Published in final edited form as:

Drug Alcohol Depend. 2011 December 1; 119(1-2): 28–36. doi:10.1016/j.drugalcdep.2011.05.010.

Conditional substance abuse and dependence by diagnosis of mood or anxiety disorder or schizophrenia in the U.S. population

Silvia S. Martins^{1,†} and David A. Gorelick²

¹Department of Mental Health, Johns Hopkins Bloomberg School of Public Health

²Intramural Research Program, National Institute on Drug Abuse, National Institutes of Health

Abstract

Background—Little is known about the association of various psychiatric disorders with the risk of developing dependence or abuse among users of various psychoactive substances (conditional dependence, CD; conditional abuse, CA).

Objectives—Evaluate the association of psychiatric disorders with CA only, CD only and CA + CD.

Method—Secondary analysis of data from 43,093 non-institutionalized US adults in the first wave (2001–2002) of the National Epidemiological Survey on Alcohol and Related Conditions. A structured diagnostic interview allowed classification by lifetime psychiatric diagnosis (DSM-IV criteria) and psychoactive substance use. Data were analyzed using weighted proportions, 95% CIs, and weighted logistic regression models to generate odds ratios (OR) adjusted for socio-demographic characteristics.

Results—Psychiatric disorders were associated with higher prevalence of psychoactive substance use, regardless of type of disorder or substance. CA, CD and CA + CD prevalence rates were generally higher than unconditional prevalence rates among respondents with and without psychiatric disorders. Respondents with multiple disorders (mainly mood and anxiety disorders) had higher rates of CA + CD on most, but not all, psychoactive substances (e.g., not heroin), while schizophrenia was associated only with higher rates of tranquilizer CA + CD. Psychiatric disorders had few associations with CA only and CD only on psychoactive substances.

Conclusion—Study findings suggest that mood and anxiety disorders are associated with increased prevalence of substance use and increased transition from use to CA and CD, while schizophrenia is associated with increased transition from abstinence to use, especially for marijuana. Findings did not support the self-medication hypothesis of substance use disorders.

© 2011 Elsevier Ireland Ltd. All rights reserved.

[†]Corresponding author: Silvia S. Martins, MD, PhD., Johns Hopkins Bloomberg School of Public Health. Department of Mental Health. 624 N. Broadway, 8th floor. Baltimore, MD 21205-1900. Ph: 410-614-2852 Fax: 410-955-9088, smartins@jhsph.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Contributors

Drs. Martins and Gorelick wrote the research questions. Dr. Martins undertook the statistical analyses, and wrote the first draft of the manuscript. Drs. Martins and Gorelick managed the literature searches and summaries of previous related work. Both authors revised the manuscript drafts. Both authors contributed to and have approved the final manuscript.

Conflict of Interest

Both authors declare that they have no conflicts of interest.

Keywords

conditional substance dependence; conditional abuse; psychiatric comorbidity; self-medication hypothesis

1. Introduction

Substance use disorders and other psychiatric disorders are highly co-morbid in the general population, as well as among patients in treatment (Buckley and Brown, 2006; Compton et al., 2007; Conway et al., 2007; de Leon and Diaz, 2005; Grant, 1995; Gregg et al., 2007; Jane-Llopis and Matytsina, 2006; Lammertink et al., 2001; Kandel et al., 1997; Kessler, 2004; Kessler et al., 2003; Reiger et al., 1990; Rounsaville et al., 1991). This high co-morbidity raises important scientific and clinical questions related to etiology, prevention, and treatment of these sets of disorders (Compton et al., 2007; Jane-Llopis and Matytsina, 2006; Kessler, 2004). Co-morbid associations based on unconditional prevalence rates are not ideal for addressing these questions because they lump together non-users (abstainers, who are at no risk for substance use disorders) and non-dependent users (who are at risk). Thus, conventional prevalence analysis, which includes people who never transitioned from abstinence to substance use, obscures the contribution of those who transitioned from substance use to substance abuse and/or dependence.

Mood and anxiety disorders may be associated with higher rates of substance dependence because they increase the risk of transition from abstinence to substance use. Therefore, studies that sample populations with increased prevalence of mood and anxiety disorders may show greater prevalence of substance abuse/dependence than other studies, even if the comorbid psychiatric disorders had no direct influence on the development of substance use disorders (i.e., no influence on the transition from substance use to abuse/dependence). Several studies suggest that different familial (including genetic) and environmental factors influence the transition from abstinence to use and from use to abuse/dependence (Ehlers et al., 2007; Fowler et al., 2007; Heiman et al., 2008; Kendler et al., 2007; Sartor et al., 2008). There is no *a priori* reason to believe that psychiatric disorders might not also have a differential effect on the two transitions. A recent analysis of prospective longitudinal data from a community-based US epidemiological study (National Comorbidity Study [NCS]) using a conditional approach found that several psychiatric disorders had different associations with the transition from abstinence to use than with the transition from use to abuse/dependence (Swendsen et al., 2010).

Evaluation of co-morbidity between substance use disorders and other psychiatric disorders that distinguishes the abstinence to use transition from the use to abuse/dependence transition may provide better clues about mechanisms of co-morbidity and possible common neurobiological and environmental mechanisms contributing to substance use disorders and co-morbid psychiatric disorders. This can be done by analysis in terms of conditional abuse (CA) or dependence (CD), i.e., abuse or dependence in relation to the population of users, rather than the total population. This focuses the analysis on the transition from use to abuse/dependence, eliminating any contribution from changes in use prevalence in the population or the transition from abstinence to use.

Most studies evaluating transitions between substance use stages have focused on sociodemographic risk factors such as age, sex, race/ethnicity, education, and marital status (Swendsen et al., 2008; Kalaydjian et al., 2009; Swendsen et al., 2009); few address psychiatric co-morbidity. Use of conditional analysis sometimes identifies different sociodemographic factors associated with various substance use stages than does

unconditional analysis, suggesting that some risk factors may be limited to specific transitions between stages. For example, female sex is associated with conditional drug dependence (i.e., transition from abuse to dependence), while unconditional analyses find male sex associated with drug dependence (Swendsen et al., 2008). Similarly, conditional analysis found no significant association between male sex, younger age, or white race and alcohol dependence (i.e., transition from abuse to dependence), while unconditional analyses find these sociodemographic factors highly associated with alcohol dependence (Kalaydjian et al., 2009).

Several studies investigating the influence of co-morbidity on transitions did not use conditional prevalences (Compton et al., 2007; Conway et al., 2006; 2007; de Leon and Diaz, 2005; Dixon et al., 1999; Jane-Llópez and Matytsina, 2006; Lammertink et al., 2001; Schneier and Siris, 1987), while others have investigated CD without considering co-morbidity (Anthony et al., 1994; Kandel et al., 1997; Perkonig et al., 1998). We are aware of only one study that addressed the issue of substance use transitions and psychiatric co-morbidity using CA and CD measures (Swendsen et al., 2010). That study evaluated co-morbidity over a prospective 10-year follow-up period (rather than lifetime), did not include respondents with schizophrenia, and did not evaluate individual illegal drugs (all illegal drugs were lumped together). Thus, to our knowledge, this study is the first to investigate CA and CD among respondents with psychiatric disorders in the general population that includes schizophrenia and individual illegal drugs in the analysis.

