



Published in final edited form as:

Drug Alcohol Depend. 2013 January 1; 127(1-3): 23–30. doi:10.1016/j.drugalcdep.2012.06.001.

Drug use patterns in young adulthood and post-college employment

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Abstract

Background—The relationship between serious drug involvement and risk for unemployment is well recognized, but few studies have prospectively examined this relationship among college students. This study used longitudinal data to examine the association between drug use patterns during college and the likelihood of employment post-college, holding constant sociodemographic variables and personality characteristics. Second, we estimate the prevalence of alcohol and other drug use disorders among employed individuals.

Methods—Data were derived from the College Life Study. Participants entered college as traditional students and were assessed annually for six years, regardless of continued college attendance. Analyses were restricted to 620 individuals no longer enrolled in school by Year 6.

Results—Using multinomial regression modeling, persistent drug users [i.e., used illicit drugs (other than marijuana) and/or nonmedical prescription drugs every year they were assessed during the first four years of study] were significantly more likely than non-users to be unemployed vs. employed full-time post-college. Persistent drug users and infrequent marijuana users were also more likely than non-users to be unemployed vs. employed part-time. In Year 6, 13.2% of individuals employed full-time and 23.7% of individuals employed part-time met DSM-IV criteria for drug abuse or dependence during the past year.

Conclusions—If confirmed, the results of this study suggest that persistent drug use among academically-achieving young adults might increase risk for post-college unemployment. More research is needed to understand the processes underlying this association. Further attention should be directed at managing substance use problems among recent college graduates who have secured employment.

Keywords

College students; drug and alcohol use; employment; longitudinal study

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1. Introduction

Excessive drinking among college students, and to a lesser extent illicit and nonmedical prescription drug use, has received significant attention because of the associated acute risks to young adult health and safety (e.g., accidental injury, blackouts, etc.). Far less often are longer-term consequences of these high-risk behaviors discussed, such as the possible impact on opportunities to secure gainful employment post-college. The negative impact of substance use on employment among other subpopulations is fairly well accepted (Alexandre and French, 2004; Bryant et al., 1996; Kandel et al., 1995; Mullahy and Sindelar, 1996). Several longitudinal studies have demonstrated that early adolescent drug use is related to reduced occupational expectations (Brook et al., 2002), occupational attainment and stability (Brook et al., 2002; DeSimone, 2002; Huang et al., 2011), and decreased wage earnings (Ringel et al., 2006) and job satisfaction (Stein et al., 1993).

The frequency and severity of substance use is important to consider (Ringel et al., 2006). Light to moderate alcohol use has been shown not to be associated with employment problems, in contrast to heavier consumption (MacDonald and Shields, 2001) and symptoms of alcohol dependence (Bray et al., 2000). Schulenberg et al. (1996), failed to find associations between binge drinking trajectories and employment outcomes. Chronic marijuana use, defined as weekly or more frequent use, was negatively related to employment, but non-chronic (i.e., less frequent) use was not (French et al., 2001).

At least two studies have shown that the association between drug use and employment is mediated by decreased educational attainment and/or aspirations to succeed. Newcomb and Bentler (1986) demonstrated that high school drug use was related to lack of college involvement and increased work involvement in young adulthood. However, this study did not evaluate the proximal relationship between drug use during college and later occupational attainment. High school marijuana use is associated prospectively with occupational attainment at age 28, and appears to be at least partially mediated by reductions in school performance and lowered educational and occupational aspirations (Schuster et al., 2001).

Whether or not drug use patterns during college influence the likelihood of subsequent employment is an understudied question. The subset of young individuals who have already achieved the milestone of entering college might be different in many respects from adolescents whose drug use might have interfered with their educational achievement. For many, starting college represents the beginning of a new developmental period, characterized by greater autonomy and exploration of new opportunities related to one's individual interests. The college years also represent a high-risk period for drug use and heavy drinking. For some, substance use patterns during college represent a continuation or an escalation of earlier high school patterns (Arria et al., 2008b); for others, initiation occurs during college (Pinchevsky et al., 2012). Nationally, one in five (20.2%) college students have used marijuana at least once during the past month (Substance Abuse and Mental Health Services Administration, 2010). Nonmedical use of prescription stimulants and opioids are also prevalent among students at some college campuses (Arria et al., 2008c; Garnier-Dykstra et al., 2012; McCabe et al., 2005a; McCabe et al., 2005b). Moreover, among college students at one large mid-Atlantic public university, 13% had used cocaine by their fourth year of college, two-thirds of whom initiated since starting college (Kasperski et al., 2011).

Drug involvement could decrease the chances of employment post-college through several mechanisms. First, having severe drug problems during college has been found to interfere with graduating (Hunt et al., 2010), and not having a college degree can certainly constrain

post-college employment opportunities. Additionally, Fergusson and Boden (2008) observed significant negative relationships between marijuana use frequency between the ages of 14 and 21 and university degree attainment as well as being employed by age 25. However, they did not examine the relationship between marijuana use and employment after stratifying the sample with regard to university graduation. Second, experiencing drug-related legal problems might delay employment or interfere with the chances of obtaining particular types of work. Third, it is reasonable to speculate that drug use might lead to disengagement from academic pursuits and constructive extracurricular activities, which could, in turn, reduce opportunities to obtain the necessary skills to secure employment, and limit one's ability to call upon networking resources to find employment within one's desired field. Finally, drug use might persist or escalate into the post-college period, making it more difficult to secure employment.

