

# Development and Validation of the College Drinking Influences Survey

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**Abstract. Objective:** The authors developed and validated measures of college drinking expectations, psychosocial influences, and values. **Participants:** Freshmen at college entry ( $N = 320$ ) and the end of freshman year ( $N = 420$ ) participated. **Methods:** The College Drinking Influences Survey, administered in paper and Web-based versions, consists of 3 distinct scales: (1) the College Drinking Expectations Scale assesses expectations for drinking norms and consequences; (2) the Psychosocial Drinking Inventory evaluates social influences, stress, and sensation seeking; and (3) the Drinking Values Scale assesses drinking decisions based on personal choice, social responsibility, and institutional obligation. **Results:** Factor analysis, interitem reliability, and correlations with existing instruments demonstrated validity and reliability. Differences between the sexes were in predicted directions, and multiple regression using subscale scores as predictors accounted for significant variance in drinking behaviors across the freshman year. **Conclusions:** Data support the usefulness of the scales for identifying student alcohol risk and protective factors.

**Keywords:** alcohol, assessment, college health

An estimated 80% to 90% of all underage college students drink alcohol,<sup>1</sup> and estimates of the college rate for alcohol abuse have been as high as 40%, with at least 1 in 12 students meeting criteria for full alcohol dependence.<sup>2,3</sup> As a direct result of dangerous drinking, 1,400 students aged 18–24 years die every year, half a million are injured, more than 600,000 are physically assaulted, and more than 70,000 are victims of drinking-related sexual assault.<sup>4</sup>

College *binge drinking* (5 or more drinks at one sitting) is also increasing.<sup>5,6</sup> Binge drinking alters perceptions, impairs judgments, and lowers inhibitions. Those who engage in binge drinking are more likely to engage in unprotected and unplanned sexual activity, vandalism, harassment, and assault. Their behaviors also affect nondrinking students by interfering with their studying and exposing them to assault

and harassment.<sup>7</sup> College freshmen are particularly vulnerable to binge drinking.<sup>8,9</sup> Freshman year marks a developmental transition to new responsibilities and freedoms in the absence of a well-established network of social support. As students struggle to adjust to the newfound freedoms of living away from home, the pressure to acculturate to perceived campus drinking norms can increase alcohol-related risk behaviors. In response to these disturbing statistics, the US Department of Health and Human Services set the goal in *Healthy People 2010* to reduce binge drinking among college students from 39% to 20% by the year 2010.<sup>10</sup>

## Factors Influencing College Drinking

Researchers have sought to understand why college students use alcohol in excessive quantities, despite the considerable risks to self and others. Social cognitive models that link drinking behaviors to alcohol expectancies, social and emotional influences, and social–moral reasoning about alcohol provide a fruitful framework for developing assessment instruments that can predict drinking risk and evaluate alcohol programs during the freshman year. Our purpose in this study was to develop a set of psychometrically sound scales to measure baseline college entry and end-of-freshman-year drinking expectations, alcohol-related psychosocial characteristics, and moral values governing drinking choices. In this section, we review the background literature used to develop the scale.

### College Drinking Expectations

Misperceptions about campus drinking norms are widespread and influence students' drinking choices.<sup>9</sup> Results from the American College Health Association–National College Health Assessment revealed that 17.5% of students reported never using alcohol and 1.8% thought the typical student was nondrinking.<sup>1</sup> High expectations of campus drinking are associated with high-risk drinking, even when these perceptions are erroneous.<sup>11–13</sup> Observing other students drinking at the beginning of freshman year often conveys social tolerance and social acceptance for underage drinking.<sup>14</sup>

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Students' expectations regarding the consequences of alcohol consumption also have been associated with drinking choices. Adolescents who believe alcohol has few negative and many positive outcomes are more likely to drink.<sup>15</sup> Despite knowledge of or experience with alcohol-related risks, college students often emphasize the positive benefits of drinking, including expectations that drinking relieves stress and enhances one's social network, romantic relationships, and illusion of personal control.<sup>16,17</sup>

#### Psychosocial Drinking Influences

Susceptibility to social pressure, stress-related coping responses, or a disposition of sensation seeking combined with availability of alcohol on campus also influence student drinking choices. Peers, resident advisors, and parents can exert significant influence on college drinking choices.<sup>18,19</sup> Peer pressure associated with convivial drinking (eg, in social groups, during partying) and intimate drinking (eg, dating, sexual situations) is predictive of alcohol-related social problems.<sup>11,20</sup> Resident assistants (RAs), who live in the dorms and are usually undergraduates themselves, are the frontline workers in the university's efforts to enforce alcohol prohibitions. Rubington<sup>21</sup> hypothesized that some residence life staff actually condone drinking, as long as it is not done in plain sight. RAs' failure to communicate a consistent message discouraging drinking on and off campus has been associated with students' lack of confidence in their ability to refuse alcohol.<sup>22</sup> Parental alcohol behaviors and attitudes also play a role in shaping college norm expectations and drinking behaviors.<sup>23,24</sup> Nucci, Guerra, and Lee<sup>25</sup> found that high school students viewed parents among the few individuals who could legitimately interfere or regulate alcohol and drug usage.

#### Intrapersonal Influences

Living in campus dormitories presents a wide range of adjustments for freshmen, from acclimating to the rigors of academic life to the pressure of making new friends and adjusting to a new living situation.<sup>26</sup> Psychological dispositions may make some freshmen particularly vulnerable to alcohol consumption risks during the transition to college. For example, data are mixed on the extent to which the positive and negative outcome expectations described previously increase frequency of college drinking. Individual differences in student drinking expectations and susceptibility to social pressures may be explained in part by a subset of college students who drink as a coping mechanism in response to academic and social pressure or students who are motivated to drink because of the risk of negative outcomes.

