Substance Abuse and Dependency Risk: The Role of Peer Perceptions, Marijuana Involvement, and Attitudes toward Substance Use among College Students

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Abstract:

Many college students are using substances at levels consistent with Substance Abuse or Dependence, yet little explanation for this phenomenon exits. The aim of this study was to explore a risk factor profile that best separates those with low and high potential for having a Substance Use Disorder (SUD). A discriminant function analysis revealed that participants with a high probability of having a SUD misperceive others' alcohol and marijuana use to a greater extent than those with a low probability of having a SUD. Implications for educators and counselors on college campuses are discussed.

Keywords: college students | substance abuse | Substance Use Disorder (SUD) | counselors

Article:

The period of young adulthood from late teens to mid-20s is a time of greatest use of substances in the United States (Johnston, O'Malley, & Bachman, 2000; Substance Abuse and Mental Health Service Administration [SAMSHA], 2003). Perhaps the most visible example of this is college students, who tend to drink alcohol at heavier rates than their non-student equivalent (Baer, Kivlahan, & Marlatt, 1995; Schulenberg, Maggs, Long, Sher, Gotham, Baer, et al., 2001). Indeed, college-bound high school seniors report relatively low drinking rates, but this trend tends to reverse upon entering college (Wetherill & Fromme, 2007). Clearly, certain aspects of the college environment and experience influences an increase in alcohol consumption (Johnson et al., 2000; Schulenberg et al., 2001; Wetherill & Fromme, 2007).

Although alcohol is the most frequently abused substance by college students, marijuana abuse is increasing on college campuses (National Center of Addiction and Substance Abuse [CASA], 2007). In fact, researchers have frequently posited that marijuana use among college students may increase both the risk for alcoholuse disorders (Shillington & Clapp, 2001; Simons, Gaher, Correia, Hansen, & Christopher, 2005) and experimentation with other, stronger substances, such

as cocaine or heroine (Kandel, Yamaguchi, & Chen, 1992). These unsettling findings suggest that, for some, marijuana may be a pathway to abuse and dependency.

The increase in alcohol and marijuana consumption during the college years (Johnston, O'Malley, Bachman, & Schulenberg, 2005) has prompted some investigators to suggest that many college students use at levels that reflect a Substance Use Disorder (SUD; i.e., dependency or abuse). Research, although scant, has supported this speculation. For example, Clements (1999) found that 25% of a sample of college students met criteria for alcohol abuse or dependence (as defined according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, DSM-IV (American Psychiatric Association [APA], 1994) within the past 12 months. Similarly, among a large, national sample of college students, Knight, Wechsler, and Kuo (2002) found that 31% of students fit criteria for an alcohol abuse diagnosis, whereas 6% met criteria for alcohol dependence within the past 12 months from the survey.

Despite these findings, however, substance abuse and dependency among college students are not well understood, as the vast majority of studies have highlighted the prevalence and correlates of substance use behaviors (i.e., quantity of consumption, frequency of consumption, frequency of binge drinking; Taylor, 2006). Indeed, relatively few studies (Grekin, Sher, & Wood, 2006; James & Taylor, 2007) have attempted to explain clinically significant substance use problems; researchers who have explored this have focused on pathological personality traits and their correlations to high levels of substance use. In the current study, we sought to examine the risk factor profiles of those who demonstrate potential for substance abuse and dependence problems. Thus, we were interested in exploring mechanisms that place students at risk for serious substance related issues.

One promising explanation of substance misuse on college campuses, especially related to alcohol consumption, is social norm theory. A key assumption of this theory is that individuals tend to converge to a "false norm" related to certain behaviors as a way to escape social isolation (Berkowitz, 2004). For example, college students tend to perceive their peers as drinking more alcohol (or using more substances) than is actually the case. These misperceptions tend to create heightened anxiety that propels students to match their behavior to the false norm (in this case drinking or substance use). Social norm theory and campus interventions based on this model have been written about extensively in the literature and thus will not be reviewed in detail here (for an excellent overview of theory and research on social norms, see Berkowitz, 2004). However, despite the preponderance of evidence in support of social norm theory as an explanatory model of alcohol use in general, we could find no research on the ability of social norms to predict risk of substance abuse or dependency. That is, it is unclear if this model is useful in explaining excessive levels of substance use consistent.

