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Assessment Reactivity: A Randomized Controlled Trial of Alcohol-Specific Measures on Alcohol-Related Behaviors

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Abstract

Introduction—Completion of alcohol assessments influences treatment outcomes, yet little is known about the aspects of assessment that may contribute to this response. The present study is a randomized controlled trial examining how the themes of alcohol assessments (e.g., assessment of alcohol-related consequences as opposed to drinking patterns) may affect drinking behaviors.

Methods—Undergraduate students ($N = 290$, $M_{\text{age}} = 19.97$, $SD_{\text{age}} = 1.81$, 61.7% female), reporting at least one binge drinking episode during the past month, completed one of five baseline assessment batteries that varied thematically: (a) Control (e.g., minimal drinking quantity and frequency questions), (b) Consequences (e.g., College Alcohol Problems Scale; CAPS-r), (c) Norms (e.g., Drinking Norms Rating Form), (d) Diagnostic (e.g., Alcohol Use Disorders Identification Test), and (e) Combined (all themes). Participants completed a one-month follow-up of drinking quantity/frequency and the CAPS-r.

Results—All groups decreased their self-reported peak drinks consumed ($p < .001$, $\eta_p^2 = .05$) and past month frequency of drinking ($p = .002$, $\eta_p^2 = .03$; except for the consequences group) from baseline to follow-up. There were no between-group differences. No changes emerged in drinks per week ($p = .09$, $\eta_p^2 = .01$) or alcohol-related consequences ($p = .06$, $\eta_p^2 = .03$) from baseline to follow-up.

Conclusion—Minimal assessment of drinking quantity and frequency may result in assessment reactivity. Reductions in markers of risky drinking behaviors did not differ as a function of the type of assessments completed (e.g., consequences vs diagnostic). Continued research is needed to determine what other important variables (e.g., treatment seeking) may affect assessment reactivity.

Keywords

drinking; young adult; intervention; assessment reactivity

Self-report of alcohol use and related consequences is a common procedure in alcohol treatment research. However, research shows reductions in drinking behavior following baseline assessments, even when no intervention is implemented (1, 2). This effect is commonly known as assessment reactivity (3–5) and has been observed in other areas including smoking (6), medication adherence (7), and blood donation (8). Although assessment reactivity highlights the benefits of assessments as potential brief interventions, it is problematic because it may mask or lead to overestimations of the therapeutic benefits of an intervention as compared to an assessment only control group (5, 9).

It is probable that responding to assessments causes people to reflect on their alcohol consumption and initiate change. Consequently, assessment only control groups may fail to operate as true control conditions. Several factors potentially influence assessment reactivity, including the frequency (3), comprehensiveness (3), and mode of assessment (e.g., in person versus phone) (10). Overall, more frequent follow-ups (3), longer assessment batteries (3, 11), and in-person assessments (8) appear to increase assessment reactivity. These methodological issues are present in the majority of alcohol intervention studies and can have significant impacts on conclusions.

In addition to methodological confounds, there are several themes of alcohol assessment that may differentially impact outcomes. These include frequency and quantity of alcohol consumption, alcohol-related consequences, diagnostic criteria for abuse or dependence, and perceptions of personal drinking in comparison to peers' drinking patterns (e.g., normative perceptions). Previous research on assessment reactivity has focused on the impact of multiple measures (e.g., comprehensiveness of an assessment battery), without systematically evaluating variability in how items themselves may impact reactivity (3, 9, 11). By examining the unique impact of various assessment measures, we may better understand which assessments influence alcohol consumption. Based on Social Cognitive Theory (12), for example, assessments of alcohol-related consequences may increase one's awareness of the problems s/he has experienced as a result of alcohol use, which may lead to greater decreases in alcohol consumption than assessment of drinking patterns alone.

