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An Analysis of Substance Use in College: Identifying Possible Risk and Protective Factors

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Abstract

In the United States, an estimated 20% of college students have an Alcohol Use Disorder (AUD). AUD is conceptualized as compulsive use of alcohol even when presented with adverse effects. Historically, student activities and organization-involvement (e.g., Greek life) was a hypothesized risk factor for student substance use. However, other studies suggest that joining clubs and developing a support system during college can protect against substance use disorders. Undergraduate students were recruited from a South Eastern University using a university-sponsored, online recruitment website. The sample was predominantly White (n = 150; 86.70%) and female (n = 127; 73.40%). We hypothesized those involved in honors, faith-based, academic, and service activities, as well as recipients of academic scholarships, would be less likely to misuse substances. Greek life members, athletes, and those not involved in activities were hypothesized to report increased substance use. Although our research cannot specify what individually discourages students from misusing substances due to its cross-sectional methodology, our findings support that those involved in campus activities report lower levels of alcohol and drug use. Mean drug use and alcohol use scores did not significantly differ between activity groups, nor scholarship recipients. Those involved in university athletics reported a wide variety of specific drug use three months prior to taking the survey. In turn, involvement with no activities and athletic participation were classified as risk factors for college substance use.

Keywords: substance use, extracurricular activities, athletics, college students

An Analysis of Substance Use in College: Identifying Possible Risk and Protective Factors

A common concern of college students is their potential exposure to harmful substances and dangerous situations in response to newly discovered independence at university. Possible high-risk behaviors may include alcohol use, risky sexual encounters, drug use, and overall hazardous actions (e.g., vandalism). Currently, the leading causes of death among college students are accidental injuries and suicide, for which alcohol and use of other substances can be a significant contributing factor (Turner, Leno, & Keller, 2013). In light of this, researchers are attempting to identify protective activities that students can engage in to lessen their substance exposure, as well as risk factors that may facilitate adverse and harmful situations. In this research paper, we look to identify different extracurricular activities that may correspond with the protection of students from, or promotion of, substance use during college.

Each year, approximately 88,000 people die from alcohol-related causes (e.g., vehicle accidents, alcohol-related liver diseases) in the United States (Alcohol Facts and Statistics, 2020). Additionally, nearly 2,000 college students aged 18 to 24 die annually from alcohol-related accidents (College Drinking, 2020). Accidental death, however, is only one life-altering consequence reported from college-age alcohol use; other outcomes include health problems, sexual assault, and educational complications. Research estimates that 50% of students between the ages of 18 and 22 engage in alcohol use, while 20% of college students meet the diagnoses for an alcohol use disorder (AUD; SAMHDA, 2018). An AUD is conceptualized as compulsive use of alcohol, even when presented with adverse effects, such as impaired productivity and interpersonal functioning (American Psychiatric Association, 2013; Grant et al., 2015), which can be drastic to a student's health and academic performance (Hingson et al., 2005; Wechsler et

al., 2002). Furthermore, research suggests that binge-drinking is also associated with increased levels of generalized anxiety (Cranford, Eisenberg, & Serras, 2009).

Though there are conflicting results for whether college students aged 18-24 usually engage in less substance misuse than their non-college-attending same-age peers, alcohol and drug use are still prevalent concerns for young adults attending college (, Kaufman, & Crowell, 2016), perhaps due to availability of substances on college campuses. As an example, previous research indicates that young adults have more opportunities to use drugs while enrolled in college than after leaving university (Allen et al., 2017). Stress has also been documented as a risk factor in college student drug use, ultimately encouraging students to seek substances to lessen their stress (Nelson et al., 2008). Common substances include Adderall (e.g., utilized to increase focus and mental stimulation) and marijuana (e.g., utilized to feel calm and lessen anxiety). One longitudinal study found that the highest annual prevalence of young adults using marijuana reached 47%, while nonmedical prescription stimulant use peaked at 21% of the given sample (Arria et al., 2017). Given these high rates of drug usage for college students, it is important to better understand the potential risk and protective factors that may contribute to engaging in maladaptive substance usage.

