–1.04)	0.7 (0.44–1.03)
West (referent)	1.0	1.0

Wave 1 Predictor	Odds Ratios (95% Confidence Intervals)	
	Unadjusted <sup>a</sup>	Adjusted <sup>b</sup>
Urban residence	1.0 (0.73–1.26)	1.2 (0.85–1.63)
Employed in past year	0.7 (0.45–1.07)	0.7 (0.37–1.19)
Past-year personal income		
≤ \$19,999	1.8 (1.01–3.15)	1.2 (0.57–2.28)
\$20,000–\$34,999	1.6 (0.88–2.81)	1.2 (0.67–2.21)
\$35,000–\$69,999	1.0 (0.57–1.73)	0.8 (0.46–1.45)
≥ \$70,000 (referent)	1.0	1.0
Current health insurance coverage		
Private (referent)	1.0	1.0
Public	2.3 (1.47–3.61)	1.4 (0.72–2.55)
None	1.3 (0.98–1.79)	1.0 (0.66–1.39)
Currently married to or cohabiting with alcoholic spouse or partner	1.3 (0.43–3.94)	0.7 (0.17–2.89)
Children age 15 or younger in household		
None (referent)	1.0	1.0
One	0.7 (0.48–1.06)	0.8 (0.47–1.24)
2+	1.1 (0.80–1.52)	1.3 (0.84–2.01)
<b>Need</b>		
Any Wave 1 past-year mood disorder	2.0 (1.50–2.78)	0.9 (0.63–1.36)
Any Wave 1 past-year anxiety disorder	2.1 (1.47–3.01)	1.3 (0.83–1.94)
Any Wave 1 past-year drug use disorder	2.8 (1.89–4.20)	1.3 (0.75–2.31)
Wave 1 past-year nicotine dependence	2.5 (1.95–3.27)	1.6 (1.17–2.29)
Wave 1 past-year pathological gambling	2.7 (0.59–12.01)	1.9 (0.32–11.33)
Additional personality disorder <sup>e</sup>	2.1 (1.58–2.67)	1.3 (0.98–1.78)
Age at first onset of alcohol use disorder, per year	1.0 (0.98–1.00)	1.0 (0.99–1.02)
Total Wave 1 past-year alcohol use disorder symptoms	1.1 (1.09–1.14)	1.1 (1.02–1.11)
Average daily ethanol intake, oz., past year	1.2 (1.12–1.28)	1.1 (0.96–1.15)
Any past-year drug use	2.2 (1.58–3.07)	1.2 (0.80–1.88)

<sup>a</sup>Odds ratios derived from single-predictor logistic regressions of treatment on each Wave 1 predictor.

<sup>b</sup>Odds ratios derived from a multivariable logistic regression model into which all Wave 1 predictors were entered simultaneously.

<sup>c</sup>ASPD: antisocial personality disorder.

<sup>d</sup>AABS: adulthood antisocial behavioral syndrome.

<sup>e</sup>Personality disorders were diagnosed on a lifetime basis only.