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Factor Structure Validation of the Alcohol Dependence Scale in a Heavy Drinking College Sample

Cara M. Murphy, BS and

Department of Psychology, University of Georgia

James MacKillop, PhD

Department of Psychology, University of Georgia Center for Alcohol and Addiction Studies,
Brown University

Abstract

The prevalence of alcohol use disorders in college students necessitates that adequate measures exist to assess students for abuse and dependence. The Alcohol Dependence Scale (ADS) is a continuous measure of the severity of alcohol involvement found to have a unidimensional factor structure in clinical samples. The latent factor structure of the ADS in college drinkers has not been examined and this study sought to replicate unidimensionality. Heavy college drinkers ($N=343$) completed the ADS. Performance was examined using confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). The CFA did not support a single factor solution. Follow-up EFA revealed a two factor structure. The first, termed “Acute Excessive Drinking” consisted of relatively commonly endorsed items relating to loss of behavioral control, blackouts, and obsessive/compulsive drinking. The second, termed “Severe Withdrawal Symptoms,” consisted of relatively infrequently endorsed items relating to withdrawal symptoms. The ADS does not appear to have the same factor structure in college and clinical samples, making it inadvisable as a linear measure of alcohol problems within a college population.

Keywords

Alcohol; Assessment; Factor Structure; College Students

Alcohol use disorders (AUDs) are diagnostically dichotomous in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994), with a diagnosis being given upon reaching the threshold of an explicit number of symptoms. However, these disorders have long been understood to vary along a continuum in terms of severity. In contrast to a categorical condition, the clinical syndrome described by Edwards and Gross (1976) emphasized a dimensional continuum, with neither all elements necessarily being present, nor present with equal intensity. The diagnostic criteria for alcohol dependence in DSM-IV and ICD-10 largely are based on the ideas put forward by Edwards and Gross in defining the alcohol dependence syndrome (Li, Hewitt, & Grant, 2007). There has been recent support for this type of symptom presentation with studies examining AUD symptoms finding they are unidimensional, additive, and suggest a continuum of severity (Kahler & Strong, 2006; Ray, Kahler, Young, Chelminski, & Zimmerman, 2008). As a result, alcohol abuse and dependence will likely be combined to form a single unidimensional diagnosis in DSM-5 (O’Brien et al., 2010). Therefore, it is

clear that valid assessments that can effectively measure severity of alcohol-related problems are important for assessing meaningful variation among drinkers.

One continuous scale that measures the alcohol dependence syndrome as described by Edwards and Gross (1976) is the Alcohol Dependence Scale (ADS; Skinner & Allen, 1982). The ADS was derived from the Alcohol Use Inventory (Horn, Wanberg, & Foster, 1974) via component analysis in an effort to develop a scale more closely related to an underlying dimensional continuum. One of the main objectives of the ADS was to minimize the view of alcohol dependence as a categorical syndrome and acknowledge a dimensional approach to the syndrome that marks the progression of alcohol use from involvement to impaired control. Consistent with this, exploratory factor analysis of the ADS revealed a unidimensional factor structure, accounting for about one-third (31%) of the variance (Skinner & Allen, 1982).

Since the publication of the ADS, several studies have examined its validity in a variety of populations. One such study conducted by Kivlahan, Sher, and Donovan (1989) examined the concurrent and predictive validity of the ADS in a sample of hospitalized alcoholics. They found evidence the ADS was internally consistent and had adequate concurrent validity with alcohol related variables including drinks per day, previous alcoholism treatments, years of problem drinking, as well as relationships with both psychiatric and physical symptoms. However, the predictive validity was limited, as the ADS manifested no relationship to attrition from treatment, alcohol consumption at follow up, or duration of aftercare involvement. In another study, Hodgins and Lightfoot (1989) found the ADS to be unidimensional in a population of incarcerated male offenders with a single factor accounting for 40% of the variance. It also had good concurrent validity with strong correlations with average amount offenders were consuming before incarceration, self-reported years of problem drinking, and consumption goals after release. Recently, the underlying factor structure of the ADS was examined using data from two large randomized clinical trials: COMBINE (Combining Medications and Behavioral Interventions Study) and Project MATCH (Matching Alcoholism Treatments to Client Heterogeneity). In this study, the ADS was found to have good convergent validity showing significant relationships to many other measures of severity of dependence and craving in participants who met DSM-IV criteria for alcohol dependence (Doyle & Donovan, 2009). However, the authors in this study suggested a three-factor solution for the ADS representing loss of behavioral control and heavy drinking, obsessive-compulsive drinking style, and psychoperceptual and psychophysical withdrawal.