*Stress Reduction.* The transition to college can lead to new or exacerbate previous sources of academic-, interpersonal-, or family-related emotional distress.<sup>27</sup> For some students, academic anxiety may be associated with a cluster of stressful life events, such as family/roommate conflict and more

general anxiety symptoms.<sup>28</sup> Some students consume alcohol to cope with difficult life events.<sup>27,29</sup> Kieffer, Cronin, and Gawet<sup>30</sup> found that college students who experienced academic distress were more likely to report drinking for tension reduction than for social camaraderie or mood enhancement. Some have argued that the frequent use of alcohol to *self-medicate* (ie, relieve stress) may be more characteristic of individuals suffering from anxiety disorders,<sup>31</sup> although Degenhardt and Hall<sup>32</sup> proposed that heavy drinking may increase such symptoms.

*Sensation Seeking.* Risk-taking or sensation seeking is proposed to reflect a generalized set of attitudes associated with frequency of college drinking and alcohol abuse.<sup>33,34</sup> Risk takers tend to be impulsive, see risky behaviors as fun, and choose actions that could produce harmful outcomes, regardless of their awareness of risks.<sup>35</sup>

#### Drinking Values

College drinking choices also may depend on socio-moral reasoning. For example, Slicker<sup>36</sup> found that light drinkers cited religious and moral reasoning, whereas heavy drinkers cited financial reasons (eg, too expensive) related to their decision to drink.

*Personal Choice vs Responsibility.* Research suggests that students who characterize substance use in moral terms (eg, right or wrong) are less likely to consume alcohol than are those who classify it as a matter of personal choice.<sup>37</sup> Students who believe that drinking choices are solely a reflection of their personal autonomy drink more than students who believe drinking choices must be based on a consideration of the consequences for self and others.<sup>25</sup> Haemmerlie, Montgomery, and Cowell<sup>38</sup> reported that frequent binge drinkers were more likely to consider personal choice and lack of rules against drinking (eg, being away from family, ease of alcohol procurement) in their alcohol use decisions, whereas light drinkers were more likely to consider risks to self and others.

*Institutional Obligations.* Students' socio-moral reflection also may reduce college drinking if they focus on the reasons for institutional rules prohibiting underage drinking. One impediment to institutional influence is the relative ease with which underage students can purchase alcohol off campus.<sup>39</sup> Another is failure of residence life staff to consistently enforce and provide a rationale for drinking rules. Johnsson and Berglund found that educating residence staff about the consequences of drinking had a trickle-down effect that reduced student alcohol use as well as the "rowdy social atmosphere."<sup>40(p632)</sup>

#### Study Objective

As college leaders strive to administer and evaluate freshman alcohol-prevention programs, there is a need for a brief yet comprehensive instrument that can facilitate a comparison of baseline freshman entry and end-of-freshman-year

data across a wide spectrum of drinking-related expectations, psychosocial characteristics, and values. A number of national surveys on college student health behaviors and instruments targeting on alcohol consumption behaviors and attitudes have significantly contributed to the identification of factors contributing to college drinking choices. However, they have limited use for residential alcohol-prevention program evaluations primarily because of length, coverage of a wide range of health behaviors, or focus on primarily one aspect of student alcohol consumption influences. Our goal in this study was to develop and validate instruments that could assess change and stability in drinking influences from the beginning to end of the freshman year.

## METHODS

### Development of the College Drinking Influences Survey

The College Drinking Influences Survey (CDIS) is composed of 3 independent scales measuring 3 distinct influences on student drinking choices: drinking expectations, psychosocial influences, and drinking values. We formed the initial pool of 85 items from the literature summarized previously and related measures on contextual, social, individual, and moral influences on college drinking. We added, deleted, and modified items after evaluating reviews of progressive iterations by small groups of college students. We constructed items and response choices representing each of these domains into the following 3 independent scales.

#### College Drinking Expectations Scale

The College Drinking Expectations Scale (CDES) included 16 initial statements representing 2 categories of drinking expectations. We adapted Drinking Norms statements from the Core Alcohol and Drug Survey,<sup>41</sup> which reflected views that drinking on and off campus is a normal part of college life. Drinking Consequences statements described negative consequences of drinking on physical safety, health, grades, and personal relationships. On a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), students responded to items such as “Most college students drink alcohol in the dorms” (Drinking Norms) and “Drinking could affect my studying and lower my grades” (Drinking Consequences).

#### Psychosocial Drinking Inventory

The Psychosocial Drinking Inventory (PDI) consisted of 51 initial items reflecting 3 domains of inter- and intrapersonal drinking influences: social influences, stress reduction, and sensation seeking. We adapted some of the items from previously developed instruments (ie, the Drinking Context Scale<sup>42</sup> and the Situational Confidence Questionnaire<sup>43,44</sup>). Using a 5-point Likert-type scale ranging from 1 (*extremely unlikely to drink*) to 5 (*extremely likely to drink*), students rated how likely they were to drink in response to different situations. One set of items described social situations related to peer drinking behaviors, parental attitudes toward student drinking, and RA enforcement of alcohol prohibitions. A second category assessed how likely

students were to drink in response to stressful life events, such as academic failure, peer rejection, or family conflict. We designed a final group of items to tap sensation seeking by assessing how likely students were to drink in situations in which they knew alcohol would increase risk of physical or sexual assault, social stigma, or engagement in health-compromising behaviors.

#### Drinking Values Scale

The 19 initial items on the Drinking Values Scale (DVS) represented 3 value approaches to college drinking decisions: responsibility, personal choice, and institutional obligations. We adapted some of the items from the Substance Use Behavior Rating Scale and the Social Values Inventory.<sup>25,37</sup> On a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), students responded to items such as “It is wrong to drink excessively” (Responsibility), “An occasional alcoholic drink is OK for anyone who enjoys it” (Personal Choice), and “Rules about drinking on campus are meant to protect students” (Institutional Obligations).

#### Demographics

A separate section at the beginning of the survey assessed basic demographic information and contained questions related to specific drinking behaviors, including average number of drinks per week, number of occasions alcohol was consumed in the past year, and number of times one had 5 or more drinks in one sitting (binge drinking).

