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The Epidemiology of Antisocial Behavioral Syndromes in Adulthood: Results from the National Epidemiologic Survey on Alcohol and Related Conditions-III

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Abstract

Objective—To present current, nationally representative U.S. findings on prevalence, correlates, psychiatric comorbidity, disability and treatment of DSM-5 antisocial personality disorder (ASPD) and syndromal adult antisocial behavior without conduct disorder before age 15 (AABS).

Method—Face-to-face interviews with respondents (n=36,309) in the 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions–III. DSM-5 alcohol, nicotine, specific drug use disorders, and selected mood, anxiety, trauma-related, eating, and personality disorders were assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule–5.

Results—Prevalences of ASPD and AABS were 4.3% and 20.3%, highest among male, white, Native American, younger, and unmarried respondents, those with high school or less education, lower incomes, and Western residence. Both antisocial syndromes were significantly associated with 12-month and lifetime substance use, dysthymia/persistent depressive, bipolar I, posttraumatic stress and borderline and schizotypal personality disorders (ORs=1.2-7.0). ASPD was additionally associated with 12-month agoraphobia and lifetime generalized anxiety disorder; AABS, with 12-month and lifetime major depressive and 12-month generalized anxiety disorders. Both were associated with significant disability ($p < 0.001$ to 0.01). Most antisocial respondents were untreated.

Conclusions—One in 4 U.S. adults exhibits syndromal antisocial behavior, with similar sociodemographic and psychiatric correlates and disability regardless of whether onset occurred before age 15, illustrating the clinical and public health significance of both ASPD and AABS. In

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addition to laying groundwork for estimates of social and economic costs, and further etiologic and nosologic research, these findings highlight the urgency of effectively preventing and treating antisocial syndromes, including investigation of whether treatment for comorbidity hastens symptomatic remission and improves quality-of-life outcomes.

Keywords

Antisocial personality disorder; epidemiology; comorbidity

Introduction

Antisocial personality disorder (ASPD) is characterized by a pattern of irresponsible, impulsive, aggressive, and remorseless behaviors beginning by early adolescence and persisting into adulthood. Symptomatic behaviors, involving violence, irresponsibility, recklessness, and dishonesty, confer enormous psychological, social, legal, and economic burdens on affected individuals, their families and social networks, and the larger society.^{1,2} ASPD is also associated with excess mortality, particularly at relatively young ages and from unnatural causes,³⁻⁷ as well as comorbid mood,^{2,8,9} anxiety,^{2,8-10} substance use,^{2,9,11} and other personality disorders (PDs),¹²⁻¹⁵ suicidality,¹⁶ and medical illnesses and injuries.¹⁷⁻¹⁹

Previous epidemiologic studies based on Diagnostic and Statistical Manual of Mental Disorders – Third Edition (DSM-III),²⁰ Diagnostic and Statistical Manual of Mental Disorders – Third Edition, Revised (DSM-III-R),²¹ and Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV)²² criteria estimated lifetime ASPD prevalence among United States adults at 3% to 5%.^{2,11,23} Since DSM-III, both conduct disorder (CD) before, and syndromal antisocial behavior since, age 15, have been required for the diagnosis. However, syndromal antisocial behavior since, absent CD before, age 15 (adulthood antisocial behavioral syndrome [AABS]; not a DSM diagnosis) is at least as common as ASPD.^{9,11,24} Individuals with AABS display fewer antisocial symptoms in adulthood than those with ASPD,²⁵⁻²⁷ but the groups show few other differences.^{9,18,24,25,27}

ASPD responds poorly to treatment.^{28,29} Nevertheless, symptomatology commonly lessens (improves) or ceases (remits), often in midlife.^{2,7,30-32} In the only prospective study of both DSM-IV ASPD and AABS, adults in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) with both syndromes were similarly likely to remit symptomatically over 3-year follow-up.³³ Even after remission, however, both syndromes predicted poorer health-related quality of life (QOL), greater perceived stress, poorer social connectedness, reduced likelihood of employment, and financial dependency.^{7,32,34}

In addition to being highly prevalent,^{2,8,9,10,11-15} psychiatric comorbidity predicts both symptomatic remission and QOL outcomes of antisocial syndromes. In clinical follow-ups of men with ASPD, predictors of remission included absence of a current alcohol use disorder (AUD) at follow-up.^{32,35} Baseline predictors of persistent antisociality over follow-up in the NESARC included lifetime drug use disorders (DUDs), additional PDs, and attention-deficit/hyperactivity disorder (ADHD).³³ Partly overlapping with those of persistent antisociality, baseline predictors of poorer QOL outcomes among antisocial

NESARC respondents included additional PDs and lifetime ADHD, mood and anxiety disorders, and nicotine dependence.³⁴

Previous epidemiologic studies of antisocial syndromes were based on data collected over 10 years ago. Changes in population composition and historical context, including the severe economic downturn beginning in 2007, terrorism, protracted wars in Iraq and Afghanistan, and their consequences may be associated with changes in relationships of antisocial syndromes to sociodemographic characteristics, disability, and help seeking.^{1,2,36,37} Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5)³⁸ diagnostic criteria for PDs did not change from DSM-IV. However, criteria for most other disorders changed modestly to substantially. Revisions to diagnostic classification may be associated with changes in relationships of antisocial syndromes to comorbidity.

