Development And Evaluation Of A Single-session Expectancy Challenge Intervention To Reduce Alcohol Use Among Heavy Drinking College Students

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DEVELOPMENT AND EVALUATION OF A SINGLE-SESSION EXPECTANCY
CHALLENGE INTERVENTION TO REDUCE ALCOHOL USE AMONG HEAVY
DRINKING COLLEGE STUDENTS

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
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Major Professor: Michael E. Dunn
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ABSTRACT

While overall rates of college student drinking have declined slightly since 1980, extreme forms of drinking are escalating. A comprehensive review of all aspects of alcohol use among college students completed by a panel of scientists and college presidents concluded that very few approaches for dealing with student drinking can be considered empirically validated, and they strongly encouraged additional efforts to develop and validate effective strategies. Expectancy challenge approaches designed to reduce risky drinking through changing key expectancies have been identified as one of the few validated strategies, but this approach has not been developed into a format that is reliably effective with females or readily delivered in a single meeting. Widespread implementation of expectancy-based strategies is dependent on further evolution of a pragmatic format of this approach while maintaining effectiveness with groups that has already been established and increasing effectiveness with other groups. The purpose of the present study was to develop and evaluate a new version of expectancy challenge to accomplish two specific goals that are critical for widespread dissemination and implementation. First, new content focused on key expectancies typically held by heavy drinking females was developed in an effort to achieve significant reductions in alcohol use among women. Second, the content of the intervention for men and women was condensed to a single session. To demonstrate the effectiveness of the redesigned expectancy challenge in reducing drinking among high-risk individuals, the intervention was implemented with heavy drinking males and females at a large state university. Exposure to the single session expectancy challenge led to significant changes in alcohol expectancies and significant reductions in subsequent drinking in both males and females.
in comparison to participants randomly assigned to an active control condition or an assessment-only control condition. These findings represent a critical step in the process of translating a theory-based intervention strategy validated in intensive academic laboratory designs, into a more practical format while maintaining, and even enhancing effectiveness. The single session expectancy challenge developed and validated in this project is more accessible to those seeking effective drinking reduction strategies for college campuses and will encourage further development of pragmatic strategies based on expectancy theory.
ACKNOWLEDGMENTS

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# TABLE OF CONTENTS

LIST OF FIGURES ................................................................................................................................. viii

LIST OF TABLES ........................................................................................................................................... ix

INTRODUCTION ............................................................................................................................................... 1

METHOD .......................................................................................................................................................... 7

Participants .......................................................................................................................................................... 7

Measures ........................................................................................................................................................... 8

- Timeline Followback ................................................................................................................................. 8
- Memory Model-Based Expectancy Questionnaire ...................................................................................... 9
- Factor-Based Expectancy Measures ......................................................................................................... 9

Procedure ......................................................................................................................................................... 10

- Expectancy Challenge Condition ............................................................................................................... 11
- CD-ROM Alcohol Education Condition ................................................................................................... 13
- Assessment-Only Control Condition ......................................................................................................... 14

RESULTS .......................................................................................................................................................... 15

- Baseline Participant Characteristics ......................................................................................................... 15
- Changes in Alcohol Consumption ........................................................................................................... 15

Alcohol Expectancies as Assessed with Factor-Based Measures ................................................................. 19

- Alcohol Expectancy Questionnaire (AEQ) ................................................................................................. 19
- Comprehensive Effects of Alcohol (CEOA) ............................................................................................... 22

Alcohol Expectancies as Assessed with a Memory Model-Based Measure ................................................. 25

DISCUSSION .................................................................................................................................................... 32

APPENDIX A: TIMELINE FOLLOW-BACK .............................................................................................. 38

APPENDIX B: MEMORY MODEL-BASED EXPECTANCY QUESTIONNAIRE ........................................... 40

APPENDIX C: FACTOR-BASED EXPECTANCY MEASURES .................................................................... 43
LIST OF FIGURES

Figure 1. Alcohol consumption at baseline and 5-week follow-up ..........................18
Figure 2. Individual Differences Scaling stimulus configuration ..........................30
Figure 3. Individual Differences Scaling participant group weight ............................31
LIST OF TABLES

Table 1. Means and Standard Deviations for Alcohol Expectancy Questionnaire..........21
Table 2. Means and Standard Deviations for Comprehensive Effects of Alcohol ..........24
INTRODUCTION

While overall rates of college student drinking appear to have declined slightly since 1980 (Johnston, O’Malley, & Bachman, 1995), extreme forms of drinking are escalating (Wechsler, Kelley, Weitzman, San Giovanni, & Seibring, 2000). Although some college students merit a diagnosis of alcohol dependence (DSM-IV, 1994; Sher, 1996), most drinking problems in college students arise from episodic excessive drinking or “bingeing.” The proportion of students who binge drink appears to have remained high (approximately 44%) and stable through the 1990’s (Wechsler, 2001). A “Call to Action” issued by NIAAA detailed widespread negative consequences associated with college student alcohol use and made a compelling case for research to address this problem (NIAAA, 2002). Programs that target general excessive drinking, and binge drinking in particular, may be warranted.

Expectancy challenge approaches have been identified as one proven method of applying expectancy theory to reduce alcohol use among college students (NIAAA, 2002). This approach is based on an extensive construct validation network that has evolved that supports expectancies as an important influence on drinking (see Goldman, Darkes, & Del Boca, 1999). Expectancies have been identified in all age and drinking groups. Expectancies are present in children before significant personal encounters with alcohol (e.g., Dunn & Goldman, 1996, 1998, 2000; Miller, Smith, & Goldman, 1990; Zucker, Kincaid, Fitzgerald, & Bingham, 1995), and predict drinking concurrently and longitudinally in adolescents and adults (e.g., Christiansen & Goldman, 1983; Christiansen, Goldman, & Inn, 1982; Christiansen, Smith, Roehling, & Goldman, 1989; Dunn & Goldman, 1998, 2000; Smith, Goldman, Greenbaum, & Christiansen, 1995;
Rather & Goldman, 1994). Findings also suggest that expectancies mediate the relationship between many antecedent variables and drinking (Brown, Goldman, & Christiansen, 1985; Goldman et al., 1999; Sher, Walitzer, Wood, & Brent, 1991). Furthermore, expectancies are changeable in children (Cruz & Dunn, 2003; Dunn & Yniguez, 1999) and adults with corresponding changes in drinking behavior (Darkes & Goldman, 1993, 1998; Dunn, Lau, & Cruz, 2000).

In experimental tests of expectancy theory, researchers have demonstrated that priming of alcohol expectancies can increase access to expectancies (Chenier & Goldman, 1992) and increase subsequent drinking (Lau & Dunn, under review; Roehrich & Goldman, 1995; Stein, Goldman, & Del Boca, 2000). In addition, several studies have used an “expectancy challenge” procedure to change participants’ expectancies regarding the positive effects of alcohol use (Darkes & Goldman, 1993, 1998; Cruz & Dunn, 2003; Dunn et al., 2000). The basis of the expectancy challenge procedure is derived from the imperfect relationship that exists between the pharmacological effects of alcohol (e.g., dizziness, nausea) and the behaviors often observed in individuals while under the influence (e.g., sociability, increased energy). Some common behavioral effects of alcohol may be placebo effects that are culturally and experientially learned, rather than the result of the pharmacological effects of alcohol. A protocol disconfirming expectancies of positive alcohol effects has been developed and tested by Darkes & Goldman (1993, 1998). Findings revealed that expectancies were altered by the intervention and post-intervention alcohol use was significantly reduced at 8-week
follow-up in a male college sample. In another study, Dunn and colleagues (2000) demonstrated that the expectancy challenge procedure led to changes in likely activation patterns of expectancies in memory in college males (a fundamental change in the information processing system that influences drinking decisions) and these changes were predictive of subsequent drinking changes. Finally, the most recent study extended the expectancy challenge methodology to a prevention program for fourth grade children by translating the expectancy challenge into a game show format (Cruz & Dunn, 2003). Results indicated that the intervention was successful in changing likely activation patterns of expectancies in memory in a direction consistent with lowered likelihood of early and problematic alcohol use. This body of research suggests that alcohol expectancy theory provides a sound empirical foundation from which intervention efforts can be derived, and further, support the inference that expectancies can be influenced to decrease drinking.

Models of memory processes related to alcohol use have been developed to identify the process by which expectancies influence drinking behavior (Dunn & Goldman, 1996, 1998; Dunn & Yniguez, 1999; Goldman & Rather, 1993; Rather & Goldman, 1994; Rather, Goldman, Roehrich, & Brannick, 1992; Stacy, Leigh, & Weingardt, 1994; Weingardt, Stacy, & Leigh, 1996). These models have treated expectancies as information nodes stored in memory in a flexible symbolic network representing direct and vicarious experiences with alcohol (see Goldman, 1989, 1994; Rather et al., 1992). Nodes may represent images, memories of sensorimotor and affect experiences, specific behavior patterns, and verbal representation of these concepts acquired from sources, including family members, media, peer groups, and inherited
biological reactions to alcohol. It is theorized that information nodes are activated in memory in a predictable fashion in response to cues that match previously learned material related to drinking. Activation patterns influence an individual’s onset and pattern of drinking.