Perceptions of peer substance use may lead to personal use by shaping individual attitudes in a direction favorable toward substances. Another factor that can influence substance use is the family social environment, and research has shown that familial discord, including substance use among family members, can lead to adolescent substance use as part of a larger pattern of deviant behavior (Patterson, 1996). However, among college students, the influence of family factors on substance use often gets subsumed under the more popular influence of peers. Indeed, Gorsline, Holl, and Pearson (2006) stated that college students who only worry about what time

the party starts is a myth, and understanding the role of family influence on college students' behavior is critical to helping them succeed. Despite research that links substance use in the home with personal use in adolescence (Dooley, Prause, & Ham-Rowbottom (2005) and in college (Baer et al., 1995), an unexamined area in collegiate substance involvement is how family member attitudes toward substance use shape personal use, and how these attitudes compare to social norms and personal attitudes in determining the potential risk for developing substance abuse and dependence. We sought to fill these gaps in the current study.

The aim of this exploratory study was to determine which set of attitudinal risk factors (peer, family/environmental, self) best describes those with a high probability of having a SUD. Specifically, this aim was guided by the following research question: Which group of variables, social norms (peer influence), family-social, attitudinal risk factors, or personal attitudes toward substance use, best discriminates between low and high probability of having an SUD? We hypothesized that those manifesting a high probability of having a SUD would misperceive alcohol and marijuana based norms to a greater extent than those manifesting a low probability of having an SUD. We further speculated that normative beliefs related to alcohol, as well as alcohol use intensity, would be the dominant discriminating variables in our analysis.

METHODOLOGY

Participants and Procedures

Participants were recruited from student referrals to the Substance Information Program (SIP) at the counseling center of a large university in central North Carolina across two recent academic school years. This program offers both substance abuse assessments and psycho-educational seminars to students referred by the Division of Student Affairs subsequent to an infraction of the University's Alcohol and Drug Policy. Typical infractions include having an open container, public intoxication, possession of alcohol by a minor, or driving under the influence (DUI).

After human subjects' approval was secured, participants were invited to partake in this study upon entry into the SIP program. The researchers explained the purpose of the study and that the instrumentation would take about 20 minutes to complete. Participants also were informed that their participation was anonymous and that they could withdrawal at any time.

Measures

The Alcohol and Other Drug (AOD) survey is a researcher created, 30-item measure designed to assess a broad range of substance using behaviors among college students, with emphasis on quantity and frequency of drinking and drug use for self, as well as perceptions of others' drinking behaviors. The AOD was adopted from the work of Thombs (1999), and the survey (or close variations) has been used in other published studies (Lewis, Olds, Thombs, & Ding, 2009; Lewis, Thombs, & Olds, 2005).

Three items from the AOD were used to assess alcohol use and one item was used to assess marijuana use. To account for the amount of alcohol in typical beverages, participants were instructed to define a "drink" as one 12-oz bottle or can of beer, one 4-oz glass of wine, one 12-

oz bottle or can of wine cooler, or one 1-oz "shot" of liquor, either straight or in a mixed drink. Frequency of alcohol consumption was assessed by the question, "On average, how often do you drink?" (Responses range from 1 = Once a month or less to 8 = 7 times a week). Quantity of alcohol consumption was assessed by the question, "How many drinks do you usually have on a typical occasion?" (Response range from 1 = One drink or less to 8 = 12 or more drinks). These two items were summed to form a composite score, Alcohol Use Intensity. Previous research (Korcuska & Thombs, 2003; Thombs & Briddick, 2000; Thombs, Olds, & Ray-Tomasek, 2001) has demonstrated that combining alcohol quantity and frequency measures produces acceptable internal consistency (e.g., .86; Thombs & Briddick, 2000). The alpha reliability for Alcohol Use Intensity in the current study was adequate (.72). Frequency of marijuana use was assessed by the question, "During the past 30 days, how many times (if any) have you used marijuana?" Responses ranged from 1 (None) to 6 (40 or more times). Due to difficulties assessing quantity of marijuana use (i.e., it is doubtful that participants would know the amount of THC recently ingested), frequency of marijuana use was entered as a single item in the data analysis.

Social Norm Questions

From the AOD survey, two items were used to create alcohol-based social norm variables, across two reference groups: closest friend and typical student. Perceived drinking intensity (PDI)—closest friend was comprised of the items, "Consider your closest friend at your university or college. How many drinks do you think they have on a typical occasion?" and "Consider your closest friend at your university or college. How often do you think they drink?" These items were summed for an overall composite score (range 2-16). Perceived drinking intensity (PDI)—typical student was comprised of the items, "Consider the typical student at your university or college. How many drinks do you think they have on a typical occasion?" and "Consider the typical student at your university or college. How often do you think they drink?" These items also were summed for an overall composite score (range 2-16). Both composite variables produced adequate to good reliability (Cronbach's alpha = .784 and .748, respectively).