Previous studies measured comorbidity as prevalences or prevalence ratios, unadjusted odds ratios (ORs), or ORs adjusted only for sociodemographic variables, leaving open the possibility that observed associations might reflect additional co-occurring disorders such as AUDs. Considering the seriousness of antisocial syndromes and their consequences, the poor treatment response of ASPD, and the high prevalence, prognostic significance,³²⁻³⁵ and treatability of comorbid conditions,³⁹⁻⁴⁶ whether treatment of comorbidity can hasten symptomatic remission and improve QOL outcomes represents an urgent clinical question. Therefore, identification of unique relationships of antisocial syndromes to specific comorbid disorders, and whether these differ between ASPD and AABS, can inform hypothesis-driven etiologic, nosologic, and treatment studies of both antisocial syndromes and their comorbidities, as well as estimates of social and economic costs, including those related to disability, on which resource-allocation decisions concerning and econometric evaluations of prevention and intervention services may be based.

Accordingly, this study presents comprehensive, recently collected data on prevalences, sociodemographic correlates, DSM-5 psychiatric comorbidity, disability, and treatment seeking for ASPD and AABS from the 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III).⁴⁷ In addition to well-documented associations with sociodemographic characteristics, including male sex, low education and income, and young age, we hypothesized that both syndromes would remain similarly and uniquely associated with externalizing and, more modestly, internalizing comorbidity, after adjustment for sociodemographic characteristics and additional diagnoses.

Methods

Sample

The NESARC-III's target population comprised noninstitutionalized civilian residents aged 18 years of U.S. households and selected group quarters, as detailed elsewhere.⁴⁷ Primary sampling units were counties or groups of contiguous counties; secondary sampling units (SSUs), groups of Census-defined blocks; and tertiary sampling units, households within sampled SSUs, from which eligible respondents were selected. Black, Asian, and Hispanic household members were assigned higher selection probabilities than nonminority individuals. In households (n=1661) with 4 eligible minority adult residents, 2 respondents

were selected. Data were adjusted for nonresponse and weighted to reflect the civilian U.S. population based on the 2012 American Community Survey.⁴⁸ These weighting adjustments compensated adequately for nonresponse.⁴⁹ The total sample size was 36,309, reflecting a household response rate of 72%, a person-level rate of 84%, and an overall rate of 60.1%, similar to other current United States national surveys.^{50,51} All respondents provided informed consent; the entire research protocol was approved by the institutional review boards of the National Institutes of Health and Westat, Inc. Respondents received \$90.00 for their interview participation.

Assessments

The diagnostic interview was the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-5 (AUDADIS-5),⁵² designed to measure DSM-5 AUD, nicotine use disorder (NUD), specific DUDs, and selected mood, anxiety, trauma-related, eating, and personality disorders.

Antisocial Behavioral Syndromes

Consistent with DSM-5, an AUDADIS-5 diagnosis of ASPD required both the specified numbers of antisocial behaviors since, and evidence of CD before, age 15. AABS was defined as meeting all ASPD criteria except CD before age 15. Test-retest reliability of CD and ASPD without the requirement for social/occupational impairment or distress (I/D) were fair ($\kappa=0.46$ for both), but lower when I/D was required: $\kappa=0.24$ for CD; 0.22 for ASPD. ICCs for dimensional CD and ASPD symptom scales were fair to good (0.60–0.70).⁵³

Other Psychiatric Disorders

Mood-related diagnoses included primary major depressive (MDD), dysthymia/persistent depressive, and bipolar I disorders. Anxiety disorders included panic, agoraphobia, social and specific phobias and generalized anxiety (GAD). Consistent with DSM-5, primary AUDADIS-5 mood and anxiety diagnoses excluded substance- and medical illness-induced cases. In addition to mood and anxiety disorders, eating disorders (anorexia nervosa, bulimia nervosa, and binge-eating disorder), schizotypal and borderline PDs, and posttraumatic stress disorder (PTSD) were assessed. PTSD was narrowly defined, requiring 3 subcriteria each for Criteria D and E to be met.

Extensive AUDADIS-5 questions operationalized diagnostic criteria for AUD, NUD, and 10 specific categories of DUDs. Specific DUD diagnoses were aggregated to yield any past-year and any lifetime DUD. Consistent with DSM-5, lifetime AUD, NUD, and DUD diagnoses required 2 of 11 criteria associated with the same substance either in or prior to the past year. Prior-to-past-year diagnoses required clustering of 2 criteria for the same substance in the same year.

As detailed elsewhere,⁵³ test-retest reliability of AUDADIS-5 diagnoses and symptom scales in a large general population sample mainly ranged from fair to excellent. Procedural validity was assessed using the semistructured, clinician-administered Psychiatric Research Interview for Substance and Mental Disorders, DSM-5 version,^{54,55} in a large general

population sample. Concordances between AUDADIS-5 and PRISM-5 diagnoses were mostly fair to good; between their dimensional criteria scales, mainly good to excellent.^{54,55}

Disability

Past-month disability was measured using the 12-Item Short Form Health Survey, version 2 (SF-12 v2),⁵⁶ a reliable and valid measure widely used in population surveys. SF-12 v2 scales included in this study were mental health, social functioning, role emotional functioning, and mental component summary (MCS). Each SF-12 v2 scale score has a mean of 50, standard deviation of ± 10 , and a range of 0-100, lower scores indicating greater disability.

