BRIEF REPORT

The Expectancy Challenge Alcohol Literacy Curriculum (ECALC): A Single Session Group Intervention to Reduce Alcohol Use

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The Expectancy Challenge Alcohol Literacy Curriculum (ECALC) is a single session group-delivered program designed to modify alcohol expectancy processes and reduce alcohol use among children and young adults. The objective of this study was to demonstrate the effectiveness of the ECALC in reducing risky alcohol use among heavy drinking college men. Four fraternities at a large state university were randomly assigned to receive either the single session ECALC or a control presentation (2 fraternity houses per condition, $n = 250$). Alcohol expectancies were assessed before and immediately after program presentation. Results demonstrated significant changes on 5 of the 7 subscales of the Comprehensive Effects of Alcohol Scale (CEOA) among students who received the ECALC when compared with control participants. Alcohol use data were collected for 4 weeks before and 4 weeks after program presentation. Compared with those in the control condition, students who received the ECALC demonstrated significant reductions in all facets of alcohol use measured, including decreased mean and peak blood alcohol content (BAC), decreased mean number of days drinking per week, decreased mean drinks per sitting, and decreased number of binge-drinking episodes per month. This study represents 2 important advances. First is the significant reduction in risky alcohol use produced by a single session group-delivered program. The second important advance is the success in changing expectancy processes without using impractical elements common in previous expectancy challenge methods (e.g., a "barlab" environment and actual alcohol administration).

Keywords: alcohol, expectancy, college students, prevention, intervention

Despite increased attention the Task Force on College Drinking (NIAAA, 2002) has brought to the prevalence of heavy drinking and alcohol-related harms among college students, there is little evidence of positive change. College student binge drinking within the past 2 weeks has remained relatively unchanged at 37% from 1993 to 2010, whereas the rate of binge drinking among noncollege peers has decreased to 28% (Johnston, O'Malley, Bachman, & Schulenberg, 2011). Effective individually delivered methods to reduce alcohol use have been identified (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Larimer & Cronce, 2002), however, the expense of implementing these programs often limits them to targeting specific subgroups (e.g., mandated students), leaving many students without effective programs (Nelson, Toomey, Lenk, Erickson, & Winters, 2010). Further, effective group-delivered programs for college students have been developed (e.g., group delivered motivational enhancement interventions; LaBrie et al., 2008; LaChance, Feldstein, Ewing, Bryan, & Hutchison, 2009). Unfortunately, widespread implementation is still limited by relatively small group sizes (e.g., 4–12 per group). Therefore, beyond environmental strategies that can efficiently reach large audiences (e.g., alcohol control policies, advertising bans), there continues to be a need for effective programs that are economical and suitable for campus-wide prevention and early intervention.

One approach to developing effective and efficient group-delivered programming targets underlying motivations for alcohol use. Alcohol expectancies have been found to develop before regular drinking habits (e.g., Dunn & Goldman, 1996, 1998, 2000) and covary with the amount of alcohol consumed, and changes in expectancies have been clearly linked to subsequent changes in alcohol use (e.g., Dunn, Lau, & Cruz, 2000; Lau-Barraco & Dunn, 2008). Several experimental studies have successfully changed expectancies and reduced alcohol use with strategies known as *expectancy challenge* (EC; e.g., Darkes & Goldman, 1993, 1998; Dunn et al., 2000; Lau-Barraco & Dunn, 2008). These expectancy-based strategies were effective, but reliance on alcohol administration and a simulated bar environment to deliver the intervention have been serious limitations. Efforts to avoid alcohol administration and use of a bar lab by using video recordings of these elements and psychoeducation about expectancies have had limited success in reducing alcohol use (Corbin, McNair, & Carter, 2001; Keillor et al., 1999).

To develop new methods for effectively challenging expectancies without alcohol administration, Cruz and Dunn (2003) created a presentation for elementary schoolchildren designed to clearly differentiate expectancy effects from the pharmacological effects of alcohol. Results demonstrated changes in expectancy processes consistent with reduced likelihood of problematic and early alcohol use. The single-session classroom-based intervention was then modified for implementation in high schools and resulted in significant changes in key expectancy processes and reductions in subsequent alcohol use (Cruz, Alfonso, & Dunn, 2006). This method of challenging expectancies without alcohol administration is known as the expectancy challenge alcohol literacy curriculum (ECALC; Sivasithamparam, Hall, & Dunn, 2008). Although the ECALC has been found to be effective in reducing alcohol use among high school students, effectiveness has yet to be demonstrated with high-risk college students such as fraternity members. In this study, the ECALC was delivered to members of fraternities, and effectiveness was evaluated by measuring changes in expectancies and alcohol use.

