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Patterns of illegal drug use among an adult alcohol dependent population: Results from the National Survey on Drug Use and Health

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Sarra L Hedden conceptualized the manuscript, did the literature search, wrote the first draft of the manuscript and undertook the statistical analysis. Silvia Martins helped with the conceptualization of the paper, aided in the literature search, contributed to the statistical methods, contributed to the clinical interpretation of the statistical results and edited the manuscript. Robert Malcolm aided in the conceptualization and interpretation of the analysis of the paper as well as aided in the conceptualization/writing of the introduction and conclusions. Leah Floyd edited the manuscript and added to the literature search and helped write the conclusions. Courtenay Cavanaugh edited the manuscript and aided in writing the results and conclusions. William Latimer revised the manuscript, aided in the interpretation of the results and the conceptualization/writing of the conclusions. All authors contributed to and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

Abstract

The use of illegal drugs is common in alcohol dependence and significant psychological and social consequences are associated with the concurrent use of alcohol and illegal drugs. However, little literature has examined the patterns of concurrent drug use in alcohol dependent individuals. A latent class analysis (LCA) was used to determine whether patterns of past year illegal drug use existed in a national sample of 6,059 alcohol dependent respondents of the combined 2005, 2006 and 2007 National Survey on Drug Use and Health. Multinomial logistic regression was then used to determine whether demographic variables, mental health disturbance and social consequences were predictive of drug use classes. Results of the LCA demonstrated a five class solution with optimal fit deduced by Bayesian Information Criterion minima. The five classes included: a close to zero probability of illegal drug use (class 1: 65%), medium marijuana, medium sedatives/tranquilizers and high analgesics (class 2: 7%), high marijuana, medium cocaine use (class 3: 21%), high probabilities of marijuana, cocaine, sedatives and analgesic use (class 4: 6%) and a high concurrent drug use except other hallucinogens (class 5: 1%). Regression results suggest that younger age, comorbidity, engaging in deviant behaviors, sexually transmitted infection and incarceration are associated with concurrent illegal drug use in alcohol dependent individuals. Findings advocate that more intense psychiatric and drug dependence treatment resources may be needed for concurrent drug using alcohol dependent populations and provide evidence for targeted prevention and treatment interventions.

Keywords

comorbidity; latent class analysis; epidemiology; sexually transmitted disease; risk factors

1. Introduction

The majority of alcohol dependent individuals use more substances than alcohol. In the alcohol dependence literature, concurrent lifetime diagnosis of another substance dependency is 64% and reports of past 90 day use of illegal drugs are 68% (Staines et al., 2001). Among alcohol dependent individuals, concurrent cocaine, benzodiazepine, marijuana and heroin use are common ranging from 30 to 60%, 12 to 20%, 20 to 50% and 7 to 10%, respectively (Midanik et al., 2007; Petry, 2001). Many adults with alcohol dependence have multiple drug use disorders (Hasin et al., 2007; Staines et al., 2001).

Co-occurring alcohol disorder and drug use have been associated with greater frequency of alcohol use and alcohol disorder (Midanik et al., 2007), problems associated with the treatment and remission of alcohol disorder (Karno, 2008; Ives and Ghelani, 2006) as well as greater prevalence of psychological and social harms (Hedden et al., 2009). Although the use of illegal drugs is common in alcohol dependence and significant psychological and social consequences are associated with the concurrent use of alcohol and illegal drugs, very little systemic research on the heterogeneity of concurrent-drug use in alcohol dependent individuals exists (Ives and Ghelani, 2006; Staines et al., 2001).

Whereas, extant research has classified subtypes of drug use in various populations (Agrawal et al., 2007; Lynskey et al., 2006; Cuffel et al., 1993; Hasin et al., 2007; Regier et al., 1990; Whitesell et al., 2006; Stinson et al., 2005) few studies have focused on subtypes of concurrent-drug users in the adult *alcohol dependent* population. Existing studies of concurrent drug use in alcohol dependent individuals often categorize individuals as concurrent drug users without differentiating between drug type (Curran et al., 2008; Karno et al., 2008). Studies on concurrent drug use in alcohol dependence which do differentiate between drug type often focus on a particular illegal drug of interest such as alcohol and the concurrent use of marijuana

(Norton and Colliver, 1988) or cocaine (Brady et al., 1995; Grant and Harford, 1990; Hedden et al., 2009).