The specific aims of this study are to: 1) compare the prevalence rates of use, CA only, CD only, and CA+CD for specific drugs among respondents with mood disorders, anxiety disorders, or schizophrenia versus those without these disorders; 2) compare the prevalence rates of CA only, CD only, and CA+ CD across psychiatric disorder subgroups (mood disorders only, anxiety disorders only, schizophrenia only and multiple disorders versus those without these disorders).

2. Methods

2.1. Sample and Measures

Data were drawn from the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative United States survey of civilian non-institutionalized participants aged 18 and older, sampled cross-sectionally and interviewed in person. Sampling frame details are described elsewhere (Grant et al., 2003; 2004; 2005). Fieldwork was conducted by the U.S. Bureau of the Census (Grant, 1996). Young adults, Hispanics, and African-Americans were oversampled, and rates were weighted to the 2000 decennial census in terms of age, race, sex, and ethnicity and were further weighted to adjust for sampling probabilities. A total of 43,093 household and group quarters respondents participated, with a response rate of 81.2%.

The Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS-4) was used in the NESARC to measure alcohol use and disorders, use of major classes of illegal drugs and associated substance use disorders, psychiatric disorders, and sociodemographic and risk factors. AUDADIS is a fully structured interview, administered by trained lay interviewers (Grant et al., 2003). Its reliability and validity are well documented in clinical and community population studies, the population for which it was designed (Compton et al., 2004). The AUDADIS gathers detailed information on quantity and frequency, age of onset, duration, and persistence of use of alcohol and tobacco, illegal drugs including marijuana, cocaine, and heroin, and prescription medications including analgesics, sedatives, tranquilizers, and stimulants. Lifetime and past year diagnoses, as well as lifetime and past year symptoms of abuse and dependence, age of onset, and duration of

substance use disorders are measured by the AUDADIS for each major drug class in the NESARC. Abuse is not a prerequisite for a diagnosis of dependence in the AUDADIS (respondents classified with dependence included those with and without abuse, Compton et al., 2007; Grant, 1996).

Psychiatric disorders assessed by the AUDADIS include major depression, dysthymia, mania, panic disorder, agoraphobia, specific phobia, social phobia, generalized anxiety disorder, antisocial and other DSM-IV axis II personality disorders, and psychotic disorders. Diagnostic methods used in the AUDADIS-IV are described in detail elsewhere (Grant et al., 2004; 2005; Hasin et al., 2005). In DSM-IV (American Psychiatric Association, 1994), “primary” excludes substance-induced disorders or those due to medical conditions; 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. Diagnostic criteria for major depression ruled out bereavement. Test-retest reliability for AUDADIS-IV mood and anxiety diagnoses in general population and clinical settings was good to fair, with kappas ranging from 0.42 for specific phobia to 0.64 for major depression (Canino et al., 1999; Grant 1995; 2003; Hasin et al., 1997). Unlike the other psychiatric disorders, schizophrenia is assessed by respondents’ self-report of ever receiving this diagnosis from a doctor, rather than by meeting diagnostic criteria.

We used data on lifetime use, abuse, and dependence of alcohol, tobacco, marijuana, cocaine, heroin, sedatives, tranquilizers, opioids, amphetamines, hallucinogens, and inhalants. To avoid overlap between substance abuse and dependence, respondents who met DSM-IV criteria (American Psychiatric Association, 1994) for both substance abuse and dependence were defined as dependent on that specific substance, those who met criteria only for substance abuse were classified as abusers of that specific substance. Primary (non-substance-induced) lifetime psychiatric diagnoses were combined into categories to increase sample sizes: mood disorder (includes major depression, dysthymia, mania, and hypomania), anxiety disorder (includes panic with agoraphobia, panic without agoraphobia, social phobia, specific phobia, and generalized anxiety disorder), and schizophrenia; those who did not meet criteria for any of these disorders were classified as respondents with no disorder.

We defined CD as the proportion of users of a specific substance who met DSM-IV criteria only for lifetime dependence on that specific substance. We defined CA as the proportion of users of a specific substance who met DSM-IV criteria only for lifetime abuse on that specific substance (i.e., excludes respondents who received both abuse and dependence diagnoses). We defined CA+CD as the proportion of users of a specific substance who met DSM-IV criteria for both lifetime abuse and dependence on that specific substance. CD, CA, and CA+CD on each substance were calculated for each psychiatric disorder subgroup (mood disorder, anxiety disorder, and schizophrenia). To test for the strength of the association between different psychiatric disorders and CD or CA, we subdivided respondents into five mutually exclusive groups: 1- no disorder, 2-mood disorder only, 3-anxiety disorder only, 4-schizophrenia only, 5- multiple disorders (any combination of mood and/or anxiety disorder and/or schizophrenia-99.5% had a mood disorder, 97.5% had an anxiety disorder, and 6.8% had schizophrenia).

2.2. Statistical analysis

Data were weighted to reflect the complex design of the NESARC sample and were analyzed by STATA 10.0 software (StataCorp, 2007). We used Taylor series estimation methods (STATA ‘svy’ commands) that allowed the use of the sampling weights provided within the NESARC dataset to obtain proper standard error estimates for the proportions and

logistic regressions. Data were analyzed using weighted proportions, 95% confidence intervals (CIs), and weighted multinomial logistic regression models to generate odds ratios (aOR) adjusted for potentially confounding sociodemographic variables (age, race or ethnicity, education, income, marital status, urbanicity, and geographic region). Prevalence rates were considered significantly different if the 95% CI of the two groups did not overlap; bivariate statistical significance tests results are also shown.

3. Results

3.1. Lifetime substance use by psychiatric disorder

Prevalence of lifetime substance use was greater in respondents with a psychiatric disorder than in those without a disorder for all 11 substance groups, with few significant differences by psychiatric disorder. Respondents with schizophrenia had greater prevalence rates than those with mood or anxiety disorders for all substances except alcohol and heroin (Table 1).

3.2. Lifetime unconditional abuse only, dependence only, and abuse + dependence by psychiatric disorder

Prevalence of lifetime abuse only was greater in those with mood and anxiety disorders than in those without a disorder for alcohol, marijuana, sedatives, and opioids. Lifetime abuse only was greater in those with schizophrenia than in those without a disorder for marijuana and tranquilizers. Prevalence of lifetime dependence only was greater in those with mood and anxiety disorders than in those without a disorder for tobacco and alcohol. Lifetime dependence only was greater in those with schizophrenia than in those without a disorder for tobacco only. Prevalence of lifetime abuse and dependence was greater for those with mood and anxiety disorders than in those without a disorder for all substances with the exception of heroin, tranquilizers, and inhalants. Lifetime abuse and dependence was greater for those with schizophrenia than in those without a disorder for all substances with the exception of heroin and sedatives (Table 2).