Method

Participants

Participants were fraternity members at a large state university. University institutional review-board approval was obtained before data collection. The office of fraternity and sorority life provided e-mail addresses for fraternity presidents and verified the ECALC and control presentations as risk-management approved programs. Presidents of all 15 social fraternities were contacted in the spring semester preceding project implementation, and seven chapters expressed interest. Chapters were eligible to participate if they could schedule times during the predetermined 1-week implementation period and commit to providing in-person follow-up data. This was to ensure that the 4-week baseline and 4-week follow-up data collection period would be identical for all fraternities. Presentations were conducted in mid-October to ensure that baseline data collection did not include summer and that follow-up data collection was completed at least 2 weeks before the final exam period. Four chapters met inclusion criteria and were randomly assigned to receive either the ECALC (two chapters; $n = 148$) or a control presentation (two chapters; $n = 102$). Of the 250 students who participated, 15 were excluded from analysis for incomplete baseline data (ECALC, $n = 5$; control, $n = 10$). Of the 235 participants who completed baseline measures, 209 (88.9%) completed 4-week follow-up (ECALC = 86.7%; $n = 124$, control = 92%; $n = 85$). Statistical comparisons of those who completed follow-up with those who did not, revealed no significant differences in baseline measures of drinking, alcohol expectancies, or treatment assignment. Of the participants who completed baseline and follow-up measures, the mean age was 19.95 ($SD = 1.28$). Approximately 78.5% identified themselves as Caucasian, 15.3% Hispanic, 1.4% Asian American, 1% African American, and 3.3% other. Approximately 14.5% identified themselves as freshman, 30.8% as sophomores, 29.5% as juniors, and 25.2% as seniors.

Measures

Demographic questionnaire. Participants were asked to provide demographic information including their age, ethnicity, and class standing.

Alcohol consumption. Daily alcohol consumption for the 4 weeks prior to receiving the expectancy presentation or the control presentation as well as the 4-week period following the presentations was measured by using the retrospective, self-report, timeline follow-back (TLFB) procedure (Sobell & Sobell, 1992). The TLFB procedure is a reliable ($r = .76–.98$) and valid method for retrospectively obtaining daily estimates of alcohol use (Sobell & Sobell, 1992). Mean and peak BAC were calculated by using the formula provided by Matthews and Miller (1979). A binge episode was defined as consuming five or more drinks in a row during a single drinking occasion (Wechsler & Nelson, 2002).

Factor model-based expectancy measure. Alcohol expectancies were assessed before and after the ECALC and control presentations by using the Comprehensive Effects of Alcohol Scale (CEOA; Fromme, Stroot, & Kaplan, 1993). The CEOA has good internal consistency and temporal stability (range of $r = .53–.81$ for the different factors). The CEOA uses a 4-point rating scale and yields four positive subscales (Sociability, Tension Reduction, Liquid Courage, and Sexuality) and three negative (Cognitive and Behavioral Impairment, Risk and Aggression, and Self-Perception).

Interventions

ECALC group. The ECALC presents scientific information about pharmacological effects of alcohol in a nonjudgmental manner. Completion of baseline measures was integrated into program content, which began with the CEOA, definition of a standard drink, and completion of the TLFB (Sobell & Sobell, 1992). The content of the presentation began with a 4-min video clip of the traditional in vivo EC and a brief summary of the results of experimental research that attempted to distinguish between pharmacological and expectancy effects of alcohol. Participants then viewed four alcohol advertisements (time range = 90–120 s), and were asked to identify positive and arousing alcohol expectancies in each advertisement. The presentation deconstructed alcohol advertisements into elements to be contrasted with scientific information previously presented. Participants then discussed the contradictions of arousing expectancies depicted in media advertisements and alcohol's pharmacological effects. At the end of the presentation participants completed the expectancy measure [CEOA] a second time. The session lasted 50 min.

Control group. Control group participants completed the same baseline measures as the experimental group, (CEOA, standard drink definition, TLFB). The control group then received a media literacy presentation about deconstructing advertisements depicting personal appearance products (e.g., hair removal products), followed by a second CEOA. The control group presentation was 50 min in length to match the ECALC group.