Studies of concurrent drug use have demonstrated that the use of alcohol in combination with other drugs has been associated with more severe psychological and social consequences than alcohol abuse or dependence alone (Hedden et al., 2009; Brady et al., 1995). For example, Brady and colleagues found that cocaine dependent individuals in treatment who abuse alcohol were more likely to exhibit cocaine related psychosis and had higher Hamilton Depression scores compared to cocaine dependent patients that did not abuse alcohol (Brady et al., 1995). Also, among persons reporting alcohol or drug abuse/dependence, comorbid mental disorders including anxiety and mood/affective disorders are common (Grant et al., 2004; Hasin et al., 2007; Merikangas et al., 1998; Regier et al., 1990). Kandel and colleagues demonstrate that the odds of mental health co-morbidities such as anxiety and depression are double for individuals who report dependency on both alcohol and illegal drug use compared to individuals with single dependency (Kandel et al., 2001). In individuals receiving treatment for heroin, cocaine and/or alcohol, affective and antisocial personality disorders were more likely in individuals with 2 or more dependencies compared to individuals with single dependency (Conway et al., 2003).

Also, adverse social consequences such a sexually transmitted infection and incarceration are more likely in individuals with co-occurring substance use disorders (Hedden et al., 2009; Midanik et al., 2007; Heil et al., 2001). For example, Heil and colleagues demonstrated that cocaine dependent alcoholics were more likely to report adverse consequences from use, including violent impulses and unwanted sexual relations (Heil et al., 2001). Using 7,612 individuals from the 2000 National Alcohol Survey, simultaneous use of alcohol with other drugs was associated with social consequences including legal problems, accidents and health problems (Midanik et al., 2007). Using the 2005 NSDUH, Hedden and colleagues demonstrated that concurrent alcohol and cocaine users were more likely to report lifetime sexually transmitted infections (STIs) and incarceration compared to single users (Hedden et al., 2009).

Literature suggests that individuals with concurrent abuse or dependence of alcohol and illegal drug use may differ from those with alcohol abuse or dependence alone. Particularly, differences in psychiatric disorders and social consequences have been described. However, no study to our knowledge has looked at psychological and social consequence as related to patterns of drug use in alcohol dependent individuals. Therefore, this study assessed the patterns of multiple illegal drugs of use in a nationally representative sample of an alcohol dependent adult population aged 18 years and older using the combined datasets from the 2005, 2006 and 2007 National Survey on Drug Use and Health (NSDUH). Illegal drug use included: marijuana, cocaine, non-prescription use of stimulants, ecstasy, other hallucinogens, non-prescription use of sedatives or tranquilizers and non-prescription use of opioid analgesics. Furthermore, correlates of concurrent drug use including demographic variables, psychiatric disorders and social consequences were assessed. It was hypothesized that classes of alcohol dependent individuals with greater concurrent drug use (i.e. high probabilities of multiple types of drug use) would have more extreme psychological and social consequences.

2. Methods

2.1 Sample

Data were from the combined 2005–2007 datasets of the NSDUH (Substance Abuse and Mental Health Services Administration, 2006; Substance Abuse and Mental Health Services Administration, 2007; Substance Abuse and Mental Health Services Administration, 2008). The NSDUH is a series of cross-sectional surveys sponsored by the Substance Abuse and

Mental Health Administration whose primary purpose is to measure the prevalence and correlates of drug use among the general population in the United States. The target population was non-institutionalized participants who were 12 years and older. The sampling design used an independent multistage area probability sample for each of the 50 states and the District of Columbia. The survey used computer assisted self-interviewing (CAI) techniques: a combination of computer assisted personal interviewing conducted by interviewers and audio assisted self-interviewing. Final samples of 68,308, 67,802 and 67,870 CAI interviews were obtained with a weighted CAI response rate of 76%, 74% and 74% for 2005, 2006 and 2007, respectively. An incentive of $30 was given for participation. Further description of the sampling methods for the 2005–2007 NSDUH are found elsewhere (Substance Abuse and Mental Health Services Administration, 2006; Substance Abuse and Mental Health Services Administration, 2007; Substance Abuse and Mental Health Services Administration, 2008).

The domain of interest was past year alcohol dependent adult (18 years or older) individuals (n=6,059). Participants meeting past year alcohol dependence for the 2005, 2006 or 2007 NSDUH datasets included 2,023, 1,990, and 2,046 of the sample, respectively. Alcohol dependence was defined based upon meeting 3 of the 7 criteria listed in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994).

2.2 Measures

Past year drug use was assessed via self-report for each cross-sectional survey, 2005–2007. Participants who reported using the listed drugs in either the 2005, 2006 or 2007 NSDUH were considered positive for “Illegal Drug Use”. Specifically, participants were asked whether they had engaged in any of the following forms of illegal drug use during the past year: 1) marijuana, 2) cocaine, 3) ecstasy, 4) other hallucinogens, and non-prescription use of 5) stimulants, 6) sedatives or tranquilizers, and 7) opioid analgesics. Seven binary (past year use=1, no past year use=0) indicators of illegal drug use were created. Past year use of heroin was not included in the analyses given its infrequency of use for this sample (raw n=88, weighted percent=1.5%).