#### Standardized Measures for Validation

##### Alcohol Expectancy Questionnaire

We administered the Alcohol Expectancy Questionnaire (AEQ)<sup>45</sup> at both baseline and end-of-semester testing periods. The AEQ is an empirically derived 90-item assessment designed to evaluate the degree to which individuals expect various consequences of alcohol use. The 6 subscales derived from factor analysis have been shown to predict alcohol behaviors. The AEQ is also high in test-retest reliability and internal consistency ( $\alpha = .70-.90$ ).<sup>45</sup>

##### The Resident Study: Association of College and University Housing Officers International and Educational Benchmarking, Inc

The Association of College and University Housing Officers International/Educational Benchmarking, Inc, survey (EBI) is a standardized 81-item survey that gauges residential students' satisfaction with university staff and services and to gather demographic information about the residents.<sup>46</sup> The university administered the EBI in November 2005. We used 3 EBI questions specifically related to drinking behavior as indicators of predictive validity.

##### Core Alcohol and Drug Survey

We administered the Core Alcohol and Drug Survey (Core),<sup>41</sup> a 39-item standardized instrument, in late spring 2006. The Core has strong psychometric properties and covers 12 main content areas that include demographics, grade point average, percep-

tion of campus substance abuse policies, frequency of drinking, frequency of binge drinking, use of other drugs, age at first use, perceptions of others' use, location of use, consequences of use, family history of substance use problems, and preference for the presence or absence of drugs and alcohol on campus ( $\alpha = .56-.91$ ).<sup>41</sup>

### Participants

We administered the CDIS twice to freshmen aged 18 or older ( $M$  age = 19 years) attending a private urban university during the 2005–2006 academic year. We obtained baseline measures during the first 2 weeks of the fall semester from 320 (64% of eligible students) incoming college freshmen who had just moved into 1 of 2 freshman dorms. We conducted end-of-semester testing in April with 420 students (190 of these students had participated in the fall testing, thus allowing for test–retest reliability). At both testing points, the sample demographics reflected those of the incoming freshman class in sex (60% female), religion (68% Roman Catholic, 27% non-Catholic Christian, 2% Jewish, 3% other), and ethnicity (79% non-Hispanic white, 5% Hispanic, 3% African American, 3% East or South Asian, 10% other).

### Procedure

The university's institutional review board approved the project, and we obtained informed consent from all participants. We also obtained a Public Health Service Certificate of Confidentiality. At the beginning of the fall semester, we administered a paper-and-pencil version of the survey to students in groups in a large university auditorium and classroom. In the spring, the study was advertised to freshmen through posters and e-mail blasts. Students could take the paper-and-pencil format or complete the survey on a secure Web site. We gave students a \$20 Barnes & Noble gift card for completing the fall survey and a \$25 Barnes & Noble gift card for the spring survey.

## RESULTS

### Drinking Behavior

Descriptive analysis revealed that in the fall, the majority of students had drinking experiences prior to entering college: 10% stated they did not drink, 74% reported they had begun drinking with peers between the ages of 14 and 17 years, 23% reported they had never been drunk, and 40% and 37% rarely or usually got drunk, respectively. Although the majority (63%) considered themselves social drinkers, 44% reported binge drinking once or twice during the past month (ie, prior to entering college) and 37% reported drinking 3–9 times during that month. Men reported significantly more binge drinking: 28% of men vs 11% of women reported bingeing 6 or more times a month,  $\chi^2(5, N = 269) = 20.41, p = .001$ . Half of the students reported drinking at least 4 drinks per week (range = 0–55), with men reporting an average of 7 drinks compared with women's 5-drink average,  $t(282) = 2.97, p = .003$ .

At year's end, the percentage of students reporting they did not drink remained consistent (9%); 70% drank on more than

10 occasions. Reports of getting drunk increased slightly from the beginning of freshman year: 16% reported they never got drunk; 35% and 49% rarely or usually got drunk, respectively; and 65% continued to consider themselves social drinkers. The majority of students reported binge drinking (85% of men and 82% of women), and 37% and 39% reported binge drinking during the past month 1–2 or 3–9 times, respectively. Half of the students reported drinking at least 4 drinks per week (range = 0–55), with men reporting an average of 9 drinks compared with women's 5-drink weekly average,  $t(398) = 4.13, p < .001$ . During the school year, 145 students (27% of those participating in the surveys) had been found in violation of the campus alcohol prohibitions.

### Analytic Plan

We used a multistep process to analyze the psychometric properties of each scale. First, we conducted factor analysis to verify the grouping of items into meaningful subscales at both precollege and end-of-semester administrations. We then assessed interitem reliability of each subscale and looked at test–retest reliability for those students who completed both baseline and end-of-year surveys. Because each subscale yielded good reliability, we further evaluated validity through tests of predicted relationships between subscales and scores on the AEQ and between subscales and reported drinking behaviors at several time points.

### Factor Analysis: Construct Validity

Our main goal was to develop and validate instruments that could assess change and stability in drinking influences from the beginning to end of the freshman year. Thus, we wanted to select scales that had psychometric validity at entry into college (T1) and completion of the freshman year (T2). For each of the 3 scales, we conducted separate exploratory factor analyses at T1 and T2 using varimax rotation with mean replacement for missing data. We kept items if they yielded an eigenvalue of at least .40 and loaded on the same factor across both T1 and T2 analyses. Tables 1–3 show the items that were maintained, their loading values, and measures of sampling adequacy and sphericity.

As anticipated, factor analyses on the CDES produced a 2-factor solution (variance explained was 40% and 44% at T1 and T2, respectively). We labeled factor 1 "Drinking Norms," which included 5 items indicating drinking was expected to be a normal part of college life. We labeled factor 2 "Drinking Consequences," which included 7 items indicating drinking was expected to lead to negative physical, social, and academic consequences. Test–retest reliability was significant at  $p < .01$  for Drinking Norms ( $r = .46$ ) and Drinking Consequences ( $r = .41$ ).