A number of studies have looked at the ADS and its relationship to DSM diagnostic criteria with mixed results. Ross, Gavin, and Skinner (1990) found that the ADS had classification accuracy of up to 89% in detecting DSM-III alcohol abuse/dependence disorders. Similarly, Chantarujikapong, Smith, and Fox (1997) found that using a cut-off score of eight, the ADS demonstrated relatively good sensitivity and specificity with a DSM-III-R alcohol use disorder diagnosis. In contrast, Willenbring and Bielinski (1994) examined the ADS in heavy drinking medical outpatients and found that the ADS evinced poor agreement with the DSM-III-R criteria, with many patients showing low or slight dependence on the ADS yet meeting diagnostic criteria on the DSM-III-R and warranting an ADS cut-off score of two. Finally, Saxon Kivlahan, Doyle, and Donovan (2007) found that the ADS could distinguish symptom severity in those with DSM-IV diagnoses of alcohol dependence, but that it could not adequately identify physiological dependence or withdrawal.

Aside from concurrent and predictive validity and relationship to DSM criteria, recent studies have explored the specific items of the ADS using item characteristic curves and option characteristic curves in both alcohol-dependent patients with elevated depressive

symptoms (Kahler, Strong, Hayaki, Ramsey, & Brown, 2003a) and high-risk drinkers who had been arrested for violence and were court-mandated to a domestic violence intervention (Kahler, Strong, Stuart, Moore, & Ramsey, 2003b). In both studies, a unidimensional factor structure was found. In the dependent population, 12 of the 25 items that were highly correlated with the original scale showed good discrimination and were correlated with other measures of alcohol involvement. In the high-risk drinker sample, nine of the 25 items that were highly correlated with the original scale reliably discriminated between those without alcohol problems and those having symptoms of abusive or excessive drinking. Of the nine, many reflected hazardous and excessive drinking rather than specific dependence symptoms, indicating that in high risk samples these items may be more sensitive and preferable. This diverged from the results of Kahler et al. (2003a) in which the retained items were mostly dependence-related, indicating the measure's applicability may be population dependent. The findings of Kahler et al. (2003b) suggest that this measure may be good in treatment-seeking populations but, in less dependent populations, some questions may be less applicable and perceived more severely.

One group frequently researched with regard to problematic use is college students. How useful the ADS may be in assessing alcohol dependence in at-risk college drinkers is largely unknown. Alcohol misuse in 18- to 24-year-old college students is highly prevalent (Hingson, Wenxing, & Weitzman, 2009). This increase is accompanied by high rates of hazardous driving, rape, death from unintentional injury, and assault, while under the influence of alcohol (Hingson et al., 2009). Related, alcohol use disorders in college students are prevalent (24% males, 13% females; Slutske, 2005). College-attending young adults were significantly more likely to be diagnosed with a DSM-IV alcohol use disorder (18%) than their non-college-attending peers (15%) and significantly more likely to report certain symptoms of alcohol dependence, such as tolerance and spending a great deal of time getting, using, or recovering from the effects of alcohol (Slutske, 2005). Finally, collegiate alcohol misuse significantly predicts alcohol use disorders later in adulthood (Dick et al., 2010; Merline et al., 2008; O'Neill et al., 2001).