3.3. Lifetime CA only, CD only, and CA+CD by psychiatric disorder

There were no significant differences in prevalence of lifetime CA only (Table 3). Lifetime CD only was greater in those with a mood or anxiety disorder than in those without a disorder for tobacco, alcohol, marijuana (mood disorder only) and sedatives. Lifetime CD only was greater in those with schizophrenia than in those without a disorder for tobacco only. Lifetime CA+CD was greater in those with a mood or anxiety disorder as compared to those without a disorder for almost all substances with the exception of inhalants. Lifetime CA+CD was greater in those with schizophrenia than those without a disorder for alcohol, marijuana, cocaine, and opioids. Respondents with schizophrenia had a higher rate of alcohol CA+CD than those with mood or anxiety disorders, (Table 3).

3.4. Multinomial logistic regression models of lifetime CA only, CD only, and CA+CD by psychiatric disorder

Those with mood disorders, as compared to those with no disorders, were more than 1.2 times more likely to have alcohol and marijuana CA only. Those with anxiety disorders as compared to those with no disorders were 1.3 times more likely to have alcohol CA only and 4.3 times more likely to have hallucinogen CA only. Those with schizophrenia as compared to those with no disorders were 19 times more likely to have amphetamine CA only. Those with multiple disorders as compared to those with no disorders were 1.5 times more likely to have marijuana CA only and almost five times more likely to have sedative CA only (Table 4).

Those with mood disorders only, as compared to those with no disorders, were about two times more likely to have tobacco and alcohol CD only. Those with anxiety disorders only and schizophrenia only did not differ from those with no disorders in regards to any substance CD only. Especially for schizophrenia only, several comparisons are not reported due to small sample size. Those with multiple disorders, as compared to those with no disorders, were almost three times more likely to have alcohol CD only, almost seven times more likely to have hallucinogen CD only, eight times more likely to have marijuana CD only, and almost 30 times more likely to have sedative CD only (95%CI is wide due to small sample size).

Those with mood disorders only, as compared to those with no disorders, were two times more likely to have amphetamine CA+CD, three times more likely to have alcohol, cocaine, and hallucinogen CA+ CD, and four times more likely to have marijuana and tranquilizer CA+ CD. Those with anxiety disorders only, as compared to those with no disorders, were more than two times more likely to have alcohol CA+ CD and three times more likely to have marijuana CA+CD. Those with schizophrenia only were more than 60 times more likely to have tranquilizer CA+ CD (wide 95% CI due to small sample size). Those with multiple disorders were almost four times more likely to have amphetamine CA+CD, five times more likely to have alcohol, cocaine, sedative, and inhalant CA+ CD, seven times more likely to have marijuana CA+CD, eight times more likely to have opioid and hallucinogen CA+ CD and nine times more likely to have tranquilizer CA+ CD.

4. Discussion

This study has several main findings: 1) Psychiatric disorders were associated with higher prevalence of psychoactive substance use, regardless of type of disorder or substance; 2) CA, CD and CA+ CD prevalence rates were generally higher than unconditional prevalence rates among respondents with and without psychiatric disorders; 3) respondents with multiple disorders (mainly mood and anxiety disorders) had higher rates of CA+CD on most, but not all, psychoactive substances (e.g., not heroin), while schizophrenia was associated only with higher rates of tranquilizer CA+ CD, 4) psychiatric disorders had few associations with CA only and CD only. This pattern of findings supports the existence of common factors relating mood and anxiety disorders and substance abuse and dependence beyond just increased substance use, e.g., possible influence on the transition from use to abuse and dependence. In contrast, schizophrenia, while also associated with increased rates of substance use, was associated only with increased tranquilizer CA+ CD and amphetamine CA only, suggesting it may have little influence on the transition from use to abuse and dependence for most substances. However, the observed associations do not necessarily reflect direct causality. This question must be addressed by longitudinal studies and genetic epidemiology studies.

Respondents with mood or anxiety disorders or schizophrenia had higher lifetime prevalence rates of substance use than found in the overall NESARC sample of the US general population using an unconditional approach (Gruza et al., 2007), but rates comparable to those in the general population from the 2002 NSDUH study, also using an unconditional approach (Gruza et al., 2007; Substance Abuse and Mental Health Services Administration, 2003). Respondents with psychiatric disorders also had higher CD rates (when considering CA+CD) than in other studies of population samples (which include respondents with psychiatric disorders) that used conditional approaches (Anthony et al., 1994; Perkonig et al., 1998). This suggests that CD rates in the general population may be inflated due to the strong association between psychiatric disorders and substance use and substance use disorders, and that the presence of psychiatric comorbidity should be taken into account when measuring CD.

Respondents with no psychiatric disorder had generally lower CD and CA+CD rates than in other studies that used conditional approaches in the general population without stratifying by presence of psychiatric disorder (Anthony et al., 1994; Perkonig et al., 1998) and lower lifetime prevalence rates of substance use (except for alcohol) than found in the overall NESARC sample of the US general population using unconditional approaches (Gruza et al., 2007) and much lower rates than those in the general population from the 2002 NSDUH study also using unconditional approaches (Gruza et al., 2007; Substance Abuse and Mental Health Services Administration, 2003). Because the NESARC and NSDUH general population samples include respondents with psychiatric disorders, these differences suggest that estimates of substance use in the general population might be inflated due to higher rates of substance use among people with psychiatric disorders.

The proportion of respondents with mood or anxiety disorders who had CA+ CD was much higher than in studies of unconditional substance dependence (Conway et al., 2006), suggesting possible influence of these disorders on the transition from use to abuse and dependence. The strength of associations between psychiatric disorders and CA+ CD in the present study somewhat resembles that found in other studies of lifetime substance use disorders (Compton et al., 2007; Conway et al., 2006; Conway et al., 2007). In the present study, associations were stronger for CA+CD than for CA only and CD only (possibly due to small sample size of respondents with only substance abuse or dependence), and for those with multiple psychiatric disorders (mainly combinations of mood and anxiety disorders), rather than a single disorder (e.g., only a mood or anxiety disorder or schizophrenia). Compton and colleagues (2007) found both past-year and lifetime unconditional drug abuse and dependence significantly associated with mood and anxiety disorders, even when adjusted for the presence of other psychiatric disorders.