Statistical Analysis

Prevalences of antisocial syndromes by sociodemographic characteristics are based on the total NESARC-III sample. However, associations of antisocial syndromes with disability and comorbidity are examined only among respondents with AUDADIS-5 ASPD, AABS, and no lifetime antisocial syndrome. Respondents with CD who did not progress to ASPD were excluded because there were too few ($n=154$ without, and $n=53$ with, I/D required) to allow meaningful statistical comparisons.

Patterns and magnitudes of associations of antisocial syndromes with sociodemographic characteristics, psychiatric comorbidity, and disability did not differ whether or not CD-associated I/D was required for the ASPD diagnosis. Moreover, the requirement that antisocial respondents report I/D related to CD symptomatology may have suffered from their lack of insight into the effects of symptomatic behaviors on role functioning,⁵⁷⁻⁵⁹ or inaccurate recall of experiences occurring many years earlier. Therefore, we report results based on the ASPD diagnosis without requiring I/D.

Weighted means and percentages were computed for continuous and categorical correlates, respectively, of antisocial syndromes. ORs obtained from multivariable logistic regressions estimated associations of antisocial syndromes with each sociodemographic characteristic, adjusted for all others. Associations with psychiatric comorbidity were estimated 2 ways: adjusted for sociodemographic characteristics, and further adjusted for all other diagnoses, testing the hypothesis that, compared to no lifetime antisocial syndrome, ASPD and AABS are each associated with noncomorbid forms of other disorders of interest. ORs were considered significantly different from one another when their 95% confidence intervals (CIs) did not overlap. Additional multivariable logistic regression models were fit to estimate ORs directly for ASPD versus AABS. Eating disorders were too rare to assess comorbid associations with antisocial syndromes, but were adjusted for in comorbidity analyses. Relationships of antisocial syndromes to SF-12 v2 scales were assessed using linear regression, adjusting for sociodemographic and diagnostic covariates. All analyses utilized SUDAAN, version 11.0,⁶⁰ to account for the NESARC-III's complex sample design.

Results

Prevalence and Sociodemographic Correlates

Prevalence ($\% \pm SE$) of ASPD was 4.3 ± 0.16 ; of AABS, 20.3 ± 0.42 . Table 1 shows prevalences and ORs of antisocial syndromes by sociodemographic characteristics. Odds of both syndromes were significantly elevated in men, Native Americans versus non-Hispanic whites, respondents aged < 65 , and those previously married, with high school education, and with family incomes $< \$70,000$. ORs were significantly greater for ASPD than AABS among men, 18- to 29- (versus 65-) year-olds, and those with family income $< \$20,000$ (versus $\$70,000$). Additionally, odds of ASPD were elevated among respondents with $<$ high school versus postsecondary education; odds of AABS, among never-married versus currently married or cohabiting respondents. Both syndromes were significantly less prevalent among Asian/Pacific Islander and Hispanic respondents, and residents of the Northeast, Midwest, and South (versus West); the inverse association of Southern residence was significantly stronger with ASPD.

Comorbidity

Prevalences ($\% \pm SE$) of comorbid psychiatric disorders are given in Table 2. In both time frames, prevalences of all disorders were intermediate among respondents with AABS between those with ASPD and nonantisocial respondents. Adjusted comorbid associations with ASPD and AABS are shown in Tables 3 (12-month) and 4 (lifetime). With adjustment for sociodemographic characteristics, both syndromes were significantly associated with all 12-month and lifetime disorders; ORs were significantly larger for ASPD except in past-year dysthymia/persistent depressive disorder. After further adjustment for diagnostic covariates, ORs were considerably attenuated. Past-year comorbid associations were strongest with substance use, bipolar I, and posttraumatic stress disorders; lifetime associations, with substance use, bipolar I, and borderline and schizotypal PDs. Past-year associations were no longer significant with either syndrome for panic disorder and social phobia, with ASPD for MDD and GAD, and with AABS for agoraphobia. The remaining ORs no longer differed significantly between ASPD and AABS. Lifetime ORs were no longer significant with either syndrome for panic disorder, agoraphobia, social phobia, and specific phobia, with ASPD for MDD, and with AABS for GAD. The remaining lifetime associations were significantly larger with ASPD than AABS for NUD, PTSD, and borderline and schizotypal PDs.

ORs directly comparing comorbidity among respondents with ASPD versus AABS are shown in Supplementary eTable 1 (12-month) and Supplementary eTable 2 (lifetime). Results were similar to those described above. However, in fully adjusted 12-month analyses, odds were significantly higher among respondents with ASPD than those with AABS for NUD, bipolar I, and PTSD, whereas the 95% CIs overlapped between ORs associated with ASPD and AABS (each versus no antisocial syndrome). Similarly, in fully adjusted lifetime analyses, odds were significantly elevated among respondents with ASPD versus AABS for any DUD and bipolar I, whereas the 95% CIs overlapped between ORs for ASPD and AABS.