The relationship between substance use and risk for unemployment is likely to be complicated by historical trends and regional variation in job opportunities as well as sociodemographic variables. Being either white or asian (Office of Employment and Unemployment Statistics: Division of Labor Force Statistics, 2010) and/or having parents who have greater financial resources (Caspi et al., 1998; Montgomery et al., 1996) can increase one's chances of employment, but recently high socioeconomic status has also been related to increased drug use among youth (Humensky, 2010). The degree to which these variables might influence the relationship between drug use and employment post-college is unknown. There is also the possibility that pre-existing personality or temperament characteristics confound the association between drug use and employment, since they might be related to both drug use (Terracciano et al., 2008) and finding employment (Kanfer et al., 2001). For example, conscientiousness and extraversion have been found to be associated with job search behavior (Kanfer et al., 2001). However, certain personality characteristics might confer an advantage only for certain types of jobs (e.g., high levels of extraversion might be important for sales or marketing).

A related issue, but distinct from the association between drug use and the risk for unemployment, is the prevalence of current drug use among young adults after securing employment post-college. The National Survey on Drug Use and Health estimates that 8.0% of full-time employees are past-month illicit drug users and 8.5% meet criteria for heavy drinking. The corresponding estimates are even higher among individuals ages 18 to 25 (19.5% and 15.5%; Substance Abuse and Mental Health Services Administration, 2010). The use of alcohol and other drugs among employed individuals has been related to significant adverse consequences including increased risk of job termination (Hoffmann and Larison, 1999; Hoffmann et al., 2007) and absenteeism (Substance Abuse and Mental Health Services Administration, 2002).

Understanding the relationship between drug use and post-college employment is important given the increasingly competitive job market facing today's college graduates. The purpose of this study was to examine the association between longitudinal drug use patterns during college and employment post-college among a sample of young adults who entered college as traditional students. By holding constant potentially confounding variables such as sociodemographic factors and personality characteristics, we aimed to understand the independent contribution of drug use patterns on post-college employment. A secondary aim of the study was to estimate the prevalence of past-year alcohol and other drug use disorders among individuals in the cohort who were employed at least part-time post-college. This information can be useful to employers to raise awareness about drug or alcohol problems that might exist among recent college graduates.

2. Methods

2.1. Study design

Data were gathered as part of the College Life Study, a longitudinal study of health-related behaviors among young adults. The study began in 2004 with a screening assessment of incoming first-time, first-year college students, ages 17 to 19, at a single mid-Atlantic university. A stratified random sample of students was selected for longitudinal follow-up and 1,253 (response rate=87%) were assessed beginning in the 2004-2005 school year (Year 1) and annually thereafter, regardless of continued college attendance. The assessment consisted of both a personal interview conducted by a trained interviewer and self-administered questionnaires. Follow-up rates were 91% in Year 2 ($n=1,142$), 88% in Year 3 ($n=1,101$), 88% in Year 4 ($n=1,097$), 81% in Year 5 ($n=1,019$), and 80% in Year 6 ($n=1,000$). IRB approval, informed consent, and a federal Certificate of Confidentiality were obtained. Participants were paid \$50 for the first four annual assessments and \$70 for the fifth and sixth assessment, with a bonus for on-time completion starting in Year 2. More detail on recruitment and follow-up procedures has been published elsewhere (Arria et al., 2008a; Vincent et al., 2012).

2.2. Participants

Because the present analyses focus on employment outcomes in Year 6—corresponding to the second post-college year for individuals following a traditional four-year track in college—356 participants were excluded because they were still enrolled in school as of Year 6, as were 253 who did not complete the Year 6 assessment. An additional 16 were excluded due to missing data on independent variables. Eight individuals were not employed but were also not seeking employment and were therefore excluded from analysis because they were not considered part of the labor market, yielding a final analytic sample size of 620. Attrition bias was as follows. Compared with the inclusion sample ($n=620$), the 253 who did not complete the Year 6 assessment were indistinguishable with respect to race, neighborhood income, childhood conduct problems, past-year marijuana use, and meeting DSM-IV criteria for alcohol and/or marijuana use disorder in Year 1. However, they were more likely to have used a drug other than marijuana during the past year at Year 1 (39% vs. 26%, $p<0.001$), had slightly lower high school grade point average (GPA; 3.80 vs. 3.86, $p=0.0495$), and were overrepresentative of males (62% vs. 48%, $p<0.001$).