Our results are only partially consistent with a recent analysis of 10-year prospective longitudinal data from the NCS (Swendsen et al., 2010). That study found that pre-existing (baseline) mood disorder was associated with increased risk of developing tobacco CD over the following 10 years, but no increased risk of alcohol or illegal drug CD. Anxiety disorders were associated only with increased risk of alcohol CD. In contrast, the present study, which evaluated lifetime diagnoses, found that mood disorders were associated with increased prevalence of both tobacco and alcohol CD only, as well as CD and CA+ CD on various illegal drugs. In addition, anxiety disorders were associated with increased prevalence of tobacco CD only, alcohol CA only and CA+CD. Moreover, combined mood and anxiety disorders (multiple disorders group) were associated with tobacco, alcohol and several illegal drugs CD only and CA+CD.

These differences can probably be explained by differences in methodology between the NESARC and the NCS studies. Of note, substance dependence in the NCS was assessed only among individuals meeting criteria for DSM-IV abuse- known as a 'gated approach' (Swendsen et al., 2010). Thus, the NCS study might have missed cases of substance dependence because this approach not only can reduce the number of identified cases of substance dependence but also can introduce bias in estimates of associations linked with substance dependence (Degenhardt et al., 2007; 2008). In addition, the longitudinal design of the Swendsen et al. (2010) study might have contributed to differences in findings if it takes more than 10 years (the period of the Swendsen study) for associations between co-morbidity and substance use transitions to become evident.

Our findings shed some light on the suggested link between marijuana use and psychosis (Moore et al., 2007). We found a high rate (45.4%) of marijuana use among respondents with schizophrenia, comparable to that found in other epidemiological studies (Gregg et al., 2007). This use rate was higher than among respondents with mood or anxiety disorders or

with no disorder. However, respondents with schizophrenia were at no greater risk of marijuana CD than those with no psychiatric disorder. These findings suggest that the association between schizophrenia and marijuana is more related to the transition from abstinence to use than from use to dependence.

Our pattern of findings is not consistent with the self-medication hypothesis, which holds that individuals use a substance in order to alleviate particular psychiatric symptoms, e.g., depressed mood or anxiety (Khantzian, 2003). As a consequence, there should be a considerable degree of psychopharmacologic specificity in an individual's preferred drug (Khantzian, 2003), e.g., those with depressed mood should be more likely to use and abuse stimulants, while those with anxiety should be more likely to use and abuse CNS depressants. We did not find any such clear-cut distinctions. Respondents with mood disorders only and anxiety disorders only had similar lifetime prevalence rates for use and similar adjusted odds ratios of developing lifetime CA+CD on both CNS depressants (alcohol, sedatives, marijuana) and stimulants (cocaine, amphetamine). Respondents with multiple disorders also had generally similar adjusted odds ratios of developing lifetime CA+CD on the various substances.

This study has several implications for clinical practice. Clinicians should keep in mind the increased risk for development of substance use disorders in patients with substance use and a comorbid psychiatric disorder. Screening all such patients for substance use disorders appears to be clinically worthwhile. Given the lack of support for the self-medication hypothesis, a narrow focus on specific substance co-morbidity in specific psychiatric disorders appears unjustified.

This study has several limitations. First, it is a cross-sectional study; thus, causal relationships cannot be inferred. Second, the diagnosis of schizophrenia was based on respondents' self-report of receiving this diagnosis from a doctor, not on a structured diagnostic interview. Thus, the diagnosis of schizophrenia may have less validity than other diagnoses. However, the prevalence of schizophrenia in the NESARC sample (<1%) is consistent with that in other studies using structured diagnostic interviews (Eaton et al., 2008), making it unlikely that schizophrenia was significantly misdiagnosed in the NESARC sample. Third, large epidemiologic studies may overestimate comorbidity associations, especially when the focus is on lifetime diagnoses in mixed-age samples (Kraemer et al., 2006). Fourth, there might be some misdiagnosis of substance use disorders among respondents who are polydrug users, e.g., they might misattribute a dependence symptom to one drug that was actually related to another drug. Fifth, sample sizes were very small for some psychiatric disorder-substance combinations, resulting in very wide 95% CIs and precluding calculation of odds ratios in some cases. Therefore, this study may have been underpowered to detect significant differences in prevalence rates between some subgroups. Sixth, all information is based on self-report, as in all large-scale epidemiologic surveys. As such, the validity of these results is predicated on the accuracy of the information provided by respondents. However, the AUDADIS-IV has shown good reliability and validity (Grant et al., 2003; Grant et al., 2005). Overall, these limitations do not seriously weaken the validity of the observed differences. Small sample sizes and misdiagnosis or underdiagnosis would tend to blur distinctions and associations among subgroups, rather than generate spuriously significant differences. In addition, we believe that the conditional approach provides a stronger basis for any observed findings, instead of simply testing for associations using an unconditional approach.

In summary, this study is the first, to our knowledge, to evaluate the rates of substance-specific CA only, CD only, and CA+CD among respondents with psychiatric disorders that includes respondents with schizophrenia. This study identified different population

subgroups at risk of developing CA and CD on different substances. In particular, it confirmed previous findings, using unconditional prevalence rates, that psychiatric comorbidity is associated with increased psychoactive substance use. The pattern of findings suggests that mood and anxiety disorders may influence the transition from substance use to abuse/dependence rather than from abstinence to use, while schizophrenia may influence the transition from abstinence to use (especially for marijuana), but does not support the self-medication hypothesis of substance use disorders.

Acknowledgments

The data reported herein come from the NESARC study that was funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA), National Institutes of Health, with supplemental support from the National Institute on Drug Abuse (NIDA), National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health. We thank Ms. Grace Lee for help in formatting the paper.

Role of funding source

The development of this manuscript was supported by the Intramural Research Program, NIH, National Institute on Drug Abuse (DAG) and NIDA grants DA-020923 (SSM), DA 020667 (SSM) & DA023434 (SSM). The NIH had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.

References

- American Psychiatric Association. American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders. 4th ed.. Washington, DC: American Psychiatric Association; 1994.
- Anthony JC, Warner LA, Kessler RC. Comparative epidemiology of dependence on tobacco, alcohol, controlled substances, and inhalants: basic findings from the National Comorbidity Survey. *Exp. Clin. Psychopharmacol.* 1994; 2:244–268.
- Buckley PF, Brown ES. Prevalence and consequences of dual diagnosis. *J. Clin. Psychiatry.* 2006; 67:e01. [PubMed: 17107226]
- Canino G, Bravo M, Ramírez R, Febo VE, Rubio-Stipec M, Fernández RL, Hasin D. 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]
- Compton WM, Thomas YF, 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.* 2007; 64:566–576. [PubMed: 17485608]
- Compton WM, Grant BF, Colliver JD, Glantz MD, Stinson FS. Prevalence of marijuana use disorders in the United States: 1991–1992 and 2001–2002. *JAMA.* 2004; 291:2114–2121. [PubMed: 15126440]
- Conway KP, Compton W, Stinson FS, Grant BF. Lifetime comorbidity of DSM-IV mood and anxiety disorders and specific drug use disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J. Clin. Psychiatry.* 2006; 67:247–257. [PubMed: 16566620]
- Conway KP, Montoya ID, Compton W. Lifetime psychiatric comorbidity of illicit drug use disorders. *Psychiatr. Times.* 2007; 24:4.
- Degenhardt L, Bohnert KM, Anthony JC. Case ascertainment of alcohol dependence in general population surveys: 'gated' versus 'ungated' approaches. *Int. J. Methods Psychiatr. Res.* 2007; 16:111–123. [PubMed: 17703472]
- Degenhardt L, Bohnert KM, Anthony JC. Assessment of cocaine and other drug dependence in the general population: "gated" versus "ungated" approaches. *Drug Alcohol Depend.* 2008; 93:227–232. [PubMed: 18065161]
- de Leon J, Diaz F. A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. *Schizophr. Res.* 2005; 76:135–157. [PubMed: 15949648]