Disability and Treatment

After adjustment for sociodemographic and diagnostic covariates, respondents with ASPD had significantly lower role emotional functioning scores, and those with AABS had significantly lower mental health, social functioning, role emotional functioning and MCS scores, than nonantisocial respondents (Table 5). Significantly more respondents with ASPD than with AABS reported treatment for antisocial behavior since age 15 (% \pm SE: 27.2 \pm 1.16 versus 12.6 \pm 0.58; $\chi^2(1)=127.84$, $p<0.0001$).

Discussion

The lifetime prevalences of DSM-5 ASPD and AABS—4.3% and 20.3%, respectively—represented 10,188,286 and 47,681,377 U.S. adults with syndromal antisocial behavior since age 15. An unknown number of additional persons in their families and communities have also experienced adverse health, economic, legal, and social impacts from antisocial adults' symptomatic behaviors. In fully adjusted analyses, AABS and ASPD were associated with similar, broadly ranging psychiatric comorbidity and disability.

The prevalence of ASPD falls within the range of previous general population estimates (3% to 5%)^{2,11,23} That of AABS is somewhat higher (2% to 16%),^{9,11,24} likely reflecting differences in design and methodology, assessment, and diagnostic criteria across surveys. However, the difference between present and previous studies is relatively modest, suggesting that factors such as recent economic crises, terrorism, and military operations are not strongly associated with changes in antisocial syndromes, their comorbidity, disability, or associated help seeking, at least in the short to medium term. Future research should examine possible longer-term influences of historical adversities on these domains.

Study hypotheses concerning sociodemographic and clinical correlates were generally supported. Consistent with previous findings,^{2,9,11} both syndromes were inversely related to age, education, past-year income, and residence in regions other than the West. ORs were significantly greater in respondents with ASPD than those with AABS only for the youngest age group, the lowest education and income, and Southern residents. Men were overrepresented among both antisocial groups, particularly respondents with ASPD, compatible with later onsets of antisociality in girls.^{61,62} Our findings, like those of Compton et al.,¹¹ identified reduced odds of both syndromes among Asians and Pacific Islanders and Hispanics, and of AABS among Blacks, but elevated odds of both among Native Americans. Taken together, these results indicate the need to characterize risk and protective factors, and underlying mechanisms, related to sociodemographic characteristics to improve understanding of the etiologies of ASPD and AABS and tailor prevention and intervention by sex, age, developmental phase, and cultural appropriateness to targeted subgroups.

After adjustment for sociodemographic and diagnostic covariates, both ASPD and AABS were significantly associated with a broad range of substance use, mood, posttraumatic stress, and borderline and schizotypal personality disorders. When CIs around ORs for ASPD and AABS, each versus no antisocial syndrome, were compared, no past-year associations differed significantly, though some overlaps, particularly for NUD, were

narrow; ORs directly comparing ASPD versus AABS showed significant differences only for NUD, bipolar I, and PTSD. Based on 95% CIs, lifetime associations of ASPD were significantly greater with only NUD, PTSD, and borderline and schizotypal PDs; ORs directly comparing ASPD versus AABS showed significant differences additionally for DUD and bipolar I. Stronger associations and significantly greater ORs for ASPD with adjustment only for sociodemographic variables suggest that factors common to antisocial syndromes and comorbid disorders partly explain both strengths and variations by antisocial syndrome in these relationships. However, the persistence of significant associations, and differences between ASPD and AABS for several disorders, after adjustment for diagnostic covariates, suggest potentially important, unique, disorder-specific neurobiological or psychosocial mechanisms.

Fewer and less consistent fully adjusted associations were observed between antisocial syndromes and anxiety disorders, particularly lifetime phobias, at variance with previous reports.^{2,8-10,63-65} As noted above, however, only 1 prior study¹⁰ accounted for additional co-occurring disorders. The lack of fully adjusted associations between antisocial syndromes and most anxiety disorders is also compatible with both deficits in fear conditioning among psychopaths and individuals with CD and ASPD,⁶⁶⁻⁶⁸ and the prominence of impulsivity in antisocial syndromes versus behavioral inhibition associated with most anxiety disorders.⁶⁹

Consistent with previous findings,^{34,70} both antisocial syndromes were associated with past-month disability. Mean scores on all SF-12 v2 scales were lower among respondents with ASPD than those with AABS. However, after adjustment for sociodemographic and diagnostic covariates, associations were significant with AABS on all scales, but with ASPD only on role emotional functioning, possibly reflecting larger standard errors associated with ASPD than with AABS because of lower prevalence of the former.