Factor analyses on the PDI yielded a 3-factor solution (variance explained was 53% and 56% at T1 and T2, respectively). The first factor, labeled "Social Influences," was composed of 10 items describing the influence of peers, parents, and resident life staff on drinking decisions.

**TABLE 1. Factor Loadings for College Drinking Expectations Scale (CDES) Items at College Entry (T1) and End of Freshman Year (T2)**

CDES item	Drinking		Consequences	
	T1 <sup>a</sup>	T2 <sup>b</sup>	T1 <sup>c</sup>	T2 <sup>d</sup>
Drinking is a normal part of college life.	.78	.76		
I came to college expecting I would drink alcohol off campus.	.76	.73		
I came to college expecting I would drink alcohol on campus.	.76	.74		
Most college students drink alcohol off campus.	.55	.59		
Most college students drink alcohol in the dorms.	.51	.62		
Drinking might lead to injury to myself or others.			.78	.75
Drinking could affect my studying and lower my grades.			.70	.74
If I drink, I may do things I would not ordinarily do.			.66	.60
If I drink, I may do things that would get me in trouble.			.65	.63
Drinking is unhealthy.			.60	.63
Drinking by other students can put me at risk for physical/sexual assault.			.60	.64
Drinking by other students can affect my study.			.50	.69

Note. Kaiser-Meyer-Olkin measure of sampling adequacy at T1 = .704; at T2 = .726. Bartlett's test of sphericity at T1 = 1,069 ( $df = 66$ ),  $p < .001$ ; at T2 = 1,635 ( $df = 66$ ),  $p < .001$ .

<sup>a</sup>eigenvalue = 2.37,  $\alpha = .72$ .

<sup>b</sup>eigenvalue = 2.88,  $\alpha = .75$ .

<sup>c</sup>eigenvalue = 3.15,  $\alpha = .72$ .

<sup>d</sup>eigenvalue = 3.29,  $\alpha = .80$ .

Ten items on the second factor, labeled "Stress Reduction," endorsed drinking as a response to distress or anxiety related to dating, friendship problems, academic failure, and family conflict. The final factor, labeled "Sensation Seeking," included 12 items endorsing drinking behavior if it increased the likelihood of risk associated with drinking (eg, disturbing others, taking sexual risks, starting fights or arguments). Test-retest reliability was significant at  $p < .01$  for Social Influences ( $r = .70$ ), Stress Reduction ( $r = .51$ ), and Sensation Seeking ( $r = .49$ ).

Factor analyses on the DVS produced a 3-factor solution (variance explained was 47% and 50% for T1 and T2, respectively). We labeled factor 1 "Responsibility," and it included 3 items indicating it was wrong to drink because of negative consequences for self and others. The second factor was labeled "Personal Choice" and included 4 items that described drinking as a personal decision. The third factor, labeled "Institutional Obligations," included 3 items reflecting a valuing of the reason for university rules prohibiting drinking. Test-retest reliability was significant at  $p < .01$  for Responsibility ( $r = .46$ ), Personal Choice ( $r = .38$ ) and Institutional Obligations ( $r = .55$ ).

### Reliability

On the basis of the factor analyses, we grouped items into 8 subscales; Tables 1–3 show interitem and test-retest reliabilities. Each subscale yielded good interitem reliability ( $\alpha = .71$ –.94). Correlations between T1 and T2 subscale scores for students who participated in both phases yielded evidence of test-retest reliability ( $r = .38$ –.70,  $p < .001$ ).

### Concurrent Validity

We evaluated concurrent validity by testing hypothesized relationships (a) among subscale scores, (b) between subscale scores and the AEQ subscales, and (c) between subscale scores and self-reported drinking behaviors at T1 and T2. As illustrated in Table 4, the data supported the predicted positive relationships among subscales measuring drinking risks (Drinking Norms, Social Influences, Sensation Seeking, Stress Reduction, Personal Choice) and among those measuring college drinking protective factors (Drinking Consequences, Responsibility, Institutional Obligations) and negative associations between risk and protective factors scales.

We predicted that higher scores on Drinking Norms, Social Pressure, Stress Reduction, Sensation Seeking, and Personal Choice (indicating increased likelihood to drink) would be positively correlated with AEQ subscales previously associated with high levels of college drinking, including social, sexual, arousal, and relaxation as well as self-reported drinking behaviors at T1 and T2. We also predicted that higher scores on expected Drinking Consequences, Responsibility, and Institutional Obligations would be positively correlated with AEQ scales associated with lower levels of drinking (eg, cognitive deficits, deteriorative effect of alcohol) and negatively correlated with self-reported drinking behaviors at T1 and T2. As indicated in Table 5, the direction of these predictions was confirmed, and in most instances, the correlations were significant.

**TABLE 2. Factor Loadings for Psychosocial Drinking Inventory (PDI) Items at College Entry (T1) and End of Freshman Year (T2)**

PDI item	Social Influences		Stress Reduction		Sensation Seeking	
	T1 <sup>a</sup>	T2 <sup>b</sup>	T1 <sup>c</sup>	T2 <sup>d</sup>	T1 <sup>e</sup>	T2 <sup>f</sup>
If I were at a party and other people were drinking	.86	.83				
If I were out with friends and they stopped by a bar for a drink	.82	.84				
If I were at a restaurant and the people with me ordered drinks	.81	.75				
If someone I was interested in dating asked me to go for a drink	.79	.78				
If I were at a party where most people were older than me	.76	.72				
If friends were talking about how good a new drink tasted	.74	.70				
If my date was drinking	.73	.75				
If drinking-associated violations were not always reported or enforced on or off campus	.70	.73				
If my parents and I had often discussed the risks of drinking at college	.64	.65				
If my friends brought a 6-pack into my room	.63	.64				
If I were angry			.79	.81		
If I were feeling depressed			.75	.83		
If I felt I had let myself down			.75	.72		
If other people were treating me unfairly			.73	.72		
If other students did not seem to like me			.72	.72		
If I were worried about family problems at home			.71	.75		
If I felt my professors were too demanding			.67	.76		
If I had an argument with my roommate			.66	.67		
If my grades were poor despite my efforts			.62	.72		
If I had trouble sleeping			.46	.62		
If there were a risk that my money would be stolen if I got drunk					.76	.73
If there were a risk that I might be sexually or physically assaulted if I got drunk					.74	.79
If the neighborhood bars would prevent other students from drinking if I behaved in a drunken manner					.73	.73
If my friends would get in trouble if I brought alcohol into their room					.72	.71
If I knew that when I drink, I get very loud in a way that disturbs others					.72	.68
If violations associated with drinking (such as vandalism, fighting, or DWIs) would be placed in my permanent school record					.69	.59
If there were a chance I would take sexual risks when I got drunk					.67	.70
If I knew I sometimes start fights or arguments with my friends when I drink					.66	.68
If I knew my parents would be hurt if they found out I had been guilty of an alcohol violation					.64	.65
If my drinking would prevent my roommate from studying					.62	.57
If my drinking would hurt the school's reputation					.61	.67