Researchers have modeled the organization and activation of expectancies in memory using methodology common in cognitive research (e.g., multidimensional scaling, preference mapping, first associates). Empirical modeling using multidimensional scaling (MDS) suggested that two dimensions best explained organization of expectancy information in memory: an evaluation dimension (from negative/antisocial to positive/prosocial) and an arousal-sedation dimension (Dunn & Goldman, 1996, 1998; Dunn & Yniguez, 1999; Rather et al., 1992). A preference mapping (PREMAP) procedure showed that heavier drinkers were more likely to associate positive/prosocial and high arousal effects with alcohol, whereas lighter drinkers associate negative and sedating effects. These finding have been replicated using other methods, such as cluster analysis (Rather, & Goldman, 1994) and analysis of first associates to an alcohol prompt (Dunn & Goldman, 1997). Combined findings suggest differences in the information networks and patterns of expectancy activation of heavy and light drinkers (Dunn & Earleywine, 2001; Dunn & Goldman, 1998, 2000; Rather et al., 1992; Rather & Goldman, 1994). Heavier drinkers may activate arousal expectancies that promote drinking, while lighter drinkers may activate sedation expectancies that suppress drinking. These findings and others suggest that strategies aimed at modifying positive and arousing alcohol expectancies represent a promising approach to prevention and early intervention with high-risk groups like college students.
Although previous expectancy challenge studies have been successful in modifying expectancies and reducing subsequent alcohol use, there were two general limitations. First, past implementations of expectancy challenge used a multiple-session format (2-3 sessions over several weeks). Attending multiple sessions may serve as a potential deterrent for initial participation, and may decrease retention in the program, particularly among heavier drinking individuals who are also at highest risk for negative consequences associated with alcohol use. In addition, the complex multiple-session format may be difficult for typical prevention personnel to master and would require resources that may not be readily available at many institutions, thereby making it less attractive for campus administrations to adopt as a broadly applied alcohol intervention strategy. The second limitation involves difficulty in generalizing the intervention to female drinkers. Previous challenge studies were either focused on male drinkers with content that was specifically developed for males (Darkes & Goldman, 1993, 1998), or showed that the intervention did not produce drinking changes when the content was superficially modified and extended to females (e.g., Dunn et al., 2000). The present study was designed to address these issues in an effort to move expectancy challenge methodology out of the exclusive domain of a few specialized laboratories, and propel it much closer to the realm of strategies that can be readily applied by the wide variety of people who are directly tackling the risky alcohol use of college students. Toward this end, the expectancy challenge protocol that was developed and validated by Darkes & Goldman (1993, 1998) was used as the foundation for the development of a simplified single-session intervention strategy. This modified version of expectancy challenge was designed to be more pragmatic while continuing to be as effective in reducing alcohol
use among heavy drinking males as the longer versions of this intervention strategy. In addition, new content was developed to target specific expectancies that may be particularly influential in motivating heavy alcohol use among females. To demonstrate the effectiveness of the more pragmatic design, the impact of the shortened and modified expectancy challenge on alcohol use was assessed in comparison to an active control condition that consisted of a CD-Rom-based intervention and an assessment-only control.

Three specific hypotheses were addressed. First, it was hypothesized that the shortened version of the expectancy challenge intervention would reduce alcohol use among heavy drinking college males to a comparable extent as the longer version of expectancy challenge validated in several previous studies. As part of this first hypothesis, it was also expected that alcohol use among participants exposed to the expectancy challenge intervention would decline significantly more than participants exposed to another active intervention and participants in an assessment only control group. Second, it was hypothesized that the new content developed to increase the impact of the expectancy challenge strategy on heavy drinking college females would result in significant reductions in alcohol use among this group. Again, reductions in drinking were also compared to an active intervention control group and an assessment only control group with the expectation that drinking among participants exposed to the expectancy challenge intervention would decline significantly more than participants in the control groups. Third, it was hypothesized that changes in drinking among males and females would be predicted by logical changes in expectancies as a result of exposure to the expectancy challenge intervention. Expectancy changes were assessed with factor model-based expectancy measures and memory model-based measures to document
modification of expectancy processes from both theoretical perspectives. Achieving significant reductions in drinking among these high-risk individuals who have been found to be resistant to a variety of intervention approaches is an important finding regardless of the mechanism of change. However, demonstrating the powerful influence of expectancies on changes in drinking further validates the theoretical foundation of this intervention approach and supports continued efforts to extend expectancy-based intervention strategies to other groups.

METHOD

Participants

Participants included 104 males and 135 females who were undergraduate students at a large open-enrollment state university. During the course of the study, 22 participants failed to complete follow-up assessment measures and were subsequently excluded from outcome analyses, resulting in a final sample of 217 participants (94 males, 123 females). The sample distribution in the expectancy challenge, CD-ROM alcohol education, and assessment-only control conditions were 114 (46 males, 68 females), 64 (28 males, 36 females), and 39 (20 males, 19 females), respectively. The average age of participants was 19.88 years ($SD=2.08$), and ranged from 18 to 39 years. Class standing of participants was 40.6% freshmen, 21.7% sophomore, 28.1% junior, and 9.2% senior. Self-reported ethnicity of participants was 76% Caucasian, 13.4% Hispanic, 5.5% African-American, 2.8% Asian-American, and 2.3% “other.”

An initial screening was conducted to identify potential participants who typically consume enough alcohol on a regular basis to allow for decrease in their consumption but who do not drink enough to be considered a problem drinker. Students were selected
for this study if they have had 2 or more binge episodes in the 30 days prior to the initial screening. A binge episode was defined as having 4 or more drinks in one sitting for females and 5 or more drinks for males, following the most commonly used definition of “binge drinking” among college students (Weschler & Austin, 1998). Individuals with drinking quantities below 5 standard drinks weekly, above 40 standard drinks weekly, or with a history of treatment for problematic alcohol use were excluded from participation. This range was selected so as to include individuals drinking sufficiently to show drinking reduction and who are more at risk for alcohol-related negative consequences than their lower drinking counterparts. Participants who consume greater than 40 standard drinks weekly were eliminated as drinking at such high levels were beyond the scope of an intervention effort. These individuals were more appropriate for alcohol abuse or dependence treatment, which is designed to be more intensive in nature and is geared specifically for this class of drinkers. These exclusion criteria were consistent with those used in previous expectancy challenge studies (Darkes & Goldman, 1993, 1998; Dunn et al., 2000). Average alcohol consumption at baseline was 14.49 (SD=10.87) standard drinks per week for males and 8.3 (SD=7.06) standard drinks per week for females.

Measures

Timeline Followback (TLFB; Appendix A)

A timeline followback procedure (Sobell & Sobell, 1992) was used to assess alcohol consumption levels at baseline and for the 5-weeks following the intervention session. Participants recorded their drinking on a calendar with self-identified historical reference points to enhance recall. The psychometric properties of the TLFB are well
established and it is considered to be a reliable and valid method of retrospectively obtaining daily estimates of alcohol consumption (Babor, Stephens, & Marlatt, 1987; Sobell & Sobell, 1992; Sobell, Sobell, Toneatto, & Shillington, 1994).

**Memory Model-Based Expectancy Questionnaire (MMBEQ; Appendix B)**

The MMBEQ is a measure of organization and activation of expectancies in memory (Dunn & Goldman, 1996, 1998). The measure consists of 41 expectancy words or phrases that can be mapped into a network format with multidimensional scaling (MDS) procedures. It has been used to discriminate between heavier and lighter drinking children and adults and found to be sensitive to changes in likely expectancy activation patterns that are predictive of changes in alcohol use (Dunn et al, 2000; Dunn & Goldman, 1996, 1998; Dunn & Yniguez, 1999; Dunn & Cruz, 2003; Rather et al., 1992). Respondents were asked to indicate, on a 4-point Likert scale, how often they experience each expectancy word (effect) when they drink alcohol.

**Factor-Based Expectancy Measures (Appendix C)**

Alcohol expectancies were assessed with 2 factor model-based measures. The Alcohol Expectancy Questionnaire (AEQ; Brown, Goldman, Inn, & Anderson, 1980) is a 69-item instrument consisting of statements regarding the effects of alcohol with a true-false response format. The AEQ was used because it is the most widely used measure of alcohol expectancies and has well-established reliability and validity (Goldman, Brown, Christensen, & Smith, 1991; Goldman, Greenbaum, & Darkes, 1997). Subscales of the AEQ include: Global Positive Changes, Social and Physical Pleasure, Sexual Enhancement, Power and Aggression, Social Assertiveness, and Relaxation and Tension Reduction. The Comprehensive Effects of Alcohol Scale (CEOA; Fromme, Stroot, &
Kaplan, 1993) was also included because it has good psychometric characteristics, it was successfully used to measure significant changes in expectancies in at least one previous expectancy challenge study (Dunn et al., 2000), and it assesses negative anticipated effects of alcohol in addition to those that are positive. The CEOA consists of four positive subscales (Sociability, Tension Reduction, Liquid Courage, Sexuality) and three negative subscales (Cognitive and Behavioral Impairment, Risk and Aggression, Self-Perception) rated on a 4-point Likert scale ranging from “Disagree” to “Agree.”