One in 4 respondents with ASPD and 1 in 8 with AABS reported treatment for antisocial behavior since age 15. To our knowledge, only 1 other general population study² examined help seeking in ASPD, finding that 14.5% of affected respondents had consulted a doctor about antisocial behavior. Low treatment rates may reflect affected individuals' lack of insight into the seriousness of their problems, lack of desire to conform to providers' rules, actual or perceived negativity from providers toward them, or lack of effective interventions.¹ Moreover, AABS can only be coded as an "other condition that may be a focus of clinical attention."³⁸ Nevertheless, these findings indicate that many antisocial adults have comorbid disorders for which they may be more likely to seek treatment, highlighting the need for comprehensive diagnostic assessment in both mental health and substance use disorder treatment settings, and provision of appropriate interventions for all identified disorders. Further research is needed to determine whether empirically supported treatments, particularly for internalizing disorders, require modification for antisocial patients.

Study limitations include the NESARC-III's cross-sectional design. Prospective investigations are needed to assess clinical course of antisocial syndromes, predictors, and underlying mechanisms. Furthermore, the NESARC-III's target population comprised civilian residents of households and selected group quarters. Therefore, it may not have

captured the most severely antisocial individuals, e.g., those most likely to be institutionalized in prisons or forensic psychiatric facilities, likely leading to underestimation of prevalences of ASPD and AABS. Antisocial respondents may also underreport socially disvalued behaviors.⁷¹ However, Cottler et al.⁷² found reliability of DSM-III-R antisocial symptom reporting no worse among “habitual liars” than among “non-liars,” and we can identify no obvious disincentives to veracity, particularly given the NESARC-III’s rigorous confidentiality protections.

Despite these limitations, the NESARC-III is the first epidemiologic survey of DSM-5 psychopathology in U.S. adults. Based on a large, nationally representative sample, it provides current, comprehensive information on a broad range of common mental disorders, incorporates a well-validated measure of functioning, and includes detailed assessments of help seeking. That 1 in 4 U.S. adults exhibit syndromal antisocial behavior, with similar sociodemographic and clinical correlates whether onset occurred before or since age 15, illustrates the seriousness of both ASPD and AABS. These results add to the evidence⁷³ questioning the requirement of CD before age 15 for the ASPD diagnosis. In addition to laying groundwork for estimates of social and economic costs, further etiologic and nosologic research, and characterization of mechanisms underlying disability, these findings highlight the need for effective prevention and treatment of antisocial syndromes. Although they characteristically improve or remit in mid- to late life, by then their damage, much of it irreparable, has been done to affected individuals’ employability, family and social relationships, and QOL.³⁴

Empirically supported interventions for CD^{74,75} are resource intensive and require sustained, active participation by targeted youth and their families; therefore, identifying effective strategies that are simpler to implement may yield substantial payoffs. Meanwhile, pragmatic effectiveness trials are also needed to determine the impacts of treatment of comorbidity on the clinical course of antisocial syndromes in adults.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Clinical Points

- Antisocial personality disorder (ASPD) is associated with substantial clinical, public health, and economic burden, reflecting both its symptomatic behaviors and high rates of psychiatric and medical comorbidities. Though not a DSM diagnosis, syndromal antisocial behavior since age 15 without conduct disorder before age 15 (AABS) is at least as common as, and shows few differences in clinical presentation from, ASPD.
- Both ASPD and AABS were significantly associated with 12-month and lifetime substance use, mood, posttraumatic stress, and borderline and schizotypal personality disorders, as well as significant disability. Associations of ASPD and AABS with 12-month and lifetime anxiety disorders were less consistent.
- While clinical benefits of evidence-based treatment of comorbid disorders have been well documented, future research is needed to determine whether these benefits include hastening symptomatic remission and improving quality of life outcomes of antisocial syndromes.

Table 1
Lifetime Prevalences and Odds Ratios^a of DSM-5 Antisocial Behavioral Syndromes in Adulthood by Sociodemographic Characteristics