Marijuana based social norm variables were derived from two items on the AOD survey. Perceived frequency of marijuana use (PFM)—closest friend was comprised of the item, "During the past 30 days, how many times (if any) do you think your closest friend has used marijuana?" Responses ranged from 1 (None) to 6 (40 or more times). Perceived frequency of marijuana use—typical student was measured by the following item: "During the past 30 days, how many times (if any) do you think the typical student at your university or college has used marijuana?" The marijuana based social norm variables were entered as single items in the analysis. Two socio-demographic variables were used for data analysis purposes: gender and grade of first drinking experience. These variables have been found to be consistent predictors of alcohol use intensity (Korcuska & Thombs, 2003; Lewis & Watts, 2004; Wechsler, Lee, Kuo, & Lee, 2000), and their inclusion allowed for a comparison of predictive power relative to other variables in the analysis.

SASSI-A2

Many Substance Use Disorder assessment instruments contain direct questions that are obvious to the respondent and can, therefore, be minimized or manipulated. To address this disadvantage,

the current version of the Substance Abuse Subtle Symptom Inventory for Adolescents (SASSI-A2; Miller & Lazowski, 2001) was designed to detect Substance Use Disorders regardless of the respondents' level of honesty, acknowledgement of substance abuse, or any motivations to distort the results. By combining scales containing both indirect and direct questions, the authors purport that the instrument increases significantly the accuracy and sensitivity of the results. As such, the SASSI instruments are among the most popular instruments used by addictions counselors (Juhnke, Vacc, Curtis, Coll, & Paredes, 2003).

The SASSI-A2 has reported to be effective at discriminating between substance abuse disorders and other psychiatric diagnoses (Bauman, Merta, & Steiner, 1999) as well as identifying substance abusers who meet DSM-IV diagnostic criteria, but deny their abuse (Rogers, Cashel, Johansen, Sewell, & Gonzalez, 1997). Thus, it was considered an ideal instrument to use in the current study in regard to assessing substance abuse or dependence.

Although the SASSI-A2 has been normed on groups of adolescents up to age 18, we believe the SASSI-A2 is more appropriate for traditional-aged college students (who comprised our sample) than the adult version of the SASSI. Indeed, the developmental and environmental circumstances of most college students between the ages of 19 and 21 suggest that these students can relate more readily to school and authority based questions included on the SASSI-A2 compared to work and financial independence questions on the adult SASSI-3, something supported by trainers of the SASSI instrument (personal communication, R. Forest, September 14, 2004). In addition, our purpose in this study is not to provide direct comparisons between the participants' scores and the normative sample (i.e., this is not a norm-referenced study); rather, we wanted to select an instrument that we believe would have the most appropriate content given the context and goals of our study. Thus, we believe the SASSI-A2 was the best choice of instrument for the purposes of our research.

The SASSI-A2 contains 72 true-false items and 28 questions which ask participants to report the frequency of substance use and misuse via Likert-scale rating. Twelve scales are comprised of these questions, including both face valid and subtle scales, upon which nine decision rules screen the respondents as either "High Probability" or "Low Probability" of having a Substance Use Disorder (abuse or dependence). Furthermore, unlike the adult version of the SASSI, the adolescent version contains two scales which attempt to discriminate between substance abuse and dependence. The SASSI-A2 is reported to have high rates of sensitivity (95%), specificity (89%), accuracy (94%), and predictive power (75%; Miller & Lazowski, 2001). The SASSI-A2 manual (Miller & Lazowski, 2001) reported internal consistency coefficients (a) for the overall inventory at.75, with a range among the scales from .61 to .95; test-retest reliability coefficients range from .71 to .92.

Of particular relevance to this study are the Family-Friends Risk Scale (FRISK) and the Attitudes Scale (ATT), both of which are face valid or direct measures of factors that may contribute to substance abuse. The FRISK scale items "provide insight into the context in which the adolescent may be misusing substances" (Miller & Lazowski, 2001, p. 19) and can indicate that the family or social system of the individual may promote or enable substance misuse. The ATT subscale describes the attitudes or belief system that may be associated with or promote

substance misuse. The alpha coefficients (a) for the FRISK and ATT scales are reported at .67 and .76 respectively (Miller & Lazowski, 2001).