Procedure

Individuals who met inclusion criteria and agreed to participate in the study were contacted for an intervention session appointment. All participants were scheduled based on their availability and gender, and then randomly assigned to one of three conditions (expectancy challenge, CD-ROM alcohol education, or assessment-only control). All pretest measures (i.e., AEQ, CEOA, MMBEQ, TLFB) were administered immediately prior to the experimental session. Expectancy measures were administered again immediately following the intervention and at the 5-week follow-up. To maximize participant retention, expectancy measures at follow-up were administered via the internet (using a secured server), rather than in-person meetings. Studies have found that the use of online data collection does not change participant responses when compared to pencil-and-paper measures (Hiskey & Troop, 2002). Participant drinking information for the follow-up period was obtained by weekly telephone interviews using the TLFB procedure. Administration of the TFLB over the telephone has been found to be a reliable method of obtaining drinking data (Sobell, Brown, Leo, Sobell, 1996).
Expectancy Challenge Condition

At the beginning of the expectancy challenge session, participants met in a typical classroom where research assistants read a detailed informed consent describing the purpose, procedure, and criteria for participation in the study. To avoid possible negative consequences associated with alcohol consumption during pregnancy, female participants were administered a urine test to verify their nonpregnant status. After participants completed the expectancy and drinking measures, they were led to a simulated bar where the expectancy challenge session took place. The length of the session was approximately 90 to 120 minutes. All sessions were conducted with same-sex groups since the content of the session was geared specifically toward men or women.

The expectancy challenge intervention was based on the procedure developed by Darkes and Goldman (1993, 1998). The original protocol consisted of 3 interactive, participant-oriented sessions designed to challenge participants’ alcohol-related social and sexual expectancies. For the current study, this 3-session protocol was abbreviated into a single-session intervention. The session content for men remained largely unchanged from the original protocol in that the intervention targeted social and sexual expectancies (see Appendix D). However, previous findings suggest that the same protocol may exert less impact on female drinkers (Dunn et al., 2000). Thus, the challenge content for females was modified to reflect potential difference in expectancies between male and female drinkers. Although research examining gender differences in alcohol expectancies has been mixed, there is evidence to suggest that men may endorse sexual enhancement effects of alcohol as more desirable than women (Gustafson, 1991, 1993). Further, women tend to have a stronger belief than men that alcohol will facilitate
social interactions and decrease social anxiety (Borjesson, & Dunn, 2000; Brown et al., 1980; Read, Wood, Lejuez, Palfai, & Slack, 2004). Based on these findings, the challenge procedure for women was changed to specifically target expectancies of social facilitation, while content challenging sexual enhancement expectancies was eliminated from the protocol (see Appendix E).

An important component of the challenge intervention is to provide participants with a dramatic experience of expectancy effects. This is accomplished by serving drinks that participants are told may or may not actually contain alcohol. Participants are told that they might receive alcoholic beverages if they are 21 years or older; but they were not told to which condition they were assigned. Those 21 years or older were randomly assigned to the alcohol or placebo condition; all other participants were automatically assigned to the placebo condition. Because participants were informed that only individuals 21 years or older may be administered alcohol, they were asked not to disclose their age to other participants. Through the session, only the bartender making the drinks knew who was consuming alcohol. Beverage content was carefully disguised by mixing the nonalcoholic beverages with one part flat tonic and four parts cranberry juice, whereas the alcoholic beverages contained one part vodka rather than tonic. Each alcoholic beverage contained 1.5 oz of 80-proof vodka. Under no circumstances was alcohol served to anyone under 21 years of age.

During the intervention, participants were served either two alcoholic beverages or two placebo beverages. While consuming their drinks, participants engaged in a party game (i.e., Win, Lose, or Draw) for 20-30 minutes to create a fun and interesting atmosphere. This process was important in that it provided stimuli associated with real
drinking situations. Group members were then asked to identify individuals they thought had consumed alcohol (including themselves) by writing names and behaviors that led them to believe they had consumed alcohol on a sheet of paper. Their responses were read aloud, and then the bartender revealed how many in the group actually received alcohol. Participants were typically inaccurate in their predictions of who drank and often provided contradicting behaviors that led them to make such conclusions (e.g., “She was drinking because she was mellow,” or “He talked a lot, so I think he was drinking”).

The basis of this exercise is to demonstrate to participants that at moderate doses in an enjoyable environment, they cannot readily determine whether or not they or anyone else actually consumed alcohol. This experience is then used to initiate a discussion of expectancy effects versus the pharmacological effects of alcohol. These discussions were interactive in nature and study participants were encouraged to provide their own real-life examples of alcohol-related expectancies. At the end of the session, blood alcohol levels were assessed through breath analysis to ensure that no participants left the session with a blood alcohol concentration greater than .02 and to verify for participants who consumed placebo or alcoholic beverages.

**CD-ROM Alcohol Education Condition**

The CD-ROM software, Alcohol 101, is designed to educate college students about the effects of alcohol and what constitutes “normal” drinking among their peers. Participants attended a single session for approximately 90-120 minutes (comparable to expectancy challenge condition) held in a computer laboratory on campus. Each group consisted of 5-25 individuals in gender-specific groups. Prior to beginning the CD-ROM
lesson, participants completed the expectancy and drinking measures. Research assistants then distributed the CD-ROMs and assisted the participants in starting the program. The same research assistants were available to supervise the session and to address any questions the participants had. The CD-ROM program began with participants entering their personal information, such as height, weight, age, gender, and amount of average drinking, as well as what he/she perceived as the norm for his/her peers. The remainder of the computer lesson was designed to simulate a party where students address issues of legality, effects of alcohol, and safety. Participants were asked to make decisions for some of the characters on the program and see the consequences of those decisions. The program also provided information, such as norming of peer drinking practices and socially acceptable ways to decline a drink. At the end of the lesson, students received information relating to their own drinking practices as compared to their peers.

*Assessment-Only Control Condition*

To minimize the likelihood that any observable effects from the expectancy challenge or the CD-ROM alcohol education were due to external factors, the assessment-only control group met during the same week as the intervention groups and consisted of individuals with similar drinking practices. Participants were asked to complete the same expectancy and drinking measures as the other two conditions. To maximize consistency across conditions, participants engaged in 2 neutral group tasks (i.e., game of Win, Lose, or Draw and rating advertisements) in a single, 90-120 minute session.
RESULTS

Of the 239 participants who began the study, 217 (91%) completed all of the follow-up assessments. Chi square analysis indicated that attrition from pre- to post-test was not different across conditions. Analyses were conducted to ensure that completers and noncompleters were not significantly different. Chi square results revealed no significant differences between the two groups on gender and ethnicity. Multivariate analysis of variance (MANOVA) indicated no significant differences between completers and noncompleters on age, drinking practices, and alcohol expectancies.

Baseline Participant Characteristics

Chi square analyses were conducted to assess baseline differences between conditions on demographic variables of gender and ethnicity. No significant differences were found. Univariate analysis of variance (ANOVA) confirmed that the groups were similar in age and typical alcohol consumption. In addition, MANOVAs were conducted to examine baseline differences between the conditions on AEQ scores and CEOA scores. No significant differences were found between conditions.

Changes in Alcohol Consumption

A 3 (expectancy challenge, CD-ROM alcohol education, assessment-only control) x 2 (pre-, post-) x 2 (male, female) mixed ANOVA was conducted to assess changes in alcohol consumption from pre- to post-intervention. Because the effect of the intervention on women was of interest in the present study, gender was taken into consideration in all analyses. Results of the ANOVA revealed a significant interaction between condition and time of drinking assessment, $F(2, 211) = 3.49, p = .032$. The
interaction was interpreted with simple main effects analysis to examine the effects of time within each condition. Findings indicated a significant reduction in alcohol
consumption from pre- to post-intervention in the expectancy challenge condition, $F(1, 211) = 27.97, p < .001$ (see Figure 1). Participants exhibited an average decrease of 3.36 standard drinks per week following the intervention. No significant condition by gender by time interaction was found, indicating that the expectancy challenge program was effective for males and females. On average, males decreased consumption by 5.21 standard drinks weekly from pre- ($M = 15.38; SD = 11.30$) to post-test ($M = 10.17; SD = 7.77$), while females reduced drinking by an average of 2.11 standard drinks weekly from pre- ($M = 8.99; SD = 8.35$) to post-test ($M = 6.88; SD = 6.22$). Drinking changes were not significant for participants in the CD-ROM education condition or the assessment-only control condition.
Figure 1. Alcohol consumption at baseline and 5-week follow-up

Mean (and SD) alcohol consumption at baseline (Pre) and 5-week follow-up (Post) across experimental conditions.
Alcohol Expectancies as Assessed with Factor-Based Measures

Alcohol Expectancy Questionnaire (AEQ)