The present study is a randomized controlled trial examining how common themes of alcohol assessments affect drinking behaviors. Participants completed one of five assessment batteries, each differing thematically, and a subsequent one-month follow-up. It was hypothesized that participants in each experimental group (i.e., Consequences, Diagnostic Assessment, Normative, and Combined groups) would demonstrate greater assessment reactivity than those in the control group, with the greatest reactivity occurring in the Consequences (12) and Combined (3) groups.

Method

Participants

Undergraduate students ($N = 290$) from a southern plains university were recruited through an online research participant pool. Participants completed a mass screening questionnaire at the beginning of each semester; those who reported 1 binge drinking episode (4/5+ drinks for females/males) in the past month were eligible to participate. Participants' data were

excluded from analyses if they did not (a) complete the one-month follow-up ($n = 74$), (b) provide matching identification numbers for baseline and follow-up ($n = 72$), or (c) report a binge drinking episode at the time of baseline assessment ($n = 40$). Figure 1 shows a CONSORT diagram. Power analyses indicated that a sample of 300 participants would produce sufficient power to discriminate statistically significant main effects of moderate magnitude ($f = 0.25$) between five groups. All procedures were approved by the university's institutional review board.

Randomized Group Assignments

Control Group—Participants in the Control group completed minimal assessment of drinking frequency and quantity; specifically, a daily drinking grid assessing past month frequency and quantity of drinking (see measures section).

Consequences Group—The Consequences group completed alcohol-related questions regarding frequency and quantity of consumption in addition to a battery of measures assessing alcohol-related consequences.

Normative Perceptions Group—The Normative Perceptions group completed assessments measuring frequency and quantity of alcohol consumption, perceptions of how much and how often college students consume alcohol (descriptive norms), and perceptions of how accepting college students are of drinking-related behaviors (injunctive norms). These measures are commonly used in studies examining the effectiveness of personalized feedback interventions (13).

Diagnostic Assessment Group—The Diagnostic Assessment group completed measures of drinking frequency and quantity in addition to clinical assessment measures of alcohol abuse and dependence. These measures reflect criteria for a diagnosis of substance abuse or dependence and are often used in research to assess alcohol severity.

Combined Group—The Combined group completed all assessment measures (i.e., frequency and quantity, consequences, norms, and diagnostic criteria).

Measures

Demographics—Participants answered questions regarding their age, gender, and ethnicity. Age and gender were not collected from 89 participants due to survey error.

Alcohol use—All groups completed a daily drinking grid modeled after the Daily Drinking Questionnaire [DDQ; (14)] at baseline and follow-up. This frequently used measure has shown to be reliable in college drinking studies (12), and was used to estimate participants' past week drinking patterns and the occasion during which they drank the most in the past month (*peak drinks*). Participants self-reported the number of standard alcoholic drinks they consumed during the past seven days (*drinks per week*). Additionally, they indicated the number of occasions they drank alcohol in the past month (*past month frequency*) and the number of drinks they consumed during their heaviest drinking occasion during the past month (*peak drinks*).

Alcohol-related consequences—Participants completed the revised College Alcohol Problems Scale (CAPS-r; (15)) and the Brief Young Adult Alcohol Consequences Questionnaire (16), which measure social and personal problems experienced as a result of alcohol use. Higher scores indicate a greater number of alcohol-related problems. Participants in the Consequences and Combined groups complete these measures at baseline, and all participants completed the CAPS-r at follow-up.

Normative Perceptions—The Drinking Norms Rating Form was used to assess participants' perceptions of typical college student drinking (descriptive norms) (17). Participants indicated the average number of drinks they believe the typical male/female student consumes on each day of the week. The four-item Injunctive Norms Rating Form (17) was used to assess participants' perceptions of their friends' approval of behaviors such as driving after drinking (injunctive norms). These items were not used to create outcome variables; participants in the Norms and Combined groups completed these questionnaires at baseline.