Given its generally strong psychometric properties and orientation as a continuous measure, the ADS may be a useful measure of alcohol-related problem severity in college students. However, as Kahler and colleagues (2003b) discovered when examining the ADS in another at-risk group, only certain questions may be particularly useful in discriminating between those with and without alcohol problems. Indeed, it is already being used in this capacity in empirical studies (e.g. MacKillop, Weinstein, & Lisman, 2007; Young et al., 2006; Williams & Ricciardelli, 1996). No studies have examined the factor structure of the ADS in a college sample, however, which is an important step of validating its use in this population. The objective of the current study was a validation of the factor structure of the ADS in a college drinking sample. It was hypothesized that the previously reported unidimensional factor structure would also be evident in collegiate heavy drinkers.

Method

Participants

This study is secondary analysis on data from four previously conducted laboratory studies on alcohol cue reactivity (MacKillop and Lisman, 2005, 2007, 2008; MacKillop et al., 2007). All four studies recruited heavy drinkers using posted advertisements at the State University of New York (SUNY) at Binghamton. The same enrollment criteria were used in each study. They required heavy alcohol consumption based on participant self-report responses on the Daily Drinking Questionnaire (DDQ) described below. Heavy drinking was defined as 20 or more standard drinks per week for males and 14 or more for females.

These criteria were based on demonstrated links to alcohol-related health problems (Dawson, 2000).

Data from three hundred and forty three individuals (67% male) were analyzed. Participants who already had participated in an alcohol study in the laboratory were excluded from participating again, thereby eliminating the potential of duplicate participant data across studies. There were no significant differences between the studies with regard to gender ($F = 1.95, p = 0.12$), DDQ drinks/week ($F = .44, p = 0.72$), or total ADS score ($F = 1.72, p = 0.16$). Subjects' ages ranged from 18 to 27, with a mean age of 20.81 years ($SD = 1.23$). Drinks per week ranged from 14 to 98 with male participants reporting drinking a mean of 34.21 ($SD = 13.52$; ~96%ile for 4-year college students, Meilman, Presley, & Cashin, 1997) standard drinks per week and female participants reporting a mean of 22.84 ($SD = 9.71$; ~99%ile for 4-year college students; Meilman, Presley, & Cashin, 1997).

Procedures

All study procedures were reviewed and approved by the Institutional Review Board. Following telephone screens, participants attended in-person sessions, completed informed consent, and questionnaires assessing demographics and other individual difference variables, including the ADS. All assessments were conducted individually in private laboratory rooms under neutral conditions.

Measures

Drinking Days Questionnaire (DDQ)—Average weekly alcohol consumption was assessed with the Drinking Days Questionnaire (DDQ; Collins, Park, & Marlatt, 1985). It is brief self-report measure in which retrospective drinking is reported by an individual by estimating average alcohol consumption for each day of the week during the last year. The retrospective time frame of one year was selected to correspond with the time frame in question on the ADS. The DDQ is a widely used measure that is face-valid and has been shown to have adequate psychometric properties (Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990).

Alcohol Dependence Scale (ADS)—The ADS is a 25-item multiple-choice questionnaire inquiring about the past 12 months and yielding scores from 0 to 47 which relate to increasing alcohol dependence severity. The suggested interpretation is that scores of 1-13 reflect a low level of alcohol dependence, marked by psychological rather than physical dependence; scores of 14-21 reflect moderate levels of alcohol dependence, marked by psychosocial problems related to drinking and psychological dependence with signs of physical dependence; scores of 22-30 reflect substantial levels of alcohol dependence, with physical dependence likely and physical and psychosocial problems probable; and scores of 31-47 reflect severe alcohol dependence, with physical dependence and physical disorders/medical problems likely. The measure was derived from the Alcohol Use Inventory (Horn et al., 1974).

