Published in final edited form as:

J Clin Psychiatry. 2008 January ; 69(1): 12–22.

Violent Behavior and DSM-IV Psychiatric Disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions

Attila J. Pulay, M.D., Deborah A. Dawson, Ph.D., Deborah S. Hasin, Ph.D., Rise B. Goldstein, Ph.D., Ms. W. June Ruan, M.A., Roger P. Pickering, M.S., Boji Huang, M.D., Ph.D., S. Patricia Chou, Ph.D., and Bridget F. Grant, Ph.D., Ph.D.

Laboratory of Epidemiology and Biometry, Division of Intramural Clinical and Biological Research, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health, Department of Health and Human Services, Bethesda, Maryland, 20852, U.S.A. (Drs. Pulay, Dawson, Goldstein, Huang, Chou and Grant, Mr. Pickering, Ms. Ruan). Mailman School of Public Health, Division of Epidemiology and College of Physicians and Surgeons, Department of Psychiatry, Columbia University, New York, NY; New York State Psychiatric Institute, New York (Dr. Hasin)

Abstract

Objective—To present nationally representative data on the lifetime prevalence and population estimates of violent behavior among individuals with DSM-IV psychiatric disorders.

Method—The data were derived from the National Epidemiologic Survey on Alcohol and Related Conditions. Prevalences, population estimates, and associations of violent behavior occurring among individuals with pure, comorbid and specific DSM-IV psychiatric disorders were examined.

Results—Controlling for sociodemographic characteristics and other comorbidity, the odds of violent behavior were significantly increased ($p < 0.05$) among individuals with substance use disorders, pathological gambling, major depressive disorder, bipolar disorders, panic disorder with agoraphobia, specific phobia, and paranoid, schizoid, histrionic, and obsessive-compulsive personality disorders. Percentages of violent behavior among individuals with each comorbid disorders was significantly greater ($p < 0.05 - p < 0.0001$) than the corresponding percentages among those presenting with the pure form of each disorder. Alcohol and drug use disorders were the most significant contributors to the public health burden of violent behavior.

Conclusion—The majority of individuals with psychiatric disorders do not engage in violent behavior, and public perception associated with stereotypic violence among individuals with psychiatric disorders appears unwarranted. Elevated risks and burden of violent behavior were not equally shared across the spectrum of psychiatric disorders, with particular disorders, especially substance use disorders, contributing disproportionately to the burden. Future research should examine the circumstances under which violence among individuals with psychiatric disorders occurs with a view towards improving clinical prediction and developing more effective prevention strategies.

Corresponding Author to Whom Requests for Reprints Should be Addressed: Bridget F. Grant, Ph.D., Ph.D., Laboratory of Epidemiology and Biometry, Room 3077, Division of Intramural Clinical and Biological Research, National Institute on Alcohol Abuse and Alcoholism National Institutes of Health, M.S. 9304, 5635 Fishers Lane, Bethesda, MD 20892-9304, Tel.: 301-443-7370, Fax 301-443-1400, bgrant@willco.niaaa.nih.gov.

Disclaimer: The views and opinions of expressed in this report are those of the authors and should not be constructed to represent the views of any of the sponsoring agencies or the U.S. government.

Keywords

Violent behavior; Psychiatric disorders; Mood and anxiety disorders; Substance use disorders; Personality disorders

The nature of the association between psychiatric disorders and violent behavior is still unresolved. To date, the majority of research addressing this linkage has examined the prevalence of violent behavior among psychiatric patients,¹ or the prevalence of psychiatric disorders among jail and prison inmates.² Although studies among patients and inmates have contributed much to our knowledge about the relationship between psychiatric disorders and violent behavior, these samples suffer from a broad range of selection biases, precluding generalization to the general population of individuals with these disorders.

Although resolution of these issues can only be significantly advanced by studying probability samples that are unselected for treatment and violent behavior status in general populations, very few epidemiologic studies^{3–7} have directly examined the association between psychiatric disorders and violent behavior. Taken together, these studies have shown an increased risk of violent behavior among individuals with alcohol and drug use disorders and antisocial personality disorder. Affective and anxiety disorders were not clearly associated with an elevated risk of violent behavior in three of these studies,^{3,6,7} but in the remaining two,^{4,5} increased risks of violent behavior were found among these individuals. Results were also mixed for psychotic disorders, including schizophrenia, with only three of the five studies demonstrating increased risk of violent behavior among these individuals. Similar to the results of treatment studies,^{8,9} comorbidity with substance use disorders was consistently shown to increase the risk of violence substantially among individuals with other psychiatric disorders.

Although prior epidemiologic surveys have contributed to our knowledge of the linkage between violent behavior and psychiatric disorders in the general population, this work has several limitations that may account for some of the disparate findings arising from them. Foremost, the relatively small sample sizes of these studies precluded analyses of specific mood and anxiety disorders. In four of these studies,^{3,4,6,7} diagnoses needed to be aggregated into categories of any mood or any anxiety disorder when controlling for socioeconomic status and other comorbid disorders, while one study⁵ did not control for either. With the exception of the study by Arseneault and colleagues,³ which required individuals to report two of seven violent behaviors in order to be classified as violent, the remaining studies either used thresholds of at least one of two to five violent behaviors, or based their analyses on responses to a single question on violence. This prior work has also been exclusively concerned with comorbidity between substance use disorders and other psychiatric disorders, ignoring other forms of comorbidity among Axis I disorders. Further, only one prior study⁵ examined the population burden of violent behavior attributable to types of psychiatric disorder by considering the base rates of disorder in the general population. However, that study used a hypothetical population, rather than estimating population estimates derived from the survey data, and failed to present corresponding estimates for the control group of individuals with no psychiatric disorder. As a result, the public health burden attributable to individuals with psychiatric disorders could not be compared with the corresponding burden attributable to those without psychiatric disorders. Lastly, no prior epidemiologic study has examined violent behavior among individuals with personality disorders other than antisocial personality disorder, or used the most current psychiatric nomenclature, the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)¹⁰ to classify psychiatric disorders.

Accordingly, the present study was designed to address the limitations of prior epidemiologic studies by examining the relationship between violent behavior occurring before and since age 15 and specific lifetime DSM-IV substance use, mood, anxiety, personality disorders and pathological gambling, in a large, nationally representative survey of the U.S. population: the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).^{11,12} The sample size of the NESARC (43,093) was large enough to allow examination of violent behavior and specific psychiatric disorders while at the same time controlling for sociodemographic factors and comorbidity. This study also presents information on differences in rates of violent behavior among individuals with pure and comorbid disorders, thereby extending previous research that was limited to the assessment of violence among individuals comorbid for substance use disorders and other psychiatric disorders. Most significantly, this study determines, for the first time, the magnitude of the public health burden of violence associated with psychiatric disorders in the United States by explicitly accounting for the base rates of psychiatric disorders in the general population.

Methods

The NESARC Sample

The 2001–2002 NESARC is a representative sample of the U.S. population, as described in detail elsewhere.^{11,12} The target population included those residing in households and selected group quarters, 18 years and older. Face-to-face interviews were conducted with 43,093 respondents. The survey response rate was 81%. Blacks, Hispanics, and young adults (ages 18–24) were oversampled, with data adjusted for oversampling and nonresponse. The weighted data were then adjusted to represent the U.S. civilian population based on the 2000 Census.

DSM-IV Psychiatric Disorders

The diagnostic interview used in the NESARC was the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV).¹³ This structured interview, designed for lay interviewers, was developed to advance measurement of substance use and mental disorders in large-scaled surveys.