Diagnostic assessment—The Alcohol Use Disorders Identification Test (AUDIT) (18), Michigan Alcohol Screening test (19), and Alcohol Dependence Scale (20) were used to assess participants' symptoms of alcohol abuse and dependence. Higher scores indicate greater symptom severity. Participants in the Diagnostic and Combined groups completed these measures at baseline.

Procedure

Participants were recruited to participate in an online study examining the relationship between alcohol and assessment. After providing informed consent, they were randomly assigned via computer algorithm to either the control group or one of four experimental groups. Questionnaires commonly used across treatment studies were identified for each assessment condition. Participants completed their assigned questionnaire battery; various filler items (e.g., favorite food) were used to balance the number of questions participants completed in each condition.

One month following the baseline assessment, participants completed the DDQ and CAPS-r online. Upon completion of the follow-up survey, participants were debriefed, granted research credit, and entered into a raffle for sixty \$15 gift cards and ten \$50 gift cards.

Analytic plan

Data were examined for missing values, outliers, and normality prior to analysis. No imputation procedures were used for missing values/outliers. Skewness and kurtosis estimates for all outcome variables fell within the normal range (21). Descriptive analyses were used to examine participants' baseline demographics and drinking-related behaviors. Outcome variables for inferential statistics included responses on the DDQ and the CAPS-r. Repeated measures Analysis (ANOVA) was used to evaluate changes in peak drinks, past month frequency, and drinks per week. An ANCOVA was used to examine between-group differences in CAPS-r scores at follow-up, controlling for baseline drinks per week. (Change in CAPS-r scores could not be examined because only participants in the Consequences and

Combined groups completed the CAPS-r at baseline.) Results presented are unadjusted for multiple comparisons.

Results

Participants

Complete demographic and drinking-related behaviors data are shown in Table 1. No between-group differences emerged in gender, ethnicity, age, baseline drinking variables ($p > .05$), or baseline alcohol-related consequences (Combined and Consequence groups only, $p > .05$).

Primary Outcomes

Table 1 shows complete descriptive data and inferential statistics. There was no significant Time by Group interaction for any outcome. Collectively, participants reduced their peak drinks [$F(1, 280) = 13.90, p < .001, \eta_p^2 = .05$] and past month frequency [$F(1, 283) = 9.75, p = .002, \eta_p^2 = .03$] over time. Changes in drinks per week were not significant [$F(1, 285) = 2.98, p = .09, \eta_p^2 = .01$]. There were no between-group differences in alcohol-related consequences at one-month follow-up [$F(4, 283) = 2.33, p = .06, \eta_p^2 = .03$].

Discussion

The present study was a randomized controlled trial (RCT) that examined the effects of alcohol assessment on drinking among college students. Specifically, we compared the unique impact of questionnaires assessing drinking quantity/frequency, alcohol-related consequences, drinking norms, and diagnostic criteria on drinking outcomes. Participants in all groups reported decreases in peak drinks and all but the consequences group decreased past month frequency of drinking; however, the type of assessment they completed had no impact on outcomes. Drinks per week and alcohol-related consequences did not change by one-month follow-up.

The finding that participants reduced risky drinking behaviors (i.e., peak drinks), but not actual alcohol consumed by volume (i.e., drinks per week), is consistent with previous research showing that assessment reactivity tends to result in a reduction in risky behaviors but not overall drinking (22). However, even participants in the Control group, who completed basic frequency and quantity questionnaires, reported decreases in drinking at one-month follow-up. This suggests that assessment reactivity may occur with minimal assessment and is consistent with research indicating that completion of the AUDIT resulted in decreased AUDIT scores at follow-up (9).