Expectancy changes on the AEQ were assessed with 3 (pre-, post-, 5-week follow-up expectancies) x 3 (expectancy challenge, CD-ROM alcohol education, assessment-only control) x 2 (male, female) mixed ANOVAs for each subscale of the AEQ. Because multiple ANOVAs were conducted, the Bonferroni correction for multiple comparisons was applied to correct Type I error probability. Due to baseline differences between the conditions on the Arousal and Power subscale, only the remaining 5 subscales were included in present analyses. There were significant changes on 2 of the 5 subscales of the AEQ after the Bonferroni correction was applied (see Table 1 for means and standard deviations). There was a significant interaction between time and condition on the Global Positive Changes subscale, \( F(4, 422) = 9.06, p < .001 \). Simple main effects analysis revealed that scores decreased significantly for participants in the expectancy challenge condition, \( F(2, 210) = 19.40, p < .001 \). No significant changes were evident for the CD-ROM education condition or the assessment-only condition. There was a significant interaction between time and condition on the Social Assertiveness subscale, \( F(4, 422) = .26, p < .001 \). Simple main effects tests showed that scores for the expectancy challenge condition decreased significantly, \( F(2, 210) = 19.71, p < .001 \). Again, no significant differences were found in the CD-ROM education or the assessment-only control condition. There was a time by condition interaction on the Relaxation and Tension Reduction subscale that was not significant after the Bonferroni correction was applied, \( F(4, 422) = 2.46, p = .045 \). Additionally, interaction effects between time and condition approached statistical significance for the Physical and
Social Pleasure subscale, p = .07. No statistically significant time by condition by gender interactions were found.
Table 1. Means and Standard Deviations for Alcohol Expectancy Questionnaire (AEQ) Subscales at Pretest, Posttest, and 5-Week Follow-Up

<table>
<thead>
<tr>
<th>AEQ Subscales</th>
<th>Expectancy Challenge</th>
<th>Alcohol Education</th>
<th>Assessment-Only Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
<td>Follow-up</td>
</tr>
<tr>
<td>Global Positive Changes</td>
<td>33.01 (4.72)</td>
<td>31.07 (5.23)</td>
<td>31.39 (5.22)</td>
</tr>
<tr>
<td>Sexual Arousal</td>
<td>9.30 (1.89)</td>
<td>9.12 (1.99)</td>
<td>8.89 (1.97)</td>
</tr>
<tr>
<td>Social &amp; Physical Pleasure</td>
<td>16.57 (1.34)</td>
<td>16.04 (1.76)</td>
<td>16.08 (1.50)</td>
</tr>
<tr>
<td>Social Assertiveness</td>
<td>17.42 (2.44)</td>
<td>16.47 (3.28)</td>
<td>16.30 (3.16)</td>
</tr>
<tr>
<td>Relaxation/Tension Reduction</td>
<td>15.54 (1.83)</td>
<td>15.27 (2.14)</td>
<td>15.16 (2.25)</td>
</tr>
<tr>
<td>Arousal &amp; Aggression</td>
<td>13.75 (1.99)</td>
<td>13.14 (2.23)</td>
<td>13.30 (2.16)</td>
</tr>
</tbody>
</table>
Comprehensive Effects of Alcohol (CEOA)

Changes in expectancies were assessed by 3 x 3 x 2 mixed ANOVAs for each subscale of the CEOA. Due to baseline differences between the conditions on the Risk and Aggression subscale, only 6 out of the 7 subscales were analyzed (see Table 2 for means and standard deviations). Bonferroni correction was applied to control for Type I error. There were 4 significant interactions between time and condition on the subscales of the CEOA. A significant interaction was found on the Sociability subscale, $F(4, 422) = 8.35, p < .001$. Simple main effects test indicated that scores decreased significantly for participants in the expectancy challenge condition, $F(2, 210) = 33.54, p < .001$. Analysis also revealed significant interaction effects between time and condition on the Liquid Courage subscale, $F(4, 422) = 2.65, p = .033$, Tension Reduction subscale, $F(4, 422) = 2.47, p = .044$, and Sexuality subscale, $F(4, 422) = 2.94, p = .02$ that were not significant after the Bonferroni correction was applied. There were no significant changes on any of the negative subscales. No statistically significant time by condition by gender interaction effects were found on any of the CEOA subscales.

In sum, both male and female participants in the expectancy challenge condition exhibited significant reductions in their beliefs of the social enhancement and global positive effects of alcohol that was followed by significant decreases in drinking. Changes in expectancies were observed immediately following the intervention and were maintained at the follow-up assessment. Participants also showed a decrease in expectancies of tension reduction, liquid courage, and sexuality that were no longer significant following the Bonferroni correction. However, a larger sample size may have
provided sufficient power to detect statistically significant differences on these subscales as well as others. Participants in the control conditions did not demonstrate any changes in expectancies or subsequent alcohol consumption.
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<tr>
<th>CEOA Subscales</th>
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<th>Alcohol Education</th>
<th>Assessment-Only Control</th>
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<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
<td>Follow-up</td>
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<tr>
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<td>24.41 (6.17)</td>
<td>25.13 (5.75)</td>
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<tr>
<td>Tension Reduction</td>
<td>8.89 (1.84)</td>
<td>8.19 (1.88)</td>
<td>8.36 (2.17)</td>
</tr>
<tr>
<td>Liquid Courage</td>
<td>13.12 (3.16)</td>
<td>11.75 (3.66)</td>
<td>11.50 (4.06)</td>
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<td>Sexuality</td>
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<td>9.33 (2.80)</td>
<td>9.24 (3.02)</td>
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<tr>
<td>Risk &amp; Aggression</td>
<td>12.62 (3.20)</td>
<td>11.60 (3.72)</td>
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<td>Self-Perception</td>
<td>7.44 (2.39)</td>
<td>7.83 (2.45)</td>
<td>7.66 (2.75)</td>
</tr>
</tbody>
</table>
Alcohol Expectancies as Assessed with a Memory Model-Based Measure

Consistent with previous work (Dunn & Goldman, 1996, 1998; Dunn et al., 2000; Rather & Goldman, 1994; Rather, Goldman, Roehrich, & Brannick, 1992), the present study employed Individual Differences Scaling (INDSCAL), a variant of Multidimensional Scaling (MDS), and preference mapping (PREMAP) to empirically map the organization and activation of alcohol expectancies in memory. MDS is a set of data analysis techniques that is applied to a proximity matrix to compute the location of each item in a multidimensional map. The matrix contains a measure of relatedness for every possible pairwise combination of items. Similar to a correlation matrix, each item appears on one column and one row of the matrix, but with zeros along the diagonal indicating no difference between the item and itself. A mathematical algorithm then is applied to the proximity matrix to produce a visual map representing Euclidean distances among every expectancy item (stimulus configuration) in the matrix. The final dimensional map is used as a representation of the possible network structure of expectancies. The optimal number of dimensions within the map is based on fit indices and theoretical rationale.

INDSCAL was chosen because it allows for simultaneous analysis of proximity matrices of multiple groups, producing a map or stimulus configuration that best represents all groups. The final INDSCAL solution was computed from a total of twelve proximity matrices based on participant responses to the memory model-based expectancy measure (i.e., one for each gender within each condition from pre- and post-intervention). In the present analyses, a two-dimensional solution accounting for 80% of the variance (stress = .22) was considered optimal based on interpretability and Davison’s
(1992) technique of selecting dimensions by graphing $R^2$. A three-dimensional solution resulted in minimal increase in accounted variance (81%), thus a two-dimensional configuration was retained for interpretability. Consistent with previous work, the INDSCAL stimulus configuration represents organization of the effects of alcohol along the dimensions of positive-negative and arousal-sedation (see Figure 2).

In addition to mapping the possible configuration of expectancies in memory, INDSCAL provides information about how different groups of participants use expectancy nodes by computing group weights for each dimension. Group weights correspond to the extent to which a dimension is relevant to a participant group’s responses. As shown in Figure 3, subject weights for male and female expectancy challenge participants were rotated toward the arousal-sedation dimension following exposure to the intervention. An examination of individual expectancy item means indicated that expectancy challenge participants were more likely to endorse sedating items and less likely to endorse arousing items from pretest to follow-up assessment.

PREMAP was applied to the INDSCAL solution to model likely paths of activation through the hypothetical memory network. PREFMAP is a multiple regression procedure that determines a vector or line of best fit through the multidimensional map (stimulus configuration). The vectors represent the ordering of each expectancy (based on frequency of occurrence ratings) for every group of participants in the analysis. At the suggestion of Estes (1991) that memory traces can be conceptualized as vectors through multidimensional space, PREFMAP was employed to model the associational paths through the expectancy network. Previous studies have found that the likely paths of activation differed as a function of drinking habits in children and adults (Dunn &
Goldman, 1996, 1998; Dunn & Yniguez, 1999; Rather et al., 1992). In general, findings indicated that vectors for heavier drinkers consisted mostly of positive and arousing expectancies, while vectors for lighter drinkers consisted primarily of negative and sedating expectancies. Other studies have demonstrated a shift in the orientation of the vectors reflecting a change in likely activation patterns that included negative and sedating effects following an intervention to challenge alcohol expectancies in children (Cruz & Dunn, 2003) and adult males that corresponded to changes in drinking (Dunn et al., 2000).