Procedure

Groups were scheduled so that data collection of drinking behavior covered the same 4-week time period for all participants

over a single fall semester. Both the ECALC and control presentations were administered following the same protocol during prescheduled chapter meetings. All participants provided informed consent and were told that all information provided would be anonymous. A psychology doctoral student delivered all presentations.

Follow-Up Assessment

Follow-up was completed in person, 4-weeks following the initial presentation and consisted of completion of the demographic questionnaire and TLFB.

Data Analysis Plan

All variables were checked for outliers and deviations from normality prior to analysis. Outliers greater than 3.29 SDs above the mean ($p < .001$) were incrementally recoded to one unit above the next lowest value (Tabachnick & Fidell, 2006; Borsari et al., 2007). Analysis of covariance (ANCOVA) was the method used to assess postpresentation outcomes (alcohol expectancies) and follow-up drinking behavior, with the respective baseline values as the covariates, and intervention condition (ECALC, control) as the between-subjects factor. Regression analysis was used to examine the relationship between postpresentation alcohol expectancy measures and 4-week follow-up drinking behavior.

Results

Comparability of Groups

Pearson's chi-square revealed no significant differences between groups on age, class standing, or ethnicity. Comparability of

alcohol use at baseline across groups was then analyzed with a series of analyses of variance (ANOVAs) for each dependent variable of interest. Results revealed a significant main effect for peak BAC, $F(1, 205) = 6.01$, $p = .02$; mean drinks per sitting, $F(1, 203) = 7.68$, $p = .006$; and peak drinks per sitting, $F(1, 205) = 7.19$, $p = .008$ (see Table 1 for means and standard deviations). Comparability of alcohol expectancies at baseline across groups was also evaluated with a series of ANOVAs. Using CEOA subscale scores as dependent variables, we found a significant main effect for the Self-Perception subscale, $F(1, 207) = 8.94$, $p = .003$ (see Table 2 for means and standard deviations). Baseline differences between groups in measures of drinking and alcohol expectancy variables were taken into consideration in subsequent analyses. A series of ANCOVAs were used to compare between-groups differences at follow-up with baseline values included as covariates. Further, multivariate analyses of variance (MANOVAs) revealed no significant differences between fraternities within each condition for measures of alcohol consumption and expectancies at follow-up.

Alcohol Expectancy Analysis

Between-groups differences in alcohol expectancies at follow-up were assessed by using an ANCOVA with baseline expectancy values included as covariates. Dependent variables consisted of subscale scores on each of the seven subscales of the CEOA. Type I error was controlled for by using the Bonferroni procedure, such that each ANCOVA was tested at the .007 significance level (.05 divided by the seven ANCOVAs conducted). Consistent with the a priori hypotheses, after controlling for baseline values, significant between-groups differences were seen on all four positive CEOA subscales, Sociability, $F(2, 203) = 8.18$,

Table 1

Mean Scores, Standard Deviations, and Significance Levels of Changes in Alcohol Consumption From Baseline to Follow-Up by Group

	Baseline	4-week follow-up			
Variable	*M* (*SD*)	*M* (*SD*)	*F*(2, 203)	*p*	Partial η²
Mean BAC			43.81**	<.001	0.18
Control	0.116 (0.096)	0.119 (0.08)			
ECALC	0.096 (0.072)	0.06 (0.05)			
M drinks per sitting			24.10**	<.001	0.11
Control	8.98 (5.08)	8.66 (4.56)			
ECALC	7.23 (3.66)	5.22 (3.93)			
Peak BAC			43.29**	<.001	0.18
Control	0.249 (0.209)	0.249 (0.149)			
ECALC	0.189 (0.141)	0.115 (0.122)			
Peak drinks per sitting			27.23**	<.001	0.12
Control	15.93 (11.15)	15.04 (8.77)			
ECALC	12.41 (7.72)	8.23 (7.51)			
Binge Episodes			40.77**	<.001	0.17
Control	6.78 (5.75)	6.83 (4.76)			
ECALC	5.28 (4.72)	3.14 (3.29)			
M drinking days per week			44.70**	<.001	0.18
Control	2.04 (1.50)	2.35 (1.49)			
ECALC	1.75 (1.32)	1.16 (1.05)			

Note. BAC = blood alcohol content; ECALC = expectancy challenge alcohol literacy curriculum.
* $p \leq .01$. ** $p \leq .001$.