Note. Kaiser-Meyer-Olkin measure of sampling adequacy at T1 = .932; at T2 = .951. Bartlett's test of sphericity at T1 = 6,654 (*df* = 561), *p* < .001; at T2 = 9,583 (*df* = 561), *p* < .001. Students used a 5-point Likert-type scale to rate how likely they were to drink in response to different situations (1 = extremely unlikely to drink, 5 = extremely likely to drink).

<sup>a</sup>eigenvalue = 11.28,  $\alpha$  = .94.

<sup>b</sup>eigenvalue = 13.53,  $\alpha$  = .94.

<sup>c</sup>eigenvalue = 2.64,  $\alpha$  = .89.

<sup>d</sup>eigenvalue = 2.32,  $\alpha$  = .93.

<sup>e</sup>eigenvalue = 3.98,  $\alpha$  = .91.

<sup>f</sup>eigenvalue = 3.28,  $\alpha$  = .93.

### Predictive Validity

To test for predictive validity, we correlated scale scores at the beginning of freshman year in predicted directions with self-reported drinking behaviors during the first 3 months of freshman year, end-of-year self-reported drinking, and

whether a student was found in violation of a drinking rule during the year (see Table 5). We conducted multiple regression analysis to further assess the predictive validity of the newly constructed scales. Criterion variables for a 3-month predictive assessment included EBI scores on 3

**TABLE 3. Factor Loadings for Drinking Values Scale (DVS) Items at College Entry (T1) and End of Freshman Year (T2)**

PDI item	Responsibility		Personal Choice		Institutional Obligations	
	T1 <sup>a</sup>	T2 <sup>b</sup>	T1 <sup>c</sup>	T2 <sup>d</sup>	T1 <sup>e</sup>	T2 <sup>f</sup>
Drinking to excess is wrong because it can have unfavorable effects on others.	.82	.81				
Excessive drinking violates the rights of other students.	.72	.66				
Drinking alcohol heavily is wrong because it affects not only you but also others.	.72	.80				
There is nothing wrong with having 1 or 2 drinks.			.80	.80		
How much a person drinks is not a matter of right and wrong but a matter of personal choice.			.63	.72		
An occasional alcoholic drink is okay for anyone who enjoys it.			.73	.77		
Drinking a lot (5 or more drinks in a row) is okay as long as you know you can handle it.			.54	.59		
The university has an obligation to parents of students to monitor and enforce drinking policies.					.86	.80
The resident advisor has an obligation to enforce university drinking policies.					.82	.85
Rules about drinking on campus are meant to protect students.					.78	.76

Note. Kaiser-Meyer-Olkin measure of sampling adequacy at T1 = .808; at T2 = .821. Bartlett's test of sphericity at T1 = 1,087 ( $df = 66$ ),  $p < .001$ ; at T2 = 1,459 ( $df = 66$ ),  $p < .001$ .

<sup>a</sup>eigenvalue = 1.71,  $\alpha = .71$ .

<sup>b</sup>eigenvalue = 1.08,  $\alpha = .72$ .

<sup>c</sup>eigenvalue = 1.06,  $\alpha = .78$ .

<sup>d</sup>eigenvalue = 3.34,  $\alpha = .78$ .

<sup>e</sup>eigenvalue = 3.35,  $\alpha = .79$ .

<sup>f</sup>eigenvalue = 1.87,  $\alpha = .77$ .

questions related to quantity and frequency of drinking and the extent to which drinking is disruptive to residence life. Criterion variables for the 9-month follow-up included Core scores on 2 questions addressing quantity and frequency of alcohol consumption. Predictor variables included sex and the 8 subscale scores at college entry. To reduce multicollinearity, we centered the subscale scores. Tables 6 and 7 provide data for each regression. Using the enter method, a significant model emerged for all criterion variables with adjusted  $R^2$ , accounting for 56% to 77% of the variance in student self-reported drinking behaviors and attitudes.

### Sex Differences and Freshman-Year Trends

Consistent with the literature, men reported higher levels of alcohol consumption than did women. To examine whether drinking expectations, psychosocial factors, and values reflected similar sex patterns, we analyzed sex differences across the CDIS subscales. Table 8 provides means, standard deviations, and  $F$  values for male and female CDIS subscale scores at college entry (T1) and end of freshman year (T2). After entering college, women were more likely to appreciate the perils of alcohol consumption, to value institutional obligations and personal and social responsibility, and to consume alcohol in response to situational stress. Entering male freshmen were more likely to consider drinking as a matter of personal choice and to rank alcohol risks as an inducement to drink (sensation seeking).

At year's end, women continued to place stronger emphasis on institutional obligations and personal and social responsibility, whereas men continued to score higher on alcohol choices based on sensation seeking. Men and women did not differ in their expectations that drinking was a normal part of college life or in drinking as a response to social pressure.