The vectors, or paths of association, are computed by using the average frequency-of-occurrence ratings for each expectancy word. A total of twelve vectors were calculated representing each gender within each condition before and after the intervention. PREFMAP calculates the location of each vector through the stimulus configuration by regressing the frequency-of-occurrence ratings onto positions of expectancies in the network. For each vector, $R$ values ranged from .91 to .99 and the overall root mean square was .99. The location of expectancy items on each vector may be determined by drawing a perpendicular line from each expectancy item to the vector. Expectancy items would lie on the vector in order of preference, with the most-preferred items located near the arrowhead, which are most likely to activate. As shown in Figure 2, PREMAP vectors are plotted on the INDSCAL stimulus configuration. The vectors for males and females within each condition at pretest were clustered closely to the horizontal dimension. The greatest magnitude of change in activation patterns from pre-to post-intervention were observed in males and females in the expectancy challenge condition, as indicated by clockwise rotation of the vectors toward the sedation end of the
arousal-sedation dimension. Likely expectancy activation may be modeled by moving a perpendicular line along the PREFMAP vector beginning at the arrowhead. Using this strategy reveals that both males and females from the expectancy challenge condition demonstrated a shift in the orientation of the vectors. By moving down the vector with a perpendicular line, the first 10 expectancies most likely activated for males before the intervention were friendly, talkative, outgoing, fun, happy, funny, jolly, relaxed, goofy, and nice. All of the expectancies reflect positive effects of alcohol. In contrast, moving down the preference vectors at follow-up assessment indicated that the 10 expectancies most likely to activate were friendly, talkative, happy, fun, sleepy, slow, funny, jolly, relaxed, and outgoing. Although many of the same expectancies appeared among the first to activate before and after the intervention, negative-sedating expectancies (e.g., sleepy, slow) became more likely to activate following participation. Female expectancy challenge participants exhibited a similar pattern of change in memory activation. At pretest, the first 10 most likely activated expectancies were friendly, talkative, outgoing, happy, funny, fun, jolly, nice, relaxed, and goofy. After the intervention, the 10 most readily activated expectancies were friendly, happy, talkative, fun, outgoing, funny, sleepy, nice, jolly, and relaxed. Like male participants, females activated expectancies reflecting only positive alcohol effects at pretest. However, the path of activation after the intervention now included negative-sedating effects of alcohol (e.g., sleepy). Activation patterns for both genders in the CD-ROM education and assessment only control conditions remained largely consistent from pre- to post-intervention in that the first 10 alcohol effects most likely to be activated at both time points were limited to positive and arousing expectancies. In sum, both genders in the expectancy challenge
condition became more likely to activate negative and sedating expectancies following the intervention and this change corresponded to a significant decrease in alcohol consumption. In contrast, activation patterns for participants in the CD-ROM education and assessment-only control conditions remained primarily unchanged, and subsequent drinking also did not change significantly.
Figure 2. *Individual Differences Scaling* stimulus configuration with preference mapping

*Individual Differences Scaling* (INDSCAL) stimulus configuration with preference mapping (PREFMAP) vectors representing possible paths of association through a memory network at pretest and follow-up based on gender and experimental condition. EC = expectancy challenge condition; AE = CD-ROM alcohol education condition; AO = assessment-only control condition.
Figure 3. Individual Differences Scaling participant group weight

Individual Differences Scaling participant group weights on the positive-negative dimension and arousal-sedation dimension for each condition, gender, and assessment time. EC = expectancy challenge condition; AE = CD-ROM alcohol education condition; AO = assessment-only control condition.
DISCUSSION

Previous studies have demonstrated the utility of the expectancy challenge intervention in reducing expectancies and alcohol consumption in men (Darkes & Goldman, 1993, 1998; Dunn et al., 2000); however, effective application to women has not been established. In addition, previous demonstrations of the procedure have relied on a multiple-session format, which may deter initial participation, as well as limit its appeal as a widely implemented intervention on college campuses. Consequently, the purpose of the present study was to implement and evaluate a single-session experiential expectancy challenge intervention with college men and women. Findings revealed that the intervention was successful in modifying participant beliefs of the expected positive effects of alcohol use. Furthermore, these changes in expectancies led to significant reductions in subsequent alcohol consumption in both genders.

There are a number of implications of the current findings. First, changes in alcohol expectancies were found across both factor model-based and memory model-based measures. As assessed with the AEQ and CEOA, both genders in the expectancy challenge condition demonstrated a significant reduction in their perception of alcohol’s ability to enhance social interaction and assertiveness, as well as their belief that alcohol is a global, positive transforming agent. Changes in expectancies were evident immediately following the intervention and were maintained at the follow-up assessment. This suggests the intervention was successful in challenging participant beliefs that the increased sociability and general positive effects they experience while drinking are not necessarily due to the pharmacological properties of alcohol, but the result of their anticipation for these outcomes. Furthermore, there is evidence to suggest that the
intervention may be effective in modifying other types of alcohol-related beliefs, such as their expectations that alcohol will reduce tension, enhance sexual experiences, and serve as ‘liquid courage’.

Modeling of likely expectancy activation before and after the intervention revealed that participants in the expectancy challenge condition exhibited the greatest changes. Specifically, both men and women in the challenge condition demonstrated a shift in the orientation of their activation path in that sedating expectancies (e.g., sleepy, slow) became more likely to activate in memory following the intervention. On the contrary, activation patterns for those in the control conditions remained largely similar from pre- to post-intervention. Consistent with the findings of Dunn et al. (2000), this suggests that the challenge procedure may lead to a fundamental change in the information processing system that influences an individual’s drinking decisions. Thus, apparent across both forms of expectancy measurement, the intervention led to a reduction in the perceived positive reinforcement value of alcohol use for expectancy challenge participants that corresponded to a significant decrease in alcohol consumption. In contrast, participants in the CD-ROM alcohol education and assessment-only control conditions did not show changes in either expectancies or consequent drinking. Therefore, these findings support the inference that expectancies exert causal influence over alcohol use in that changes in positive expectancies lead to changes in prospective drinking.

A second implication is that the present study demonstrated for the first time that an experiential expectancy challenge program could be effectively implemented with a college female population. Although previous researchers
made attempts to tailor the original protocol developed by Darkes and Goldman (1993, 1998) to women, the material did not translate well, resulting in a lack of significant reductions in drinking within this group. Consequently, modifications were made to the present protocol to reflect expectancies that have been found to be most salient for women. In particular, session content related to negative sexual effects of alcohol was eliminated based on findings indicating that women rate sexual enhancement expectancies as less desirable than men. In addition, since women may hold stronger beliefs than men that alcohol will enhance and facilitate social experiences, the challenge was tailored to focus on these expectancies specifically. The reduction in expectancies and drinking observed in women suggests that targeting social enhancement beliefs may be critical in the successful implementation of the intervention for this group. It also provides support that, for the procedure to be maximally effective for different groups of individuals, it may be necessary to discriminate among types of expectancies targeted in expectancy challenge programs that are most relevant to those individuals.

Another implication is that the present study provides additional validation for an experiential expectancy challenge intervention. The effectiveness of the program to reduce alcohol use in men was replicated in an institution different from where the protocol was first originated. In addition to successfully extending this approach to women, the present research went beyond previous studies by modifying the original procedure into a single-session program. Clear advantages of such a modification are that implementation will require less resources and increase ease of dissemination, as well as improve recruitment and retention of participants. The widespread negative consequences associated with alcohol use in college students is well documented and the
need for empirically supported programs to target this issue is clearly needed. The current findings lend additional support for the utility of an expectancy challenge approach as an intervention strategy to address college student drinking. However, beyond application to target drinking in young adults, expectancy-based approaches may also hold promise as a primary prevention for children to decrease likelihood of early and problematic drinking (Cruz & Dunn, 2003).

Finally, these findings add to the construct validation network asserting expectancies as a critical influence on alcohol consumption. The majority of previous studies relating expectancies to drinking behavior, however, have relied primarily on correlational designs that limit inferences regarding the causal properties of expectancies. Results of this study support an experimental test of alcohol expectancies as a causal variable in drinking behavior by demonstrating concomitant changes in drinking and expectancies. The use of random assignment procedures and control conditions minimize possible alternative explanations for group differences.

Caution is needed in interpreting the present findings for several reasons. First, the 5-week follow-up period may be too restricted to allow conclusions regarding the long-term impact of the expectancy challenge intervention. Some studies evaluating college intervention programs have found immediate reductions in drinking at posttest that are not maintained at follow-up (e.g., Collins, Carey, & Sliwinski, 2002). Thus, the follow-up period must be extended in future studies to examine the durability of the intervention on future drinking. In addition, it has been found that college student
drinking over the course of the academic year varies as a function of holiday periods and academic demands, with drinking being highest during holiday periods and lowest during midterm and final exams (Del Boca, Darkes, Greenbaum, & Goldman, 2004). The inclusion of comparison groups in the present study renders it unlikely that drinking reductions observed in the expectancy challenge group are attributed to temporal influences or normal variations in consumption patterns. However, a longer follow-up assessment period would capture a more accurate representation of overall consumption patterns in light of the temporal variability of college student drinking.