AUDADIS-IV questions operationalize DSM-IV criteria for alcohol and drug-specific abuse and dependence for ten drug classes (aggregated in this report). Consistent with DSM-IV, lifetime diagnoses of alcohol abuse required at least one of the four criteria for abuse either in the 12-month period preceding the interview or previously. Alcohol dependence diagnoses required at least three of the seven DSM-IV criteria for dependence during the past year or within a previous one-year period. Drug use disorder^{14–16} and nicotine dependence diagnoses¹⁷ used the same algorithms. Lifetime diagnoses of pathological gambling are described in detail elsewhere¹⁸ and required the respondent to meet at least five of the ten diagnostic criteria in any one 12-month period preceding the interview.

Mood disorders included DSM-IV “primary” major depressive disorder (MDD), bipolar I, bipolar II, and dysthymia. 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.^{11,14,19–23} In DSM-IV, primary excludes substance-induced disorders or those due to medical conditions: AUDADIS-IV improvements over previous measures in making the primary/substance-induced distinction for mood and anxiety disorders are presented elsewhere,^{11,14,19,22–25} including the fact that specific AUDADIS questions about the chronological relationship between intoxication or withdrawal and the full psychiatric syndrome implement DSM-IV criteria differentiating primary from substance-induced

disorders. MDD diagnoses also ruled out bereavement. Personality disorders (PDs), assessed on a lifetime basis, included DSM-IV avoidant, dependent, obsessive-compulsive, paranoid, schizoid and histrionic PDs. Antisocial PD was also assessed in the NESARC but not included in the present analysis since by definition it includes violent behaviors as diagnostic criteria. DSM-IV PD diagnoses require long-term patterns of social/occupational impairment; AUDADIS-IV PD diagnoses were made accordingly.^{14,22,23}

The reliability of the AUDADIS-IV substance use disorders, tobacco dependence, and pathological gambling diagnoses is documented in clinical and general population samples, with test-retest reliability ranging from good to excellent ($\kappa = 0.70\text{--}0.84$).^{17,18,26–29} Convergent, discriminant, and construct validity of AUDADIS-IV alcohol use disorder criteria and diagnoses were good to excellent,^{30–34} including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity,^{35–40} where clinical reappraisals documented good validity of selected disorder diagnoses ($\kappa = 0.60\text{--}0.76$).^{35,39,41} Test-retest reliability for AUDADIS-IV mood, anxiety and personality disorder diagnoses in general population and clinical settings was fair to good ($\kappa = 0.40\text{--}0.62$).^{27–29} Test-retest reliabilities of AUDADIS-IV personality disorders (not measured in prior surveys) compare favorably with those in patient samples using semi-structured personality interviews.⁴² Convergent validity was good to excellent for all affective and anxiety diagnoses, and selected diagnoses showed good agreement ($\kappa = 0.64\text{--}0.68$) with psychiatrist reappraisals.^{17,19,27,29,41}

Violent Behavior

Information on violent behavior was collected for 2 time periods: before age 15 and since age 15 years. Similar to other studies,^{3,6} respondents were classified as positive for violent behavior if they reported at least two of seven of the following violent behaviors: (1) forcing someone to have sex with you against their will; (2) getting into a lot of fights; (3) getting into fights that came to swapping blows with someone like a husband, wife, girlfriend or boyfriend; (4) using a weapon like a stick, knife or gun in a fight; (5) hitting someone so hard that he or she was injured or had to see a doctor; (6) physically hurting another person in any other way on purpose; or (7) robbing or mugging someone like snatching a purse.

Statistical Analyses

Weighted frequencies and cross-tabulations were computed to derive the prevalences of violent behavior before and since age 15 among respondents with lifetime substance use, mood, anxiety and personality disorders. A series of multivariate logistic regression analyses was used to examine the associations between violent behavior and each psychiatric disorder controlling for age, sex, race-ethnicity and all comorbid substance use, mood, anxiety and personality disorders and pathological gambling. Chi-square statistics were used to examine differences in the rates of violent behavior between respondents classified with each pure and comorbid psychiatric disorder. For example, pure MDD respondents did not have a lifetime diagnosis of any other DSM-IV disorder assessed in the NESARC whereas those diagnosed with comorbid MDD had at least one other DSM-IV disorder on a lifetime basis. The magnitude of the public health burden of violent behavior was determined by deriving population estimates of violent behavior for each pure and comorbid disorder that accounted for their base rates in the general population. Similar analyses were conducted to examine the cumulative burden attributable to specific diagnostic groups. These analyses were both unstandardized and standardized (i.e., controlling for sex, age and race-ethnicity). These analyses were only conducted for violent behavior since age 15, since the population estimates for violent behavior before age 15 would have been distorted for some psychiatric disorders with earlier onsets than others, especially substance use disorders. All analyses

were conducted with SUDAAN,⁴³ a software program that makes adjustments for survey design effects.

Results

Prevalence of Violent Behavior Among Respondents With Specific Psychiatric Disorders

The prevalences of violent behavior before and since age 15 were 0.21% and 0.66% among individuals classified with no lifetime psychiatric disorder. The prevalences of violent behavior before age 15 ranged from 2.16% for major depressive disorder to 10.53% for drug dependence (Table 1) and were much lower than the rates of violent behavior since age 15 (7.73%–31.60%). Rates of violent behavior before age 15 were clearly greater among respondents with drug dependence than any other substance use disorder (2.24%–4.91%). Rates of violent behavior before age 15 were also greater for bipolar I disorder (7.86%) relative to other mood disorders (2.16%–5.88%) and greater for generalized anxiety disorder (4.09%) than other anxiety disorders (3.04%–4.04%). With respect to PDs, rates were greatest for respondents with histrionic (9.54%) and paranoid (7.64%) PDs. Prevalences of violent behavior since age 15 among individuals with lifetime DSM-IV psychiatric disorders were much greater (7.73%–31.60%) and paralleled the pattern of results observed for violent behavior before age 15 for specific psychiatric disorders.

After controlling for sociodemographic factors and comorbid disorders, the odds of violent behavior before and since age 15 were significantly greater among respondents with any DSM-IV disorder relative to those without any DSM-IV disorder (ORs=11.04, 12.39), and among respondents with specific lifetime substance use disorders (ORs=1.86–3.05) and paranoid, schizoid, histrionic, and obsessive-compulsive PDs (ORs=1.32–2.53). The odds of violent behavior before and since age 15 were also significantly greater among respondents with bipolar I and II disorders (ORs=1.77–3.72), whereas the odds of violent behavior since the age of 15 were significantly greater among respondents with MDD (OR=1.73), pathological gambling (OR=2.54), panic disorder without agoraphobia (OR=1.66) and specific phobia (OR=1.34).

Prevalence of Violent Behavior Among Respondents With Pure and Comorbid Disorders

The prevalences of violent behavior before age 15 among individuals with each pure disorder were generally very low (0.00%–3.11%) with the exception of bipolar II disorder, with zero prevalences reported for many psychiatric disorders (Table 2). Rates of violent behavior since age 15 among respondents with pure disorder were somewhat greater, ranging from 0.00% to 11.32%.