Numerous academically related factors can affect a student's exposure to, and involvement with, substances, such as receipt of scholarships, activity involvement, and social interaction. For example, in a study of college students, males and those involved in athletics were more likely to be poly-substance users (i.e., using four or more different substances simultaneously), while honor society members were more likely to engage in hookah/marijuana usage (Evans-Polce, Lanza, & Maggs, 2015). However, other research has associated honors society membership with decreased probability of alcohol and marijuana use (Lanza, Patrick, &

Maggs, 2010). In addition, athletic participation has been linked to higher rates of alcohol consumption and binge-drinking in students (Ford, 2007). Likewise, involvement in Greek life (i.e., fraternities and sororities) is associated with increased substance use, compared to nonmembers (Park, Sher, & Krull, 2008).

Due to the different responsibilities and impulsivity found in various social groups, social interactions may significantly impact the amount of substance use they engage in during university (Borsari & Carey, 2006). For example, some extracurricular activities may promote more sensation seeking than others, which has been correlated to increased depressive substance and tranquilizer use in college students (Blanchard et al., 2017). Negative Urgency has also emerged as a predictor of college substance use and has been helpful to account for in intervention efforts (Kaiser et al., 2012). Differing activities and climates within these social groups could facilitate various impulsivity characteristics, and, in turn, foster different use of substances.

Though college students do exhibit an increased risk of substance use due to stress, new social environments, and a desire for new experiences, this may not be the same for all enrolled students. In this study, we not only look for substance use trends in our sample of college students but investigate possible activities that may lessen or heighten students' exposure to harmful substances and actions. Additionally, our sample also offers perspective into the substance use of students attending a university in the Appalachian region. This study allows for discussion of previous research against a unique Appalachian sample, analyzing how trends found in other models equate against this distinctive region. Results from this study could offer further insight into different interventions needed to combat substance use in the Appalachian area. We hypothesized that some types of activity involvement would correspond with protection

from substance use; specifically, students involved in honors, academic, faith-based, and service groups would engage in less substance use when compared to other students. Conversely, we hypothesized that participants in Greek life, athletics, and those who were not associated with any extracurricular activities, would report more instances of substance use. Finally, we predicted that recipients of academic-based scholarships would report lower amounts of substance use compared to those who did not receive academic scholarships, though there is no previous empirical support for this claim.

Method

Participants

Participants included 173 undergraduate students at a public southeastern university in the U.S. All eligible participants were between the ages of 18 and 24 years old (M_{age} = 19.70, *SD*=1.78), most of whom were Freshmen (*n* = 72; 41.60%). The majority of those involved described themselves as White (*n* = 150; 86.70%), female (*n* = 127; 73.40%), single (*n* = 135; 78.00%), and identified their religious affiliation as Baptist (*n* = 53; 30.60%) or other Christian (*n* = 67; 38.70%). Approximately 50.90% of students reported a current GPA within the range of 3.50-4.00 (*n* = 88), 26.60% within 3.00-3.49 (*n* = 46), and 17.40% (*n* = 30) below 3.00. Additionally, 39.90% were the recipient of need-based financial aid (*n*=69), and 50.90% received academic scholarships (*n* = 88). Students were involved in the following activities: approximately 42.80% claimed no involvement in campus activities (*n* = 74), 14.50% participated in faith-based activities (*n* = 25), 13.30% were involved in academic activities (*n* = 23), and 11% stated that they were involved in other unspecified activities (*n* = 19). See Table 1 for additional demographic details for our sample.

Procedure

Participants were recruited through an online survey system to participate in research for class credit. Students were informed of the purpose of the study, which was to collect information regarding general academic and demographic information, activity participation, and substance use. Eligible students were undergraduates between the ages of 18 and 24; this age range was chosen to more accurately represent the profile of an "average" college student and prevent outliers in age from influencing results. A total of 205 participants consented to partake and initiated the survey. However, three participant responses were eliminated because their age was outside the required range of 18 to 24, and 29 respondents did not complete at least 70% of the survey questions. Our research study was approved by the Institutional Review Board, and all respondents provided informed consent.