Demographic variables included: gender, race/ethnicity, age, education status and income. Due to sample size consideration, race/ethnicity was aggregated into the following levels: Caucasian, African American, Hispanic or other. Age was aggregated into the categories of 18–25 years, 26–34 years, and greater than 35 years of age. Education status was grouped into the following categories: less than high school, high school, some undergraduate school, and undergraduate/graduate school. Annual income levels consisted of less than $20,000, $20,000–$49,000, $50,000–$74,999 and greater than $75,000.

Psychological disorders included lifetime generalized anxiety disorder (GAD) and major depressive disorder (MDD) and were assessed by participant self-reports of previous diagnosis by a medical doctor or health care professional. ‘Deviant behaviors’ were assessed and used as a proxy for conduct disorder. Specifically, a measure of deviant behavior was assessed using the survey questions: “During the past 12 months, how many times have you attacked someone with the intent to seriously hurt them?”, “During the past 12 months, how many times have you sold illegal drugs”, and “During the past 12 months, how many times have you stolen or tried to steal anything worth more than US $50?”. Participants who self-reported any of the three behaviors were categorized as having ‘deviant behavior’ (Martins et al., 2006). Other variables included self-reports of lifetime sexually transmitted infection (STI), incarceration and treatment for alcohol/drug use.

2.3 Statistical Analysis

All analyses were performed via SAS version 9.1 and MPLUS version 5 using the sampling weights and complex survey design measures. Descriptive statistics were used to describe the sample. Specifically, counts and percentages were used to describe categorical variables.

Hierarchical latent class analysis (LCA) accounting for the complex sampling design was used to explain heterogeneity of concurrent drug use in the adult alcohol dependent sample (Hagenaars and McCutcheon, 2002). LCA, a method of data reduction that allows for non-additive associations among illegal drug use, was used to identify latent class patterns of adult alcohol dependent individuals with similar concurrent drug use profiles. In order to determine the model with the optimal number of classes, models were run with between 1 and 6 classes and evaluated. The model with the number of classes associated with minimum values of fit statistics including, Akaikes Information Criterion (AIC), Bayesian Information Criterion (BIC) and Sample Size Adjusted BIC (ABIC) was chosen (Nylund et al., 2007). The BIC was given priority over other fit statistics given its optimal performance in simulation studies (Nylund et al., 2007). The optimal latent class model was checked for model fit and model assumptions including conditional independence (Garrett and Zeger, 2000). Specifically, conditional independence was tested by estimating class conditional odds ratios and 95% confidence intervals for each of the $\binom{7}{2}$ bi-variable combinations. Model identifiability was checked intrinsically and then empirically by including multiple random starting values in order to avoid local solutions that may not reflect global maximum likelihood (Muthen and Muthen, 2007). Once the number of classes was determined, correlates including demographics, psychological and social consequences were added to multinomial regression models singly and then multiply.

To account for classification error, the latent class probabilities were exported into SAS 9.1 and then used to output class indices for 20 independent datasets using a random uniform number generator to simulate a multinomial distribution. Each of the 20 outputted data sets were analyzed and estimates were combined using Rubin's rules for combining estimates (Rubin, 1987).

3. Results

Demographic characteristics of the adult alcohol dependent sample are listed in Table 1. Most of the alcohol dependent sample was male (66%) and white (68%), older than 35 years of age, and had undergraduate school and graduate school (48%) as highest education level. The most prevalent illegal drug of use was marijuana (41%), followed by non-prescription use of opioid analgesics (23%), cocaine (19%), non-prescription use of sedatives and tranquilizers (12%), non-prescription use of stimulants (7%), ecstasy (5%) and other hallucinogens (5%).

An identified latent class model indicated that a five class model was optimal. Fit statistics were computed for the 1 to 6 class models. The number of classes was chosen using theoretical reasoning, fit statistics and practical consideration. The fit statistics of AIC (28,405.2), BIC (28,666.8) and ABIC (28,542.9) were lower for the 5-class compared to the 4-class model (AIC=28,490.5; BIC=28,698.5; ABIC=28,600.0) and similar to the 6-class model (AIC=28,376.2; BIC=28,691.6; ABIC=28,542.2). The BIC was lowest for the 5 class model as opposed to the 6 class model suggesting that the minimum fit index value occurred for the 5 class solution (Nylund, 2007). Furthermore, the ABIC value was not differentiated in the 5 and 6 class model. The parsimonious 5 class solution was chosen over the 6 class solution due to production of the minimum BIC fit statistic. In addition to picking the model with good fit statistics, the five class model was chosen over the four class model because the five class model differentiated between high concurrent drug users who had high probabilities of all

illegal drug use except other hallucinogens and high concurrent drug users who had high probabilities of all illegal drugs except ecstasy and stimulants. The entropy value for the 5 class model was approximately, 0.7.