2.3. Measures

2.3.1. Employment—In Year 6, participants were asked about current employment status. Response options were: working full-time, working part-time, multiple part-time jobs, self-employed, recently hired but have not started job yet, not working and not looking for work, not working and looking for work, temporarily laid off, and homemaker. Responses were coded into three categories: 1) full-time employed ($n=510$); 2) part-time employed ($n=76$), which was comprised of individuals who had one ($n=49$) or more part-time jobs ($n=16$) or were self-employed ($n=11$; most of whom did freelance work such as photography, music, tutoring, jewelry design); and 3) unemployed ($n=34$), including individuals who were still in the labor market, either looking for work ($n=22$), temporarily laid off and not working ($n=1$), or who had not yet started in their new position ($n=11$). Job titles were recorded verbatim, and later coded into one of ten categories according to the original Hollingshead Occupational Scale (Hollingshead, 1975): unemployed; menial workers (e.g., farm laborers, maids, janitors); unskilled workers (e.g., bartenders, private babysitters); semi-skilled workers (e.g., truck drivers, non-private childcare workers); skilled workers (e.g., electricians, mechanics, plumbers); clerical/sales (e.g., clerks, bookkeepers); technicians/semi-professionals (e.g., dental technicians, retail sales managers); managers/professionals (e.g., administrative managers, primary school teachers); administrative officers/

professionals (e.g., district managers, secondary school teachers); and executives/professionals (e.g., doctors, engineers, lawyers).

2.3.2. Drug use patterns—Annually, participants were asked about their past-year use of seven illicit drugs (marijuana, inhalants, cocaine, hallucinogens, heroin, amphetamines/methamphetamine, and ecstasy) and nonmedical use of three classes of prescription drugs (stimulants, analgesics, and tranquilizers). Using all available data on the drug use patterns from Years 1 through 4, four mutually-exclusive groups were derived: non-users (did not use any illicit or prescription drugs nonmedically during college; $n=117$), infrequent marijuana users (used marijuana at least once during college but did not use any other illicit or prescription drugs; $n=156$), sporadic drug users (used at least one drug other than marijuana sometime during college, but not every year; $n=248$), and persistent drug users (used a drug other than marijuana in every year studied; $n=99$). Participants missing one or two of the four annual assessments were coded based on their non-missing assessments; participants who completed only one assessment were excluded. Detailed data on other drug and alcohol use characteristics of these four groups are available upon request.

2.3.3. Past-year alcohol and drug use disorders—Alcohol and other drug use disorders (abuse and dependence) were defined according to DSM-IV criteria (American Psychiatric Association, 1994), measured in Year 6 from a series of questions adapted from the National Survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration, 2003). Individuals that reported use of a given substance less than five times during the past year did not answer the series of questions and were automatically coded for the absence of disorder. The presence of alcohol use disorder (AUD) was defined as meeting criteria for either abuse or dependence ($n=306$). Non-drinkers ($n=16$) were coded as not having AUD. Similarly, drug use disorder (DUD, $n=93$) was assessed for eight other drugs (marijuana, cocaine, heroin, amphetamines/methamphetamine, and prescription stimulants, analgesics, tranquilizers, and sedatives).

2.3.4. Alcohol consumption—As a control variable in the models predicting employment status, the responses to the annual question regarding the typical number of drinks consumed per drinking day were averaged over Years 1 through 4.

2.3.5. Year 6 drug use involvement—As a possible mediator of the relationship between drug use during Years 1 through 4 and employment status, post-college drug use at Year 6 was computed as an index of the number of drugs used at least once during the past year, including hallucinogens, inhalants, ecstasy, and the eight other drugs listed in Section 2.3.3.

2.3.6. High school GPA—High school GPA was evaluated as a potential covariate in the analyses and was captured from administrative data.

2.3.7. Personality characteristics—The 60-item NEO-FFI was self-administered in Year 1 to measure personality dimensions and consists of subscales for five personality factors: neuroticism (Cronbach's α for study sample=0.854), extraversion ($\alpha=0.794$), openness ($\alpha=0.715$), agreeableness ($\alpha=0.724$), and conscientiousness ($\alpha=0.836$; Costa and McCrae, 1992). Neuroticism refers to an individual's level of adjustment and emotional stability, extraversion refers to level of sociability, and openness refers to imagination, preference for variety, intellectual curiosity, independence, and aesthetic sensitivity. Agreeableness includes level of sympathy, altruism, and eagerness to help others, and conscientiousness refers to the ability to plan, control impulses, and organize tasks. This

scale has good test-retest reliability and internal consistency (Costa and McCrae, 1992; Robins et al., 2001).

2.3.8. Sociodemographic characteristics and other control variables—Gender was recorded by the interviewer at baseline. Race/ethnicity was self-reported, and later dichotomized for analytic purposes into white vs. non-white. Neighborhood income was estimated by the mean adjusted gross income of the participant's ZIP code during the senior year of high school, which was gathered from publicly available data (MelissaDATA, 2003). Annually, participants reported their level of involvement in fraternities or sororities (i.e., regularly, irregularly, or not at all). These variables were later collapsed and dichotomized into a single variable representing the individual's highest level of involvement during college (regular vs. irregular/not involved). Graduation from college was coded as present when the participant self-reported that they had graduated with a bachelor's degree. This information was confirmed with administrative data for participants who graduated from the home institution. Childhood conduct problems were assessed in Year 1 via the Conduct Disorder Screener (Falls et al., 2011; Johnson et al., 1995; Nurco et al., 1999), yielding an index of the number of 17 possible conduct problems that occurred before age 18.