Materials

Demographics Questionnaire. A 28-item questionnaire was used to collect demographic information from the students such as age, sex, and race. Participants were also asked personal academic questions relating to GPA, scholarships, financial aid, and activity involvement.

Impulsive Behavior Scale - Revised (UPPS-P; Lynam, Smith, Whiteside, & Cyders, 2006). This measure is a revised version of the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001). The 59-item questionnaire assesses Positive Urgency (e.g., "I tend to lose control when I am in a great mood."), Negative Urgency(e.g., "I have trouble controlling my impulses."), Perseverance (e.g., "I generally like to see things through to the end."), Premeditation (e.g., "I have a reserved and cautious attitude towards life."), and Sensation Seeking (e.g., "I generally seek new and exciting experiences and sensations."). This measure

uses a Likert scale, with choices ranging from "1" (agree strongly) to "4" (disagree strongly). A mean score is calculated for each subscale, so that greater scores mean higher presence of these variables. Our analysis of the UPPS-P showed good reliability ($\alpha = .883$).

DSM 5 Level 2 – Substance Use - Adult (American Psychiatric Association, 2016). This measure is an adaptation from the NIDA-modified ASSIST (National Institute on Drug Abuse, 2016). While not fully diagnostic alone, it is used to assess participants' use of drugs (e.g., painkillers, stimulants, sedatives) without a doctor's prescription, in greater amounts, or longer than originally prescribed. The questionnaire consists of two 10-item sections, respectively addressing drug use in the two weeks or three months prior to taking the survey. The drugs mentioned include painkillers, stimulants, sedatives or tranquilizers, marijuana, cocaine or crack, club drugs, hallucinogens, heroin, inhalants or solvents, and methamphetamine. Responses correspond to a five-point Likert scale evaluating the participants' use of the drugs ("1" being no use and "5" being most days), and each time period is evaluated independently.

Drug Abuse Screening Test (DAST; Skinner, 1982). The DAST is a 28-item scale that seeks to identify abuse of drugs other than alcohol. This measure evaluates the presence of maladaptive drug usage by assessing the experience of negative consequences of substance use. The DAST uses 'yes' and 'no' questions, either giving a score of "1" or "0" for each question answered, for example, "Have you abused prescriptions drugs?" or "Have you ever lost a job because of drug abuse?" . A total cutoff score of 6 has been useful in identifying substance use disorders, though a cutoff less than 11 reduces the sensitivity of the measure. An overall score of 12 or above is classified as the presence of problematic substance abuse. The Drug Abuse Screening Test was found to have good reliability ($\alpha = .843$).

Alcohol Use Disorder Identification Test (AUDIT; Barbor et al., 1992). This 10-item measure assesses symptoms of an alcohol use disorder (e.g., "How often have you had six or more drinks on one occasion?"). Response choices for each question vary, though all are related to a 4-point Likert scale from "0" to "3". A total score of 8 or more indicates that there may be an alcohol use problem. Individual items of this measure also address more specific problems such as hazardous/harmful alcohol use or alcohol dependency. The Alcohol Use Disorder Identification Test was shown to have good reliability in our analysis ($\alpha = .855$).

Desired Effects of Drinking (DEOD; Simpson, Little, & Arroyo, 1996). This measure consists of 36 items that assess 9 subscales: Assertion, Drug Effects, Mental, Negative Feelings, Positive Feelings, Relief, Self Esteem, Sexual Enhancement, and Social Facilitation. The DEOD analyzes the participants' motivations for drinking during the past three months (e.g., "to be more mentally alert" or "to feel good") using a four-point Likert scale with "0" representing "Never" and "3" representing "Always." There is a maximum total score of 12 for each subscale. The Desired Effects of Drinking scale was also found to have excellent reliability ($\alpha = .961$).

Validity Measures Several validity measures were also included in the online survey to ensure that participants were actively and accurately providing information. For example, one item advised participants, "Please mark 'sometimes' for this question."