RESULTS

Out of 116 referrals, a total of 78 clients (67.2%) consented to and completed the survey. Of this sample of SIP participants, 41 (52.6%) were men. The average age was 18.43 years. The majority of participants (87.2%) were Caucasian, followed by African-American (5.1%), Multi-racial (2.6%), Asian-American (2.6%), and "Other" (1.3%). Freshmen comprised the greatest proportion of participants (76.9%), followed by sophomores (15.4%), juniors (6.4%), and seniors (1.3%). The vast majority (88.5%) of participants did not report belonging to a fraternity or sorority organization.

Freshmen were overrepresented in the sample (comprising just over three-fourths). This appears to be the case for two reasons: First, freshmen are more likely to live on campus compared to upper class students, increasing their risk of being sanctioned by campus authorities. Second, some freshmen may have been unfamiliar with campus rules and regulations regarding substance use and thus were more likely to be sanctioned for violating campus policy. As noted earlier, part of this sanction was to attend several on-campus group-based interventions (i.e., SIP).

Discriminant Analysis

To control the potential effects of time of data collection (i.e., data were collected across two academic years), a preliminary phi ( ) product moment correlation analysis was used to determine if a significant relationship existed between year of data collection and probability of having a SUD (high/low). Results (not shown) indicated a non-significant relationship between time of data collection and probability of having a SUD. Thus, the data were collapsed for data analysis purposes. A discriminant function analysis was performed on two binary groups, based on their SASSI profile: (a) those demonstrating a low probability of having a SUD, and (b) those demonstrating a high probability of having a SUD. Out of 78 participants, two cases were dropped due to excessive missing data, resulting in 76 useable cases for the analysis. Ten independent variables were entered into the analysis simultaneously to determine which contributed the most in discriminating between the two groups.

The results of the discriminant analysis are displayed in Table 1. The first (and only) discriminant Function (F1) was significant ($2 = 40.43$, $p < .001$). An analysis of the structure coefficients in Table 1 suggests that all ten discriminating variables made significant, independent contributions to the first Function. As a general guideline, any discriminating variables with structure coefficients over .30 were considered important in defining Function 1. In order of magnitude, these variables were (a) perceived frequency of marijuana use—closest friend, (b) frequency of marijuana use, (c) attitudes toward substance use, (d) perceived frequency of marijuana use—typical student, (e) perceived drinking intensity—closest friend, (f) gender, (g) grade of first drinking experience, (h) perceived drinking intensity—typical student, (i) family-friends risk, and (j) alcohol use intensity.

Table 1. Discriminant Function Analysis, Means, Standard Deviations, and Structure Coefficients among a Sample of College Students Who Were in Violation of a Campus Alcohol and Substance Abuse Policy (N = 76)

Function	Eigenvalue	Canonical Correlation	Wilk's Lambda	χ^2	df	p
F1	.797	.667	.557	40.43	10	.000

	Group Membership				
	Low Probability of having a SUD[a] (n = 33)		High Probability of having a SUD (n = 43)		Structure Coefficients
Discriminating Variables (possible range)	M	SD	M	SD	F1
PFM[b]—Closest Friend (1-6)	1.48	0.71	3.27	1.70	.723
Frequency of Marijuana Use—Self[c] (1-6)	1.08	0.19	1.43	.493	.485
Attitudes (0-10)	3.00	2.06	4.72	1.97	.480
PFM—Typical Student (1-6)	2.27	0.76	3.13	1.20	.470
PDI[d]—Closest Friend (2-16)	7.54	3.75	10.13	2.74	.444
Gender (binary variable)	N/A	N/A	N/A	N/A	−.403
Grade of first drinking experience (1-8)	5.27	1.67	4.15	1.82	−.346
PDI—Typical Student (2-16)	8.27	2.64	9.47	2.31	.334
Family-Friends Risk (0-9)	2.33	1.70	3.32	1.68	.329
Alcohol Use Intensity—Self (2-16)	9.30	4.66	11.93	4.54	.308

[a]SUD = Substance Use Disorder. [b]PFM = Perceived frequency of marijuana use in past 30 days. [c]Transformed variable (Square root) due to non-normality. [d]PDI = Perceived Drinking Intensity.