2.4. Statistical analyses

Descriptive statistics documented the characteristics of individuals in each employment category. χ^2 tests of independence and oneway analyses of variance (ANOVAs) were used to evaluate the statistical significance of group differences for categorical and continuous variables, respectively.

For the first aim, multinomial logistic regression was used to estimate associations between the 4-group college drug use variable and employment status, holding constant sociodemographic variables, fraternity/sorority involvement, college graduation, alcohol consumption, childhood conduct problems, and personality characteristics. The variable for college drug use group was treated in the analyses as a set of three dummy variables, representing each of the three levels (infrequent marijuana use, sporadic drug use, and persistent drug use) as compared to the reference level (no use). First, each variable's relationship to employment status was estimated separately from a series of bivariate models. Next, all variables were entered into a multivariate logistic regression model. This model produced three comparisons: being unemployed vs. employed full-time, being unemployed vs. employed part-time, and being employed part-time vs. full-time. Next, only variables that were significantly associated with employment status were retained in a model that adjusted for gender, race, and neighborhood income. Each excluded variable was then re-entered into the model individually to determine if it contributed significantly to the model, as a condition of being retained in the “final” model.

Analyses for the secondary aim focused on descriptive comparisons of AUD and DUD prevalence within the three employment status groups. Pairwise comparisons were conducted using multinomial regression, holding constant gender, race, and neighborhood income.

3. Results

3.1. Sample characteristics

Approximately 82.3% ($n=510$) of the sample was employed full-time, 12.3% ($n=76$) were employed part-time, and 5.5% ($n=34$) were unemployed (Table 1). Approximately half of the sample were male (48.4%), the majority were white (73.4%), approximately one-third were regularly involved in a fraternity or sorority during college (34.2%), and almost

everyone had graduated from college by Year 6 (96.3%). Almost one in five (18.9%) individuals did not use a drug during college, whereas 16.0% met our definition for persistent use. Among those participants who were employed either full-time or part-time, a majority were in the technicians/semi-professionals or managers/professionals Hollingshead categories (Table 2). Not surprisingly, on average, individuals employed full-time were more likely than their part-time counterparts to have more prestigious occupation ratings as measured by the Hollingshead scale.

3.2. Drug use patterns and post-college employment status

Figure 1 graphically displays the proportions within each drug use pattern group with respect to employment status. As can be seen, persistent drug users had the highest rate of unemployment (10.1%), followed by infrequent marijuana users (6.4%), sporadic drug users (4.8%), and non-users (1.7%). Corresponding to these descriptive results, Table 3 presents the results of the multivariate model that evaluates the associations between drug use patterns and employment status, holding constant other suspected risk factors.

3.2.1. Comparison of unemployed vs. employed full-time—After adjustment for sociodemographic and personality characteristics, the first column of Table 3 shows that persistent drug users were significantly more likely than non-users to be unemployed ($AOR=8.10$, 95% $CI=1.61-40.76$, $p=0.011$), relative to employed full-time. Higher levels of extraversion ($AOR=0.92$, 95% $CI=0.86-0.99$, $p=0.019$) and conscientiousness ($AOR=0.94$, 95% $CI=0.89-0.99$, $p=0.018$) decreased the likelihood of unemployment, whereas agreeableness increased the risk of unemployment ($AOR=1.08$, 95% $CI=1.01-1.16$, $p=0.035$).

3.2.2. Comparison of unemployed vs. employed part-time—In the full model, none of the drug-using groups were significantly different from non-users in this comparison. However, in the best-fitting model, the likelihood of being unemployed was significantly higher among persistent drug users ($AOR=5.49$, 95% $CI=1.01-29.81$, $p=0.048$) and infrequent marijuana users ($AOR=6.36$, 95% $CI=1.19-33.92$, $p=0.030$) than non-users. None of the personality variables reached statistical significance in this comparison.

3.2.3. Comparison of employed part-time vs. employed full-time—As above, in the full model, none of the drug-using groups were significantly different from non-users in this comparison. However, in the best-fitting model, persistent drug users were more likely than non-users to be employed part-time vs. full-time ($AOR=2.53$, 95% $CI=1.03-6.26$, $p=0.044$). None of the personality variables reached statistical significance in this comparison.

3.3. Post-hoc analyses

Two sets of post-hoc analyses were conducted. First, to evaluate academic performance as a possible predictor of post-college employment, the multinomial models were replicated with the addition of high school GPA. Results did not change appreciably, and high school GPA did not approach statistical significance (results available upon request).