Figure 1 plots the past year illegal drug use on the x-axis and the probability of past year use of each drug for the five classes as indicated on the y-axis. The probabilities of endorsing past year illegal drug use are plotted for the seven illegal drugs for each of the five classes. The five class solution included a 'no illegal drug use' class (class 1) consisting of 65% of the adult alcohol dependent sample and included participants with near zero probabilities of past year illegal drug use. Class 2, consisting of 7% of the sample of adults with alcohol dependence, had medium probabilities of marijuana use, medium probabilities of non-prescription sedative/tranquilizer use and high probabilities of non-prescription analgesic use. Class 3, consisting of 21% of the sample, included individuals with high probabilities of marijuana use and medium probabilities of cocaine use. Two high concurrent-drug use classes emerged: Class 4 and Class 5. Class 4 included adults with alcohol dependence (6%) with high probabilities of marijuana, cocaine, non-prescription tranquilizers/sedatives and non-prescription analgesic use. Class 5 was the smallest class consisting of 1% of the sample and was characterized as adults with alcohol dependence with high probabilities of each illegal drug except other hallucinogens.

Table 2 demonstrates the sample characteristics of the adults with alcohol dependence by latent class, given the five class solution. Participants in Class 1 are less likely to report lifetime MDD, GAD, deviant behavior, having an STI and been incarcerated compared to the concurrent drug using classes. Also, participants in Classes 2, 4 and 5 were most likely to report having had lifetime MDD and GAD compared to participants in Class 1. Participants in Class 5 were most likely to report GAD (26%), MDD (40%) and deviant behavior (68%). Compared to the other concurrent-drug using classes participants in class one are less likely to have been in treatment for alcohol or drug use (27%). Although all individuals in the study met alcohol dependence criteria, individuals in class 1 were more likely to report meeting 3 criteria and were less likely to report meeting 5+ criteria compared to all other classes. Furthermore, the heaviest concurrent-drug use class, Class 5, was more likely to have been in treatment for alcohol or drug use compared to all other classes.

Results from the simple and multiple multinomial regression models are presented in Table 3 which lists the OR and AOR given that class 1 or the 'no past year illegal drug use' class is the referent group. Simple multinomial regression models indicate that individuals with alcohol dependence reporting GAD during their lifetime had 1.9 (95% CI: 1.3, 2.7) the odds of being in class 4 compared to class 1. Although not always statistically significant, the odds of being in any of the concurrent drug using classes compared to class 1 ranged from 1.2 to 2.1 for participants reporting lifetime GAD. In alcohol dependent participants reporting a history of MDD the odds of being in class 4 were 1.6 (95% CI: 1.1, 2.4) and being in class 5 were 2.3 (95% CI: 1.2, 4.7) compared to class 1. Concurrent drug users (Classes 2 to 5) were also more likely to report deviant behavior, having ever had an STI, having been booked or incarcerated, meeting more (5+) alcohol dependence criteria and having been in treatment for an alcohol or drug problem compared to participants with practically no concurrent drug use in the past year (Class 1).

Results of the multiple multinomial regression model demonstrated that adults with alcohol dependence who reported deviant behavior were more likely to be in the concurrent drug using classes (Classes 2, 3, 4 and 5) compared to class1. Alcohol dependent participants reporting a history of incarceration had 1.7 (95% CI: 1.2, 2.5) the odds being in class 4 compared to class 1. Alcohol dependent participants meeting 5 or more of the alcohol dependence criteria compared to 3 dependence criteria had odds ranging from 1.7 to 2.2 for being in the concurrent drug using classes compared to class 1. Reporting ever having been in treatment for an alcohol

or drug problem was more likely for class 3 (AOR=1.7, 95% CI: 1.2, 2.3) and class 4 (AOR=1.7, 95% CI: 1.1, 2.7) compared to class1.

4. Discussion

To our knowledge, this is the first study to examine patterns of past year illegal drug use among adults meeting criteria for alcohol dependence in a nationally representative sample. Findings indicate that illegal drug use is common in this population; the most common illegal drug used was marijuana (41%) followed by non-prescription opioid analgesics (23%) and cocaine (19%). Furthermore, study findings revealed that illegal drug use in adult alcohol dependent individuals is linked to a number of psychosocial problems; however, only 30% of the adults with alcohol dependence in this sample reported ever receiving treatment for alcohol or drugs.