By contrast, prevalences of violent behavior before and since age 15 were much greater among respondents classified with a comorbid disorder. With respect to violent behavior before and since age 15, prevalences were greater for drug dependence (10.70%, 31.92%) than other substance use disorders, and greater for bipolar I disorder (8.58%, 27.58%) than other mood disorders. and Before age 15, the prevalence of violent behavior was greater for generalized anxiety disorder (4.32%) than for other anxiety disorders (3.59–4.26%). Since age 15 violent behavior was more prevalent for panic disorder without agoraphobia (15.29%) compared with other anxiety disorders (12.49–14.75%). Rates of violent behavior before and since age 15 were also greatest for paranoid (8.09%, 24.62%) and histrionic (9.76%, 25.36%) PDs relative to other PDs.

When rates of violent behavior were compared between pure and comorbid cases of each psychiatric disorder, respondents with each comorbid disorder were, with few exceptions, significantly more likely ($p<0.05$) to engage in violent behavior both before and since age 15.

Population Estimates of Violent Behavior Since Age 15 Among Respondents with Pure and Comorbid Disorders

Table 3 shows the prevalences and U.S. population estimates of each pure and comorbid disorder and violent behavior since age 15. Note that the population estimates of violent behavior associated with the aggregate disorder rows for pure disorder may not be the sum of all specific pure disorder estimates in that category, because the aggregate figures allow for comorbidity among specific disorders within each aggregate category. For example, the population estimate of 2,606,812 for the aggregate category of any pure substance use disorder includes respondents with one or more substance use disorders, but with no other DSM-IV disorder. However, the sum of all population estimates within each aggregate category can be interpreted as the public health burden of violence attributable to any pure specific disorder of that type. Therefore, respondents with any pure substance use disorder (n=1,150,363) contributed most to the burden of violent behavior, followed by those with any pure mood disorder (n=149,156), with any pure personality (n=80,815) disorder and any pure anxiety disorder (n=84,521) having less impact and pathological gambling having no impact. Pure alcohol abuse (n=479,067), major depressive disorder (n=111,775), specific phobia (n=35,006), and obsessive-compulsive PD (n=62,289) had the greatest population estimates of violent behavior relative to other pure substance use, mood, anxiety, and PDs, reflecting both the high prevalences of these disorders as well as the high rates of violent behavior among individuals with these disorders.

Unlike population estimates associated with pure disorder, estimates of violent behavior for aggregated and specific comorbid disorders cannot be used to derive exact burden estimates because individuals can and indeed must be counted in more than one of these disorder categories. Overall, however, the burden of violence among individuals with comorbid disorders (n=7,719,156) is significantly greater ($p < 0.001$) than the burden associated with pure disorders (n=1,507,970).

Percentages and Population Estimates of Violent Behavior Since Age 15 Accounted for by Respondents within Aggregate Disorder Groups

One way to determine the relative contribution to violent behavior since age 15 of various diagnostic groups given the extensive comorbidity observed in this general population sample is to examine cumulative burden associated with increasingly comprehensive aggregate disorder groups. As can be seen in Table 4, respondents with anxiety disorders, but no other disorder, contribute very little (0.9%) to the burden of violent behavior in the United States, but that burden increases to 3.7% when the contribution of respondents with either mood or anxiety, but no other disorder, is considered, and to 9.1% when the contribution of those with any mood, anxiety or PD (but no other disorder) is considered. The burden associated with individuals with any anxiety, mood, PD, nicotine dependence or pathological gambling further increases to 15.1%, but the greatest increase occurs when the burden among respondents with alcohol and drug use disorders is added, an increase from 15.1% to 93.5%. Further, the burden of violent behavior attributable to respondents without any lifetime DSM-IV disorder is 6.5% relative to the burden associated with respondents with any DSM-IV disorder (93.5%). Table 4 also shows that the corresponding standardized percentages for the cumulative burden associated with increasingly comprehensive aggregate disorder groups differed little from the unstandardized estimates.

Discussion

Consistent with the results of prior epidemiologic research,³⁻⁷ violent behavior before and since age 15 was significantly increased among individuals with alcohol and drug use disorders. Bipolar I and II disorders were associated with increased risks of violent behavior

both before and since age 15, and MDD was associated with an increased risk of violent behavior since age 15. These new findings reflect the fact that the NESARC was the first epidemiologic study to differentiate between MDD and bipolar disorders, while at the same time controlling for sociodemographic characteristics and comorbidity. In contrast to previous studies,^{3,6,7} that examined aggregate measures of any anxiety disorder, this study also found increased risks of violent behavior since age 15 among individuals with panic disorder without agoraphobia and with specific phobia.

Information on the associations of PDs other than antisocial PD, nicotine dependence, and pathological gambling with violent behavior has not previously been available. This study found increased odds of violent behavior both before and since age 15 among individuals with paranoid, schizoid, histrionic, and obsessive-compulsive PDs, as well as nicotine dependence, with increased odds observed among individuals with pathological gambling for violent behavior since age 15. Within the context of these findings, it is important to note that the clear majority of individuals with psychiatric disorders do not engage in violent behavior, a finding that we will elaborate upon later.

Earlier studies^{5,7,44,45} had suggested that the observed associations between psychiatric disorders and violent behavior could be explained in terms of underlying sociodemographic factors, but this study, which controlled for sex, age, and race-ethnicity, has not supported this view. Psychiatric disorder appears to be an independent correlate of violent behavior, albeit a modest one (ORs=1.29–3.72), for individual disorders. It was not surprising that individuals with substance use disorders, who have earlier ages at onset than other Axis I disorders^{16, 17} were more likely to engage in violent behavior both before and after age 15. The violent behavior of these individuals is most likely due to the disinhibiting effects of alcohol and drugs. In addition, individuals with drug use disorders are of necessity exposed to illegal drug markets that promote violence.⁴⁶ Interestingly, pathological gambling, an impulse control disorder closely related to substance use disorders, was also associated with an increased odds of violent behavior since age 15. Individuals with pathological gambling may also share with individuals who have substance use disorders exposure an illegal market, in this case to the illegal betting enterprise, an industry often inextricably linked to the illicit drug market. By contrast, nicotine dependence appears to contribute to the public health burden of violence largely through its comorbidity with other substance use disorders. This explanation is partially supported by the observation that relatively few individuals in the general population with pure nicotine dependence engaged in violent behavior (n=173,903) compared to those with comorbid nicotine dependence (4,850,249).

Increased rates of violent behavior were also observed among individuals with MDD, bipolar I and II disorders, panic disorder with agoraphobia, specific phobia, and paranoid, schizoid, histrionic, and obsessive-compulsive PDs. Paranoid PD, characterized by a pervasive distrust and suspiciousness of others, may predispose toward violence through a number of avenues including pathological jealousy, the tendency to bear persistent grudges, and misinterpretation of even benign remarks or events as threatening. The tendency of individuals with paranoid PD to react to even minor stimuli with anger is also seen among those with histrionic PD, a predisposition that may increase the likelihood of violent behavior. The salient features of schizoid PD, i.e., aloofness, lack of close friends or confidants, and emotional coldness, could contribute to violent behavior among affected individuals by virtue of their extreme detachment from ordinary feelings and emotions. As with schizoid PD, individuals with obsessive-compulsive PD can be characterized by apparent formality and social detachment, both of which can increase the probability of violent behavior.