Data Analysis

Confirmatory factor analysis (CFA) was initially used to test for a unidimensional factor structure. The factor structure was measured based on goodness of fit measured by chi-square (χ^2), Comparative Fit Index (CFI), Root Mean Square Residual (RMR), and Root Mean Square Error of Approximation (RMSEA) (Tomarken & Waller, 2005). A χ^2 test is used to determine whether there is a significant difference in the covariance of the proposed and observed matrices. Interpretation of χ^2 is that the lower the value, the better the fit to the model, with a non-significant chi-square indicating that the hypothesized factor structure closely resembles the actual factor structure (i.e., does not significantly differ). To control

for sample size, the ratio of chi-square to degrees of freedom was calculated, with value of < 2 being considered to reflect a good model fit (Byrne, 1989). The Comparative Fit Index (Bentler, 1990) compares the hypothesized model to the actual model using a correlational model with a perfect fit of 1.0. A value of >0.90 was used as the criterion for good fit (Ullman, 2001). The Root Mean Square Residual (RMR) corresponds to the average fit of residuals between the actual factor structure and the hypothesized one; the lower the RMR, the better the fit of the model, with a 0 value indicating no residual between the actual and hypothesized covariance matrices. An RMR value of <0.10 was used as the criterion of good fit (Marsh & Hocevar, 1985). The Root Mean Square Error of Approximation (RMSEA) refers to the discrepancy due to the estimation of random variables which are not directly observable (Brown & Cudeck, 1993). It will be zero only if the model fits exactly. However, RMSEA measures discrepancy per degrees of freedom so that adding additional parameters does not unduly influence the model. The RMSEA was calculated with 90% confidence intervals with small values reflecting smaller error of approximation and a better fitting model. Generally, values of ≤ 0.05 for RMSEA indicate a good model fit (Brown & Cudeck, 1993).

In the event that a unidimensional factor structure was not supported by CFA, the empirical factor structure was examined using exploratory factor analysis (EFA). Specifically, principal axis factoring (PAF) was used in order to identify the latent constructs underlying measured variables examining shared variance. Based on the recommendations of Russell (2003) and Fabrigar, Wegner, MacCallum, and Strahan (1999), an oblique Promax rotation with Kaiser Normalization was selected. Given the relatedness of items, it was considered probable that a multifactorial solution would have correlated factors, hence the oblique rotation to allow rotated factors to correlate with one another. The factor solution interpretation was based on several indices, including the observed scree plot discontinuity and factor proportions of variance, parallel analysis of a bootstrapped random dataset, and Velicer's (1976) minimum average partial (MAP) tests (O'Connor, 2000). Parallel analysis identifies factors that account for more variance than found when deriving components from random data using identical parameters, including the number of cases (343) and the number of variables (25). The MAP test determines the optimal numbers of components by partialing out all possible components from the variables of interest and then looking at the remaining unsystematic variance that corresponds to each possible solution. The number of components which generates the smallest average squared correlation is chosen as the best factor solution because it has the smallest amount of unaccounted for unsystematic variance. Items were considered to significantly load on a factor based on a pattern matrix loading of $\geq .30$. This value was determined based on previous work establishing $.30$ as the cutoff for medium/modest correlations rather than statistical significance (Cohen, 1988). To further characterize the data, Pearson's product moment correlations were examined between drinks/week and the latent factors, and proportionate endorsement of the ADS items were generated to examine the absolute magnitudes of responding. All analyses were conducted using AMOS 18.0 and SPSS 17.0.

Results

Participants yielded a mean ADS score of 12.01 (SD= 5.06) ranging from 1 to 33. Confirmatory factor analysis did not identify a unidimensional factor structure as previously reported (Skinner & Allen, 1982; Kahler et al., 2003a, 2003b) based on three of the four goodness-of-fit indices: χ^2 (275, $N=343$) = 730.81; $p < 0.001$ and the χ^2 ratio was 2.66; RMR = 0.20; CFI = 0.60. Of note, the RMSEA = 0.07 (CI = 0.06-0.08), is within a reasonable error of approximation but does not indicate a close fit (≤ 0.05).