LCA findings suggested five patterns of past year illegal drug use and different psychosocial correlates of the illegal drug use patterns in adults with alcohol dependence. Similar to existing literature, adults with alcohol dependence who use illegal drugs (i.e. those characterized by classes 2–5) were more likely than adult with alcohol dependence with nearly no illegal drug use (i.e. class 1) to have had the following: GAD, MDD, Deviant Behaviors, STIs, or incarceration (Stinson et al., 2005; Conway et al., 2003; Hedden et al., 2009). Specifically, participants with GAD were more likely to be in class 4 (characterized with multiple illegal drug use: marijuana, cocaine, non-prescription tranquilizers/sedatives, and non-prescription analgesic use) compared to class 1. Also, participants with MDD were more likely have been in either class 4 and 5 (both characterized by multiple illegal drug use with Class 4 less likely to use stimulants or ecstasy) compared to class 1. Comparable to existing literature on the association between STI and the concurrent use of alcohol and cocaine, alcohol dependent individuals with STI history were more likely to be in class 3 (characterized by marijuana and cocaine use) compared to class1 (Hedden et al., 2009; Heil et al., 2001). Adults with alcohol dependence and incarceration history were also more likely to be in classes 3 and 4 compared to class 1 (Hedden et al., 2009; Mumola and Karberg, 2006). Further, participants reporting Deviant Behaviors and meeting 5 to 7 of the Alcohol Dependence Criteria were more likely to be in the illegal drug using Classes (Classes 2–5) (Conway et al., 2003; Staines et al., 2001). Generally, findings suggest that adults with alcohol dependence with histories of past year illegal drug use (53% of our sample) have broader psychosocial treatment needs than adults with alcohol dependence with nearly no illegal drug use.

4.1 Strengths and Limitations

This study included a nationally representative population, which allowed us to generalize study findings to the U.S. population of adult individuals with alcohol dependence. Furthermore, it included assessment of participant use of a range of illegal drugs of use and assessment of mental health disorders consistent with the DSM-IV. However, limitations of this study should be noted; the NSDUH had a cross sectional design. This prevented us from being able to make causal inferences regarding the temporal order of illegal drug use and psychosocial problems as well as measuring the persistence of Alcohol Dependence over time. Also, the NSDUH did not take into account economic cost and availability of illegal drug use. That is, as prices of certain drugs rise or fall so does selection of illegal drugs of use (Petry, 2001). The choice of certain illegal drugs of use in this study may have been confounded by their availability and or cost. Although nicotine dependence often associated with alcohol dependence and illegal drug would have been pertinent to the regression analyses, nicotine dependence was only measured for the time frame of ‘past month’ rather than ‘past year’ in the NSDUH survey and was therefore not added to the analyses. Furthermore, since the data was obtained by self-report, participants may have under or over-reported their drug use

compared to treatment seeking individuals or due to stigmas associated with mental or physical health and drug use (Harrison, 1997).

4.2 Implications for Prevention and Treatment

The study provides evidence for 1) the existence of distinct subgroups of illegal drug use among adult alcoholics and 2) different relationships between patterns of illegal drug use and psychosocial problems. Findings suggest the need for public health officials to boost efforts to prevent and screen for alcohol and illegal drug use. For many young persons, alcohol is the first drug they abuse. Increasing efforts to prevent young persons from initiating alcohol use may reduce the number of individuals who become involved with other illegal drug use (Ives and Ghelani, 2006). Treating alcohol disorders and preventing the onset of alcohol use will likely serve to reduce adverse psychological and social consequences associated with alcohol and other drug use.

Class 3, characterized by a high probability of marijuana and cocaine use, was associated with history of STI suggesting that STI screening should be a comprehensive component of substance disorder treatment. All concurrent drug using classes were associated with deviant behaviors and Class 3 and 4 were further associated with history of incarceration. This is especially concerning given that drug-related offenses account for an overwhelming portion of offenders in federal and state prisons (Mumola, 2006) and suggests that drug treatment programs in prisons are needed.

Given that different classes of concurrent drug use exist, multiple and targeted treatment strategies are needed. For example, Classes 4 and 5, characterized by multiple drug use as well as anxiety and/or depression, may benefit from combinations of cognitive behavior therapy (CBT) and pharmacotherapy which are known to dually treat such comorbidities and substance disorders (Hesse, 2009). CBT for the addiction plus Selective Serotonin Reuptake Inhibitors could be effective to reduce anxiety and/or depressive symptoms without addiction liability. For individuals with concurrent alcohol and cocaine dependence without anxiety/depression, they may benefit from CBT plus topiramate (Johnson et al., 2005).

Furthermore, determining differing characteristics of concurrent drug users is necessary such that treatment resources may be efficiently allocated. Study findings reveal that greater efforts are needed to bring adults with alcohol dependence into treatment as only 30% appear to ever have attended treatment for alcohol or drug use. Given that concurrent drug use is associated with greater severity of psychological and social consequences more resources may need to be allocated to the treatment of individuals with alcohol dependence and concurrent illegal drug use.