Possible symptomatology and related motivations underlying the relationships of mood and anxiety disorders with violent behavior are less clear. Major depressive disorder and bipolar disorders characterized predominantly by irritability or hyperirritability may contribute to the occurrence of violent behaviors among individuals with these presentations. Panic attacks associated with panic disorder without agoraphobia and often accompanying specific phobia may lead to weakening of self-control mechanisms, increasing the likelihood of violent behavior among affected individuals, similar to the override of personal controls shown to predispose toward violence among psychotic individuals experiencing certain types of hallucinations and delusions.^{47–49} Future attempts to specify which symptoms of specific psychopathology are associated with violent behavior, together with tests of theory-driven explanations about the mechanisms that produce such associations, are sorely needed. Future research examining patterns of violence should recognize that violence among individuals with psychiatric disorders cannot be explained solely in terms of the clinical features of the disorders. The impact of symptomatology on violent behavior can only be adequately understood in the context of social relationships, that is, the ways in which symptomatology affects relationships by impairing individuals' abilities to relate meaningfully to others, gain critical social support, and resolve conflicts.⁵⁰

Although the aforementioned results provide information on which specific psychiatric disorders are associated with rates of violent behavior in excess of the control group without any lifetime DSM-IV disorder, the data do not address the magnitude of the problem because they ignore the base rates or prevalences of specific psychiatric disorders in the general population. When base rates and associated population estimates of violent behavior since age 15 were estimated for each pure disorder, the number of individuals who engaged in violent behavior, with pure substance use disorders ($n=1,150,363$), especially alcohol abuse ($n=479,067$) was clearly greater than the combined number of individuals who engaged in violent behavior with pure mood ($n=149,156$), anxiety ($n=84,521$), and PDs ($n=80,815$).

Although previous research has established that comorbidity with substance use disorders increases the risk of violent behavior among individuals with other psychiatric disorders,^{3–7,47} this study was the first to show that comorbidity between and within Axis I and II disorders also significantly increases the likelihood of violent behavior regardless of which specific psychiatric disorder was examined. Indeed, the public burden of violence since age 15 was 1,507,970 among individuals with specific lifetime pure psychiatric disorders, whereas the corresponding burden among those with comorbid disorders was 7,719,156. The increased disability and impairment in social and occupational functioning among comorbid individuals, well documented in both the clinical and the epidemiologic literatures,¹⁶ may predispose toward violence in these individuals. Future research examining associations between disability and violent behavior among individuals with pure and comorbid psychiatric disorders appears warranted.

When interpreting the results of this study, it is important to keep in mind, as previously mentioned, that only a minority of individuals with psychiatric disorders (i.e., 9,227,126 of 110,365,733) engage in violent behavior, a result that does not validate the public image of all individuals with psychiatric disorders as potentially violent. The public health burden of violent behavior, however, is clearly greater among individuals with psychiatric disorders ($n=9,227,126$) than among individuals with no psychiatric disorders ($n=641,718$) in the general population when expressed in terms of U.S. population estimates. In marked contrast to findings of previous research,^{3–7, 51} psychiatric disorders were found in this study to be associated with violent behavior in the general population. Prior research focused exclusively on the modest to moderate increases in rates of violent behavior among individuals with psychiatric disorders, which this study also found, while ignoring the

burden of violent behavior attributable to individuals with psychiatric disorders, by not analyzing base rates and population estimates. Previous research^{5, 51} also failed to present the burden of violent behavior attributable to those without psychiatric disorders and to compare these estimates with those associated with any psychiatric disorder. Further, conclusions from past research that only a weak association exists between psychiatric disorder and violent behavior, based on analyses showing that demographic factors were far better predictors of violent behavior than psychiatric disorders, were also not supported by the results of this study. Significant associations remained between specific psychiatric disorders and violent behavior even after controlling for sociodemographic factors and comorbidity.

This study has increased our understanding of the relationship between psychiatric disorders and violent behavior by demonstrating that the burden of violent behavior in the general population is not equally shared across the spectrum of psychiatric disorders. Burden is limited to several particular disorders, most noteworthy alcohol and drug use disorders followed in magnitude by nicotine dependence, personality disorders and mood disorders, with anxiety disorders and pathological gambling contributing little to the overall burden of violent behavior. In fact, individuals with alcohol and drug use disorders contribute more to the public health burden of violent behavior than all other psychiatric disorders combined. Reducing levels of anger leading to violent behavior is now seen as an important component in substance use treatment and anger dyscontrol has been associated with relapse.⁵² Although anger management modules and emotional regulation are often components of substance use treatment programs there exist no large scale randomized controlled clinical trials of such programs.^{53, 54} Clearly, the need to develop, evaluate and implement anger management programs and their ability to control the consequences of anger as both an affect and behavior is needed to break the alcohol and drug use disorder-violent behavior cycle.

Individuals with alcohol and drug use disorders have also repeatedly been identified as high risk groups for intimate partner violence (IPV).^{55–57} However, not much is currently known about the best treatments for IPV among individuals with alcohol and drug use disorders and the efficacy of domestic violence intervention programs tailored to these individuals is unknown.⁵⁸ Comprehensive evaluation of IVP among married or cohabiting individuals entering substance abuse treatment, strengthening referral linkages between these programs, and developing and evaluating interventions for IVP that can be integrated into substance abuse treatment programs can help substantially reduce the public health burden of violent behavior. Increasing prevention efforts aimed at excessive alcohol and/or drug use, especially among high risk subgroups of the population, will also be needed to parallel treatment interventions if the burden of violent behavior attributable to these disorder is to be reduced.

Similar to all previous epidemiologic work in this area, the present study was cross-sectional, whereas several questions regarding relationships between violent behavior and psychiatric disorders would best be examined in a longitudinal design. Although this study has advanced our understanding of the relationship between violent behavior and psychiatric disorders, prospective epidemiological studies of general populations will be needed to determine the exact nature of that relationship. The Wave 2 NESARC, a three-year follow-up of participants in this Wave 1 survey, was designed to address this limitation. Further, general population surveys may not capture all individuals who engage in violent behaviors, since these individuals are more likely to be incarcerated, homeless or otherwise less likely to live in households, the exclusive sampling frame of most general population surveys. However, the NESARC sampled from households and group quarters (e.g., shelters, halfway houses, group homes), one strategy designed to increase representation in the sample of

individuals who engage in violent behavior. Based on these considerations of potential underrepresentation of individuals who engage in violent behaviors, NESARC estimates of prevalences and risks are likely to be conservative.

Stigma of mental disorders and substance use disorders, and the public perceptions and anxieties associated with stereotypes of violence among individuals with these disorders, appear to be largely unwarranted, as the majority of individuals with these disorders do not engage in violent behavior. However, the public health burden of violence in the general population appears to be most attributable to individuals with psychiatric disorders, with specific disorders disproportionately contributing to that burden. Clearly the public health burden of violent behavior can be largely attributed to alcohol and drug use disorders. With regard to public health implications, campaigns to educate the public about the low prevalence of violent behavior among individuals with psychiatric disorders and those disorders most associated with violence appear warranted. With regard to clinical implications, there is a need to assess violent behavior particularly among comorbid individuals, especially those with specific psychiatric disorders most significantly related to violence in this study. Future research on the interplay of various factors affecting the relationships found in this study can refine the identification of subgroups of individuals with psychiatric disorders who are particularly prone to violent behavior. Increasing our knowledge of the circumstances under which violence among individuals with specific psychiatric disorders is likely to occur promises to improve the accuracy of prediction in clinical practice; this in turn will contribute to the development of more effective prevention strategies in the future.

Acknowledgments

The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) was sponsored by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) with supplemental funding from the National Institute on Drug Abuse (NIDA). This work was supported, in part, by the Intramural Program of the NIAAA, National Institutes of Health.