Second, we evaluated Year 6 drug use as a possible mediator of the relationship between college drug use and post-college employment, holding constant gender, race, neighborhood income, alcohol consumption, and agreeableness. Mediation in this post-hoc statistical model focuses on the relationship between an intervening variable and a multinomial dependent variable. Therefore, it is not possible to employ any of the tests of significance discussed by MacKinnon et al. (2002) to establish mediation, as all such tests focus on testing a single parameter estimate for the relationship between X (college drug use group

membership) and M (mediator: Year 6 drug use), M and Y (employment status), and X and Y in the presence of M. Instead, the approach to assessing mediation followed the three steps outlined by Kenny, Kashy, and Bolger (1998): 1) establish that there is a significant relationship between college drug use group membership and employment status in the absence of the mediator; 2) establish that there is a significant relationship between college drug use group membership and Year 6 drug use; and 3) establish that there is a significant relationship between Year 6 drug use and employment status, controlling for college drug use group membership. Step 1 results were already conducted as part of the initial analyses, and have been reported above. Step 2 results indicated that college drug use group membership predicted Year 6 drug use ($p < 0.02$ for all pairwise comparisons between the groups). Step 3 results indicated that the effect of persistent drug use during college, which was significant in the original model, became non-significant ($AOR = 1.46$, $95\% CI = 0.52-4.10$, $p = 0.476$) when Year 6 drug use was introduced ($AOR = 1.24$, $95\% CI = 1.04-1.48$, $p = 0.014$), and that Year 6 drug use predicted part-time employment ($AOR = 1.30$, $95\% CI = 1.12-1.52$, $p = 0.001$). Thus, results support the possibility that Year 6 drug use mediates the influence of persistent drug use during college on attaining part-time rather than full-time employment.

3.4. The prevalence of past-year AUD and DUD by employment status

Figure 2 compares individuals employed full-time with those employed part-time and unemployed individuals with respect to the prevalence of past-year alcohol and drug abuse and dependence in Year 6. As can be seen, alcohol dependence appeared more prevalent among unemployed individuals (8.8%) than individuals employed full-time (4.7%) or part-time (2.6%), yet alcohol abuse was similar across all three groups. Drug dependence appeared higher among both individuals employed part-time (6.6%) and unemployed (5.9%) relative to those employed full-time (2.4%), as did drug abuse (17.1% and 17.6% vs. 10.8%). After adjusting for gender, race, and neighborhood income, the only significant difference observed was between individuals employed part-time and full-time, such that individuals employed part-time were more likely than those employed full-time to meet criteria for both drug abuse ($AOR = 2.07$, $95\% CI = 1.05-4.07$, $p = 0.036$) and drug dependence ($AOR = 3.82$, $95\% CI = 1.25-11.71$, $p = 0.019$).

4. Discussion

This study provides evidence supporting the notion that drug involvement among college-attending young adults is associated with significantly decreased chances for becoming employed post-college. Despite the fact that nearly all individuals in the study graduated from college, in-college drug use predicted worse post-college employment status. Moreover, this association was significant even controlling for the potentially confounding effects of sociodemographic factors and personality characteristics.

This set of findings comports with other research that found an association between heavy drug and alcohol use and employment problems (Alexandre and French, 2004; Bryant et al., 1996; Kandel et al., 1995; Mullahy and Sindelar, 1996). Yet, while others have shown that this association might be mediated by decreased educational attainment (i.e., drug users are less likely to enter college), our study provides evidence that drug use during college might also lower one's chances of becoming employed. One possible explanation is that drug users compared with non-users are less involved in college (Newcomb and Bentler, 1986) or lack aspirations to succeed (Schuster et al., 2001). Nevertheless, we cannot rule out the possibility that drug use itself might have directly interfered with some aspect of the process of securing or keeping employment, such as in identifying appropriate employment opportunities or presenting oneself as an attractive candidate. Future studies should investigate other possible pathways linking drug use and employment, including legal

difficulties, decreased engagement in campus life and academic interests, possible cognitive impairments, and reduced skill development; all of which could have a negative impact on employment opportunities. In this study, we demonstrated that drug use two years post-college partially mediated the association between college drug use and becoming employed part-time vs. full-time. Future research should focus on the longitudinal relationship between drug use during college and severity of post-college DUD, and their relative importance as predictors of post-college employment.

Another important finding from this study is that a substantial proportion of individuals who were employed post-college full-time met criteria for either AUD or DUD during the past year. Although AUD and DUD were more prevalent among unemployed individuals, employed individuals were not immune from these problems, particularly those employed part-time. This finding calls for more attention related to assessing the presence of substance-related problems among recent college graduates who have secured employment. Unfortunately, we were unable to locate published findings from nationally-representative samples with which we could compare our estimates of AUD and DUD.

It is important to note several limitations of this study. Although we statistically adjusted for sociodemographic characteristics in our analytic models, there is a need for future studies with larger samples to uncover possible subgroup variation (e.g., gender, race/ethnicity) in the observed associations. Second, we did not include the individual's field of study or college major as a predictor variable of employment status, simply due to the large number of different majors represented among our sample, as well as multiple-major combinations. Future studies should attempt to explore associations between drug use patterns, college major, and employment opportunities post-college.