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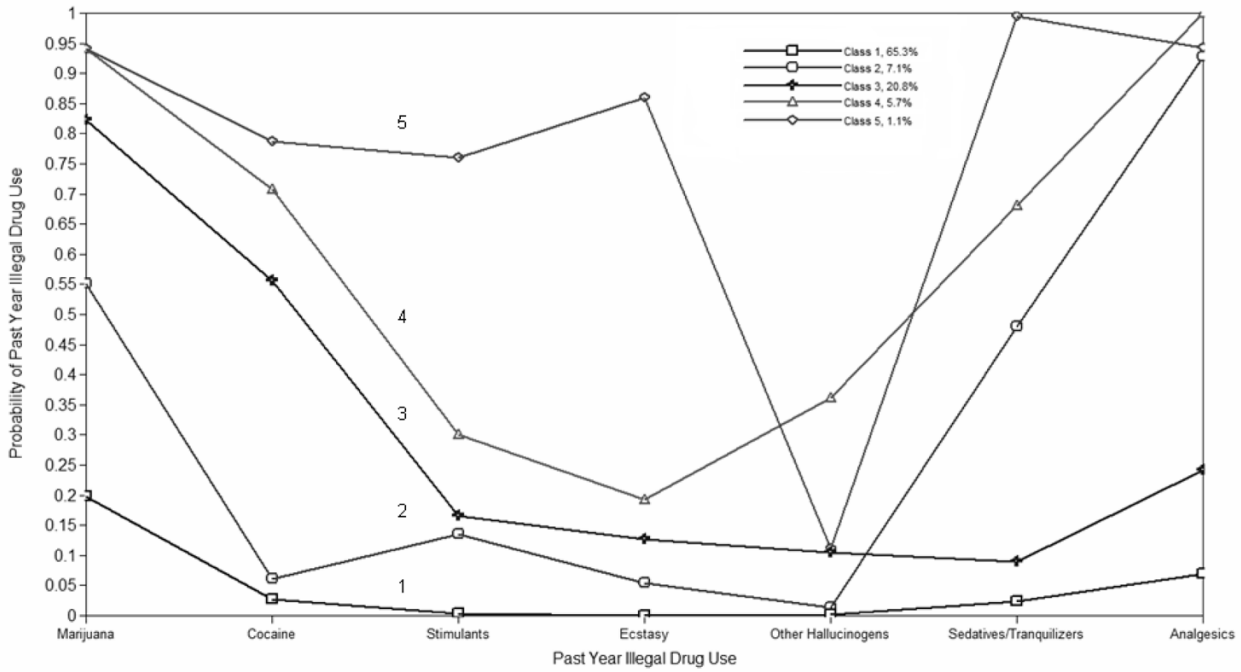

Figure 1.
Conditional Probabilities of Adult Alcohol Dependent Participants Based on a 5-Class Latent Class Analysis (n=6,059)

Table 1

Characteristics of Adult Alcohol Dependent Individuals (n=6,059), NSDUH 2005–2007

Characteristic	N (%)
Gender	
Female	2450 (33.9)
Male	3609 (66.2)
Age	
18–25	4040 (31.6)
26–34	818 (21.6)
>34	1201 (46.8)
Race	
White	4021 (68.0)
African American	590 (12.4)
Hispanic	550 (4.7)
Other	898 (14.8)
Education	
< High School	1216 (18.7)
High School	2048 (33.1)
College	2795 (48.2)
Income	
<$20K	2108 (28.6)
$20K–$49K	2175 (35.4)
$50K–$75K	731 (13.3)
>75K	1045 (22.7)
Lifetime Anxiety	
No	5015 (84.3)
Yes	916 (15.8)
Lifetime Depression	
No	4593 (76.8)
Yes	1338 (23.2)
Past-year Deviant Behavior	
No	4595 (83.7)
Yes	1425 (16.3)
Lifetime STD	
No	5468 (92.6)
Yes	463 (7.4)
Lifetime Incarceration	
No	3410 (53.9)
Yes	2639 (46.1)
Alcohol Dependence Criteria	
three	3006 (46.0)
four	1587 (27.4)
five to seven	1466 (26.6)

Characteristic	N (%)
Ever in Tx for ETOH or Drugs	
No	4464 (70.1)
Yes	1579 (30.0)

N represent raw numbers and % represent weighted percentages

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Table 2

Characteristics of Adult Alcohol Dependent Individuals by Concurrent Drug Use Class, NSDUH 2005 to 2007