- Dixon L, Postrado L, Delahanty J, Fischer PJ, Lehman A. The association of medical comorbidity in schizophrenia with poor physical and mental health. *J. Nerv. Ment. Dis.* 1999; 187:496–502. [PubMed: 10463067]
- Eaton WW, Martins SS, Nestadt G, Bienvenu OJ, Clarke D, Alexandre PK. The burden of mental disorders. *Epi. Rev.* 2008; 30:1–14.
- Ehlers CL, Wall TL, Corey L, Lau P, Gilder DA, Wilhelmsen K. Heritability of illicit drug use and transition to dependence in Southwest California Indians. *Psychiatr. Genet.* 2007; 17:171–176. [PubMed: 17417061]
- Fowler T, Lifford K, Shelton K, Rice F, Thapar A, Neale MC, McBride A, van den Bree MB. Exploring the relationship between genetic and environmental influences on initiation and progression of substance use. *Addiction.* 2007; 102:413–422. [PubMed: 17298649]
- Grant BF. Comorbidity between *DSM-IV* drug use disorders and major depression: results of a national survey of adults. *J. Subst. Abuse.* 1995; 7:481–497. [PubMed: 8838629]
- Grant BF. *DSM-IV*, *DSM-III-R*, and *ICD-10* alcohol and drug abuse/harmful use and dependence, United States, 1992: a nosological comparison. *Alcohol. Clin. Exp. Res.* 1996; 20:1481–1488. [PubMed: 8947328]
- Grant, BF.; Moore, TC.; Shepard, J.; Kaplan, K. Source and accuracy statement for wave 1 of the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2003.
http://niaaa.census.gov/pdfs/source_and_accuracy_statement.pdf
- 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]
- 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 USA: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychol. Med.* 2005; 35:1747–1759. [PubMed: 16202187]
- Gregg L, Barrowclough C, Haddock G. Reasons for increased substance use in psychosis. *Clin. Psychol. Rev.* 2007; 27:494–510. [PubMed: 17240501]
- Gruzca RA, Abbachi AM, Pryzbeck TR, Gfroerer JC. Discrepancies in estimates of prevalence and correlates of substance use and disorders between two national surveys. *Addiction.* 2007; 102:623–629. [PubMed: 17309538]
- Hasin DS, Goodwin RD, Stinson FS, Grant BF. Epidemiology of major depressive disorder: results from the National Epidemiologic Survey on Alcoholism and Related Conditions. *Arch. Gen. Psychiatry.* 2005; 62:1097–1106. [PubMed: 16203955]
- 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; 14:133–141. [PubMed: 9088785]
- Heiman GA, Ogburn E, Gorrochurn P, Keyes KM, Hasin D. Evidence for a two-stage model of dependence using the NESARC and its implications for genetic association studies. *Drug Alcohol Depend.* 2008; 92:258–266. [PubMed: 17933473]
- Jane-Llópez E, Matysina I. Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. *Drug Alcohol Rev.* 2006; 25:515–536. [PubMed: 17132571]
- Kalaydjian A, Swendsen J, Chiu WT, Dierker L, Degenhardt L, Glantz M, Merikangas KR, Sampson N, Kessler R. Sociodemographic predictors of transitions across stages of alcohol use, disorders, and remission in the National Comorbidity Survey Replication. *Compr. Psychiatry.* 2009; 50:299–306. [PubMed: 19486727]
- Kandel D, Chen K, Warner LA, Kessler RC, Grant B. Prevalence and demographic correlates of symptoms of last year dependence on alcohol, nicotine, marijuana and cocaine in the U.S. population. *Drug Alcohol Depend.* 1997; 44:11–29. [PubMed: 9031816]
- Kandel DB, Johnson JG, Bird HR, Canino G, Goodman SH, Lahey BB, Regier DA, Schwab-Stone M. Psychiatric disorders associated with substance use among children and adolescents: findings from