Table 2

Mean Scores, Standard Deviations, and Significance Levels for Changes in Comprehensive Effects of Alcohol (CEOA) Subscales From Before and After Presentation

CEOA subscale	Prepresentation M (SD)	Postpresentation M (SD)	$F(2, 203)$	p	Partial η^2
Sociability			8.18*	.005	0.04
Control	26.85 (3.81)	26.80 (4.50)			
ECALC	26.85 (4.15)	25.15 (5.55)			
Tension Reduction			7.20*	.008	0.03
Control	8.68 (1.99)	9.04 (2.17)			
ECALC	8.67 (1.98)	8.32 (2.32)			
Liquid Courage			8.34*	.004	0.04
Control	14.45 (3.57)	14.89 (3.49)			
ECALC	14.48 (3.45)	13.80 (3.98)			
Sexuality			12.60**	<.001	0.06
Control	11.43 (2.61)	11.53 (2.93)			
ECALC	11.35 (2.85)	10.31 (3.12)			
Cognitive Behavioral Impairment			0.01	.92	0.00
Control	23.82 (5.37)	25.08 (5.96)			
ECALC	23.87 (5.32)	25.06 (5.84)			
Risk and Aggression			2.73	.10	0.01
Control	13.73 (3.67)	14.23 (3.56)			
ECALC	12.76 (3.64)	12.87 (3.94)			
Self-Perception			8.05*	.005	0.04
Control	8.01 (3.08)	9.29 (3.45)			
ECALC	6.95 (2.53)	7.54 (2.87)			

Note. ECALC = expectancy challenge alcohol literacy curriculum.
* $p \leq .01$. ** $p \leq .001$.

$p = .005$, $\eta^2 = .04$; Liquid Courage, $F(2, 203) = 8.34$, $p = .004$, $\eta^2 = .04$; Sexuality, $F(2, 203) = 12.60$, $p < .001$, $\eta^2 = .06$; Tension Reduction, $F(2, 203) = 7.20$, $p = .008$, $\eta^2 = .03$; and the negative CEOA subscale of Self-Perception, $F(2, 203) = 8.05$, $p = .005$, $\eta^2 = .04$ (see Table 2 for means and standard deviations).

Alcohol Use Analysis

ANCOVA was used to compare between-groups differences on drinking variables at follow-up, with baseline alcohol values included as covariates. Type I error was controlled for using the Bonferroni procedure, such that each ANCOVA was at the .008 significance level (.05 divided by the 6 ANCOVAs). After controlling for baseline alcohol values, significant between-groups differences were seen on outcome variables of mean BAC, $F(2, 203) = 43.81$, $p < .001$, $\eta^2 = .18$; mean drinks per sitting, $F(2, 201) = 24.10$, $p < .001$, $\eta^2 = .11$; peak BAC, $F(2, 203) = 43.29$, $p < .001$, $\eta^2 = .18$; peak drinks per sitting, $F(2, 203) = 27.23$, $p < .001$, $\eta^2 = .12$; number of binge episodes per month, $F(2, 203) = 40.77$, $p < .001$, $\eta^2 = .17$; and mean drinking days per week, $F(2, 204) = 44.70$, $p < .001$, $\eta^2 = .18$ (see Table 1 for means and standard deviations). Participants in the ECALC group reported significantly lower mean and peak number of drinks consumed per sitting, mean and peak BAC, mean number of drinking days per week, and number of binge episodes per month relative to those in the control group.

Mediation Analysis

Regression analyses were used to examine alcohol expectancies as a mediator between the ECALC condition and alcohol use at follow-up. Evidence of mediation or an indirect effect is present when both Path A, the condition to the expectancies relation, and Path B, the expectancies and alcohol use relation are statistically significant (MacKinnon, Fairchild, & Fritz, 2007). Mediation analyses were conducted for each subscale of the CEOA. Results indicated that the ECALC condition was significantly associated with expectancies of sexual enhancement ($\beta = -.21$, $p \leq .01$) and sociability ($\beta = -.17$, $p \leq .01$) assessed postpresentation. Expectancies of both sexual enhancement ($\beta = .17$, $p \leq .05$) and sociability ($\beta = .16$, $p \leq .05$) were, in turn, significantly associated with average blood alcohol content at follow-up. In addition, the significance of the intervening effect was evaluated with the Goodman (1960) test. The test of indirect effects indicated that the expectancy of sexual enhancement ($z = -1.96$, $p \leq .05$) exerted a significant intervening effect in the condition to outcome relationship.