References

1. Eronen M, Angermeyer MC, Schulze B. The psychiatric epidemiology of violent behavior. *Soc Psychiatry Psychiatr Epidemiol* 1998;33:S13–S23. [PubMed: 9857775]
2. Anderson HS. Mental health in prison populations. A review – with special emphasis on a study of Danish prisoners on remand. *Acta Psychiatr Scand* 2004;110 (Supplement 424):5–59.
3. Arseneault L, Moffitt TE, Caspi A, Taylor PJ, Silva PA. Mental disorders and violence in a total birth cohort. *Arch Gen Psychiatry* 2007;57:979–986. [PubMed: 11015816]
4. Coid J, Yang M, Roberts A, Ullrich S, Moran P, Bebbington P, Brugha T, Jenkins R, Farrell M, Lewis G, Singleton N. Violence and psychiatric morbidity in a national household population—a report from the British Household Survey. *Am J Epidemiol* 2006;164:1199–1208. [PubMed: 17032695]
5. Corrigan PW, Watson AC. Findings from the National Comorbidity Survey on the frequency of violent behavior in individuals with psychiatric disorders. *Psychiatric Res* 2005;136:153–162.
6. Link, BG.; Stueve, A. Psychotic symptoms and the violent/illegal behavior of mental patients compared to community controls. In: Monahan, J.; Steadman, HJ., editors. *Violence and Mental Disorder. Developments in Risk Assessment*. Chicago IL: University of Chicago Press; 1994. p. 137-159.
7. Swanson JW, Holzer CE, Ganju VK, Jono RT. Violence and psychiatric disorders in the community: evidence from the Epidemiologic Catchment Area Surveys. *Hosp Comm Psychiatry* 1990;41:761–770.

8. Steadman HJ, Mulvey EP, Monahan J, Robbins PC, Appelbaum PS, Grisso T, Roth LH, Silver E. Violence by people discharged from acute psychiatric inpatient facilities and by others in the same neighborhoods. *Arch Gen Psychiatry* 1998;55:1–9.
9. Swartz MS, Swanson JW, Hiday VA, Borum R, Wagner HR, Burns BJ. Violence and severe mental illness: the effects of substance abuse and nonadherence to medication. *Am J Psychiatry* 1998;155:226–231. [PubMed: 9464202]
10. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4. Washington DC: American Psychiatric Association; 1994.
11. Grant BF, Stinson FS, Dawson DA, Chou SP, Dufour MC, Compton W, Pickering RP, Kaplan K. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry* 2004;61:807–816. [PubMed: 15289279]
12. Grant, BF.; Moore, TC.; Shepard, J.; Kaplan, K. Source and Accuracy Statement: Wave 1 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). National Institute on Alcohol Abuse and Alcoholism Web Site. [Accessed July 2, 2005.]. Available at: <http://www.niaaa.nih.gov>
13. Grant, BF.; Dawson, DA.; Hasin, DS. The Alcohol Use Disorder and Associated Disabilities Interview Schedule—DSM-IV Version (AUDADIS-IV). Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2001.
14. Compton WM, Conway KP, Stinson FS, Colliver JD, Grant BF. Prevalence, correlates, and comorbidity of DSM-IV antisocial personality syndromes and alcohol and specific drug use disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry* 2005;66:676–685.
15. Compton WM, Lopez M, Stinson FS, Grant BF. Prevalence, correlates, disability and comorbidity of DSM-IV drug abuse and dependence in the United States. Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. In Press.
16. Hasin DS, Stinson FS, Ogburn E, Grant BF. Prevalence, correlates, disability and comorbidity of DSM-IV alcohol abuse and dependence in the United States. Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. In Press.
17. Grant BF, Hasin DS, Chou SP, Stinson FS, Dawson DA. Nicotine dependence and psychiatric disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry* 2004;61:1107–1115. [PubMed: 15520358]
18. Petry NM, Stinson FS, Grant BF. Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: results of the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry* 2005;66:564–574. [PubMed: 15889941]
19. Hasin DS, Goodwin RD, Stinson FS, Grant BF. The epidemiology of major depressive disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry* 2005;62:1097–1106. [PubMed: 16203955]
20. Grant BF, Hasin DS, Blanco C, Stinson FS, Chou SP, Goldstein RB, Dawson DA, Smith S, Saha TD, Huang B. The epidemiology of social anxiety disorder in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry* 2005;66:1351–1361. [PubMed: 16420070]
21. Grant BF, Hasin DS, Stinson FS, Dawson DA, Goldstein RB, Smith SM, Huang B, Saha TD. The epidemiology of DSM-IV panic disorder and agoraphobia in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry*. In Press.
22. Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Pickering RP. Prevalence, correlates, and disability of personality disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry* 2004;65:948–958. [PubMed: 15291684]
23. Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Huang B. Co-occurrence of 12-month mood and anxiety disorders and personality disorders in the US: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Psychiatr Res* 2005;39:1–9. [PubMed: 15504418]

24. Grant BF, Hasin DS, Stinson FS, Dawson DA, Ruan WJ, Goldstein RB, Smith SM, Saha TD, Huang B. Prevalence, correlates, co-morbidity, and comparative disability of DSM-IV generalized anxiety disorder in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychol Med* 2005;35:1747–1759. [PubMed: 16202187]
25. Grant BF, Stinson FS, Hasin DS, Dawson DA, Chou SP, Ruan WJ, Huang B. Prevalence, correlates, and comorbidity of bipolar I disorder and Axis I and II disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry* 2005;66:1205–1215. [PubMed: 16259532]
26. Chatterji S, Saunders JB, Vraiti R, Grant BF, Hasin D, Mager D. Reliability of the alcohol and drug modules of the Alcohol Use Disorder and Associated Disabilities Interview Schedule—Alcohol/Drug-Revised (AUDADIS-ADR): an international comparison. *Drug Alcohol Depend* 1997;47:171–185. [PubMed: 9306043]
27. Grant BF, Dawson DA, Stinson FS, Chou PS, Kay W, Pickering R. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. *Drug Alcohol Depend* 2003;71:7–16. [PubMed: 12821201]
28. Grant BF, Harford TC, Dawson DA, Chou PS, Pickering RP. The Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability of alcohol and drug modules in a general population sample. *Drug Alcohol Depend* 1995;39:37–44. [PubMed: 7587973]
29. Hasin D, Carpenter KM, McCloud S, Smith M, Grant BF. The Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability of alcohol and drug modules in a clinical sample. *Drug Alcohol Depend* 1997;44:133–141. [PubMed: 9088785]
30. Hasin D, Paykin A. Alcohol dependence and abuse diagnoses: concurrent validity in a nationally representative sample. *Alcohol Clin Exp Res* 1999;23:144–150. [PubMed: 10029216]
31. Hasin D, Grant B, Endicott J. The natural history of alcohol abuse; implications for definitions of alcohol use disorders. *Am J Psychiatry* 1990;147:1537–1541. [PubMed: 2221170]
32. Hasin DS, Muthen B, Wisnicki KS, Grant BF. Validity of the bi-axial dependence concept: a test in the US general population. *Addiction* 1994;89:573–579. [PubMed: 8044123]
33. Hasin D, Van Rossem R, Endicott J. Differentiating DSM-IV alcohol dependence and abuse by course: community heavy drinkers. *J Substance Abuse* 1997;9:127–135.
34. Hasin DS, Schuckit MA, Martin CS, Grant BF, Bucholz KK, Helzer JE. The validity of DSM-IV alcohol dependence: what do we know and what do we need to know? *Alcohol Clin Exp Res* 2003;27:244–252. [PubMed: 12605073]
35. Cottler LB, Grant BF, Blaine J, Mavreas V, Pull C, Hasin D, Compton WM, Rubio-Stipec M, Mager D. Concordance of DSM-IV alcohol and drug use disorder criteria and diagnoses as measured by AUDADIS-ADR, CIDI and SCAN. *Drug Alcohol Depend* 1997;47:195–205. [PubMed: 9306045]
36. Hasin DS, Grant BF, Cottler L, Blaine J, Towle L, Ustun B, Sartorius N. Nosological comparisons of alcohol and drug diagnoses: a multisite, multi-instrument international study. *Drug Alcohol Depend* 1997;47:217–226. [PubMed: 9306047]
37. Nelson CB, Rehm J, Ustun B, Grant BF, Chatterji S. Factor structure of DSM-IV substance disorder criteria endorsed by alcohol, cannabis, cocaine and opiate users: results from the World Health Organization Reliability and Validity Study. *Addiction* 1999;94:843–855. [PubMed: 10665074]
38. Pull CB, Saunders JB, Mavreas V, Cottler LB, Grant BF, Hasin DS, Blaine J, Mager D, Ustun BT. Concordance between ICD-10 alcohol and drug use disorder criteria and diagnoses as measured by the AUDADIS-ADR, CIDI and SCAN: results of a cross-national study. *Drug Alcohol Depend* 1997;47:207–216. [PubMed: 9306046]
39. Ustun B, Compton W, Mager D, Babor T, Baiyewu O, Chatterji S, Cottler L, Gogus A, Mavreas V, Peters L, Pull C, Saunders J, Smeets R, Stipec MR, Vraiti R, Hasin D, Room R, Van den Brink W, Regier D, Blaine J, Grant BF, Sartorius N. WHO Study on the reliability and validity of the alcohol and drug use disorder instruments: overview of methods and results. *Drug Alcohol Depend* 1997;47:161–170. [PubMed: 9306042]