- the methods for the epidemiology of child and adolescent mental disorders (MECA) study. *J. Abnorm. Child Psychiatry*. 1997; 25:121–132.
- Kendler KS, Myers J, Prescott CA. Specificity of genetic and environmental risk factors for symptoms of cannabis, cocaine, alcohol, caffeine, and nicotine dependence. *Arch. Gen. Psychiatry*. 2007; 64:1313–1320. [PubMed: 17984400]
- Kessler RC. The epidemiology of dual diagnosis. *Biol. Psychiatry*. 2004; 56:730–737. [PubMed: 15556117]
- Kessler, RC.; Aguilar-Gazola, S.; Andrade, L.; Bijl, R.; Borges, LG.; Caraveo-Anduaga, JJ.; DeWit, DJ.; Kolody, B.; Merikangas, KR.; Molnar, BR.; Vega, WA.; Walters, EE.; Wittchen, H. Cross-national comparisons of co-morbidities between substance use disorders and mental disorders. In: Sloboda, Z.; Bukoski, WJ., editors. *Handbook of Drug Abuse Prevention: Theory, Science, and Practice*. New York: Kluwer Academic Publishers; 2003. p. 447–472.
- Khantzian EJ. The self-medication hypothesis revisited: the dually diagnosed patient. *Prim. Psychiatry*. 2003; 10:47–54.
- Kraemer HC, Wilson KA, Hayward C. Lifetime prevalence and pseudocomorbidity in psychiatric research. *Arch. Gen. Psychiatry*. 2006; 63:604–608. [PubMed: 16754833]
- Lammertink M, Lohrer F, Kaiser R, Hambrecht M, Pukrop R. Differences in substance abuse patterns: multiple drug abuse alone versus schizophrenia with multiple drug abuse. *Acta Psychiatr. Scand*. 2001; 104:361–366. [PubMed: 11722317]
- Moore TH, Zammit S, Lingford-Hughes A, Barnes TR, Jones PB, Burke M, Lewis G. Cannabis use and risk of psychotic or affective mental health outcomes: a systematic review. *Lancet*. 2007; 370:319–332. [PubMed: 17662880]
- Perkonig A, Lieb R, Wittchen HU. Prevalence of use, abuse and dependence of illicit drugs among adolescents and young adults in a community sample. *Eur. Addict. Res*. 1998; 4:58–66. [PubMed: 9740818]
- Regier DA, Farmer ME, Rae DS, Locke BZ, Keith SJ, Judd LL, Goodwin FK. Comorbidity of mental disorders with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) study. *JAMA*. 1990; 264:2511–2518. [PubMed: 2232018]
- Rounsaville BJ, Kosten TR, Weissman MM, Prusoff B, Pauls D, Anton SF, Merikangas K. Psychiatric disorders in relatives of probands with opiate addiction. *Arch. Gen. Psychiatry*. 1991; 48:33–42. [PubMed: 1984760]
- Sartor CE, Agrawal A, Lynskey MT, Bucholz KK, Heath AC. Genetic and environmental influences on the rate of progression to alcohol dependence in young women. *Alcohol. Clin. Exp. Res*. 2008; 32:632–638. [PubMed: 18331380]
- Schneier FR, Siris SG. A review of psychoactive substance use and abuse in schizophrenia. Patterns of drug choice. *J. Nerv. Ment. Dis*. 1987; 174:641–652. [PubMed: 3316490]
- StataCorp. Stata statistical software: release 10.0. College Station, TX: Stata Corporation; 2007.
- Substance Abuse and Mental Health Services Administration. Results from the 2002 National Household Survey on Drug Abuse: Volume II. Technical appendices and selected data tables. Rockville, MD: SAMSHA; 2003. (Office of Applied Studies, NHSDA Series H-22, DHHS Publication No. SMA 03-3836)
- Swendsen J, Anthony JC, Conway KP, Degenhardt L, Dierker L, Glantz M, He J, Kalaydjian A, Kessler RC, Sampson N, Merikangas KR. Improving targets for the prevention of drug use disorders: sociodemographic predictors of transitions across drug use stages in the national comorbidity survey replication. *Prev. Med*. 2008; 47:629–634. [PubMed: 18926848]
- Swendsen J, Conway KP, Degenhardt L, Dierker L, Glantz M, Jin R, Merikangas KR, Sampson N, Kessler RC. Socio-demographic risk factors for alcohol and drug dependence: the 10-year follow-up of the national comorbidity survey. *Addiction*. 2009; 104:1346–1355. [PubMed: 19549055]
- Swendsen J, Conway KP, Degenhardt L, Glantz M, Jin R, Merikangas KR, Sampson N, Kessler RC. Mental disorders as risk factors for substance use, abuse and dependence: results from the 10-year follow-up of the National Comorbidity Survey. *Addiction*. 2010; 105:1117–1128. [PubMed: 20331554]

Table 1

Proportion of respondents with specific psychiatric disorders who are lifetime users of a specific substance, NESARC 2001–2002.

Substance use											
Tobacco % 95%CI	Alcohol % 95%CI	Marijuana % 95%CI	Cocaine % 95%CI	Heroin % 95%CI	Sedative % 95%CI	Tranquilizer % 95%CI	Opioid % 95%CI	Amphetamine % 95%CI	Hallucinogen % 95%CI	Inhalant % 95%CI	
56.1 *** n=4,700	89.3 *** 7,727	33.9 *** 2,834	11.9 *** 1,013	0.8 *** 73	9.4 *** 768	8.1 *** 636	10.6 *** 851	10.4 *** 827	11.6 *** 920	4.0 *** 316	
55.6 *** n=3,979	88.6 *** 6,518	31.3 *** 2,187	10.4 *** 743	0.7 *** 54	7.9 *** 566	7.3 *** 489	8.9 *** 605	9.1 *** 598	10.5 *** 687	3.6 *** 227	
70.1 *** n=260	89.3 *** 330	45.4 *** 131	20.3 *** 76	*** 11	16.4 *** 65	16.5 *** 54	17.6 *** 62	16.6 *** 56	22.5 *** 66	12.1 *** 37	
43.4 42.7–44.1	80.3 79.8–80.6	16.4 15.7–16.7	4.4 4.1–4.7	0.2 0.1–0.3	2.6 2.3–2.8	2.1 1.8–2.2	3.0 2.8–3.2	2.1 2.6–3.1	4.0 3.7–4.3	1.1 0.9–1.2	
n=12,587	23,897	4,494	1,258	60	678	537	786	748	1,025	1.2 281	

this diagnosis from a doctor.

confidence interval

Drug Alcohol Depend. Author manuscript; available in PMC 2012 December 1.

Table 2
Weighted proportion of respondents with specific psychiatric disorders who developed lifetime abuse only, dependence only, and abuse+dependence at substance (unconditional rates), NESARC 2001–2002.