Characteristic	Prevalence (% , SE)		Odds Ratio (95% Confidence Interval)	
	ASPD (n = 1600)	AABS (n = 7470)	ASPD versus No Antisocial Syndrome	AABS versus No Antisocial Syndrome
Total	4.3 (0.16)	20.3 (0.42)	_ <i>b</i>	_ <i>b</i>
Sex				
Men	6.4 (0.27)	25.2 (0.53)	3.5 (3.11-4.03)	2.1 (1.94-2.23)
Women	2.4 (0.14)	15.7 (0.46)	1.0 (referent)	1.0 (referent)
Race/ethnicity				
White	4.3(0.21)	21.6 (0.52)	1.0 (referent)	1.0 (referent)
Black	5.3 (0.34)	22.6 (0.87)	1.0 (0.83-1.23)	0.9 (0.77-0.98)
Native American	11.9 (1.85)	30.3 (3.34)	3.0 (1.97-4.45)	1.6 (1.19-2.16)
Asian/Pacific Islander	1.9 (0.33)	8.3 (0.82)	0.3 (0.18-0.39)	0.3 (0.22-0.34)
Hispanic	4.0 (0.30)	15.9 (0.65)	0.5 (0.39-0.59)	0.5 (0.43-0.55)
Age, years				
18-29	5.8 (0.37)	23.2 (0.62)	5.0 (3.70-6.76)	3.0 (2.67-3.42)
30-44	5.0 (0.31)	23.8 (0.63)	4.9 (3.71-6.47)	3.4 (2.99-3.88)
45-64	4.2 (0.23)	20.4 (0.67)	3.5 (2.62-4.58)	2.5 (2.21-2.79)
65	1.8 (0.22)	11.2 (0.61)	1.0 (referent)	1.0 (referent)
Marital status				
Married/cohabiting	3.6 (0.20)	17.9 (0.47)	1.0 (referent)	1.0 (referent)
Widowed/separated/divorced	4.7 (0.28)	22.8 (0.69)	1.6 (1.33-1.84)	1.5 (1.39-1.63)
Never married	5.8 (0.33)	24.0 (0.68)	1.0 (0.87-1.23)	1.1 (1.01-1.22)
Education				
Less than high school	6.2 (0.51)	19.8 (0.89)	1.7 (1.37-2.05)	1.1 (0.97-1.25)
High school	5.1 (0.30)	22.9 (0.73)	1.3 (1.11-1.56)	1.2 (1.09-1.28)
Postsecondary	3.6 (0.18)	19.3 (0.40)	1.0 (referent)	1.0 (referent)
Family income, \$				
0-19,999	6.3 (0.38)	23.5 (0.78)	2.5 (2.02-3.13)	1.7 (1.50-1.92)
20,000-34,999	4.7 (0.33)	21.7 (0.70)	1.9 (1.48-2.42)	1.5 (1.36-1.72)
35,000-69,999	4.1 (0.24)	20.7 (0.60)	1.5 (1.28-1.87)	1.4 (1.23-1.48)
70,000	2.8 (0.23)	16.6 (0.53)	1.0 (referent)	1.0 (referent)
Urbanicity				
Urban	4.3 (0.16)	20.1 (0.40)	1.0 (0.78-1.24)	1.0 (0.91-1.17)
Rural	4.4 (0.42)	20.8 (0.94)	1.0 (referent)	1.0 (referent)
Region				
Northeast	4.3 (0.25)	19.1 (1.23)	0.7 (0.58-0.87)	0.8 (0.67-0.98)

Characteristic	Prevalence (% , SE)		Odds Ratio (95% Confidence Interval)	
	ASPD (n = 1600)	AABS (n = 7470)	ASPD versus No Antisocial Syndrome	AABS versus No Antisocial Syndrome
Midwest	4.1 (0.26)	20.1 (0.86)	0.6 (0.46-0.73)	0.8 (0.66-0.89)
South	3.8 (0.30)	20.7 (0.70)	0.5 (0.41-0.67)	0.8 (0.72-0.93)
West	5.5 (0.31)	20.7 (0.64)	1.0 (referent)	1.0 (referent)

ASPD: Antisocial personality disorder. AABS: Adulthood antisocial behavioral syndrome. Significant ($p < 0.05$) odds ratios are shown in **boldface**.

^aOdds ratios are derived from a single logistic regression model into which all sociodemographic variables were entered simultaneously.

^bNot applicable.

Table 2
Prevalences (% , SE) of 12-Month and Lifetime DSM-5 Comorbid Disorders by Lifetime DSM-5 Antisocial Behavioral Syndrome

Comorbid Psychiatric Disorder	12-Month			Lifetime		
	ASPD	AABS	None	ASPD	AABS	None
Any substance use disorder	64.1 (1.55)	52.6 (0.83)	20.5 (0.37)	83.6 (1.16)	73.8 (0.67)	32.5 (0.49)
Alcohol use disorder	35.3 (1.83)	26.6 (0.73)	9.2 (0.28)	66.7 (1.47)	54.9 (0.80)	20.0 (0.42)
Nicotine use disorder	49.6 (1.50)	37.5 (0.96)	13.6 (0.32)	64.6 (1.31)	50.3 (1.00)	19.7 (0.41)
Any drug use disorder	16.6 (1.06)	9.9 (0.43)	1.5 (0.10)	41.8 (1.33)	26.0 (0.68)	3.7 (0.16)
Any mood disorder	33.6 (1.58)	23.2 (0.60)	9.7 (0.25)	51.5 (1.82)	39.0 (0.66)	19.3 (0.41)
Major depressive disorder	20.1 (1.28)	16.7 (0.63)	8.1 (0.23)	35.2 (1.46)	30.6 (0.69)	17.1 (0.38)
Dysthymia/persistent depressive disorder	8.3 (0.96)	5.9 (0.37)	2.1 (0.12)	14.1 (1.04)	10.4 (0.50)	3.8 (0.14)
Bipolar I disorder	9.9 (1.12)	3.6 (0.22)	0.5 (0.06)	11.8 (1.25)	4.8 (0.28)	0.8 (0.07)
Any anxiety disorder	30.0 (1.34)	21.4 (0.56)	9.8 (0.21)	35.8 (1.50)	27.0 (0.67)	13.1 (0.27)
Panic disorder	9.9 (1.13)	5.8 (0.31)	1.9 (0.10)	13.5 (1.34)	9.4 (0.42)	3.6 (0.15)
Agoraphobia	6.2 (0.98)	2.8 (0.22)	0.9 (0.06)	6.9 (1.00)	3.6 (0.25)	1.2 (0.07)
Social phobia	8.9 (0.99)	5.2 (0.33)	1.9 (0.11)	10.6 (1.01)	6.7 (0.38)	2.5 (0.12)
Specific phobia	11.8 (0.97)	8.4 (0.41)	4.6 (0.17)	13.1 (1.02)	9.4 (0.42)	5.2 (0.18)
Generalized anxiety disorder	14.6 (0.98)	9.6 (0.45)	3.6 (0.15)	20.3 (1.32)	13.2 (0.55)	5.5 (0.19)
Posttraumatic stress disorder ^c	18.4 (1.12)	9.6 (0.44)	2.5 (0.14)	22.6 (1.21)	12.1 (0.48)	3.5 (0.18)
Borderline personality disorder	— ^b	— ^b	— ^b	50.1 (1.61)	28.0 (0.72)	4.7 (0.22)
Schizotypal personality disorder	— ^b	— ^b	— ^b	32.1 (1.75)	14.8 (0.62)	2.5 (0.14)