To assess the stability in drinking influences from the beginning to the end of freshman year, we also performed correlated  $t$  tests for students who participated in both the T1 and T2 surveys. On average, students' college experience during freshman year reduced their expectations of drinking harms and valuing of institutional responsibilities and, on a more positive note, reduced sensation seeking,  $t(174) = 5.67$  and  $t(5.05) = 4.29$ , respectively ( $p < .001$  for both). From college entry to the end of freshman year, they increased their expectations that drinking is a college norm ( $t[174] = 4.25$ ,  $p = .001$ ) and their use of alcohol to reduce stress,  $t(174) = 2.14$ ,  $p = .034$ .

### COMMENT

We developed the CDIS as a brief, easy-to-administer instrument for assessing change and stability in student drinking-related expectations, psychosocial characteristics, and values from the beginning to end of the freshman year. Factor analysis, interitem reliability, and confirmation of predicted relationships with existing instruments provide

**TABLE 4. Correlations Among College Drinking Influences Survey Subscales at College Entry (T1) and End of Freshman Year (T2)**

Subscale	College Drinking Expectations Scale		Psychosocial Drinking Inventory			Drinking Values Scale		
	1	2	3	4	5	6	7	8
1. Drinking Norms								
T1	—	-.16**	.61**	.32**	.26**	.42**	-.39**	-.29**
T2	—	.02	.60**	.40**	.23**	.50**	-.29**	-.29**
2. Drinking Consequences								
T1		—	-.32**	-.23**	-.01	-.31**	.33**	.33**
T2		—	-.28**	-.21**	-.03	-.18**	.35**	.34**
3. Social Influences								
T1			—	.60**	.41**	.49**	-.48**	-.30**
T2			—	.67**	.52**	.49**	-.42**	-.38**
4. Sensation Seeking								
T1				—	.28**	.32**	-.45**	-.34**
T2				—	.53**	.35**	-.46**	.42**
5. Stress Reduction								
T1					—	.12	-.25**	-.21**
T2					—	.14**	-.24**	-.28**
6. Personal Choice								
T1						—	-.39**	-.26**
T2						—	-.33**	.27**
7. Responsibility								
T1							—	.46**
T2							—	.48**
8. Institutional Obligation								
T1								—
T2								—

\*\* $p < .001$  (using a conservative Bonferonni correction).

evidence for the validity and reliability of each of the 8 subscales of this 53-item instrument administered in its entirety, or individually as 3 distinct measures: CDES, PDI, and DVS. In addition, analyses of sex differences and multiple regressions of subscale scores as predictors of drinking behaviors across the freshman year support the usefulness of this instrument for understanding factors contributing to college student drinking choices.

### Limitations and Strengths

Some limitations should be noted when considering administration of the CDIS. First, we drew student participants from a single campus at which students are predominantly non-Hispanic white and Catholic. Second, although the sample reflected 63% of the eligible population, it was nonetheless a volunteer sample that may not fully represent the diversity of freshmen living on campus. A bias also may exist in the different methods of survey completion between T1 and T2. It is possible that students who agreed to take an online survey at T2 differed from those who took the paper-and-pencil survey at T1. Although the change in incentive from T1 to T2 was small, this slight increase in value of the gift card might have resulted in a difference between students

who took the survey at T2 and T1. However, the positive correlations between T1 and T2 testing among the 190 students who participated in both administrations suggest that the effect of different formats and incentives was minimal.

Participant attrition is also a limitation. Forty-one percent (130) of the original T1 participants did not complete the measures at T2; however, 230 new individuals completed the survey in the spring semester. Finally, the self-report methods used to gather information on drinking history are always fallible to inaccurate response rates because of poor recall or perceived social desirability.

The exploratory factor analyses conducted for the CDES, PDI, and DVS accounted for 40% to 56% of the total variance at college entry and end of freshman year. We would have preferred to have a greater amount of the variance accounted for; however, the adjusted  $R^2$  for the combined effect of all the subscales from the CDIS at college entry, along with sex, accounted for 56% to 74% of variance in self-reported drinking behaviors at 3 and 9 months and thus supports the usefulness of the CDIS in understanding student drinking choices.

The strengths of the study are that it included freshmen at 2 distinct time periods (college entry and end of freshman

**TABLE 5. Correlations Between College Drinking Influences Survey (CDIS) Subscale Scores, Alcohol Expectancy Questionnaire (AEQ)<sup>45</sup> Scores, Drinking Behaviors, and Alcohol Violations at College Entry (T1) and End of Freshman Year (T2)**

Survey item	College Drinking Expectations		Drinking Values Scale			Situational Drinking Influences Scale		
	Drinking Norms	Drinking Consequences	Personal Choice	Responsibility	Institutional Obligations	Social Influences	Sensation Seeking	Stress Reduction
AEQ								
Global score								
T1	.21**	.01	.10	-.17**	-.08	.21**	.22**	.29**
T2	.26**	.08	.20**	-.09	-.10	.30**	.28**	.28**
Social effects								
T1	.24**	.03	.11	-.15**	.00	.34**	.22**	.31**
T2	.36**	-.15**	.36**	-.24**	-.14*	.43**	.37**	.22**
Sexual effects								
T1	.27**	-.03	.18**	-.22**	-.08	.27**	.24**	.17**
T2	.23**	.11*	.18**	-.04	.01	.29**	.18**	.19**
Cognitive effects								
T1	.21**	-.02	.02	-.19**	-.14*	.15*	.21**	.22**
T2	-.04	-.12*	-.05	-.14**	-.15**	.10*	.24**	.22**
Deteriorative effects								
T1	-.11	.27**	-.16**	.19**	.26**	-.08	-.14*	.02
T2	.11*	.27**	.03	.22**	.18**	.00	-.12*	-.05
Arousal effects								
T1	.11	-.04	.11	-.07	.00	.17**	.08	.06
T2	.14*	.15**	.14**	.01	.08	.16**	.11*	.08
Relaxing effects								
T1	.05	.02	.05	-.06	.00	.19**	.06	.22**
T2	.24**	.11*	.25**	.00	.02	.26**	.11*	.16**
5+ drinks at 1 sitting								
CDIS								
T1	.47**	-.22**	.41**	-.43**	-.20**	.60**	.49**	.19**
T2	.29**	.03	.26**	.31**	.21**	.44**	.42**	.23**
EBI <sup>46</sup>								
T1	.31**	-.24**	.26**	-.31**	-.20**	.41**	.38**	.11
Core <sup>41</sup>								
T2	.17*	-.18**	.13	-.27**	-.19**	.37**	.28**	.17*
Average # of drinks per week								
CDIS								
T1	.29**	-.03	.26**	-.31**	-.21**	.44**	.42**	.23**
T2	.29**	-.03	.26**	-.31**	-.21**	.44**	.42**	.23**
EBI								
T1	.33**	-.18**	.27**	-.17**	-.11	.43**	.30**	.22**
Core								
T2	.16*	-.02	.12	-.17*	-.19**	.23**	.21**	.07
Negative effect of alcohol on resident life (EBI)								
T1	-.21**	.20**	-.16**	.23**	.16**	-.25**	-.27**	-.07
Violates campus alcohol prohibitions								
T1	.14*	-.03	.06	-.21**	-.14*	.22**	.24**	.15*