Psychiatric disorder	Tobacco % 95%CI	Alcohol % 95%CI	Marijuana % 95%CI	Cocaine % 95%CI	Heroin % 95%CI	Sedative % 95%CI	Tranquilizer % 95%CI	Opioid % 95%CI	Amphetamine % 95%CI	Hallucinogen % 95%CI	Inhalant % 95%CI
Substance abuse only											
<i>Alcohol Dependence</i>	---	21.9 *** 20.7–23.1	2.1 *** 1.8–2.5	0.3 * 0.1–0.4	0.2 0.1–0.3	0.2 *** 0.1–0.3	0.1 *** 0.04–0.2	0.5 *** 0.3–0.7	0.1 0.06–0.2	0.1 0.04–0.2	0.01 –0.01–0.03
<i>Substance Dependence</i>	---	22.2 *** 20.9–23.5	1.6 *** 1.3–2.0	0.2 0.1–0.4	0.2 0.1–0.3	0.2 *** 0.1–0.3	0.2 *** 0.03–0.3	0.5 *** 0.3–0.7	0.2 ** 0.1–0.3	0.1 * 0.03–0.3	0.002 –0.02–0.01
<i>Schizophrenia †</i>	---	16.6 11.1–22.0	4.9 *** 1.0–8.8	1.6 –1.3–4.4	1.0 *** –0.2–2.3	0.3 –0.2–0.1	0.6 ** –0.5–1.7	1.7 ** –1.2–4.6	0.5 –0.4–1.3	0.1 –0.01–0.2	--
<i>Personality Disorder</i>	---	18.2 17.0–19.4	0.7 0.6–0.9	0.1 0.06–0.1	0.1 0.06–0.2	0.01 –0.1–0.03	0.03 0.002–0.04	0.1 0.01–0.2	0.04 –0.1–0.1	0.03 0.01–0.06	0.01 –0.1–0.03
Substance dependence only											
<i>Alcohol Dependence</i>	33.0 * 31.5–34.6	2.0 *** 1.6–2.4	0.5 *** 0.2–0.7	0.01 –0.1–0.02	0.01 * –0.1–0.03	0.1 *** 0.06–0.2	0.03 ** –0.1–0.1	0.03 * 0.01–0.1	0.04 ** –0.01–0.1	0.1 *** 0.03–0.2	0.005 –0.1–0.01
<i>Substance Dependence</i>	31.7 * 30.3–33.2	1.7 *** 1.3–2.0	0.5 *** 0.3–0.8	--	--	0.2 *** 0.1–0.3	0.04 *** –0.1–0.1	0.05 *** –0.01–0.1	0.02 –0.02–0.1	0.1 ** 0.02–0.2	0.01 –0.01–0.02
<i>Schizophrenia †</i>	45.3 * 38.9–51.6	2.5 * 0.8–4.2	0.3 –0.2–0.8	--	--	--	0.2 *** –0.2–0.7	0.1 –0.1–0.3	0.1 –0.1–0.2	0.6 *** –0.6–1.8	--
<i>Personality Disorder</i>	12.4 11.2–13.2	0.7 0.6–0.9	0.04 0.02–0.1	0.01 –0.1–0.02	--	0.002 –0.1–0.01	0.002 –0.2–0.01	--	--	0.01 –0.1–0.02	0.02 –0.01–0.04
Substance abuse +dependence											
<i>Alcohol Dependence</i>	---	21.9 *** 20.5–23.3	3.7 *** 3.1–4.2	3.0 *** 2.5–3.4	0.3 *** 0.2–0.4	0.7 *** 0.4–0.9	0.6 *** 0.04–0.9	1.1 *** 0.7–1.4	1.7 *** 1.3–2.0	0.8 *** 0.5–1.0	0.2 *** 0.03–0.3
<i>Substance Dependence</i>	---	20.3 *** 18.9–21.7	3.3 *** 2.8–3.9	2.5 *** 2.0–2.9	0.2 *** 0.1–0.4	0.6 *** 0.4–0.9	0.6 *** 0.4–0.8	1.0 *** 0.7–1.4	1.6 *** 1.2–2.0	0.7 *** 0.4–1.0	0.1 *** 0.01–0.3
<i>Schizophrenia †</i>	---	32.8 *** 26.0–39.7	7.9 *** 3.2–12.6	7.7 *** 4.6–10.8	1.1 *** 0.1–2.3	1.5 *** 0.1–2.8	2.8 *** 0.3–5.3	3.6 *** 0.4–6.8	2.7 *** 0.9–4.4	3.4 *** 0.2–6.6	0.3 –0.1–0.7
<i>Personality Disorder</i>	---	7.2 6.6–7.7	0.4 0.3–0.5	0.3 0.2–0.4	0.03 0.01–0.1	0.05 0.01–0.1	0.02 0.01–0.1	0.1 0.03–0.1	0.2 0.1–0.3	0.05 0.02–0.1	0.01 –0.01–0.02

received this diagnosis from a doctor.

CI: 95% confidence interval

5

01

.0001.

Table 3
Weighted proportion of respondents of a psychoactive substance with specific psychiatric disorders who developed lifetime **abuse only, dependence only, and abuse+dependence** on that substance (conditional rates), NESARC 2001–2002.

Psychiatric disorder	Tobacco % 95%CI	Alcohol % 95%CI	Marijuana % 95%CI	Cocaine % 95%CI	Heroin % 95%CI	Sedative % 95%CI	Tranquilizer % 95%CI	Opioid % 95%CI	Amphetamine % 95%CI	Hallucinogen % 95%CI	Inhalant % 95%CI
Substance abuse only											
<i>Alcohol Depend.</i>	---	24.5 23.2–25.8	**6.3 5.3–7.3	2.1 0.1–3.4	25.6 –1.4–52.5	2.4 ** 1.1–3.6	1.8 0.1–3.1	5.2 3.3–7.1	1.4 1.0–2.2	1.1 0.4–1.8	0.3 –0.1–1.0
<i>Substance Depend.</i>	---	25.1 23.7–26.4	5.3 4.1–6.4	2.4 1.0–4.0	27.1 –58.7–112.9	2.6 * 1.1–4.1	2.4 0.4–4.3	5.4 2.9–7.9	2.4 1.0–3.8	1.4 0.2–2.6	0.1 –0.1–0.3
<i>Schizophrenia †</i>	---	18.6 12.5–24.6	10.8 2.6–19.1	7.7 –6.5–21.9	39.8 –186.4–266.0	1.9 –1.3–5.2	3.8 –3.2–10.7	9.6 –6.7–25.8	2.9 –2.4–8.2	0.4 –0.4–1.1	--
<i>Substance Depend.</i>	---	22.6 21.4–23.9	4.6 4.0–5.2	2.4 1.4–3.3	49.7 –49.0–148.4	1.0 –0.1–1.3	1.2 0.1–2.4	4.1 2.1–6.1	1.6 0.1–3.2	1.0 0.1–1.5	1.3 –0.1–3.2
Substance dependence only											
<i>Alcohol Depend.</i>	58.9 ** 57.1–60.7	2.2 *** 1.8–2.7	1.4 *** 1.0–2.0	0.1 –0.1–0.2	1.1 –3.8–6.1	1.7 *** 1.0–2.7	0.4 –0.1–1.0	0.3 0.01–1.0	0.4 –0.1–1.0	1.1 * 0.02–2.0	0.1 –0.1–0.3
<i>Substance Depend.</i>	57.1 ** 55.1–59.1	1.9 *** 1.5–2.3	1.6 0.1–2.4	--	--	2.1 1.0–3.5	1.0 –0.1–1.2	0.5 –0.1–1.1	0.2 –0.2–1.0	1.0 0.1–1.9	0.2 –0.1–0.4
<i>Schizophrenia †</i>	64.6 ** 56.7–72.4	2.8 * 0.1–4.7	0.7 –0.3–1.8	--	--	--	1.4 –1.6–4.5	0.5 –0.5–1.6	0.5 –0.5–1.5	2.6 –2.9–8.1	--
<i>Substance Depend.</i>	28.6 27.4–29.8	1.0 0.7–1.1	0.3 0.1–0.4	0.2 –0.1–0.4	--	0.1 –0.1–0.3	0.1 –0.1–0.4	--	--	0.2 –0.1–0.6	0.2 –0.1–0.4
Substance abuse +dependence											
<i>Alcohol Depend.</i>	---	24.5 *** 23.0–26.0	10.8 *** 9.4–12.3	25.1 *** 21.7–28.5	35.8 9.1–62.5	7.1 *** 4.7–9.4	8.0 *** 5.5–10.5	10.0 *** 7.3–12.8	16.1 *** 13.4–18.9	6.5 *** 4.5–8.5	3.8 ** 1.0–6.7
<i>Substance Depend.</i>	---	22.9 21.3–24.4	10.6 *** 8.9–12.3	23.6 19.8–27.4	36.6 –52.2–125.3	8.0 5.3–10.7	8.2 5.3–11.1	11.8 8.4–15.1	17.9 14.0–21.7	7.0 4.2–9.7	3.7 0.1–7.3
<i>Schizophrenia †</i>	---	36.8 *** 29.3–44.2	17.5 *** 7.5–27.5	38.3 *** 23.5–53.0	43.4 –179.7–267.4	8.9 1.0–17.1	17.1 ** 2.3–31.9	20.4 ** 4.2–36.6	16.0 6.1–25.9	15.1 *** 1.7–28.5	2.6 –1.8–6.9
<i>Substance Depend.</i>	---	8.9 8.3–9.6	2.6 2.0–3.2	7.9 6.2–9.6	17.0 –51.9–85.9	1.8 0.6–3.0	1.2 0.1–2.4	2.0 0.8–3.2	6.4 4.0–8.9	1.2 0.5–1.9	0.9 –0.1–1.9