Longer-term follow-up of this cohort will help to answer important questions regarding the impact of earlier drug use patterns on employment stability and career development more generally. It is possible that the negative impact of drug use on employment outcomes is temporary and that as time passes, especially if drug problems resolve, the impact of earlier drug problems on constraining employment opportunities dissipates. We did not have a sufficient number of individuals who stopped or decreased their drug use during the study to answer detailed questions regarding the possible impact of resolution of drug problems on employment outcomes. Although we gathered preliminary descriptive data on other aspects of employment such as job stability, satisfaction, and likelihood of staying with an employer, future studies should examine these dimensions of employment in relation to current and past drug use patterns.

Another limitation of our data is that the original sample was first-time traditional-age students enrolled at a single university. Therefore, our results might not be generalizable to non-traditional students or individuals who attend other types of institutions, such as small, private, or community colleges. Other students might have very different employment opportunities post-college because of differences in alumni networking prospects, as well as regional variations in availability of pre-college internships and job opportunities post-college.

Despite these limitations, this study provides strong evidence that drug involvement during college might have significant adverse consequences for post-college employment. The findings are important given that drug use, especially before it has reached the stage of severe addiction, is a potentially malleable risk factor. More research should be conducted to understand whether interventions aimed at reducing drug use during college might also have the benefit of increasing chances for employment post-college. In light of the increasingly

competitive job market for college graduates, the importance of understanding the possible role of drug use in narrowing graduates' employment opportunities cannot be overstated.

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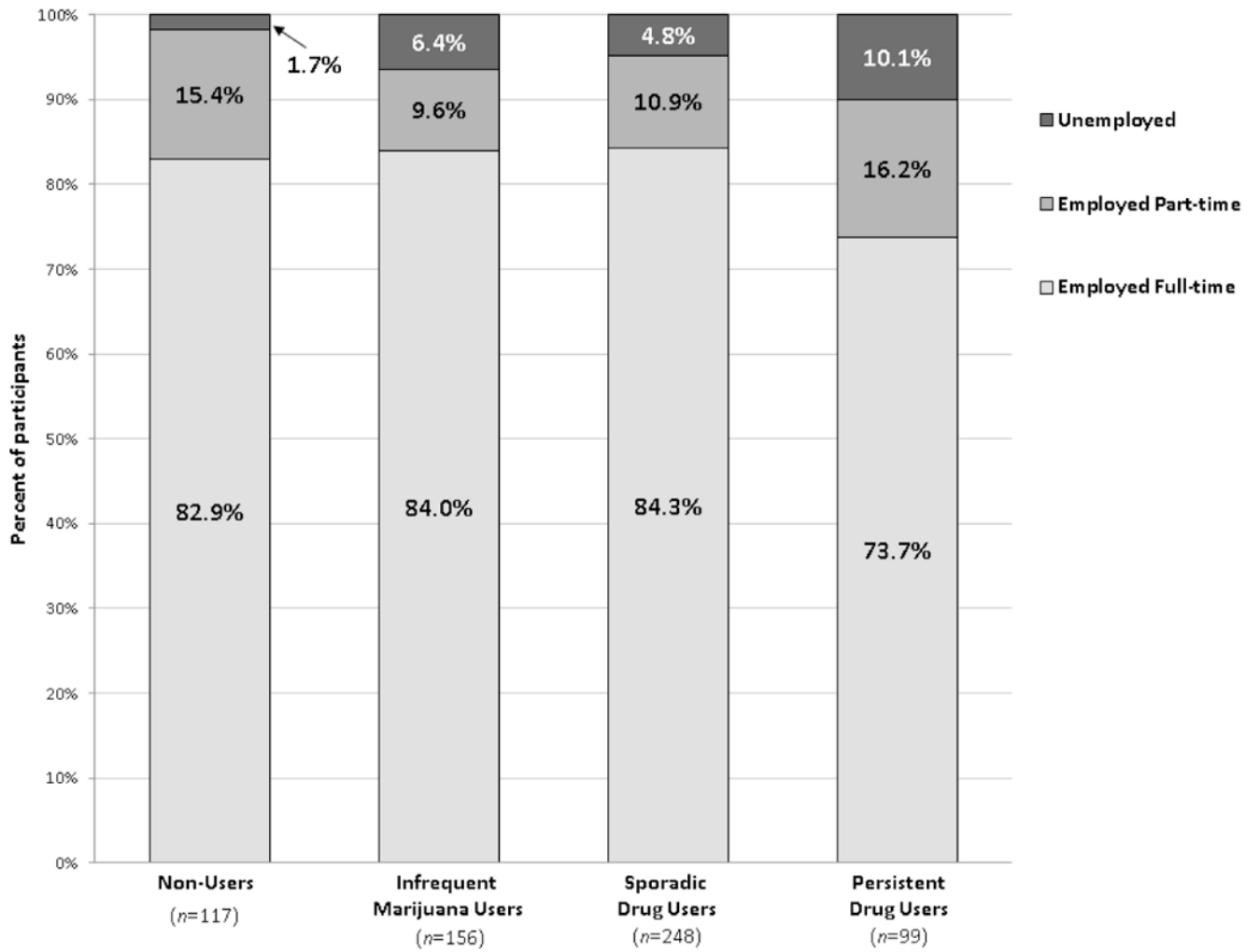


Figure 1. Post-college employment status by college drug use patterns ($N=620$).