ASPD: Antisocial personality disorder. AABS: Adulthood antisocial behavioral syndrome.

^a Posttraumatic stress disorder was narrowly defined to require 3 subcriteria each for Criteria D and E to be considered positive, in addition to duration of 1 month and impairment or distress.

^b Personality disorders were assessed on a lifetime basis only.

^c Posttraumatic stress disorder was narrowly defined to require 3 subcriteria each for Criteria D and E to be considered positive, in addition to duration of 1 month and impairment or distress.

Table 3
Odds Ratios (95% Confidence Intervals) of DSM-5 Antisocial Behavioral Syndromes in Adulthood and 12-Month Substance Use, Mood, Anxiety, and Posttraumatic Stress Disorders

Comorbid Psychiatric Disorder	Adjusted for Sociodemographic Characteristics ^a		Adjusted for Sociodemographic Characteristics and Other Psychiatric Disorders ^b	
	ASPD versus None	AABS versus None	ASPD versus None	AABS versus None
Any substance use disorder	5.0 (4.42-5.76)	3.4 (3.19-3.72)	3.5 (3.04-4.08)	2.8 (2.64-3.07)
Alcohol use disorder	4.2 (3.49-4.98)	3.0 (2.72-3.33)	2.2 (1.79-2.78)	2.1 (1.83-2.30)
Nicotine use disorder	4.6 (4.12-5.21)	3.0 (2.75-3.30)	2.8 (2.43-3.23)	2.2 (2.01-2.44)
Any drug use disorder	9.0 (7.13-11.41)	5.7 (4.79-6.89)	2.8 (2.12-3.71)	2.7 (2.17-3.24)
Any mood disorder	5.0 (4.19-5.86)	2.8 (2.56-3.02)	1.5 (1.24-1.87)	1.4 (1.24-1.51)
Major depressive disorder	3.0 (2.52-3.61)	2.3 (2.05-2.49)	0.9 (0.72-1.19)	1.2 (1.03-1.33)
Dysthymia/persistent depressive disorder	4.3 (3.20-5.91)	2.9 (2.41-3.45)	1.6 (1.10-2.24)	1.4 (1.12-1.81)
Bipolar I disorder	18.8 (12.72-27.80)	6.6 (5.04-8.54)	3.3 (2.12-5.10)	2.0 (1.49-2.73)
Any anxiety disorder	4.8 (4.19-5.55)	2.7 (2.53-2.95)	1.5 (1.22-1.76)	1.4 (1.23-1.50)
Panic disorder	5.8 (4.40-7.63)	3.0 (2.53-3.48)	1.3 (0.99-1.85)	1.2 (0.93-1.43)
Agoraphobia	7.8 (5.59-10.90)	3.1 (2.60-3.74)	1.6 (1.14-2.33)	1.1 (0.91-1.36)
Social phobia	4.9 (3.73-6.42)	2.7 (2.24-3.18)	1.1 (0.79-1.57)	1.0 (0.85-1.29)
Specific phobia	3.5 (2.80-4.30)	2.1 (1.85-2.47)	1.4 (1.04-1.90)	1.2 (1.03-1.49)
Generalized anxiety disorder	5.3 (4.42-6.36)	3.0 (2.62-3.34)	1.2 (0.98-1.53)	1.2 (1.04-1.44)
Posttraumatic stress disorder ^c	9.7 (7.94-11.91)	4.1 (3.57-4.77)	2.5 (1.96-3.27)	1.7 (1.44-2.04)

ASPD: Antisocial personality disorder. AABS: Adulthood antisocial behavioral syndrome. Significant ($p < 0.05$) odds ratios are shown in **boldface**.

^aOdds ratios are adjusted for sex, age, race/ethnicity, education, family income, marital status, urbanicity, and geographic region.

^bOdds ratios are adjusted for sex, age, race/ethnicity, education, family income, marital status, urbanicity, geographic region, and all other substance use and psychiatric disorders.

^cPosttraumatic stress disorder was narrowly defined to require 3 subcriteria each for Criteria D and E to be considered positive, in addition to duration of 1 month and impairment or distress.