40. Vrasti R, Grant BF, Chatterji S, Ustun BT, Mager T, Olteanu I, Badoi M. Reliability of the Romanian version of the alcohol module of the WHO Alcohol Use Disorder and Associated Disabilities Interview Schedule - Alcohol/Drug-Revised. *Eur Addict Res* 1998;4:144–149. [PubMed: 9852366]
41. Canino GJ, Bravo M, Ramirez R, Febo V, Fernandez R, Hasin DS. The Spanish Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability and concordance with clinical diagnoses in a Hispanic population. *J Stud Alcohol* 1999;60:790–799. [PubMed: 10606491]
42. Zimmerman M. Diagnosing personality disorders: a review of issues and research methods. *Arch Gen Psychiatry* 1994;51:225–245. [PubMed: 8122959]
43. Research Triangle Institute. Software for Survey Data Analysis (SUDAAN), Version 9.0. Research Triangle Park, NC: Research Triangle Institute; 2004.
44. Link BG, Andrews H, Cullen FT. The violent and illegal behavior of mental patients reconsidered. *Am Sociol Rev* 1992;57:275–292.
45. Link BG, Stueve A. Evidence bearing on mental illness as a possible cause of violent behavior. *Epidemiol Rev* 1995;17:172–181. [PubMed: 8521935]
46. Blumstein A. Youth violence, guns and the illicit drug industry. *J Crim Law Criminol* 1995;86:10–36.
47. Link BG, Stueve A, Phelan J. Psychotic symptoms and violent behaviors: probing the components of “threat/control-override” symptoms. *Soc Psychiatry Psychiatr Epidemiol* 1998;33:S55–S66. [PubMed: 9857780]
48. Link, BG.; Stueve, A. Psychotic symptoms and the violent/illegal behavior of mental patients compared to community controls. In: Monahan, J.; Steadmen, HJ., editors. *Violence and Mental Disorder: Developments in Risk Assessment*. Vol. 137. Chicago IL: University of Chicago Press; 1994. p. 137-160.
49. Swanson J, Estroff S, Swartz M, Borum R, Lachicotte W, Zimmer C, Wagner R. Violence and severe mental disorder in clinical and community populations: the effects of psychotic symptoms, comorbidity and lack of treatment. *Psychiatry* 1997;60:1–22. [PubMed: 9130311]
50. Angermeyer MC, Cooper B, Link BG. Mental disorder and violence: results of epidemiological studies in the era of de-institutionalization. *Soc Psychiatry Psychiatr Epidemiol* 1998;33:S1–S6. [PubMed: 9857773]
51. Corrigan, PW.; Cooper, AE. Mental illness and dangerousness: fact or misconception, and implications for stigma. In: Corrigan, PW., editor. *On the Stigma of Mental Illness: Strategies for Research and Social Change*. Washington DC: American Psychological Association; 2005. p. 165-180.
52. Marlatt, GA. Relapse prevention: theoretical rationale and overview of a model. In: Marlatt, GA.; Gordon, JR., editors. *Relapse Prevention*. New York NY: Guilford Press; 1985.
53. Lin W-F, Mack D, Enright RD, Krahn D, Baskin TW. Effect of forgiveness therapy on anger, mood, and vulnerability to substance use among inpatient substance-dependent clients. *J Consult Clin Psychol* 2004;72:1114–1121. [PubMed: 15612857]
54. Reilly PM, Shopshire MS. Anger management group treatment for cocaine dependence: preliminary outcomes. *Am J Drug Alcohol Abuse* 2000;26:161–177. [PubMed: 10852354]
55. Caetano R, Schafer J, Curadi CB. Alcohol-related intimate partner violence among white, Black and Hispanic couples in the United States. *Alcohol Health Res World* 2000;169:6–14.
56. Murphy CM, O’Farrell TJ. Factors associated with marital aggression in male alcoholics. *J Fam Psychol* 1994;8:321–335.
57. O’Farrell TJ, Murphy CM. Marital violence before and after alcoholism treatment. *J Consult Clin Psychol* 1995;63:256–262. [PubMed: 7751486]
58. Fals-Steward W, Kennedy C. Addressing intimate partner violence in substance-abuse treatment. *J Sub Abuse Treat* 2005;29:5–17.

Table 1

Prevalence and Adjusted^a Odds Ratios of Violent Behavior Before and Since Age 15 and Lifetime DSM-IV Substance Use, Mood, Anxiety and Personality Disorders