A second limitation of the current study is the failure to account for the potential influence of participant perceptions of program credibility and demand characteristics on study outcome. It may be possible that the impact of expectancy challenge was partly due to differences in perceived pressure to change between conditions. However, in the initial studies conducted by Darkes and Goldman (1993, 1998), control conditions did not differ from the expectancy challenge condition in their perceptions of experimenter demands to change or in their appraisals of likelihood of change following the study. The current protocol follows the same experimental procedures as in the studies conducted by Darkes and Goldman; thus, it is unlikely the changes observed in the expectancy challenge group were due to demand characteristics.

Another limitation pertains to the ethnic homogeneity of the present sample. Although representative of the ethnic profile at the university where the study was conducted, the majority of the sample was comprised of Caucasian students (76%). Given the research detailing differences among ethnic groups in alcohol use and factors contributing to excessive drinking (e.g., Bachman, Wallace, O’Malley, Johnston, Kurth,
& Neighbors, 1991; Presley, Meilman, Cashin, & Lyerla, 1996), the generalizability of findings beyond Caucasian college students may be limited. Lastly, the present sample excluded individuals with a history of substance abuse treatment or with extreme drinking practices (i.e., greater than 40 standard drinks per week); consequently, the potential impact of expectancy challenge on such individuals remains unknown.

In summary, the current study was the first to develop and evaluate a single-session version of expectancy challenge to target heavy drinking in college men and women. Exposure to the intervention led to significant changes in alcohol expectancies and significant reductions in subsequent drinking in both males and females in comparison to participants in control conditions. These findings represent a critical step in the process of translating a theory-based intervention strategy validated in intensive academic laboratory designs, into a more practical format while maintaining, and even enhancing effectiveness. The single session expectancy challenge developed and validated in this project is more accessible to those seeking effective drinking reduction strategies for college campuses and will encourage further development of pragmatic strategies based on expectancy theory.
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APPENDIX B: MEMORY MODEL-BASED EXPECTANCY QUESTIONNAIRE
MMBEQ-A

The following pages contain words describing possible effects of alcohol. For each word, imagine it completing the sentence: "DRINKING ALCOHOL MAKES ME _______." Then, for each word circle the word that indicates how often you think that this effect happens or could happen to you after drinking several drinks of alcohol. "Drinking alcohol" refers to drinking any alcoholic beverage such as beer, wine, wine coolers, whiskey, scotch, vodka, gin, or mixed drinks.

There are no right or wrong answers. Answer each item quickly according to your first impression and according to your own personal beliefs about the effects of alcohol. Circle one answer for each question.

"DRINKING ALCOHOL MAKES ME _______."

1. Less Nervous NEVER SOMETIMES USUALLY ALWAYS
2. Active NEVER SOMETIMES USUALLY ALWAYS
3. Cocky NEVER SOMETIMES USUALLY ALWAYS
4. Content NEVER SOMETIMES USUALLY ALWAYS
5. Dangerous NEVER SOMETIMES USUALLY ALWAYS
6. Dizzy NEVER SOMETIMES USUALLY ALWAYS
7. Dumb NEVER SOMETIMES USUALLY ALWAYS
8. Friendly NEVER SOMETIMES USUALLY ALWAYS
9. Funny NEVER SOMETIMES USUALLY ALWAYS
10. Happy NEVER SOMETIMES USUALLY ALWAYS
11. Loud NEVER SOMETIMES USUALLY ALWAYS
12. Mad NEVER SOMETIMES USUALLY ALWAYS
13. Nasty NEVER SOMETIMES USUALLY ALWAYS
14. Pretty NEVER SOMETIMES USUALLY ALWAYS
15. Relaxed NEVER SOMETIMES USUALLY ALWAYS
16. Rude NEVER SOMETIMES USUALLY ALWAYS
17. Sad NEVER SOMETIMES USUALLY ALWAYS
"DRINKING ALCOHOL MAKES ME _______."

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<thead>
<tr>
<th></th>
<th></th>
<th>NEVER</th>
<th>SOMETIMES</th>
<th>USUALLY</th>
<th>ALWAYS</th>
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<tr>
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<td>Sleepy</td>
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<tr>
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<td>Slow</td>
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<td>Smart</td>
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<td>Talkative</td>
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<tr>
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<td>Wild</td>
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<td>Fun</td>
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<td>Jolly</td>
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<td>Quiet</td>
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<tr>
<td>29.</td>
<td>Cool</td>
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<td></td>
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<td>30.</td>
<td>Goofy</td>
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<td>31.</td>
<td>Less Upset</td>
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<td>Mean</td>
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<td>34.</td>
<td>Sick</td>
<td></td>
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<td>35.</td>
<td>Hurt Others</td>
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<tr>
<td>36.</td>
<td>Forgetful</td>
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<td>37.</td>
<td>Crazy</td>
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<td>38.</td>
<td>Good</td>
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<tr>
<td>39.</td>
<td>Stupid</td>
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<td>40.</td>
<td>Carefree</td>
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<tr>
<td>41.</td>
<td>Hyper</td>
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</tbody>
</table>
APPENDIX C: FACTOR-BASED EXPECTANCY MEASURES
RESPOND TO THESE ITEMS ACCORDING TO WHAT YOU PERSONALLY BELIEVE TO BE TRUE ABOUT ALCOHOL (CIRCLE ONE)

1. Some alcohol has a pleasant, cleansing, tingy taste..........................................AGREE
2. Drinking adds a certain warmth to social occasions........................................AGREE
3. When I'm drinking, it is easier to open up and express my feelings........AGREE
4. Time passes quickly when I'm drinking........................................................AGREE
5. Drinking makes me feel flushed.................................................................AGREE
6. I feel powerful when I drink, as if I can really influence others to do what I want............................................................AGREE
7. Drinking gives me more confidence in myself..................................................AGREE
8. Drinking makes me feel good........................................................................AGREE
9. I feel more creative after I've been drinking....................................................AGREE
10. Having a few drinks is a nice way to celebrate special occasions...................AGREE
11. When I'm drinking I feel freer to be myself and do whatever I want........AGREE
12. Drinking makes it easier to concentrate on the good feelings I have at the time.................................AGREE
13. Alcohol allows me to be more assertive.........................................................AGREE
14. When I feel "high" from drinking, everything seems to feel better........AGREE
15. I find that conversing with members of the opposite sex is easier for me after I've had a few drinks..........................................................AGREE
16. Drinking is pleasurable because it's enjoyable to join in with people who are enjoying themselves........................................AGREE
17. I like the taste of some alcoholic beverages....................................................AGREE
18. If I'm feeling restricted in any way, a few drinks make me feel better........AGREE
19. Men are friendlier when they drink................................................................AGREE
20. After a few drinks, it is easier to pick a fight....................................................AGREE
21. If I have a couple of drinks, it is easier to express my feelings....................AGREE
22. Alcohol makes me need less attention from others than I usually do.........AGREE
23. After a few drinks, I feel more self-reliant than usual....................................AGREE
24. After a few drinks, I don't worry as much about what other people think of me..........................................................AGREE
25. When drinking, I do not consider myself totally accountable or responsible for my behavior..................................................AGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE

DISAGREE
RESPOND TO THESE ITEMS ACCORDING TO WHAT YOU PERSONALLY BELIEVE TO BE TRUE ABOUT ALCOHOL (CIRCLE ONE)

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Alcohol enables me to have a better time at parties.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Drinking makes the future seem brighter.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>I often feel sexier after I've had a couple of drinks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>I drink when I'm feeling mad.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Drinking alone or with one other person makes me feel calm and serene.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>After a few drinks, I feel brave and more capable of fighting.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Drinking can make me more satisfied with myself.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>My feelings of isolation and alienation decrease when I drink.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Alcohol helps me sleep better.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>I'm a better lover after a few drinks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Alcohol decreases muscular tension.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Alcohol makes me worry less.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>A few drinks makes it easier to talk to people.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>After a few drinks I am usually in a better mood.</td>
<td></td>
<td></td>
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<tr>
<td>40</td>
<td>Alcohol seems like magic.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Women can have orgasms more easily if they've been drinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Drinking helps get me out of a depressed mood.</td>
<td></td>
<td></td>
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<tr>
<td>43</td>
<td>After I've had a couple of drinks, I feel I'm more of a caring, sharing person.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Alcohol decreases my feelings of guilt about not working.</td>
<td></td>
<td></td>
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<tr>
<td>45</td>
<td>I feel more coordinated after I drink.</td>
<td></td>
<td></td>
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<tr>
<td>46</td>
<td>Alcohol makes me more interesting.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>A few drinks makes me feel less shy.</td>
<td></td>
<td></td>
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<tr>
<td>48</td>
<td>Alcohol enables me to fall asleep more easily.</td>
<td></td>
<td></td>
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<tr>
<td>49</td>
<td>If I'm feeling afraid, alcohol decreases my fears.</td>
<td></td>
<td></td>
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<tr>
<td>50</td>
<td>For this statement circle the answer &quot;agree&quot; on your sheet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Alcohol can act as an anesthetic, that is, it can deaden pain.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>I enjoy having sex more if I've had some alcohol.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>I am more romantic when I drink.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>I feel more masculine/feminine after a few drinks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Alcohol makes me feel better physically.</td>
<td></td>
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</tr>
</tbody>
</table>
RESPOND TO THESE ITEMS ACCORDING TO WHAT YOU PERSONALLY BELIEVE TO BE TRUE ABOUT ALCOHOL (CIRCLE ONE)