Analytic Plan

The statistical analyses used for this study were carried out using IBM SPSS Statistical software (Version 26). Bivariate correlations between involvement in activity groups and usage of specific drugs of abuse, as measured by the Modified ASSIST, or overall alcohol or drug use, as measured by the AUDIT and DAST, were evaluated using Pearson's *r* calculations. For each

activity, engagement was coded as 1 and non-engagement as 0. One-Way ANOVAs were conducted for each activity classification, examining significant differences in self-reported drug and alcohol use between activity groups. Overall scores for alcohol use for each participant were calculated using the AUDIT. Furthermore, drug use was assessed using mean scores on the DAST.

Results

Bivariate Correlations

Honors, Academic, Faith, and Service. The relations between self-reported honors, academic, faith-based, service group involvement, and substance use were evaluated. Engagement in any of these groups was not significantly related to the use of any specific drug, as indicated by the Modified ASSIST. There was also no significant correlation between honors, academic, faith-based, or service involvement with total scores on the DAST, AUDIT, Revised UPPS-P impulsivity subscale (e.g., sensation seeking or negative urgency), and Desired Effects of Drinking scale (DEOD).

Greek Life. In this sample, Greek life membership did not significantly correlate to usage of any specific drug, as identified by the Modified ASSIST. There was also not a significant correlation to DAST or AUDIT scores, drinking motivation groups indicated by the DEOD, nor any UPPS-P impulsivity factors.

General Sports. Students who reported activity in a general "sports" category, such as intramural sport members, were not significantly related to any type of specific drug use. General sports participation was not associated with higher scores on the DAST and AUDIT. Being involved in general sports was negatively associated with two desirable effects of drinking:

positive feelings, $r(172) = -.171$, $p < .05$ and relief, $r(169) = -.157$, $p < .01$. General sport involvement was not significantly related to any of the UPPS-P impulsivity factors.

University-Sponsored Athletics. Involvement in university-sponsored athletics was correlated with specific drug use during the two weeks prior to taking the survey: club drugs, $r(173) = .241$, $p < .01$, crack/cocaine, $r(173) = .279$, $p < .01$, hallucinogens, $r(172) = .259$, $p < .01$, inhalants/solvents, $r(173) = .279$, $p < .01$, methamphetamine, $r(172) = .279$, $p < .01$, and stimulants, $r(171) = .206$, $p < .01$. Using the modified ASSIST, we also identified significant correlations between involvement in university-sponsored athletics and drug use in the three-months prior to the survey: heroin, $r(172) = .279$, $p < .01$, inhalants/solvents, $r(170) = .259$, $p < .01$, methamphetamine, $r(172)=.279$, $p<.01$, painkillers, $r(172)=.293$, $p<.01$, and stimulants, $r(172) = .235$, $p < .01$. There was not a significant relation between participation in university sports and scores on the AUDIT and DAST. There was a significant, positive relation between being a university athlete and the DEOD subscale of drinking for assertion, $r(171) = 1.61$, $p < .05$. University sport participation was not significantly correlated with any impulsivity factors measured by the UPPS-P.

No Activity. Lack of engagement in any activities significantly correlated with marijuana use during both the two weeks, $r(173) = .232$, $p < .01$, and three months prior to completing the survey, $r(172) = .242$, $p < .01$. As hypothesized, lack of activity was significantly and positively related to scores on the DAST, $r(173) = .189$, $p < .05$; however, there was not a significant correlation with AUDIT scores or a specific motivation to drink. There was a significant, negative correlation between not being involved in activities and sensation seeking, $r(173) = -.192$, $p < .05$.

Academic Scholarships. Receipt of an academic scholarship was significantly related to less marijuana use, $r(172) = -.225$, $p < .01$, but was not correlated with scores on the DAST or AUDIT, or with motivations for alcohol consumption. Students who reported that they did not have an academic scholarship reported lower levels of perseverance, $r(172) = -.196$, $p < .05$ and premeditation, $r(172) = -.202$, $p < .01$, on the UPPS.

ANOVA Results

Honors, Academic, Faith, Service, Athletics, and Greek Life. Multivariate analyses showed no significant differences in DAST or AUDIT scores, across specific activity groups.