In contrast to hypotheses, the Consequences group demonstrated the least change in alcohol-related outcomes; conversely, they reported an increase in the number of consequences experienced and no change in past month frequency of drinking. This may be due in part to an increase in cognitive dissonance. Cognitive Dissonance Theory (23) suggests that, when individuals become aware of inconsistencies between their attitudes and behaviors, they change their beliefs (*nothing dangerous will happen while I'm drinking*), their behaviors (*I'll drink less when I go out*), or their perceptions of the outcome (*blacking out is not that big of*

a deal). Thus, it is possible that students who completed consequence measures altered their perceptions of the outcome (such that consequences are less negative/important), rather than changing their behaviors. Consistent with this hypothesis, there is some evidence that individuals who experience more consequences view those consequences as less important (24) and have lower intentions of changing their drinking (25). However, more recent data suggest that individuals with more experience with consequences in the past year consume less alcohol, perhaps in response to an accumulation of negative drinking events and the development of a more negative evaluation of those events over time (26). Given the discrepancy in these findings, future studies may examine the extent to which history of consequences influences young adults' responses to assessment and intervention. Additionally, given the pattern of reduction in past month frequency seen in all groups but the consequences group, future research utilizing a Solomon Four Group (27) instead of a RCT is warranted to more effectively test the influence of pre-tests.

Inconsistent with previous research, those who received the most comprehensive assessment showed no differences in their drinking-related behaviors than those with fewer assessments (3). However, previous research examining the effect of comprehensive assessments on reactivity was completed among treatment-seeking adults with DSM-IV diagnoses of alcohol abuse or dependence. In contrast, our sample was comprised of college students reporting at least one binge drinking episode during the past month. It is possible that treatment-seeking individuals have more motivation to change and, therefore, may be more amenable to change based on assessment alone. Further research is needed to examine how certain subpopulations may differ in assessment reactivity.

Several possible alternative explanations may account for the present study's findings including the Hawthorne Effect [i.e., a change in behavior due to participants' awareness of being observed (28)], natural declines in drinking towards semester end, regression to the mean, and measurement error/unreliable self-report data. In regards to the Hawthorne Effect, a recent meta-analysis concluded that the small effects observed in some studies are likely at least partially due to other phenomenon (e.g., assessment questions encourage new ways of thinking(29)), rather than a single Hawthorne effect. Second, follow-up assessment occurred anytime between the fourth week of school and the week before final exams; however, semester-related drinking patterns (i.e., decreased drinking during exams) could be affecting this study's results. Third, regression to the mean has been a suggested explanation for alcohol assessment reactivity, particularly as cut-off for eligibility increases [i.e., heavier drinkers only; (30)]. Fourth, measurement error or unreliable self-report data may be responsible for observed results; however, evidence suggests that people generally provide reliable self-report alcohol use data (31, 32). Clearly, more research is needed to parse out the influence of non-treatment related factors on observed drinking changes.

This study has a few notable limitations. First, although our control condition completed only drinking quantity and frequency questions, it did not serve as a pure no-assessment control condition. Future research is needed using designs such as a Solomon Four Group (27) or SMART-ED (33) to truly test whether assessment effects, pre-test sensitization, the Hawthorne effect, or some other mechanism is responsible for drinking changes seen in this and other studies (27, 34). Second, due to survey error, we were unable to statistically

control for gender; however, gender is typically included as a covariate due to gender differences in alcohol consumption (35), and we were able to control for baseline drinking quantity. Third, participants reported on their past seven-day drinking, as opposed to a “typical week.” It is possible that for some participants, the past seven days were atypical drinking days; however, given that peak drinks and number of drinking days in the past month were also assessed, it is expected that these variables will collectively capture participants’ risky drinking behaviors. Fourth, responses to CAPS-r questions are on a 5-point likert scale with the highest option being “very often.” These response options may limit apparent significant differences between groups given the little room for reduction with a 1-month follow-up. Perhaps an explicit frequency assessment (e.g., “How many times did you blackout in the past month) would better capture decreases in alcohol-related consequences. Fifth, utilization of a college student sample limits generalizability to adolescents, older adults, or treatment-seeking populations. Despite these limitations, the present study begins to investigate a ubiquitous problem in alcohol intervention research.