received this diagnosis from a doctor.

CI: 95% confidence interval

05

01

<.001.

Table 4

Adjusted Odds Ratio (aOR) of lifetime users of a psychoactive substance among respondents with specific psychiatric disorders who developed **lifetime dependence abuse only (CA), conditional dependence only (CD) and conditional abuse+dependence (CA+CD)** on that substance, results from multinomial logistic regression, NESARC 2001–2002.

Drug	Psychiatric Disorder				
	No disorder	Mood Disorder aOR (95%CI)	Anxiety disorder aOR(95%CI)	Schizophrenia aOR (95%CI)	Multiple Disorders aOR (95%CI)
Tobacco					
CD only	1.0	2.5 (2.2, 2.8)	2.2 (2.0, 2.5)	1.4 (0.6, 2.9)	4.1 (3.6, 4.7)
Alcohol					
CA only	1.0	1.2 (1.1, 1.4)	1.3 (1.2, 1.5)	1.1 (0.5, 2.4)	1.2 (1.0, 1.3)
CD only	1.0	2.1 (1.5, 3.0)	1.6 (1.0, 2.5)	3.8 (0.8, 17.3)	2.7 (1.8, 3.8)
CA+ CD	1.0	2.9 (2.5, 3.3)	2.3 (2.0, 2.6)	2.3 (0.8, 6.4)	5.1 (4.5, 5.8)
Marijuana					
CA only	1.0	1.7 (1.3, 2.2)	1.3 (0.8, 2.0)	1.7 (0.2, 14.0)	1.5 (1.1, 2.1)
CD only	1.0	2.4 (1.0, 5.9)	3.0 (0.9, 9.9)	n/a	8.1 (3.4,19.5)
CA+ CD	1.0	3.9 (2.8, 5.3)	3.2 (2.0, 5.2)	0.8 (0.1, 4.0)	6.9 (5.0, 9.5)
Cocaine					
CA only	1.0	0.8 (0.4, 1.8)	1.5 (0.5, 4.4)	n/a	0.5 (0.2, 1.3)
CD only	1.0	0.6 (0.1, 6.3)	n/a	n/a	n/a
CA+ CD	1.0	2.9 (1.9, 4.3)	1.3 (0.8, 2.3)	1.3 (0.3, 6.2)	5.7 (4.0, 8.0)
Heroin					
CA only	1.0	0.2 (0.06,1.0)	0.5 (0.1,2.1)	2.3 (0.1,73.4)	0.5 (0.1,1.6)
CD only	1.0	n/a	1.0 (0.5,2.0)	1.0 (0.2,5.0)	1.0 (0.6,1.6)
CA+ CD	1.0	3.6 (1.0–13.1)	3.1 (0.7–13.2)	1.9 (0.07–53.1)	2.6 (0.8,8.5)
Sedative					
CA only	1.0	1.6 (0.5, 5.4)	0.9 (0.1, 9.8)	n/a	4.9 (1.2, 19.8)
CD only	1.0	1.9 (0.1, 34.8)	n/a	n/a	29.5 (3.3, 266.9)
CA+ CD	1.0	2.0 (0.8, 4.8)	2.1 (0.7, 6.8)	n/a	5.3 (2.3, 11.9)
Tranquilizer					
CA only	1.0	0.9 (0.2,3.8)	2.0 (0.4,3.9)	n/a	1.9 (0.6,6.6)
CD only	1.0	n/a	n/a	n/a	6.3 (0.6,64.2)

Drug	Psychiatric Disorder				
	No disorder	Mood Disorder aOR (95%CI)	Anxiety disorder aOR(95%CI)	Schizophrenia aOR (95%CI)	Multiple Disorders aOR (95%CI)
CA+ CD	1.0	4.1 (1.5,11.7)	2.2 (0.5,10.6)	62.2 (5.3,727.9)	9.0 (3.3,24.4)
Opioid					
CA only	1.0	0.8 (0.4, 1.8)	0.4 (0.1, 2.1)	n/a	2.0 (0.9,4.4)
CD only	1.0	n/a	n/a	n/a	n/a
CA+ CD	1.0	2.4 (1.1, 5.2)	2.3 (0.7, 7.6)	n/a	7.8 (3.8, 15.7)
Amphetamine					
CA only	1.0	0.8 (0.3,2.0)	2.7 (0.7,10.7)	19.3 (1.9,192.5)	0.9 (0.3,3.5)
CD only	1.0	n/a	n/a	n/a	n/a
CA+ CD	1.0	1.8 (1.1,2.9)	1.8 (0.7,4.1)	3.9 (0.5,24.0)	3.8 (2.3,6.4)
Amphetamine					
CA only	1.0	2.6 (0.9,7.7)	4.3 (1.3,14.5)	--	0.4 (0.1,2.5)
CD only	1.0	3.5 (0.4,28.4)	n/a	n/a	6.6 (1.1,38.5)
CA+ CD	1.0	3.3 (1.4,7.7)	3.4 (0.8,13.7)	n/a	8.0 (3.9,16.4)
Inhalant					
CA only	1.0	0.5 (0.05,5.7)	n/a	n/a	0.1 (0.06,1.1)
CD only	1.0	n/a	n/a	n/a	1.5 (0.2,11.2)
CA+ CD	1.0	2.7 (0.5,13.3)	n/a	n/a	5.5 (1.2,25.8)

aOR: adjusted for age, race/ethnicity, sex, education, income, urbanicity, and geographic region. For heroin, tranquilizers, amphetamines, hallucinogens, ORs are only adjusted for urbanicity and geographic region because sample size was too small for other covariate adjustment. Base category is no disorder.

n/a = not available because sample sizes were too small to allow calculation of odds ratios.

Values in bold are statistically significant. (95% CI does not include 1.0)