Because a single-factor structure was not evident in this sample, an EFA was conducted to identify the optimal number of factors to retain. Based on the observed scree plot discontinuity and proportions of variance, a two-factor solution appeared to be most interpretable. The MAP test found the smallest average squared correlation after component extraction to be .010, which also corresponded to a solution with two components. Parallel analysis comparing the eigenvalues of random data to the eigenvalues found during the PAF indicated that the eigenvalues of the first three factors were larger than the corresponding first three 95th percentile random data eigenvalues ($4.1 > 1.6$; $2.0 > 1.5$; $1.5 > 1.4$). The fourth eigenvalue from the actual data was not greater than the fourth 95th percentile random data eigenvalue ($1.4 = 1.4$). Thus, parallel analysis suggested a three factor solution. However, per O'Connor (2000), optimal decisions should consider the results of both parallel analysis and MAP. As parallel analysis tends to err in the direction of overextraction and because the third eigenvalue of the actual data (1.5) was only slightly larger than that of the random data (1.4), a two factor solution was determined to be the most appropriate.

Within a two factor solution, the cumulative variance explained by the two factors was 18.5% and 10 of the 25 items did not load on either factor. Factor loading of the ADS items for the first two factors can be shown in Table 1. The most prominent factor explained 13.5% of the variance at extraction and was named “Acute Excessive Drinking” as most of the items related to consuming large amounts of alcohol and associated consequences such as hangovers, passing out, and blackouts (loss of memory). The second factor explained 5% of variance at extraction and was labeled “Severe Withdrawal Symptoms” as many of the items reflected psychoperceptual withdrawal characteristics such as visual and auditory hallucinations. The two factors were moderately positively correlated with one another $r = .45$; however, only the first factor was associated with drinks/week (Factor 1: $r = .30$, $p < .001$; Factor 2: $r = .06$, $p = .24$). The first factor, Acute Excessive Drinking, had a relatively high mean proportionate endorsement of 32% of factor maximum across the ten items, compared to the second factor, which had a mean proportionate endorsement of 8% across the five items.

Discussion

The results of this study do not support a unidimensional factor structure of the ADS in a heavy drinking college population. The 25 items on the ADS did not aggregate together to support a single factor, but appeared to have a two factor structure with ten items loading on neither factor. Because two factors are present, similar scores may in fact represent very different pictures of dependence by drawing from different factors. As a result, the lack of support for undimensionality and the inutility of ten items contraindicates the use of the use of ADS in this cohort.

With regard to the specific factors observed, the first factor, termed “Acute Excessive Drinking,” comprised ten items ($\alpha = .72$) that reflect common themes of excessive alcohol use and negative consequences within and immediately following an episode. Specifically, these items assess the level of intoxication, frequency of intra-episode memory impairment (“blackouts”) and loss of consciousness (“passing out”), frequency of severe hangovers, and diminished control over drinking. The second factor, termed “Severe Withdrawal Symptoms,” comprised five items ($\alpha = .66$) that all reflected severe withdrawal symptoms, including hallucinatory experiences, “weird or frightening experiences,” and seizures. It has been suggested that youth may endorse experiencing withdrawal symptoms because they are confusing binge drinking and its ramifications, in particular, physiological reactions following excessive alcohol consumption, with the features of an actual withdrawal syndrome (Caetano & Babor, 2006). In addition, it is also possible that students endorsed withdrawal symptoms of perceptual disturbances as a result of using other substances, such

as cannabis or psychostimulants, while intoxicated, again mistakenly endorsing items designed to measure features of a withdrawal syndrome rather than poly-substance use. Therefore, the second factor of severe withdrawal symptoms may not be providing particularly useful information in this cohort and does not meet the rule of thumb standard for acceptable internal consistency of $>.7$ (George & Mallery, 2003). Ten items did not load on either of the two factors, indicating limited latent overlap and suggesting they are largely inapplicable to the drinking practices and experiences of collegiate heavy drinkers.

Further insight into the factor structure of the ADS in this sample can be gained by considering the associations between the factors, their association with drinking behavior, and the proportionate level of response. First, the two factors were moderately correlated with each other, indicating that as excessive alcohol use and its consequences reflected in Factor 1 increased, there was a general increase in the probability of experiencing severe withdrawal symptoms reflected in Factor 2. Second, of the two factors, only the first was significantly correlated with alcohol use, suggesting only that factor reflected the common consequences of increasing volumetric consumption. Third, with regard to the frequency of endorsement, participants had a high mean proportionate endorsement of the items on Factor 1 relative to the mean proportionate endorsement of the items on Factor 2 (32% vs. 8% of mean item maxima). That is, the behaviors and consequences of Factor 1 tended to be relatively common within the sample but severe withdrawal items were highly infrequent. Taken together, these relationships suggest that individuals who are high on Factor 1 are also more likely to be higher on Factor 2, but only Factor 1 was associated with drinking level.