56. Sometimes when I drink alone or with one other person it is easy to feel
   cozy and romantic.................................................................AGREE DISAGREE

57. I feel like more of a happy-go-lucky person when I drink..............................AGREE DISAGREE

58. Drinking makes get-togethers more fun................................................AGREE DISAGREE

59. Alcohol makes it easier to forget bad feelings........................................AGREE DISAGREE

60. After a few drinks, I am more sexually responsive................................AGREE DISAGREE

61. If I'm cold, having a few drinks will give me a sense of warmth....................AGREE DISAGREE

62. It is easier to act on my feelings after I've had a few drinks........................AGREE DISAGREE

63. I can discuss or argue a point more forcefully after I've had a drink or two......AGREE DISAGREE

64. A drink or two makes the humorous side of me come out............................AGREE DISAGREE

65. Alcohol makes me more outspoken or opinionated.....................................AGREE DISAGREE

66. Drinking increases female aggressiveness.................................................AGREE DISAGREE

67. A couple of drinks makes me more aroused or physiologically excited..........AGREE DISAGREE

68. At times, drinking is like permission to forget problems............................AGREE DISAGREE

69. If I am tense or anxious, having a few drinks makes me feel better..............AGREE DISAGREE
COMPREHENSIVE EFFECTS OF ALCOHOL

This questionnaire assesses what you would expect to happen if you were under the influence of alcohol.

Check from disagree to agree – depending on whether you expect the effect to happen to you if you were under the influence of alcohol. These effects will vary, depending upon the amount of alcohol you typically consume.

This is not a personality assessment. We want to know what you expect to happen if you were to drink alcohol, not how you are when you are sober. Example: If you are always emotional, you would not check agree as your answer unless you expected to become MORE EMOTIONAL if you drank.

If I were under the influence of alcohol:

<table>
<thead>
<tr>
<th></th>
<th>Disagree</th>
<th>Slightly disagree</th>
<th>Slightly agree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I would be outgoing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>My senses would be dulled</td>
<td></td>
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<tr>
<td>3.</td>
<td>I would be humorous</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td>My problems would seem worse</td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td>It would be easier to express my feelings</td>
<td></td>
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<tr>
<td>6.</td>
<td>My writing would be impaired</td>
<td></td>
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<tr>
<td>7.</td>
<td>I would feel sexy</td>
<td></td>
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<tr>
<td>8.</td>
<td>I would have difficulty thinking</td>
<td></td>
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<td>9.</td>
<td>I would neglect my obligations</td>
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<tr>
<td>10.</td>
<td>I would be dominant</td>
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<tr>
<td>11.</td>
<td>My head would feel fuzzy</td>
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<tr>
<td>12.</td>
<td>I would enjoy sex more</td>
<td></td>
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<tr>
<td>13.</td>
<td>I would feel dizzy</td>
<td></td>
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</table>
Check from disagree to agree – depending on whether you expect the effect to happen to you if you were under the influence of alcohol. These effects will vary, depending upon the amount of alcohol you typically consume.

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</thead>
<tbody>
<tr>
<td>14. I would be friendly</td>
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<td>15. I would be clumsy</td>
<td></td>
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<tr>
<td>16. It would be easier to act out my fantasies</td>
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<td>17. I would be loud, boisterous, or noisy</td>
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<tr>
<td>18. I would feel peaceful</td>
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<td>19. I would be brave and daring</td>
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<td>20. I would feel unafraid</td>
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<td>21. I would feel creative</td>
<td></td>
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<tr>
<td>22. I would be courageous</td>
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<td>23. I would feel shaky, or jittery the next day</td>
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<td>24. I would feel energetic</td>
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<td>25. I would act aggressively</td>
<td></td>
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<tr>
<td>26. My responses would be slow</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>27. My body would be relaxed</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>28. I would feel guilty</td>
<td></td>
<td></td>
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<tr>
<td>29. I would feel calm</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>30. I would feel moody</td>
<td></td>
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Check from disagree to agree – depending on whether you expect the effect to happen to you if you were under the influence of alcohol. These effects will vary, depending upon the amount of alcohol you typically consume.

**If I were under the influence of alcohol:**

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<th>Slightly disagree</th>
<th>Slightly agree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. It would be easier to talk to people</td>
<td></td>
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<tr>
<td>32. I would be a better lover</td>
<td></td>
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<tr>
<td>33. I would feel self-critical</td>
<td></td>
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<td></td>
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<tr>
<td>34. I would be talkative</td>
<td></td>
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<tr>
<td>35. I would act tough</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. I would take risks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. I would feel powerful</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. I would act sociable</td>
<td></td>
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</tbody>
</table>
APPENDIX D: EXPECTANCY CHALLENGE SESSION SLIDES FOR MALE PARTICIPANTS
**Welcome to the Bar Lab!!**

**Introductions**
- The Group Leader
- The Project Leader
- Most Importantly...THE BARTENDER!

**Tonight’s Agenda**
- Drink!
- Get to know each other!
- Drink some more!
- Play Win-Lose-or-Draw
- Discuss some things about alcohol

**Bring on the Drinks!**

**Getting to Know Each Other...**
- Please introduce yourself
  - First name
  - Major
  - Worst pick up line or most embarrassing moment while drinking

**Win-Lose-or-Draw**
- The Rules
  - Divide into 2 teams
  - Draw topic you pick from a jar
  - Team tries to guess the topic
  - The other team will get to guess
  - LET’S PLAY
Who's Drinking What????

- Who do you think had alcohol?
- What behaviors made you think they were drinking?
- Use the list of players and topics to remember what they've said and done.

Behaviors Associated with Drinking

- By telling us the behaviors that led you to believe people were drinking, you have told us what you think the effects of alcohol are.
- Everyone has beliefs about the effects of alcohol.
- People tend to have similar beliefs about the effects of alcohol.

Common Beliefs About Alcohol

**ALCOHOL...**

Makes us have more fun
Makes it easier to talk to strangers

Do you think alcohol have these effects???

These Beliefs...

- Are usually not accurate
- Often contradict each other
- Have a powerful influence over how we behave when we drink

Alcohol doesn't really make us have more fun, more outgoing, and doesn't really enhance sexuality

These aren't REAL effects of alcohol.

Does Alcohol make us...

- Sleepy or outgoing?
- Happy or sad?
- Quiet or loud?
- Mad or relaxed?

People tend to believe all these things!!!!

But Why Are These Beliefs Important?

These beliefs influence how we act when we drink.

The best way to predict how someone will act is to know if they think they drank alcohol... whether they did or not!
Expectancies = our beliefs about the effects of alcohol

These expectancies (or beliefs) can create or add to the effects we experience when we drink.

Beliefs or REAL effects: Balanced Placebo Design

- Told Alcohol Told Placebo
  - Get Placebo Get Alcohol
  - Told Alcohol Get Alcohol Told Placebo
  - Get Alcohol

When people get alcohol but think they're getting a soft drink...

However, they act as due to the REAL effects of alcohol because they don’t know that they’ve been drinking.

Pharmacological Effects of Alcohol

- Dizziness
- Sleepiness
- Nausea

What about the other group?

When people THINK they are having alcohol but are actually having soft drinks...

...They become more social, talkative, & outgoing

even though they weren't drinking!

How they behave is due to their beliefs about alcohol's effects & NOT the REAL effects of alcohol because they didn't drink!
But Where Do These Effects Come From?

Our expectancies often have nothing to do with the actual effects of alcohol!

We act the way we do when we drink because of the way we expect alcohol to affect us!

Most Common Expectancies...

- Social Behaviors
  - Outgoing
  - Talkative
  - Horny
- Mood Changes
  - Horny
  - Happy
  - Relaxed

Where do changes in your social behavior come from?

- After tricking people about what's in their drinks, they experience the social effects they expect from alcohol whether they get alcohol or not
- So it doesn't matter whether you are drinking or not

Alcohol doesn't change your behavior or mood, you do!

Now, Let's Talk About Sex...

- Common Beliefs About Alcohol
  - Makes it easier to approach strangers to whom we are attracted
  - Alcohol makes us more sexually aroused

BUT...

These Types of Beliefs...

- Are usually not accurate
- Are often contradictory or oppose each other
- Have a powerful influence over how we behave when we drink
Sexual Expectancies

- Remember the placebo studies?
- Similar studies were done to see the effects of alcohol and expectancies on sexual arousal and sexual performance

Results: Alcohol, Expectancies, and Sex

Low alcohol consumption = increased sexual arousal!

High consumption = decreased sexual arousal!

In Plain English:
More alcohol = less arousal & ability to perform!

More Results...

In another study, people who believed that they had drank alcohol showed higher levels of arousal even though they had NOT consumed alcohol!!!
**How Does This Work?**

We seek effects we have been told or have learned to expect from alcohol → **ALCOHOL** → We get the effects we seek because we label the effects based on our expectancies

We attribute the effects to alcohol and so we drink again later to achieve the same effects!