Disorder	n	Violent Behavior Before Age 15		Violent Behavior Since Age 15	
		% (SE)	OR (CI) ^b	% (SE)	OR (CI)
Substance use disorder	15,238	3.03 (0.18)	4.26 (3.26–5.57)	10.43 (0.34)	6.09 (5.16–7.18)
Alcohol abuse	7,062	2.24 (0.21)	2.22 (1.67–2.95)	7.73 (0.38)	2.65 (2.23–3.15)
Alcohol dependence	4,781	4.91 (0.37)	2.31 (1.78–2.99)	16.62 (0.71)	3.05 (2.49–3.73)
Drug abuse	3,023	4.85 (0.47)	2.06 (1.56–2.70)	16.18 (0.81)	2.17 (1.84–2.58)
Drug dependence	1,045	10.53 (1.00)	2.50 (1.78–3.52)	31.60 (1.91)	2.77 (2.19–3.50)
Nicotine dependence	6,937	4.06 (0.29)	1.86 (1.45–2.38)	13.64 (0.56)	2.03 (1.74–2.37)
Pathological gambling	192	7.25 (2.00)	1.53 (0.82–2.86)	28.06 (3.86)	2.54 (1.64–3.93)
Mood disorder	7,929	3.48 (0.25)	1.88 (1.47–2.41)	11.74 (0.48)	2.24 (1.96–2.56)
Major depressive disorder	5,695	2.16 (0.23)	1.28 (0.92–1.79)	8.31 (0.48)	1.73 (1.47–2.05)
Dysthymia	1,427	3.24 (0.63)	1.66 (1.00–2.75)	10.02 (0.99)	1.30 (1.00–1.69)
Bipolar I	1,411	7.86 (0.83)	2.67 (1.94–3.66)	25.34 (1.57)	3.72 (2.94–4.70)
Bipolar II	494	5.88 (1.31)	2.18 (1.26–3.79)	13.58 (1.64)	1.77 (1.26–2.49)
Anxiety disorder	7,233	2.97 (0.22)	1.29 (1.02–1.62)	9.75 (0.48)	1.29 (1.12–1.50)
Panic disorder with agoraphobia	463	4.04 (1.00)	0.90 (0.50–1.64)	14.47 (2.31)	1.02 (0.65–1.58)
Panic disorder without agoraphobia	1,653	3.72 (0.55)	1.46 (0.98–2.18)	13.18 (0.97)	1.66 (1.33–2.07)
Social phobia	1,983	3.25 (0.47)	0.83 (0.58–1.19)	11.22 (0.94)	0.91 (0.73–1.13)
Specific phobia	4,030	3.04 (0.33)	1.31 (0.95–1.79)	10.12 (0.65)	1.34 (1.13–1.58)
Generalized anxiety	1,757	4.09 (0.56)	1.28 (0.90–1.81)	13.04 (1.01)	1.16 (0.91–1.48)
Personality disorder	5,535	5.13 (0.35)	3.07 (2.40–3.93)	15.02 (0.64)	2.64 (2.27–3.06)
Paranoid	2,105	7.64 (0.71)	1.95 (1.39–2.73)	23.26 (1.38)	2.53 (1.97–3.24)
Schizoid	1,425	6.94 (0.86)	1.52 (1.02–2.28)	18.53 (1.37)	1.32 (1.03–1.69)
Histrionic	808	9.54 (1.17)	1.81 (1.23–2.65)	24.67 (1.82)	1.54 (1.19–2.00)
Avoidant	995	5.28 (0.80)	0.98 (0.65–1.50)	15.02 (1.43)	0.78 (0.58–1.06)
Dependent	208	7.01 (2.09)	0.78 (0.35–1.73)	23.34 (3.59)	1.14 (0.69–1.86)
Obsessive-compulsive	3,261	4.67 (0.46)	1.53 (1.12–2.10)	14.36 (0.78)	1.55 (1.30–1.85)
Any DSM-IV disorder	22,010	2.52 (0.13)	11.04 (7.60–16.04)	8.36 (0.27)	12.39 (10.07–15.26)

Disorder	n	Violent Behavior Before Age 15		Violent Behavior Since Age 15	
		% (SE)	OR (CI) ^b	% (SE)	OR (CI)
No DSM-IV disorder	21,083	0.21 (0.04)	1.00 (Referent)	0.66 (0.07)	1.00 (Referent)

^a Adjusted for sex, age, race-ethnicity and relevant comorbid substance use, mood, anxiety and personality disorders.

^b CI = 95% confidence interval.

Table 2

Prevalence of Violent Behavior Before and Since Age 15 Among Individuals With Lifetime Pure and Comorbid DSM-IV Substance Use, Mood, Anxiety and Personality Disorders

Disorder	Before Age 15					Since Age 15				
	Pure Disorder		Comorbid Disorder			Pure Disorder % (SE)	Comorbid Disorder % (SE)	χ^2	p	χ^2
	n	% (SE)	n	% (SE)	p					
Substance use disorder	8,222	1.75 (0.18)	7,016	4.60 (0.30)	<0.001	5.95 (0.33)	15.90 (0.59)	107.01	<0.001	
Alcohol abuse	3,039	0.68 (0.16)	4,023	3.43 (0.35)	<0.001	2.98 (0.34)	11.39 (0.59)	84.71	<0.001	
Alcohol dependence	949	1.92 (0.52)	3,832	5.65 (0.44)	<0.001	7.22 (1.06)	18.95 (0.82)	52.84	<0.001	
Drug abuse	293	1.84 (0.81)	2,730	5.14 (0.51)	0.002	8.24 (2.22)	16.93 (0.87)	10.97	0.002	
Drug dependence	18	0.00 (0.00)	1,027	10.70 (1.01)	<0.001	11.32 (9.08)	31.92 (1.93)	3.80	0.056	
Nicotine dependence	1,348	0.88 (0.22)	5,589	4.78 (0.36)	<0.001	2.55 (0.49)	16.15 (0.67)	103.84	<0.001	
Pathological gambling	6	0.00 (0.00)	186	7.44 (2.05)	0.129	0.00 (0.00)	28.78 (3.98)	2.77	0.101	
Mood disorder	1,823	0.88 (0.28)	6,106	4.19 (0.31)	<0.001	2.17 (0.43)	14.36 (0.57)	122.80	<0.001	
Major depressive disorder	1,318	0.74 (0.26)	4,377	2.55 (0.29)	<0.001	1.88 (0.49)	10.07 (0.59)	76.44	<0.001	
Dysthymia	115	0.00 (0.00)	1,312	3.48 (0.67)	<0.001	1.58 (1.13)	10.64 (1.04)	17.39	<0.001	
Bipolar I	124	0.53 (0.53)	1,287	8.58 (0.90)	<0.001	2.52 (1.39)	27.58 (1.67)	40.45	<0.001	
Bipolar II	68	8.58 (5.75)	426	5.50 (1.28)	0.610	5.12 (3.85)	14.76 (1.87)	4.26	0.043	
Anxiety disorder	1,690	0.61 (0.24)	5,543	3.62 (0.27)	<0.001	1.10 (0.35)	12.14 (0.60)	109.74	<0.001	
Panic disorder with agoraphobia	12	0.00 (0.00)	451	4.15 (1.03)	0.017	3.39 (3.44)	14.75 (2.38)	3.61	0.062	
Panic disorder without agoraphobia	265	0.84 (0.81)	1,388	4.26 (0.66)	0.002	1.88 (1.07)	15.29 (1.13)	46.58	0.003	
Social phobia	196	0.32 (0.32)	1,787	3.59 (0.52)	<0.001	0.15 (0.11)	12.53 (1.02)	63.01	<0.001	
Specific phobia	939	0.59 (0.31)	3,091	3.67 (0.42)	<0.001	0.88 (0.32)	12.49 (0.81)	82.67	<0.001	
Generalized anxiety	106	0.00 (0.00)	1,651	4.32 (0.59)	<0.001	4.71 (4.00)	13.51 (1.03)	4.78	0.032	
Personality disorder	1,054	1.61 (0.52)	4,481	5.87 (0.39)	<0.001	3.36 (0.75)	17.49 (0.72)	82.78	<0.001	
Paranoid	156	0.85 (0.63)	1,949	8.09 (0.75)	<0.001	2.36 (1.16)	24.62 (1.43)	39.85	<0.001	
Schizoid	112	0.10 (0.09)	1,313	7.44 (0.91)	<0.001	0.10 (0.09)	19.87 (1.44)	39.01	<0.001	
Histrionic	31	3.11 (3.09)	777	9.76 (1.19)	0.069	3.89 (3.20)	25.36 (1.89)	10.72	0.002	
Avoidant	36	0.00 (0.00)	959	5.45 (0.83)	<0.001	0.00 (0.00)	15.52 (1.47)	22.59	<0.001	
Dependent	9	0.00 (0.00)	199	7.30 (2.18)	0.052	0.00 (0.00)	24.32 (3.77)	4.51	0.038	
Obsessive-compulsive	499	0.65 (0.38)	2,762	5.38 (0.51)	<0.001	2.53 (0.90)	16.45 (0.88)	60.38	<0.001	