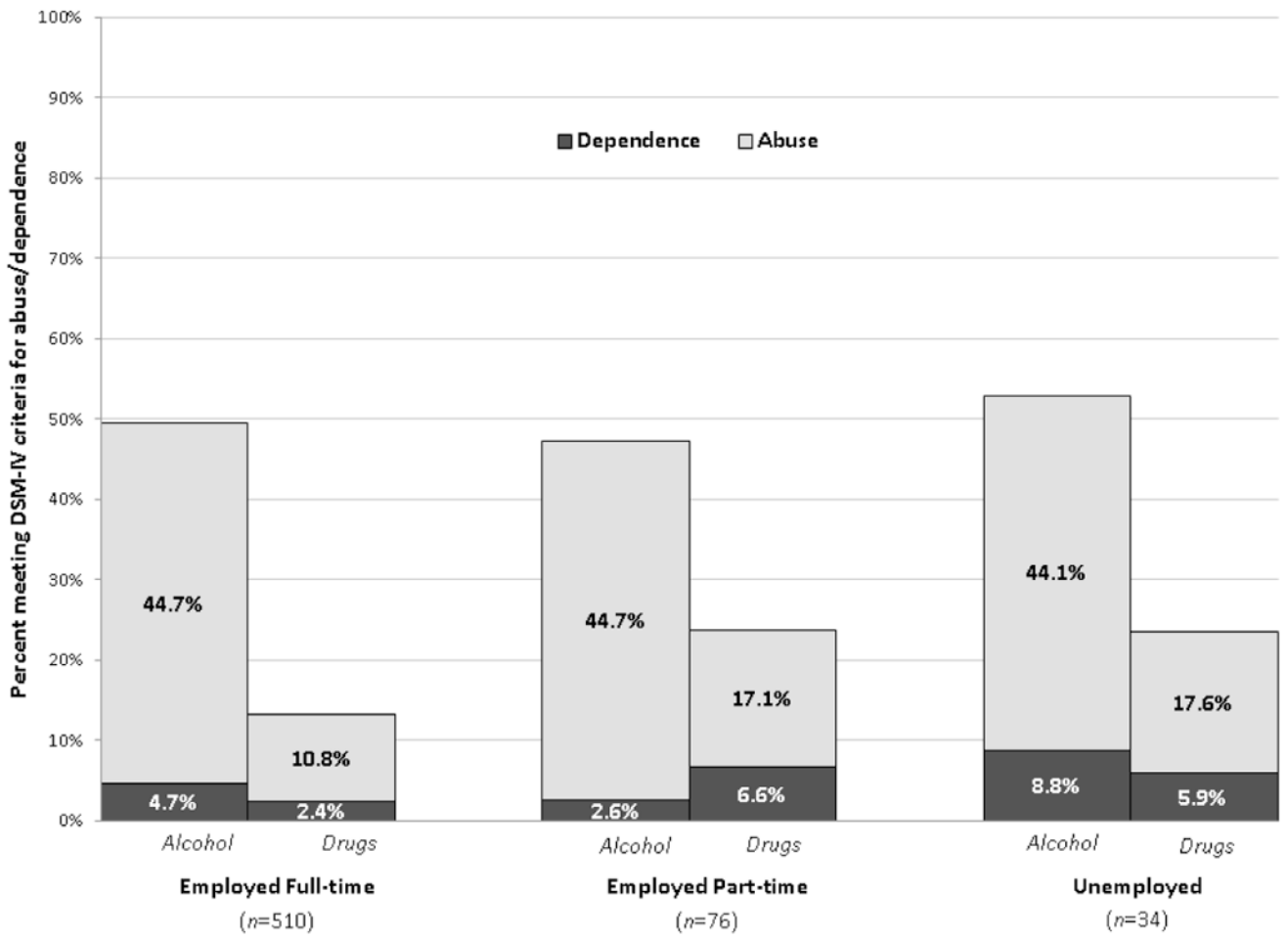


Figure 2. Past-year alcohol and drug use disorders by employment status ($N=620$).

Table 1

Descriptive statistics by employment status (N=620).