No Activity. The mean AUDIT scores of those involved in activities ($M = 3.89$, $SD = 3.89$) was lower than those not participating in activities ($M = 5.28$, $SD = 6.00$), though this difference was not statistically significant. Participants who reported no club activity ($M = 1.49$, $SD = 3.22$) scored higher on the DAST than students who reported activity engagement ($M = 0.57$, $SD = 1.47$). In a One-Way ANOVA, DAST scores were significantly different between those involved and not involved in activities $F(1, 171) = 6.34$, $p < .05$.

Academic Scholarships. Academic scholarship recipients ($M = 3.75$, $SD = 4.30$) reported lower mean AUDIT scores than those who did not receive scholarships ($M = 5.33$, $SD = 5.53$). Students who did not receive academic scholarships ($M = 1.01$, $SD = 1.99$) also showed higher DAST totals than those who did ($M = .92$, $SD = 2.70$). In a One-Way ANOVA, differences between groups for the DAST, $F(1,151) = 3.881$, $p = .051$, and AUDIT, $F(1, 170) = .061$, $p = .805$, were not significant.

Discussion

In our sample of college students, we examined the associations between extracurricular activity and several drug and alcohol-related health outcomes, including differences in drug/alcohol misuse across activity groups. No significant correlations between honors, academic, faith-based, or service participation and substance use were identified. These findings do not align with previous research, which has supported a relation between religious participation and lower risk of alcohol and drug abuse in the general college population (Milot & Ludden, 2009; Shulenberg et al., 2005; Stewart, 2001), and in general Appalachian samples (Kim-Spoon et al., 2015; Webb & Brewer, 2010). Additionally, in previous research, honors, academic, and service group involvement are associated with a lower prevalence of substance abuse, perhaps due to the commonly higher GPA and school commitment rates in these groups (Porter & Pryor, 2007; Tibbetts & Whittimore, 2002). Previous research suggests that participation in these types of social groups is often protective against college substance use, though we did not find this in our study. It is unclear whether this deviance from established research is due to study limitations.

The second hypothesis, which stated that students involved in Greek life, athletics, or no extracurricular activity engagement would report higher levels of alcohol and drug use, was partially supported. Contrary to past research, there was no significant relation between fraternity/sorority involvement and substance use in our study. Greek life is often considered a risk factor for college students, given the perception that members of these groups indulge in harmful social activities and behaviors (e.g., risky sexual encounters, binge-drinking, and drug use) (McCabe et al., 2005; McCabe, Veliz, & Schulenberg, 2018; Whitten, 2006), though our research did not support this assertion. Our lack of findings may be due, in part, to the climate

within the Greek life organizations of this particular university. However, our study did show increased substance use amongst athletes, both those in general sports clubs and university-sponsored athletics. Students who reported involvement in general sports were less likely to drink for positive feelings and relief, while university athletes were more likely to report drinking for assertion. University-athletic participation was related to the use of multiple drugs in the two weeks prior to taking the survey (i.e., club drugs, crack/cocaine, hallucinogens, inhalants/stimulants, methamphetamine, and stimulants). Engagement in university athletics was also positively related to the use of multiple drugs in the three months prior to taking the survey (i.e., heroin, inhalants/solvents, methamphetamine, painkillers, and stimulants). These findings support previous research indicating that athletic participation poses a risk for college substance use (Buckman et al., 2009; Dunn & Wang, 2003; Martens, Dams-O'Connor, & Beck, 2006).

As hypothesized, there was a significant difference between the substance use of those involved in activities and those not. Students who did not engage in any activities were more likely to use marijuana, both two weeks and three months prior to taking the survey, and had lower rates of sensation seeking. These students also reported significantly higher mean scores on the DAST, showing an increased presence of drug abuse. A lack of participation in extracurricular activities has been related to increased substance misuse and harmful behavior in past research analyzing young adults (Farb & Matjasko, 2012). Some research also suggests that marijuana use may affect the motivation levels of adolescents (Lane et al., 2005), which may translate to their school participation. It is unclear, however, whether previous use of marijuana has influenced these students to not partake in activities, or if insufficient social integration resulting from lack of group participation contributes to increased drug use, for example. Though we cannot speak to the causal relation of drug misuse and activity involvement, in this

circumstance, due to the cross-sectional nature of the data collection, we can confirm their correlation.