Discussion

Consistent with a priori hypotheses, results indicate that the ECALC successfully modified alcohol expectancy processes and significantly reduced subsequent alcohol use among heavy drinking college students who were members of fraternities. Further, analyses revealed that the sexual enhancement expectancy significantly mediated the intervention to outcome relationship. These results provide evidence consistent with the theoretically driven hypothesis that expectancy challenge strategies change drinking behavior through manipulation of key alcohol expectancies. Sexual enhancement expectancies were critical in modification of drinking changes for participants in the ECALC condition. An unexpected finding, however, was the significant differences be-

tween conditions on the Self-Perception subscale of the CEOA, with participants in the control group reporting significantly higher mean score. One possible explanation is that drinking assessments coupled with continued elevated consumption resulted in more negative self-perceptions. In correspondence with changes in expectancy processes were significant reductions in alcohol consumption, including decreases on measures of quantity, frequency, and heavy episodic drinking. Although differences in alcohol consumption at baseline indicated that those in the control groups reported higher peak BAC, peak drinks per sitting, and mean drinks per sitting than those in the ECALC groups, results indicated that drinking variables of those in the control group remained relatively stable from baseline to follow-up whereas those in the ECALC groups showed significant reductions. Therefore, reductions in alcohol consumption can be attributed to treatment effect and not individual differences between groups.

There are several important implications of these findings. First, results demonstrated the effectiveness of a single 50-min group-delivered expectancy challenge presentation without an alcohol administration component or specialized "bar lab" environment. Of the various types of interventions aimed at reducing risky drinking behaviors on college campuses, few have been targeted specifically to the Greek community. And of those targeted to the Greek population, most have proven unsuccessful or provided little clinical utility (Harrington, Brigham, & Clayton, 1999). Further, of the programs that have shown reductions in alcohol use over time within the Greek community, the results of this study show at least comparable results to programs that use time-intensive individually based interventions (Larimer et al., 2001) or multiple group-training sessions (Garvin et al., 1990). For example, Larimer et al. (2001) demonstrated reductions in typical peak BAC from 0.10 to 0.07, which is similar to this study's reduction in mean BAC from 0.10 to 0.06. Our study, however, is unique in that it was implemented in a single-session group setting.

Several limitation of this study must be noted. First, participants were randomly assigned at the fraternity level. Consequently, significant differences between ECALC and control groups at follow-up may be due to individual differences between fraternities or confounded by history effects. However, there were no significant differences between fraternities within in each condition on measures of alcohol use or expectancies at follow-up, minimizing the potential influence of history effects and individual differences between fraternities. Second, the follow-up period was limited to 4 weeks. Given the considerable fluctuation in college students' drinking over a typical year, some may argue the decrease in alcohol consumption was due to a natural dip in use over time. Several experimental design elements, however, minimize these possibilities. Comparing alcohol consumption between groups over the same 4-week period greatly reduced potential variability in the results. Further, fraternities were randomly assigned to condition, and results indicated a significant decline in expectancies and drinking only among those participants who received the ECALC. The 4-week follow-up period, however, only permits conclusions in regard to the impact of the current program on immediate changes in expectancies and reductions in alcohol use over the subsequent month. Finally, because this study targeted fraternities, results cannot be generalized to women or students who are not fraternity members.

In conclusion, this study demonstrated the effectiveness of a 50-min group presentation (ECALC) in changing alcohol expectancies and significantly reducing alcohol use among heavy drinking college students who were members of fraternities. Studies designed to assess the effectiveness of the ECALC with other types of college students are clearly warranted.

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Correction to Gonzalez (2012)

In the article "Association of Solitary Binge Drinking and Suicidal Behavior Among Emerging Adult College Students," by Vivian M. Gonzalez (*Psychology of Addictive Behaviors*, Advance online publication, January 30, 2012. doi: 10.1037/a0026916), there is an error in the introductory paragraph. The number of students who had seriously considered attempting suicide in the Barrios, Everett, Simon, & Brener (2000) study should have been reported as 11.4%, not 1.4%. Additionally, in the Participants section, data for the study were collected from March 2009 to September 2010, not March 2009 to January 2010 as reported.