Note. EBI = Educational Benchmark, Inc survey; Core = Core Alcohol and Drug Survey.

\* $p < .05$ . \*\* $p < .001$ .

year), such that the psychometric properties found for the scales are conducive to measure effectiveness of program evaluations during this time period. Future studies that we currently are undertaking should determine whether

the subscale factors and interitem reliability can be replicated in new samples and whether data from the CDIS can enhance alcohol-prevention program design and evaluation during the freshman year. Last, the results of the multiple

**TABLE 6. Summary of Multiple Regression Analysis for Baseline College Entry Subscale Scores Predicting Freshman Drinking Behaviors and Attitudes After 3 Months, as Measured by the Educational Benchmark, Inc Survey (EBI)<sup>46</sup> (n = 252)**

CDIS subscale	B	SE	β	p
<i>How many alcoholic drinks do you typically consume per event?<sup>a</sup></i>				
Gender	0.202	0.315	.066	.522
Drinking Norms	-1.378	0.190	-.745	.000
Drinking Consequences	-0.209	0.341	-.023	.541
Personal Choice	0.301	0.322	.038	.350
Responsibility	-0.433	0.299	-.064	.149
Institutional Obligations	-0.326	0.307	-.041	.291
Social Influences	1.342	0.299	.234	.000
Sensation Seeking	0.831	0.368	.098	.025
Stress Reduction	-0.334	0.305	-.042	.275
<i>How frequently do you consume alcohol?<sup>b</sup></i>				
Gender	0.330	0.131	.235	.012
Drinking Norms	-0.531	0.079	-.620	.000
Drinking Consequences	-0.004	0.142	-.011	.760
Personal Choice	0.163	0.132	.045	.219
Responsibility	0.003	0.124	.012	.762
Institutional Obligations	-0.006	0.127	-.016	.640
Social Influences	0.650	0.124	.246	.000
Sensation Seeking	0.180	0.152	.046	.238
Stress Reduction	0.009	0.126	.025	.480
<i>To what degree does the use of alcohol negatively affect the quality of life for students on your floor?<sup>c</sup></i>				
Gender	0.382	0.187	.239	.042
Drinking Norms	-0.532	0.113	-.549	.000
Drinking Consequences	0.419	0.201	.090	.038
Personal Choice	0.138	0.188	.034	.461
Responsibility	-0.003	0.175	-.009	.860
Institutional Obligations	0.114	0.180	.028	.527
Social Influences	-0.008	0.175	-.027	.649
Sensation Seeking	-0.302	0.216	-.068	.162
Stress Reduction	0.004	0.179	.011	.807

Note. CDIS = College Drinking Influences Survey.

<sup>a</sup>Adjusted R<sup>2</sup> = .72.

<sup>b</sup>Adjusted R<sup>2</sup> = .77.

<sup>c</sup>Adjusted R<sup>2</sup> = .64.

regressions, although preliminary and not aimed at hypothesis testing, suggest that the CDIS subscales may be useful in testing indirect effects on college drinking behaviors. For example, subscales on Drinking Norms, Social Influences, and Stress Reduction at college entry were significantly correlated with one another and with the average number of drinks consumed per week reported at 3 months into the freshman year. However, when included in a multiple regression, only scores on Drinking Norms and Social Influences yielded significant beta values, suggesting further research is needed to examine these factors' direct and indirect pathways of influence of on drinking choices. In future research, we will apply the CDIS subscales to test

whether high perceptions of drinking norms and susceptibility to peer pressure can mediate the extent to which students look to alcohol for stress reduction.

### **Application to Alcohol-Prevention Program Design and Evaluation**

The briefness, ease of administration, and sound psychometric properties of the CDIS speak to its potential usefulness to assist college administrators in identifying the need for and evaluating the outcomes of alcohol prevention programs. College administrators may wish to use student scores on the different CDIS subscales to identify the types of intervention programs best suited to the drinking

**TABLE 7. Summary of Multiple Regression Analysis for Baseline College Entry College Drinking Influences Survey (CDIS) Subscale Scores Predicting Freshman Drinking Behaviors After 9 Months, as Measured by the Core Alcohol and Drug Survey<sup>41</sup> (n = 216)**