In previous studies of the factor of the ADS, a unidimensional factor structure has generally been reported (Skinner & Allen, 1982; Kivlahan et al., 1989; Hodgins & Lightfoot, 1989). One possible reason for why the factor structure did not hold in a heavy drinking college sample may be related to reported ADS correlations with social desirability. In initial studies of internal factor structure, the ADS correlated strongly ($r = -.51$) with tendency to report socially desirable characteristics about one's self (Skinner & Allen, 1984). In this factor solution, it may be the case that items on the first factor are symptoms that may be more normative and condoned in college culture, and, therefore, are more likely to be reported. The undesirability of more severe symptoms may result in underreporting thereby excluding these items from being useful and relevant. Furthermore, Slutske (2005) noted that certain symptoms are not as noticeable against the backdrop of the college environment because of the buffer the environment may provide against certain alcohol-related problems, also noting that college students were less likely than their non-college peers to report withdrawal symptoms. Additionally, in a separate study of alcohol abusers, it was found that nondaily drinkers had higher ADS scores than daily drinkers (Wood, Sobell, Sobell, Dornheim, & Agrawal, 2003). This may be the result of nondaily drinkers' perception of a greater degree of loss of control of their behavior due to less consistent drinking, whereas daily drinkers are less able to contrast drinking and nondrinking days. A similar pattern may also be true in this sample in which those who drink more regularly and heavily perceiving themselves as more in control of their behavior than peers who drink less regularly. Given these reasons for possible under-reporting, selective reporting, or unique reporting of symptoms, biased responding may be partially responsible for the distinct factor structure found in this study.

Aside from a possible role of social desirability, other studies have found similar patterns of reporting in those who are not presenting for treatment including veterans with alcohol-related medical problems. Similar to the present sample, a group of male veterans who had not presented for assessment or treatment of alcohol problems, yet had medical illnesses related to alcohol use had much lower ADS scores than expected (Willenbring & Bielinski,

1994). This could possibly be attributable to either a lack of insight into their drinking habits or, again, a reluctance to disclose undesirable behavior (Willenbring & Bielinski, 1994).

More specifically, according to Kahler et al. (2003b), when focusing on the items themselves, many ADS questions read as too severe and were not useful in discriminating among levels of alcohol involvement. It was suggested that the items focused on excessive drinking were most important and these items may be preferable when using non-clinical samples. These findings are consistent with the current study in which it seemed that the severe psychoperceptual withdrawal symptoms separated to form an independent factor.

An implication of the current study is that other measures may be more appropriate for use in college samples. For example, the Alcohol Use Disorders Identification Test (AUDIT) has been psychometrically validated in college students (Aertgeerts et al., 2000) and numerous other samples. In addition, within college samples, other measures of alcohol problem severity that assess more common psychological, social, and physical consequences may be more appropriate. These include the Young Adult Alcohol Problems Screening Test (YAAPST; Hurlbut & Sher, 1992) and Young Adult Alcohol Consequences Questionnaire (YAACQ; Kahler, Strong, & Read, 2005; Read, Kahler, Strong, & Colder, 2006). These questionnaires may assess more relevant elements of problematic alcohol use in college students.