Characteristic, N (%)	Class 1	Class 2	Class 3	Class 4	Class 5
Gender					
Female	1397 (33.4)	222 (40.4)	590 (32.1)	198 (36.5)	44 (39.1)
Male	2122 (66.6)	256 (59.7)	888 (67.9)	288 (63.5)	55 (60.9)
Age					
18–25	2063 (24.5)	361 (42.2)	1115 (40.7)	417 (61.1)	85 (65.6)
26–34	539 (21.2)	56 (22.5)	172 (22.8)	43 (19.4)	9 (26.5)
>34	917 (54.3)	62 (35.3)	191 (36.5)	27 (19.5)	4 (7.8)
Race					
White	2230 (67.0)	355 (73.8)	973 (66.6)	385 (75.4)	77 (87.1)
African American	387 (13.1)	29 (6.7)	148 (14.0)	23.4 (7.8)	3 (2.9)
Hispanic	332 (5.3)	36 (4.0)	144 (4.0)	29 (2.5)	8 (3.6)
Other	569 (14.7)	58 (15.5)	213 (15.5)	49 (14.2)	10 (6.3)
Education					
< High School	673 (18.3)	101 (20.0)	304 (18.9)	112 (21.1)	25 (18.9)
High School	1186 (32.6)	161 (31.6)	492 (34.0)	170 (35.5)	39 (40.7)
College	1660 (49.1)	216 (48.5)	681 (47.1)	204 (43.3)	34 (40.5)
Income					
<$20K	1155 (26.0)	167 (30.4)	563 (32.9)	190 (37.8)	33 (38.4)
$20K–$49K	1297 (36.4)	167 (33.3)	518 (34.1)	158 (32.1)	36 (34.3)
$50K–$75K	442 (13.9)	58 (11.5)	162 (12.7)	58 (11.7)	11 (8.6)
>75K	624 (23.7)	87 (24.8)	235 (20.2)	80 (18.4)	19 (18.6)
Lifetime Anxiety					
No	2995 (85.9)	365 (77.4)	1228 (83.9)	356 (76.6)	72 (74.0)
Yes	454 (14.1)	103 (22.6)	217 (16.1)	118 (23.4)	24 (26.0)
Lifetime Depression					
No	2740 (77.7)	329 (70.2)	1134 (79.2)	327 (68.6)	63 (60.0)
Yes	709 (22.3)	139 (29.8)	311 (20.8)	147 (31.4)	33 (40.1)
Past-Year Deviant Behavior					
No	2999 (90.5)	329 (75.5)	1006 (75.3)	231 (53.9)	31 (32.0)

Characteristic, N (%)	Class 1	Class 2	Class 3	Class 4	Class 5
Yes	504 (9.5)	147 (24.5)	458 (24.7)	250 (46.1)	66 (68.0)
Lifetime STD					
No	3224 (93.6)	428 (92.2)	1301 (90.1)	430 (92.0)	86 (84.8)
Yes	225 (6.4)	40 (7.8)	143 (9.9)	44 (8.0)	10 (15.2)
Lifetime Incarceration					
No	2127 (57.7)	261 (49.4)	762 (47.9)	214 (40.3)	47 (45.8)
Yes	1384 (42.3)	217 (50.6)	715 (52.1)	272 (59.7)	51 (54.2)
Alcohol Dependence Criteria					
three	1878 (49.9)	215 (36.5)	672 (39.0)	201 (39.6)	40 (38.0)
four	891 (27.0)	130 (29.5)	401 (27.8)	140 (28.2)	26 (25.7)
five to seven	749 (23.1)	134 (34.0)	405 (33.2)	145 (32.3)	33 (36.3)
Ever in Tx for ETOH or Drugs					
No	2728 (73.3)	347 (67.8)	1021 (63.2)	310 (62.2)	58 (59.9)
Yes	786 (26.7)	130 (32.2)	451 (36.8)	172 (37.8)	40 (40.1)

Numbers and percentages represent combined estimates over 20 simulations to account for classification error N represent raw numbers and % represent weighted percentages

Table 3

Crude Odds Ratios (OR), Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI) of Adult Alcohol Dependent Individuals, NSDUH 2005, 2006, and 2007