Given that alcohol and drug use during college has been previously shown to correspond with academic consequences (Arria et al., 2008; Arria et al., 2013), such as lower GPA and, in turn, loss of scholarships, we hypothesized that students with academic scholarships (which are contingent based on a student's GPA) would report lower levels of drug and alcohol abuse. While our data did not show a significant difference in substance use between those who were and were not academic scholarship recipients, the difference of mean scores on the DAST did support that participants who were not academic scholarship recipients report increased drug use.

Limitations and Future Research

We may be limited in our generalization of results to the entire college population because our sample was mostly White and female. Our data may also be subject to self-report bias given that this was an online survey and self-report survey, and students may not have reported unfavorable information. This possible bias is a significant concern for our current study, given the sensitive nature of questions relating to alcohol and drug abuse. To control for this, participants were ensured anonymity, and validity measures were implemented throughout the survey. Additionally, given the small sample size, individual drug use can heavily influence the results of the larger group.

While we cannot identify what personal characteristics and involvement cause a student to misuse substances, our results may offer some insight into activity-based risk and protective factors for substance abuse in college students. Our results suggest that college students who do not participate in any extracurricular activity may be at risk for the misuse of alcohol and drug

use disorders, though not all group involvement is considered a protective factor. For example, our findings also indicate that sports involvement, specifically university-sponsored athletics, may be a particularly salient risk factor as it is related to increased use of multiple drug classes. Given the lack of significant data, we cannot draw conclusions on activities such as honors, Greek life, academic, faith-based, or service groups in our sample. In addition, although academic scholarships were not significantly related to lower mean scores on the DAST, we do classify them as a protective factor, given the academic requirements to maintain one.

Further research should seek to identify other influences on college substance use not explored in this study, such as living situations, GPA, and other demographics (e.g., race, gender, credit hours). Our results also call for an investigation into the effectiveness of current substance use interventions, and their possible differential effectiveness for individuals who are engaged in different types of activities or who are unengaged in any activities. Given that some activity groups presented with varying motivations for substance use, this may imply that alternative methods should be used during intervention, such as focusing on peer perceptions of substances within these various groups (Lewis & Mobley, 2010). Future studies should collect longitudinal data throughout a student's college experience in order to substantiate causal relations, to improve the cross-sectional findings of our study.

Conclusion

Substance use is a significant concern for college students, perhaps due to stressors associated with the academic experience, and it is important to identify possible risk and protective factors relating to college substance use. Our findings indicated that those involved in athletic activities and students who did not report any activity involvement are at an increased

risk of substance use during college. Further research should be conducted analyzing the impact of activity involvement on other academic factors, such as scholarship receipt and GPA.

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Table 1

Demographic characteristics of the total sample of college students.

	N	%	M	SD	Range
Age	173		19.7	1.78	18-24
Gender					
Male	43	24.90%			
Female	127	73.40%			
Transgender	2	1.20%			
Other	1	0.60%			
Academic Year					
Freshman	72	41.60%			
Sophomore	25	14.50%			
Junior	36	20.80%			
Senior	39	22.50%			
Race/Ethnicity					
White	150	86.70%			
African American	19	11.00%			
Hispanic	2	1.20%			
Asian	1	0.60%			
Other	1	0.60%			
Marital Status					
Single	135	78%			
Married	3	1.70%			
Committed Relationship	31	17.90%			
Cohabitating	3	1.70%			
Other	1	0.60%			
Activity Involvement					
None	74	42.80%			
Academic	23	13.30%			
Faith-Based	25	14.50%			
Greek Life	17	9.80%			
Honors	14	8.10%			
Residence Life	8	4.60%			
Service	13	7.50%			
Special Interest	12	6.90%			
Sports	14	8.10%			
ROTC	1	0.60%			
University Athletics	12	6.90%			
Other	19	11.00%			