Classification Results Comparing Predicted versus Actual Group Membership

The classification results comparing predicted and actual group membership are displayed in Table 2. Prior probabilities (i.e., the relative proportion of each group to the total sample) were computed from actual group sizes in order to adjust for substantially different group sizes (see Hair, Black, Babin, Anderson, & Tatham, 2006 for more information prior probabilities). In general, the discriminant functions accurately classified 78.9% of SIP clients into the two groups. The discriminating variables were most successful in classifying those demonstrating a high probability of having a SUD. To determine if the classification was significant, we computed a Press's Q statistic (Hair, Black, Babin, Anderson, & Tatham, 1998) which compares the number of correct classifications with the total sample size (76) and the number of groups (2). The calculated value is then compared to a critical value (chi-square w/ 1 df). If Q exceeds this critical value, then the classification matrix is deemed significantly better than chance. Performing the Press's Q, we achieved a value of 24.0, which far exceeds the chi-square value of 6.63 at a .01 significance level. Thus, we have evidence that the discriminant model predicts group membership significantly better than chance.

Table 2. Classification Results Comparing Predicted versus Actual Group Membership

| | Predicted group membership | | | |
| | Low probability | | High probability | |
Actual group	*n*	%	*n*	%
Low probability (*n* = 33)	24	72.7	9	27.3
High probability (*n* = 43)	7	16.3	36	83.7

Note: 78.9% of original grouped cases classified correctly.

DISCUSSION

The results provided support for the first hypothesis that participants with a high probability of having a SUD would misperceive alcohol and marijuana based norms to a greater extent than those with a low probability of having a SUD. However, the second hypothesis was not supported. The results suggest that normative beliefs related to alcohol and alcohol use intensity made relatively modest contributions to the discriminant model. Thus, the risk of abuse or dependency cannot be gauged solely by perceptions of peer drinking behavior or drinking behavior for self.

Research suggests that normative beliefs related to alcohol, particularly those of a proximal (i.e., closest friend) nature, are consistent explanatory mechanisms of drinking intensity among college students (Borsari & Carey, 2003). However, our results suggest that this explanatory power is somewhat diminished when explaining levels of drug use suggestive of abuse or dependency. For college students in this category, it is normative beliefs related to marijuana, not alcohol, which better separates students into the high probability of having an SUD group.

Alcohol-based social norms may be useful in explaining the intensity of one's drinking behavior, but when a college students' use approaches the realm of clinical significance, this explanation appears to lessen. Many college students perceive campus drinking norms to be higher than their own (Borsari & Carey, 2003), but probably not at a level reflecting dependency. They may realize that peers who use in a manner consistent with dependency are outside the normative college experience and thus would be minimally influenced by the perception of this abnormal drinking or using pattern. Our results indicate that normative beliefs surrounding peer marijuana use is a more robust discriminator between those with high and low risk of having a SUD. Indeed, researchers (Neighbors, Geisner, & Lee, 2008) have found that perceptions of friends' marijuana use were the strongest predictors of marijuana use for self; however, it is unclear why marijuana-based social norms had greater discriminatory power compared to alcohol based norms in explaining SUD risk; future research is needed to clarify this connection.

Marijuana Use, Attitudes, and Social System Risk Factors

Frequency of marijuana use for self had the second greatest impact on the discriminatory model, well beyond that exerted by alcohol use intensity. A popular theory regarding marijuana use is

that it is a step beyond alcohol and indicates a "gateway" to more serious drug problems (Kandel, 2003). Although the evidence of such a gateway effect is mixed (Lynskey, Heath, Bucholz, Slutske, Madden, Elliot, et al., 2003; Mackesy-Amiti, Fendrich, & Goldstein, 1997), marijuana use in the current sample may be more closely aligned with "harder" or illicit substance use compared to alcohol. Indeed, follow-up bivariate correlations (not shown) indicated that frequency of marijuana use had significant correlations with previous use of illicit and prescription drugs, including LSD, MDMA, Cocaine, Methamphetamine, Oxycontin, and Vicodin. Comparatively, relationships between alcohol use intensity and other drug use were of a lesser magnitude. This suggests that marijuana use may have co-occurred with other substance use, including alcohol, thus providing a lens through which an individual's potential for substance abuse or dependence could be assessed.