	Class 2		Class 3		Class 4		Class 5	
Variable	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**
Gender								
Female	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Male	0.7 (0.5, 1.1)	0.7 (0.5, 1.0)*	1.1 (0.8, 1.4)	1.0 (0.7, 1.3)	0.9 (0.6, 1.3)	0.8 (0.5, 1.2)	0.8 (0.4, 1.5)	0.7 (0.3, 1.6)
Age								
18–25	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
26–34	0.6 (0.4, 0.9)**	0.7 (0.4, 1.0)*	0.7 (0.5, 0.9)**	0.6 (0.4, 0.9)**	0.4 (0.2, 0.6)**	0.4 (0.2, 0.7)**	0.5 (0.2, 1.2)	0.5 (0.2, 1.7)
>34	0.4 (0.3, 0.6)**	0.4 (0.2, 0.6)**	0.4 (0.3, 0.6)**	0.4 (0.3, 0.5)**	0.1 (0.1, 0.3)**	0.2 (0.1, 0.3)**	0.1 (0.0, 0.3)**	0.1 (0.0, 0.4)**
Race								
White	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
African American	0.5 (0.2, 0.9)**	0.5 (0.2, 1.0)*	1.1 (0.7, 1.6)	1.0 (0.7, 1.6)	0.5 (0.3, 1.1)	0.4 (0.2, 0.9)**	0.1 (0.0, 1.0)	0.1 (0.0, 0.9)**
Hispanic	0.7 (0.3, 1.7)	0.6 (0.2, 1.7)	0.8 (0.5, 1.2)	0.7 (0.4, 1.2)	0.4 (0.2, 0.9)**	0.3 (0.2, 0.8)**	0.5 (0.1, 1.9)	0.4 (0.1, 1.6)
Other	1.0 (0.5, 1.8)	0.9 (0.5, 1.7)	1.1 (0.7, 1.5)	0.9 (0.6, 1.4)	0.8 (0.4 1.9)	0.7 (0.3, 1.5)	0.3 (0.1, 0.9)**	0.3 (0.1, 0.9)**
Education								
< High School	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
High School	0.9 (0.5, 1.5)	1.0 (0.5, 1.8)	1.0 (0.7, 1.5)	1.2 (0.8, 1.8)	1.0 (0.6, 1.5)	1.2 (0.7, 2.1)	1.2 (0.6, 2.7)	1.5 (0.6, 3.5)
College	0.9 (0.5, 1.6)	1.0 (0.5, 1.9)	0.9 (0.7, 1.3)	1.2 (0.8, 1.8)	0.8 (0.5, 1.2)	1.2 (0.7, 1.9)	0.8 (0.3, 2.0)	1.1 (0.4, 3.0)
Income								
<$20K	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
$20K–$49K	0.8 (0.5, 1.3)	0.9 (0.5, 1.5)	0.7 (0.6, 1.0)	0.8 (0.6, 1.1)	0.6 (0.4, 1.0)	0.7 (0.4, 1.1)	0.6 (0.3, 1.4)	0.7 (0.3, 1.7)
$50K–$75K	0.7 (0.4, 1.4)	0.8 (0.4, 1.6)	0.7 (0.5, 1.1)	0.9 (0.6, 1.4)	0.6 (0.3, 1.0)	0.7 (0.4, 1.2)	0.4 (0.1, 1.3)	0.5 (0.1, 1.8)
>75K	0.9 (0.5, 1.5)	1.1 (0.6, 2.0)	0.7 (0.5, 1.0)**	0.9 (0.6, 1.3)	0.5 (0.3, 0.9)**	0.7 (0.4, 1.2)	0.5 (0.2, 1.3)	0.7 (0.3, 1.8)
Lifetime Anxiety								
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	1.8 (1.0, 3.0)	1.4 (0.8, 2.6)	1.2 (0.9, 1.6)	1.2 (0.8, 1.7)	1.9 (1.3, 2.7)**	1.6 (1.0, 2.5)*	2.1 (0.9, 4.9)	1.3 (0.5, 3.7)
Lifetime Depression								
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

	Class 2		Class 3		Class 4		Class 5	
Variable	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**
Yes	1.5 (0.9, 2.4)	1.1 (0.7, 1.9)	0.9 (0.7, 1.2)	0.8 (0.5, 1.1)	1.6 (1.1, 2.4)**	1.2 (0.7, 1.9)	2.3 (1.2, 4.7)**	1.4 (0.6, 3.7)
Past-year Deviant Behavior								
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	3.1 (2.1,4.7)**	2.5 (1.6, 4.0)**	3.1 (2.3, 4.2)**	2.3 (1.7, 3.2)**	8.2 (5.7, 11.7)**	5.4 (3.5, 8.5)**	20.5 (10.3, 41.0)**	13.6 (5.8, 32.0)**
Lifetime STD								
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	1.2 (0.5, 2.7)	1.1 (0.5, 2.4)	1.6 (1.0, 2.5)**	1.6 (1.0, 2.5)*	1.3 (0.7, 2.3)	1.1 (0.5, 2.1)	2.6 (0.8, 7.9)	1.9 (0.6, 6.2)
Lifetime Incarceration								
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	1.4 (0.9, 2.1)	1.4 (0.8, 2.3)	1.5 (1.2, 1.9)**	1.2 (0.9, 1.6)	2.0 (1.4, 2.9)**	1.7 (1.2, 2.5)**	1.6 (0.8, 3.4)	1.3 (0.5, 3.0)
Alcohol Dependence Criteria								
three	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
four	1.5 (0.9, 2.4)	1.5 (0.9, 2.3)	1.3 (1.0, 1.8)	1.3 (0.9, 1.8)	1.3 (0.8, 2.1)	1.2 (0.7, 2.0)	1.2 (0.5, 3.1)	1.3 (0.6, 3.2)
five to seven	2.0 (1.3, 3.2)**	2.0 (1.2, 3.3)**	1.8 (1.3, 2.5)**	1.8 (1.3, 2.6)**	1.8 (1.1, 2.8)**	1.7 (1.0, 2.8)**	2.1 (0.9, 4.8)**	2.2 (0.9, 5.4)*
Ever in Tx for ETOH or Drugs								
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	1.3 (0.8, 2.0)	1.2 (0.7, 1.9)	1.6 (1.2, 2.1)**	1.7 (1.2, 2.3)**	1.7 (1.1, 2.5)**	1.7 (1.0, 2.7)**	1.8 (0.9, 3.6)	1.9 (0.9, 4.0)*

Odds ration and confidence intervals represent combined estimates over 20 simulations to account for classification error Multivariable analysis controls for year of data collection

*p<0.1

**p<0.5