The present study is the first to systematically assess the effects of specific assessment measures on drinking-related behaviors and consequences. Findings suggest that assessment reactivity may occur among college students with minimal assessment of quantity and frequency. The present study also highlights how assessment itself may serve as a brief intervention in student health, primary care, and other relevant settings. Continued research is needed to determine the extent to which different assessments create reactivity and how this may be moderated by variables such as age or motivation.

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Figure 1.
CONSORT Diagram

Table 1

Demographics and drinking-related behaviors.

	Control (<i>n</i> = 47)	Consequences (<i>n</i> = 60)	Norms (<i>n</i> = 59)	Diagnostic (<i>n</i> = 59)	Combined (<i>n</i> = 65)	Total (<i>N</i> = 290)		
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>N</i> (%)	<i>F/χ²</i>	<i>p</i>
Baseline demographics and drinking-related behaviors								
Gender [†]								
Female	15 (50.0)	27 (60.0)	31 (70.5)	24 (63.2)	27 (61.4)	124 (61.7)	3.26	0.52
Ethnicity								
White	28 (59.6)	36 (60.0)	41 (69.5)	30 (50.8)	42 (64.6)	177 (61.0)	4.77	0.31
Non-white	19 (40.4)	24 (40.0)	18 (30.5)	29 (49.2)	23 (35.4)	113 (39.0)		
Age, <i>M</i> (<i>SD</i>) [†]	20.53 (2.54)	20.09 (1.69)	19.45 (1.89)	19.87 (1.49)	20.07 (1.41)	19.97 (1.81)	1.76	0.14
AUDIT, <i>M</i> (<i>SD</i>)	–	–	–	9.99 (4.11)	10.94 (4.56)	10.44 (4.37)	1.77	0.19
Follow-up drinking-related behaviors								
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>F</i>	<i>p</i>
								<i>η²</i>
Peak Drinks								
Baseline	10.72 (5.93)	11.0 (5.97)	10.45 (6.0)	11.37 (6.01)	11.67 (7.51)	11.07 (6.33)	0.35	0.84
Follow-up	9.50 (6.39)	10.29 (6.02)	9.67 (7.20)	9.37 (6.83)	8.80 (4.98)	9.51 (6.27)	1.28 ^{††}	0.28
Past Month Frequency								
Baseline	8.68 (4.79)	9.32 (5.95)	8.32 (5.42)	9.02 (6.43)	9.22 (5.72)	8.93 (5.70)	0.30	0.88
Follow-up	7.40 (4.65)	9.51 (6.10)	7.34 (4.75)	7.76 (5.67)	8.18 (5.16)	8.07 (5.34)	1.49 ^{††}	0.21
Drinks/Week								
Baseline	14.47 (13.81)	14.48 (10.75)	11.27 (10.09)	14.42 (16.21)	15.14 (12.55)	13.96 (12.80)	0.85	0.50
Follow-up	12.06 (15.34)	14.58 (10.09)	11.32 (10.98)	11.58 (10.26)	13.37 (12.01)	12.63 (11.71)	0.68 ^{††}	0.61
CAPS-r								
Baseline	–	12.97 (5.47)	–	–	11.94 (4.41)	12.43 (4.96)	1.35	0.25
Follow-up	12.17 (4.25)	13.31 (5.67)	11.24 (4.18)	12.58 (5.10)	11.06 (3.97)	12.06 (4.74)	2.37	0.06

Note.

[†]Age and gender were not collected from 89 participants. All unmarked *F* values indicate the results of a one-way ANOVA (baseline) or ANCOVA (follow-up).

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Numbers represent the F values for the Time X Group interaction from repeated measure ANOVA tests. AUDIT = Alcohol Use Disorder Identification Test; Score of 8 is indicative of hazardous drinking. CAPS-r = College Alcohol Problem Scale—Revised.