Disorder	Before Age 15				Since Age 15			
	Pure Disorder		Comorbid Disorder		Pure Disorder		Comorbid Disorder	
	n	% (SE)	n	% (SE)	% (SE)	% (SE)	% (SE)	p
Any DSM-IV disorder	9,709	0.92 (0.11)	12,301	3.75 (0.22)	3.15 (0.21)	12.35 (0.40)	140.11	<0.001

Note: The population estimates of violent behavior associated with the aggregate disorder rows for pure disorder are not the sum of all specific pure disorder estimates in that category, because the aggregate figures allow for comorbidity among specific disorders within each aggregate category

Table 3

Prevalence and Population Estimates of Violent Behavior Since Age 15 Among Individuals with Specific Lifetime Pure and Comorbid Psychiatric Disorders

Disorder	Pure Disorder				Comorbid Disorder			
	Prevalence of Disorder in General Population (1)	Population Estimate of Disorder in General Population (2)	Prevalence of Violent Behavior (3)	Population Estimate of Violent Behavior (3) × (2)	Prevalence of Disorder in General Population (1)	Population Estimate of Disorder in General Population (2)	Prevalence of Violent Behavior (3)	Population Estimate of Violent Behavior (3) × (2)
Substance use disorder ^a	21.09	43,841,180	5.95	2,606,812	17.30	35,965,835	15.90	5,718,200
Alcohol abuse	7.74	16,083,422	2.98	479,067	10.06	20,915,804	11.39	2,382,204
Alcohol dependence	2.48	5,163,150	7.22	372,679	10.00	20,790,459	18.95	3,940,210
Drug abuse	0.67	1,398,895	8.24	115,261	7.07	14,690,459	16.93	2,487,677
Drug dependence	0.04	83,531	11.32	9,453	2.55	5,295,791	31.92	1,690,434
Nicotine dependence	3.27	6,806,938	2.55	173,903	14.44	30,023,365	16.15	4,850,249
Pathological gambling	0.01	21,669	0.00	0	0.41	848,460	28.78	244,152
Mood disorder ^b	3.93	8,164,893	2.17	176,810	14.41	29,946,635	14.36	4,299,095
Major depressive disorder	2.86	5,937,517	1.88	111,775	10.37	21,556,665	10.07	2,171,804
Dysthymia	0.22	458,437	1.58	7,250	2.99	6,207,142	10.64	660,392
Bipolar I	0.30	614,860	2.52	15,501	3.01	6,260,730	27.58	1,726,807
Bipolar II	0.14	285,539	5.12	14,630	0.98	2,037,949	14.76	300,891
Anxiety disorder ^c	3.71	7,712,943	1.10	84,521	13.44	27,933,464	12.14	3,391,690
Panic disorder with agoraphobia	0.03	55,829	3.39	1,891	1.05	2,175,538	14.75	320,910
Panic disorder without agoraphobia	0.63	1,312,241	1.88	24,622	3.37	6,999,746	15.29	1,070,538
Social phobia	0.53	1,095,154	0.15	1,647	4.44	9,231,156	12.53	1,156,847
Specific phobia	1.92	3,984,488	0.88	35,006	7.47	15,526,336	12.49	1,939,043
Generalized anxiety	0.22	453,455	4.71	21,355	3.92	8,144,306	13.51	1,100,007
Personality disorder ^d	2.23	4,639,552	3.36	155,848	10.55	21,940,005	17.49	3,837,720
Paranoid	0.27	562,991	2.36	13,312	4.14	8,613,220	24.62	2,120,920
Schizoid	0.21	440,878	0.10	438	2.91	6,057,537	19.87	1,203,830
Histrionic	0.06	122,930	3.89	4,776	1.78	3,706,157	25.36	939,877

Disorder	Pure Disorder				Comorbid Disorder			
	Prevalence of Disorder in General Population (1)	Population Estimate of Disorder in General Population (2)	Prevalence of Violent Behavior (3)	Population Estimate of Violent Behavior (2) × (3)	Prevalence of Disorder in General Population (1)	Population Estimate of Disorder in General Population (2)	Prevalence of Violent Behavior (3)	Population Estimate of Violent Behavior (2) × (3)
	%	N	%	N	%	N	%	N
Avoidant	0.08	156,958	0.00	0	2.28	4,738,752	15.52	735,445
Dependent	0.02	41,090	0.00	0	0.47	980,776	24.32	238,488
Obsessive-compulsive	1.18	2,459,805	2.53	62,289	6.70	13,922,172	16.45	2,289,659
Any DSM-IV disorder	23.02	47,863,050	3.15	1,507,970	30.08	62,502,683	12.35	7,719,156

Note: Population estimates of violent behavior for pure and comorbid disorders are exact figures that may not correspond to the product of columns (2) and (3) due to rounding of prevalence of violent behavior reported in column (3). The sum of the population estimates for the individual pure disorders may not equal the population estimate for the corresponding pure disorder category because the mean weight factors used to derive the weighted population estimates vary across disorders.

- ^aThe aggregated pure substance use disorder includes respondents with one or more substance use disorder, but with no other DSM-IV disorder.
- ^bThe aggregated pure mood disorder includes respondents with one or more mood disorder, but with no other DSM-IV disorder.
- ^cThe aggregated pure anxiety disorder includes respondents with one or more anxiety disorder, but with no other DSM-IV disorder.
- ^dThe aggregated pure personality disorder includes respondents with one or more personality disorder, but with no other DSM-IV disorder.

Table 4

Prevalences and Population Estimates of Violent Behavior Since Age 15 and Lifetime Psychiatric Disorders and Percentage of Violent Behaviors Accounted for by Each Diagnostic Group

Disorder	Prevalence of Disorder in General Population (1)		Population Estimate of Disorder in General Population (2)		Prevalence of Violent Behavior (3)		Population Estimate of Violent Behavior (2) × (3)		% of Violent Individuals Accounted for by Disorder Group
	%	N	%	N	%	N			
Any anxiety disorder, only	3.71	7,712,943	1.10	84,521				0.9	
Any anxiety or mood disorder only	9.33	19,398,187	1.89	367,226				3.7	
Any anxiety, mood or personality disorder only	14.63	30,414,386	2.95	896,340				9.1	
Any anxiety, mood, personality disorder, tobacco dependence or pathological gambling only	20.75	43,131,756	3.46	1,492,957				15.1	
Any DSM-IV disorder including any anxiety, mood, personality disorder, tobacco dependence, pathological gambling, or alcohol or drug use disorder	53.1	110,365,733	8.36	9,227,126				93.5	
No DSM-IV disorder	46.9	97,514,105	0.66	641,718				6.5	

Note: Population estimates of violent behavior are exact figures that may not correspond to the product of columns (2) and (3) due to rounding of prevalence of violent behavior reported in column (3).