Table 4
Odds Ratios (95% Confidence Intervals) of DSM-5 Antisocial Behavioral Syndromes in Adulthood and Other Lifetime Psychiatric Disorders

Comorbid Psychiatric Disorder	Adjusted for Sociodemographic Characteristics ^a		Adjusted for Sociodemographic Characteristics ^a and Other Psychiatric Disorders ^b	
	ASPD versus None	AABS versus None	ASPD versus None	AABS versus None
Any substance use disorder	8.5 (7.10-10.21)	4.9 (4.60-5.32)	5.5 (4.52-6.64)	3.9 (3.64-4.22)
Alcohol use disorder	6.8 (5.91-7.80)	4.3 (3.94-4.61)	2.6 (2.18-3.03)	2.4 (2.18-2.61)
Nicotine use disorder	6.4 (5.64-7.17)	3.6 (3.28-3.88)	2.7 (2.33-3.11)	2.0 (1.81-2.19)
Any drug use disorder	14.2 (12.25-16.55)	7.5 (6.61-8.43)	4.4 (3.67-5.17)	3.3 (2.89-3.83)
Any mood disorder	5.5 (4.72-6.44)	2.9 (2.71-3.10)	1.9 (1.57-2.25)	1.5 (1.41-1.64)
Major depressive disorder	3.3 (2.85-3.75)	2.3 (2.15-2.50)	1.2 (0.98-1.42)	1.3 (1.20-1.42)
Dysthymia/persistent depressive disorder	4.7 (3.83-5.67)	3.0 (2.67-3.47)	1.4 (1.12-1.87)	1.4 (1.18-1.65)
Bipolar I disorder	15.3 (10.75-21.83)	5.9 (4.74-7.23)	2.9 (1.93-4.28)	1.9 (1.43-2.50)
Any anxiety disorder	4.7 (4.07-5.44)	2.7 (2.54-2.95)	1.2 (1.02-1.44)	1.2 (1.11-1.33)
Panic disorder	4.8 (3.66-6.19)	2.8 (2.45-3.17)	1.1 (0.85-1.49)	1.1 (0.93-1.30)
Agoraphobia	6.8 (4.90-9.47)	3.1 (2.62-3.76)	1.4 (0.98-1.95)	1.1 (0.89-1.32)
Social phobia	4.7 (3.67-5.94)	2.7 (2.35-3.16)	1.0 (0.76-1.34)	1.0 (0.85-1.23)
Specific phobia	3.6 (2.90-4.39)	2.2 (1.92-2.50)	1.3 (0.94-1.70)	1.1 (0.95-1.34)
Generalized anxiety disorder	5.6 (4.66-6.63)	2.9 (2.56-3.28)	1.3 (1.05-1.55)	1.2 (1.00-1.36)
Posttraumatic stress disorder ^c	9.4 (7.81-11.39)	4.0 (3.46-4.52)	2.3 (1.80-2.85)	1.5 (1.28-1.78)
Borderline personality disorder	21.0 (17.80-24.83)	7.8 (6.89-8.80)	7.0 (5.73-8.56)	3.8 (3.31-4.44)
Schizotypal personality disorder	16.7 (13.76-20.37)	6.3 (5.40-7.29)	4.1 (3.21-5.18)	2.4 (1.99-2.87)

ASPD: Antisocial personality disorder. AABS: Adulthood antisocial behavioral syndrome. Significant ($p < 0.05$) odds ratios are shown in **boldface**.

^aOdds ratios are adjusted for sex, age, race/ethnicity, education, family income, marital status, urbanicity, and geographic region.

^bOdds ratios are adjusted for sex, age, race/ethnicity, education, family income, marital status, urbanicity, geographic region, and all other substance use and psychiatric disorders.

^cPosttraumatic stress disorder was narrowly defined to require 3 subcriteria each for Criteria D and E to be considered positive, in addition to duration of 1 month and impairment or distress.

Table 5
Mean (SE) Norm-Based Quality of Life Scores for Past 4 Weeks (Short Form 12, Version 2) by Antisocial Behavioral Syndrome

Short Form 12, Version 2, Scale	Antisocial Behavioral Syndrome		
	ASPD (n=1600)	AABS (n = 7470)	None (n = 27,085)
Mental Health	46.8 (0.34)	49.1 (0.15) **	52.8 (0.09)
Social Functioning	46.0 (0.35)	48.3 (0.16) ***	51.5 (0.10)
Role Emotional Functioning	44.0 (0.35) *	46.5 (0.19) **	49.2 (0.13)
Mental Component Summary	45.9 (0.32)	48.3 (0.15) **	51.8 (0.09)

ASPD: Antisocial personality disorder. AABS: Adulthood antisocial behavioral syndrome.

* Significantly different ($p < .05$) from score for individuals with no antisocial behavioral syndrome, after adjusting for sociodemographic characteristics and 12-month psychiatric comorbidity.

** Significantly different ($p < .01$) from score for individuals with no antisocial behavioral syndrome, after adjusting for sociodemographic characteristics and 12-month psychiatric comorbidity.

*** Significantly different ($p < .001$) from score for individuals with no antisocial behavioral syndrome, after adjusting for sociodemographic characteristics and 12-month psychiatric comorbidity.