	Total (N=620)	Employed Full-time (n=510)	Employed Part-time (n=76)	Unemployed (n=34)
Gender (% Male)	48.4	48.8	44.7	50.0
Race (% White)*	73.4	75.3	61.8	70.6
Neighborhood income (M, SD) ^a	7.3 (3.5)	7.3 (3.5)	7.3 (3.0)	7.3 (3.1)
Regular fraternity/sorority involvement (%)	34.2	35.5	23.7	38.2
Graduated college (%)	96.3	97.1	93.4	91.2
Childhood conduct problems (M, SD)	3.0 (2.2)	3.0 (2.2)	2.8 (2.1)	3.7 (2.3)
Alcohol consumption (M, SD)*	4.7 (2.8)	4.8 (2.8)	3.9 (2.6)	4.8 (2.2)
Drug use pattern group (%)				
No use	18.9	19.0	23.7	5.9
Infrequent marijuana use	25.2	25.7	19.7	29.4
Sporadic drug use	40.0	41.0	35.5	35.3
Persistent drug use	16.0	14.3	21.1	29.4
NEO-FFI personality subscales				
Neuroticism (M, SD)	19.4 (7.8)	19.2 (7.7)	20.5 (8.4)	20.3 (7.9)
Extraversion (M, SD)	31.9 (5.9)	32.1 (5.8)	31.2 (6.0)	29.9 (6.6)
Openness (M, SD)	28.5 (6.1)	28.4 (6.1)	28.9 (6.5)	29.1 (6.6)
Agreeableness (M, SD)	31.0 (5.5)	31.0 (5.6)	31.4 (5.4)	31.1 (5.3)
Conscientiousness (M, SD)*	30.6 (6.5)	30.9 (6.4)	29.8 (6.8)	27.5 (6.2)

* P<0.05

^aThe mean adjusted gross income for each participant's home ZIP code during their last year in high school, measured in ten thousands.

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Table 2
Hollingshead Occupational Scale categorization of full-time and part-time jobs held by participants (N=620).

Hollingshead Occupational Scale Codes	Employed Full-time (n=510) n (%)	Employed Part-time (n=76) n (%)	Total (N=620) n (%)
0 Unemployed/Not looking for work	--	--	34 (5.5)
1 Menial workers (e.g., attendant, delivery person)	0 (0.0)	1 (1.3)	1 (0.2)
2 Unskilled workers (e.g., bartender, waiter)	11 (2.2)	5 (6.6)	16 (2.6)
3 Semi-skilled workers (e.g., barber, truck driver, tutor)	5 (1.0)	9 (11.8)	14 (2.3)
4 Skilled workers (e.g., mechanic, plumber, receptionist)	8 (1.6)	7 (9.2)	15 (2.4)
5 Clerical/sales (e.g., customer service representative, sales associate)	44 (8.6)	8 (10.5)	52 (8.4)
6 Technicians/semi-professionals (e.g., administrative assistant, legal assistant, research assistant)	119 (23.3)	26 (34.2)	145 (23.4)
7 Managers/professionals (e.g., analyst, office manager, paralegal, teacher [not college or secondary])	227 (44.5)	17 (22.4)	244 (39.4)
8 Administrative officers/professionals (e.g., accountant, district manager, teacher [secondary])	63 (12.4)	3 (4.0)	66 (10.6)
9 Professionals/executive (e.g., engineer, scientist)	29 (5.7)	0 (0.0)	29 (4.7)
Missing/refused	4 (0.8)	0 (0.0)	4 (0.6)

Table 3
 Results of multinomial logistic regression models predicting post-college employment status (N=620).

Independent Variables	Unemployed vs. Employed Full-time		Unemployed vs. Employed Part-time		Employed Part-time vs. Employed Full-time	
	AOR (95%CI)	p	AOR (95%CI)	p	AOR (95%CI)	p
Male	0.97 (0.47-2.00)	0.942	1.13 (0.50-2.58)	0.765	1.04 (0.62-1.73)	0.886
White	0.66 (0.30-1.48)	0.316	1.33 (0.54-3.28)	0.532	0.62 (0.36-1.06)	0.080
Neighborhood income ^a	0.99 (0.89-1.10)	0.828	1.00 (0.89-1.12)	0.953	1.00 (0.93-1.07)	0.959
Regular fraternity/sorority involvement						
Graduated college						
Childhood conduct problems						
Alcohol consumption					0.87 (0.77-0.98)	0.027
Drug use pattern group						
No use	Ref		Ref		Ref	
Infrequent marijuana use	4.14 (0.87-19.80)	0.075	6.36 (1.19-33.92)	0.030	0.90 (0.41-1.98)	0.784
Sporadic drug use	3.23 (0.68-15.29)	0.140	4.15 (0.81-21.20)	0.087	1.18 (0.56-2.47)	0.663
Persistent drug use	8.10 (1.61-40.76)	0.011	5.49 (1.01-29.81)	0.048	2.53 (1.03-6.26)	0.044
NEO-FFI personality subscales						
Neuroticism						
Extraversion	0.92 (0.86-0.99)	0.019	0.95 (0.89-1.02)	0.179		
Openness						
Agreeableness	1.08 (1.01-1.16)	0.035			1.02 (0.98-1.07)	0.378
Conscientiousness	0.94 (0.89-0.99)	0.018				

Note: Results adjusted for all effects shown. AOR=adjusted odds ratio. 95% CI=95% confidence interval.

^aThe mean adjusted gross income for each participant's home ZIP code during their last year in high school, measured in ten thousands.