CDIS subscale	<i>B</i>	<i>SE</i>	$\beta$	<i>p</i>
<i>How often have you consumed 5 or more drinks at a sitting during the past 2 weeks?<sup>a</sup></i>				
Gender	0.401	0.170	.236	.019
Drinking Norms	-0.654	0.104	-.634	< .001
Drinking Consequences	0.008	0.185	.017	.646
Personal Choice	0.170	0.171	.038	.323
Responsibility	-0.175	0.162	-.045	.283
Institutional Obligations	-0.130	0.171	-.029	.447
Social Influences	0.762	0.167	.225	< .001
Sensation Seeking	0.480	0.206	.101	.021
Stress Reduction	-0.253	0.166	-.056	.128
<i>Average number of drinks consumed per week?<sup>b</sup></i>				
Gender	-0.206	1.081	-.027	.849
Drinking Norms	-2.947	0.666	-.628	< .001
Drinking Consequences	1.940	1.135	.087	.089
Personal Choice	1.984	1.088	.097	.070
Responsibility	-1.317	1.003	-.076	.191
Institutional Obligations	0.975	1.104	.047	.378
Social Influences	1.092	1.044	.071	.297
Sensation Seeking	9.983	1.311	.457	< .001
Stress Reduction	-1.064	1.049	-.052	.311

<sup>a</sup>Adjusted  $R^2 = .77$ .<sup>b</sup>Adjusted  $R^2 = .56$ .

expectations, psychosocial characteristics, and values of their specific student population. In developing the survey, we were cognizant of the need for instruments to help evaluate different types of alcohol-prevention models. For example, social norms research has repeatedly emphasized the importance of using campus attitudes toward alcohol to reduce use and abuse.<sup>47,48</sup> The CDES may be helpful in evaluating the extent to which social norms campaigns have reduced expectations about drinking norms and increased expectations for negative consequences of drinking. Recognizing the strong influence of peers on drinking behaviors, a number of institutions have initiated peer-educator programs as a source of prosocial modeling.<sup>18,49</sup>

Other colleges emphasize the role of RAs or parents in influencing freshmen drinking choices. At the same time, there is widespread recognition that some students may have psychological predispositions that necessitate one-on-one counseling approaches to alcohol problems. The 3 subscales of the PDI tap these psychosocial risk factors for college drinking. Taken as a whole, the PDI subscales can help college officials understand the percentage of incoming freshmen who may be responsive to prevention programs focused on peer modeling and parental involvement (those scoring high on the Social Influences subscale) versus the percentage of students who may need more individualized services (students

scoring high on subscales tapping drinking choices based on Sensation Seeking or Stress Reduction). These scales also may help college health professionals better understand important dynamics of students referred for drinking problems.

Few researchers have studied college drinking-prevention programs that use socio-moral and character-building components because few institutions have attempted to integrate these factors into prevention curriculum.<sup>50</sup> Empirical support exists for the idea that fostering a sense of social responsibility through civic engagement and mutual obligation on campus may decrease college alcohol abuse. Students also must understand the moral basis for university prohibitions against drinking; in this regard, it is often RAs and resident directors who find themselves as both policy enforcers and communicators of university campus drinking values. Universities seeking to integrate alcohol-prevention programs into their campuswide character education initiatives will find the 3 DVS subscales (Personal Choice, Responsibility, and Institutional Obligations) useful in evaluating whether such initiatives transition incoming students from a values framework that is narrowly focused on personal choice to one that conceptualizes student drinking behaviors and campus drinking policies as reflecting broader moral commitments to personal and social responsibility.

**TABLE 8. Means and Standard Deviations of the College Drinking Influences Survey (CDIS) Subscales at College Entry (T1) and End of Freshman Year (T2)**

Measure	Men		Women		F	p
	M	SD	M	SD		
<b>CDES</b>						
Drinking Norms						
T1	3.66	.75	3.64	.62	0.04	.88
T2	3.87	.77	3.95	.65	1.12	.94
Drinking Consequences						
T1	3.52	.52	3.69	.59	6.01*	.002
T2	3.27	.72	3.34	.63	2.86	.07
<b>DVS</b>						
Personal Choice						
T1	3.90	.71	3.74	.59	4.81*	.02
T2	3.84	.82	3.83	.62	0.03	.09
Responsibility						
T1	3.13	.78	3.34	.74	5.97*	.03
T2	3.00	.87	3.19	.75	4.88*	.02
Institutional Obligations						
T1	3.45	.72	3.66	.63	8.13**	.007
T2	3.03	.83	3.36	.71	17.26***	< .001
<b>PDI</b>						
Social Influences						
T1	2.98	1.05	3.01	.81	0.10	.86
T2	3.14	1.00	2.94	.94	3.74	.13
Sensation Seeking						
T1	1.80	.72	1.65	.56	4.01*	.004
T2	2.19	.85	1.88	.72	14.15***	< .001
Stress Reduction						
T1	1.52	.60	1.70	.65	5.99*	.008
T2	1.70	.65	1.76	.81	0.28	.90

Note. For men, *n* = 112–135 and 107–137 for T1 and T2, respectively. For women, *n* = 157–183 and 203–263 for T1 and T2, respectively. At T1, the corresponding *df* for each *F* value is 1,280; at T2, it is 1,332. PDI = Psychosocial Drinking Inventory; DVS = Drinking Values Scale; CDES = College Drinking Expectations Scale.  
\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

**Conclusions**

College administrators are unanimous in their assessment of the seriousness of college student drinking. Yet colleges vary greatly in the nature of alcohol-prevention focus and allocation of institutional resources to individual and environmental measures. One reason for widespread variation in alcohol-prevention program efforts is the paucity of targeted assessment instruments that can provide administrators with information beyond data on the frequency of self-reported drinking behaviors and documented violations of campus alcohol policies. The 3 scales comprising the CDIS yield psychometrically sound subscales tapping college drinking risk and protective factors. The CDIS scales also have the potential to be used at both the needs assessment and program evaluation stages of alcohol prevention programs by providing colleges with tools to assess student drinking expectations, psychosocial characteristics, and values that are in need of change and whether they are responsive to programmatic interventions.

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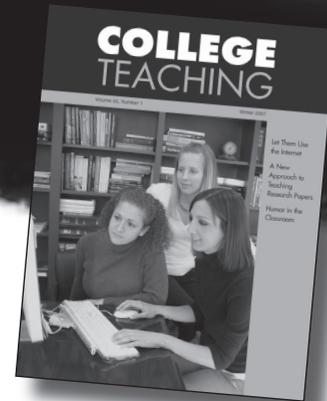
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