---

**Example of Labeling**

- You're at a party
  - You're talking to friends
  - You've had a few drinks
  - You're feeling the vague effects of alcohol
  - You label these effects as alcohol making you more sociable

---

**Another Example**

- After a night with a date you believe that your sexual arousal and/or performance was attributable to alcohol
- Because we attribute the effects to alcohol (feeling sexier or more responsive), we drink again later to achieve the same effects.

---

**In Other Words...**

If you BELIEVE alcohol makes you feel outgoing or sexier or whatever, then you will drink to get that effect...even though that's not a REAL effect of alcohol!

---

**This Brings Us to a Very Important Question:**

If it's all in our heads, then why do we continue to use alcohol?

---

**Answer:**

Because we learn that alcohol can do many things!

AND WE BELIEVE IT!
You Think We’re Full of Crap??!!!

- We aren’t saying alcohol has no effect on us.
- Alcohol is a powerful depressant drug.
- BUT, many of us drink because we expect alcohol to do many things for us.

But if alcohol is such a depressant, how do we come to expect these positive effects from alcohol?

- We see or hear about adults drinking as children (e.g., movies, parents, etc)
- We anticipate our first drink, but it is generally not very good.
- So why do we keep drinking after a bad first experience?

How We Learn Alcohol Expectancies

- Advertisements
- Conversations
- Mass Media
- Entertainment and Literature
- Others….parents, school, friends

What are some examples of these?
Conclusions From Research

- Expectancies are our beliefs about the effects of alcohol.
- Alcohol does have some true physical & mental effects, which can be quite different than those we expect.
- Most effects thought to be from alcohol are actually due to our expectancies.

Conclusions From Research

- We learn wide variety of expectancies for the effects of alcohol from many sources.
- People display behavior changes, such as laughter and cheerfulness, in response to being told they have had alcohol, even if they have not.
- People expect that drinking alcohol enhance sexual response, but in large doses, alcohol actually decreases sexual response & performance.

Implications...

- It is natural for us to have alcohol expectancies because of the culture we're raised in.
- We will continue to have these alcohol expectancies until we are made aware of the real effects of alcohol.

So Does This Mean We Have to Stop Drinking?!

- Of course NOT!!!
- We don't have to stop drinking alcohol... but we can drink less because we can create the desired effects ourselves.
- We SHOULD realize that some of the effects we expect from drinking are actually the opposite of what it will do for us.

CONCLUSIONS

- We need less alcohol to get the "buzz" that we are seeking, the rest we can do on our own.
- We don't have to have the expense, hangovers, calories, DUI's, etc. to get the effects we want!!!

Closing...

- What are your expectancies?
- Take notice of expectancies for the social effects of alcohol around you (e.g. friends, media)
- Monitor your drinking
APPENDIX E: EXPECTANCY CHALLENGE SESSION SLIDES FOR FEMALE PARTICIPANTS
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- The Project Leader
- Most Importantly... THE BARTENDER!

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- Get to know each other!
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Bringing on the Drinks!

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Common Beliefs About Alcohol
ALCOHOL...
- Makes us have more fun
- Makes it easier to talk to strangers

Do you think alcohol have these effects???

These Beliefs...
- Are usually not accurate
- Often contradict each other
- Have a powerful influence over how we behave when we drink

Alcohol doesn't really make us have more fun, more outgoing, and social!

These aren't REAL effects of alcohol

But Why Are These Beliefs Important?
These beliefs influence how we act when we drink.

The best way to predict how someone will act is to know if they think they drank alcohol... whether they did or not!

Does Alcohol Make Us...
- Sleepy or outgoing?
- Happy or sad?
- Quiet or loud?
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Expectancies = our beliefs about the effects of alcohol

These expectancies (or beliefs) can create or add to the effects we experience when we drink.

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  - Got Placebo
- Told Alcohol
  - Got Placebo
- Told Placebo
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When people get alcohol but think they're getting a soft drink...

However they act is due to the REAL effects of alcohol because they don't know that they've been drinking.

Pharmacological Effects of Alcohol

- Dizziness
- Sleepiness
- Nausea

SO WHAT ARE THE REAL EFFECTS OF ALCOHOL???

What About the Other Group?

When people THINK they are having alcohol but are actually having soft drinks...

...They become more social, talkative, & outgoing

Even though they weren't drinking!

How they behave is due to their beliefs about alcohol's effects & NOT the REAL effects of alcohol because they didn't drink!
**But Where Do These Effects Come From?**

Our expectancies often have nothing to do with the actual effects of alcohol!

We act the way we do when we drink because of the way we expect alcohol to affect us!

---

**Most Common Expectancies...**

- Social Behaviors
  - Outgoing
  - Talkative
  - Horny
- Mood Changes
  - Horny
  - Happy
  - Relaxed

---

**What are the most common beliefs about the effects of alcohol?**

**More Common Beliefs About Alcohol**

**Common Social Expectancies...**

- "Drinking makes me feel more at ease around others"
- "Having a few drinks helps me relax in a social situation"

---

**But These Types of Beliefs...**

1. Are usually not accurate
2. Are often contradictory or oppose each other
3. Have a powerful influence over how we behave when we drink

---

**Social Expectancies**

- Remember the placebo studies?
- Similar studies were done to see the effects of alcohol and expectancies on your anxiety/nervousness around others in social situations
**Does drinking alcohol REALLY make you more at ease around others? Or is it in your head?!**

- When people THINK they’re drinking alcohol but are actually having soft drinks....
  - They said they felt less anxious even though they weren’t drinking!!!!
  - True especially if they BELIEVE alcohol has this effect!

**The Reality...**

Alcohol **DOESN’T** actually make you more at ease or comfortable around others...you do!!

---

**Why Do We Feel This Way If Alcohol Doesn’t Do It?**

- Alcohol causes a general slowing and numbing effect.
- We label what is happening around us based on our beliefs and on the situation.
- So we think alcohol is making us friendlier or happier or horny or whatever!

**How Does This Work?**

We seek effects we have been told or have learned to expect from alcohol → **ALCOHOL** →

We get the effects we seek because we label the effects based on our expectancies.

We attribute the effects to alcohol and so we drink again later to achieve the same effects!

---

**Example of Labeling**

- You’re at a party
  - You’re talking to friends
  - You’ve had a few drinks
  - You’re feeling the vague effects of alcohol
  - You label these effects as alcohol making you more sociable

**Another Example**

- You are on a date with someone you are attracted to
- You have had a few drinks
- You start feeling physically attracted to the person
- You may be labeling some of the vague effects of alcohol as making you aroused
In Other Words...

Because we attribute the effects to alcohol (e.g., outgoing, happy, sociable, sexy), we drink again later to achieve these effects...

...even though that's not a REAL effect of alcohol!

Answer:

Because we learn that alcohol can do many things!

AND WE BELIEVE IT!

This brings us to a very important question:

If it's all in our heads, then why do we continue to use alcohol???

You Think We're Full of Crap??!!!!

- We aren't saying alcohol has no effect on us.
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Conclusions From Research

- We learn wide variety of expectancies for the effects of alcohol from many sources.
- People display behavior changes, such as laughter and cheerfulness, in response to being told they've had alcohol, even if they've not.
- People said that drinking helped them feel more at ease and relaxed around others even though they didn't have any alcohol.

Implications...

- It is natural for us to have alcohol expectancies because of the culture we're raised in.
- We will continue to have these alcohol expectancies until we are made aware of the real effects of alcohol.
**So Does This Mean We Have to Stop Drinking?!**

- Of course NOT!!
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- We don’t have to have the expense, hangovers, calories, DUI’s, etc. to get the effects we want!!!
August 30, 2004

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o/o Dr. Michael Dunn, Room 305C  
Orlando, FL 32816-1390

Dear Ms. Lau:

On August 25, 2004, the UCF Institutional Review Board reviewed your study entitled, "Evaluation of a Single-Session Expectancy Challenge Program,". This evaluation included an examination of the protocol, sample advertisements to be used as part of the study, and the consent form. The full board, by unanimous vote with a quorum present, granted contingent approval with a few minor changes to the consent form being requested. Having received the revised consent form and your assurance that all participants will be at least 18 years of age and no participants under the age of 21 will receive alcohol, final approval is granted. You may enroll subjects as of the date of this letter.

Please be advised that this approval is given for one year. Should there be any addendums or administrative changes to the already approved protocol, they must also be submitted to the Board. Changes should not be initiated until written IRB approval is received. Adverse events should be reported to the IRB as they occur. Further, should there be a need to extend this protocol, a renewal form must be submitted for approval at least one month prior to the anniversary date of the most recent approval and is the responsibility of the investigator (UCF).

Should you have any questions, please do not hesitate to call me at 407-823-2901.

Please accept our best wishes for the success of your endeavors.

Cordially,

Barbara Ward  
Barbara Ward, CIM  
Institutional Review Board (IRB)

Copies: IRB File
REFERENCES


Gustafson, R. (1993). Alcohol-related expected effects and the desirability of these effects for Swedish college students measured with the Alcohol Expectancy Questionnaire (AEQ). Alcohol and Alcoholism, 28, 469-475.