Although this study has a number of strengths, such as sample size and high level of drinking among the participants, several limitations should also be noted. One limitation was lack of inclusion of a measure of social desirability. Future studies may wish to see to what degree desirability influenced responding. In combining the data from multiple studies, no systematic differences across the studies on any study variables were found. Nonetheless, it is possible that differences existed on an unmeasured variable. Additionally, another limitation of this study is it is difficult to interpret the actual levels of dependence within this sample because no alternative definitive criterion measure was used. Other measures of dependence may have been useful in comparing ADS self-report to other assessment tools measuring dependence. Finally, the objective of the current study was a validation of the factor structure of the ADS in a college drinking sample. Therefore, this paper is only one part of a psychometric validation and does not include any information on validity. For these reasons, these findings are useful in suggesting caution when evaluating alcohol dependence syndrome in an at-risk college sample using the ADS, but should not be considered definitive. It also should be noted that this study included only college student heavy drinkers who were consuming at levels associated with alcohol-related problems. Therefore, these findings may not be generalizable to college students drinking at lower levels.

In summary, the current study does not support the ADS for use in a college sample insofar as it did not confirm the previously reported unidimensional factor structure. Instead, responses on the ADS coalesced into two factors reflecting excessive alcohol use (with relatively high frequency of endorsement) and psychoperceptual withdrawal experiences (with relatively low frequency), although a number of items appeared to be of generally low relevance. This suggests that assessments of severity of alcohol problems in this sample may not be reliable and other measures, such as the AUDIT, YAAPST, or YAACQ are more appropriate to validly characterize alcohol misuse among college students. Future work may wish to explore using the ADS items of predominant first factor as a stand-alone brief scale for college students, as it may be useful for researchers interested only in measuring alcohol dependence rather than some of its correlates.

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Table 1**Alcohol Dependence Scale (ADS) Item Factor Loadings**

ADS Question	Factor Loadings		Mean % Endorsement	
	AED	SWS	AED	SWS
1. How much did you drink the last time you drank?	.335	.003	48.7%	
2. Do you often have hangovers on Sunday or Monday morning?	.386	.011	43.2%	
3. Have you had the “shakes” when sobering up (hands tremble, shake in side)?	.340	.121	15.6%	
4. Do you get physically sick (e.g. vomit, stomach cramps) as a result of drinking?	-.004	.147		
5. Have you had the “DTs” (delirium tremens) - that is, seen, felt or heard things not really there as a result of drinking?	-.062	.702		7.4%
6. When you drink do you stumble about, stagger and weave?	.233	.231		
7. As a result of drinking, have you felt overly hot and sweaty (feverish)?	.148	.248		
8. As a result of drinking, have you seen things that were not really there?	-.151	.695		5.0%
9. Do you panic because you may not have a drink when you need it?	.317	-.100	4.7%	
10. Have you ever had blackouts (loss of memory without passing out) as a result of drinking?	.690	.013	31.6%	
11. Do you carry a bottle with you to keep it close at hand?	.267	-.007		
12. After a period of abstinence (not drinking), do you end up drinking heavily again?	.479	.186	51.3%	
13. In the past twelve months, have you passed out as a result of drinking?	.551	.019	51.0%	
14. Have you had a convulsion (fit) following a period of drinking?	-.032	.347		3.2%
15. Do you drink throughout the day?	.250	-.018		
16. After drinking heavily, has your thinking been fuzzy or unclear?	.190	.163		
17. As a result of drinking have you felt your heart beating rapidly?	.137	.232		
18. Do you constantly think about drinking and alcohol?	.248	.163		
19. As a result of drinking, have you heard things that were not really there?	-.056	.654		10.5%
20. Have you ever had weird or frightening sensations when drinking?	.111	.381		14.4%
21. As a result from drinking, have you “felt things” crawling on you that were not really there (e.g., bugs, spiders)?	-.129	.273		
22. Duration of blackouts (loss of memory):	.582	-.048	39.2%	
23. Have you tried to cut down on your drinking and failed?	.410	-.111	11.8%	
24. Do you gulp drinks (drink quickly)?	.253	-.067		
25. After taking one or two drinks, can you usually stop?	.345	-.086	24.8%	
Mean proportionate endorsement by factor			32.2%	8.1%

Note. Factor loadings > .30 are in bold face. ADS= Alcohol Dependence Scale; AED= “Acute Excessive Drinking” Factor; SWS= “Severe Withdrawal Symptoms” Factor. Mean percent endorsement of each of the 15 items which loaded > .30 are shown.