Students who demonstrated attitudes that endorse substance use accounted for some discrimination between the two groups. This suggests that internal processes favorable toward substance use play a significant role in one's risk for a SUD, beyond that played by several of the normative variables. In addition, those who score higher on the ATT scale of the SASSI are likely to be more defensive if confronted with the consequences of their substance use (SASSI Institute, 2001a). Thus, college students who harbor affirmative attitudes toward substance use, perhaps even embellishing its "positive" effects, may become resistant to attempts from concerned peers, family, and administrators to change their using behavior when it approaches dangerous levels consistent with abuse or dependency.

Not surprisingly, involvement in a family or social system that promotes or endorses substance use showed discriminatory power, although this effect was modest in nature. Growing up and participating in a social environment that enables substance use leads some older adolescents to have difficulty recognizing consequences of their actions, to view problems as trivial or inevitable, and to become resistant to accepting limits and supervision of any kind (SASSI Institute, 2001b). Such students my revel in their newfound freedom of college life and become resistant to any attempts to limit such freedom. For many college students, freedom, in this context, may include drinking and drug use, sometimes to dangerously high levels.

The two socio-demographic variables made significant contributions to the discriminant model: Gender and age of first drinking experience. In general, men were more likely to demonstrate a higher risk for substance abuse or dependency compared to women, and the earlier participants began drinking alcohol, the higher their risk of having a SUD. These findings support previous research (Engs, Diebold, & Hanson, 1996; Korcuska & Thombs, 2003; Wechsler et al., 2000) and further suggest that these variables may increase one's probability of developing substance abuse or dependency. Although the effects of gender and grade of first drinking experience were modest, they may be legitimate considerations when determining one's risk profile for substance abuse or dependency.

Based on these findings it is possible to generate a risk profile of those who demonstrate a high probability for having a SUD. These students are more likely to be male, begin drinking in an early age, smoke marijuana somewhat frequently, and perceive their peers as smoking marijuana frequently. They also are more likely to harbor attitudes that promote substance use in general,

perceive peers as drinking heavily, and hang out in social groups (including family) that endorse substance use.

Implications for Educators and Counselors

Counselors and campus personnel who have an investment in college student health may need to place greater emphasis on the assessment of marijuana involvement, both of self and peers, as a possible indication of substance abuse or dependency. It is often the case that alcohol and marijuana use are reported in standard assessment procedures, followed by an intervention designed to curb or limit such use. Our results suggest that students who report using marijuana and view peers as using marijuana should be assessed further for additional substance use beyond alcohol. If students affirm marijuana involvement (of both self and peers), there is greater risk the client may be approaching an abuse or dependency problem.

Additional insights for counselors and campus leaders can be generated from the SASSI-A variables (i.e., ATT and FRISK). Students who fall in the high probability category may demonstrate attitudes toward substance use that are difficult to change. These entrenched beliefs may stem from growing up in a social or family environment that enables substance use rather than prevents it. Approaches designed to limit resistance, such as motivational interviewing, may be particularly well-suited for students at risk for a SUD. Rather than forcing a change of attitudes on students, pros and cons can be discussed, discrepancies pointed out, and self-efficacy supported, without engaging in argumentation which often serves to engender resistance. Respecting students' need for freedom and individuality also may soften the reality of living within the limits and supervision imposed by university and authority restraints. Gently exploring, and perhaps challenging, familial attitudes toward substance use may prove worthwhile.

Finally, attitudes are unlikely to change without a structured program that includes peer support for such changes (SASSI Institute, 2001a). Campus programs that incorporate peer involvement and feedback, such as supportive and educational groups, may provide the structure needed to facilitate lasting change.

Limitations

Several limitations of the methods must qualify the aforementioned results. First, the AOD survey and SASSI-A2 are self-report measures, which introduce the possibility of biased responding. However, research (Johnston & O'Malley, 1997) has shown that when anonymity is assured and respondents believe the research serves an important purpose, accuracy is enhanced. Second, freshmen were overrepresented, and the sample was from one university in one region of the country, calling in to question the generalizability of the results. Third, the sample size limited the number of variables we could adequately enter in the discriminant analysis so as not to violate the variable–participant ratio. With a larger sample, additional socio-demographic variables could be assessed to determine their impact relative to other variables. Nonetheless, in the current analysis two socio-demographic variables were selected based on their robust predictability in previous research.

Future research could replicate this study using a larger, more representative sample as well as using additional variables to extend or clarify the risk profile of those demonstrating a high probability of having a SUD. Knowledge of potential risk factors becomes an important window from which to make decisions regarding how to provide assistance to students in need.

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