Changing Expectancies: Cognitive Mechanisms and Context Effects

Reinout W. Wiers, Mark D. Wood, Jack Darkes, William R. Corbin, Barry T. Jones, and Kenneth J. Sher

This article presents the proceedings of a symposium at the 2002 RSA Meeting in San Francisco, organized by Reinout W. Wiers and Mark D. Wood. The symposium combined two topics of recent interest in studies of alcohol expectancies: cognitive mechanisms in expectancy challenge studies, and context-related changes of expectancies. With increasing recognition of the substantial role played by alcohol expectancies in drinking, investigators have begun to develop and evaluate expectancy challenge procedures as a potentially promising new prevention strategy. The two major issues addressed in the symposium were whether expectancy challenges result in changes in expectancies that mediate intervention (outcome relations), and the influence of simulated bar environments ("bar labs," in which challenges are usually done) on expectancies. The presentations were (1) An introduction, by Jack Darkes; (2) Investigating the utility of alcohol expectancy challenge with heavy drinking college students, by Mark D. Wood; (3) Effects of an expectancy challenge on implicit and explicit expectancies and drinking, by Reinout W. Wiers; (4) Effects of graphic feedback and simulated bar assessments on alcohol expectancies and consumption, by William R. Corbin; (5) Implicit alcohol associations and context, by Barry T Jones; and (6) A discussion by Kenneth J. Sher, who pointed out that it is important not only to study changes of expectancies in the paradigm of an expectancy challenge but also to consider the role of changing expectancies in natural development and in treatments not explicitly aimed at changing expectancies.

Key Words: Expectancy, Alcohol, Context, Cognitive-Mechanism, Implicit Cognition, Behavioral Change.

ALCOHOL EXPECTANCIES, CONTEXT, AND COGNITION: THE MORE THINGS CHANGE...

Jack Darkes

Alcohol expectancies predict alcohol use over time, exist in children before drinking onset, predict drinking onset, and change reciprocally with drinking (for a recent review, see Goldman et al., 1999a). Expectancy change, whether naturally occurring (Sher et al., 1996; Smith et al., 1995) or experimentally induced (Darkes and Goldman, 1993, 1998; Roehrich and Goldman, 1995; Stein et al., 2000), is associated with drinking changes, suggesting the process and experience-oriented nature of expectancy operation. Complex models of expectancy structure (e.g., Dunn and Goldman, 1996; Goldman et al., 1997; Leigh and Stacy, 1993; Rather et al., 1992) have suggested that expectancies exist as a complex network of information nodes, and, subsequently, the focus of expectancy research has somewhat shifted toward explicating the cognitive processes underlying expectancy influence (e.g., Goldman and Rather, 1993).

Inducing Changes in Expectancies—The Expectancy Challenge. The expectancy challenge reflects an experience-based approach to behavior change (Del Boca et al., 2002), by using controlled drinking experiences in a naturalistic drinking context (i.e., a bar) and the administration of alcohol-containing and placebo beverages to highlight incongruities between the expected and actual pharmacological effects of alcohol. It was created (Darkes and Goldman, 1993, 1998) to provide an experimental test of the causal role of expectancies in drinking by manipulating expectancies and evaluating subsequent changes in alcohol use. The reductions in expectancies and drinking that resulted also suggested its utility as a prevention/intervention strategy, and soon further investigations were undertaken. As Darkes noted (Del Boca et al., 2002, p. 933), the expectancy challenge should not be viewed as only the content challenged (as in an information-only challenge) but...
rather as a structured procedure in which expectancies are experientially challenged. Hence, although social and sexual expectancies have most frequently been addressed, expectations for any alcohol effect could conceivably be challenged by using the procedure.

Although much has been learned about the challenge, many issues remain for investigation. For instance, which expectancy domains should be targeted in different groups of drinkers? What is the time course of and temporal relationship between challenge-induced changes in both expectancies and drinking? What processes mediate the relationship between the observed changes in expectancies and drinking? What is it that changes: the structure (e.g., the “data”) or the process (e.g., access to the data)? In many ways, this reflects a question central to modern expectancy theory and research: What is expectancy?

**Natural Variation in Expectancies: Expectancies in Context.** Context is integral to an experience-based model of expectancy operation (Del Boca et al., 2002), and the expectancy/drinking relationship varies as a function of context (e.g., MacLatchy-Gaudet and Stewart, 2001; Reich et al., 2002; Wall et al., 2001). Further investigation of the role of context in expectancy process will need to define the parameters of context. For instance, in current expectancy research, contexts investigated range from single words seen first on a list, to line drawings or photographs, to in vivo exposure to naturalistic drinking environments. Further studies must delineate the essential characteristics (e.g., physical, social, or affective elements; e.g., Barnett and Ceci, 2002) of contexts that facilitate transfer of knowledge and the degree of each needed to be sufficient yet not overpower other important factors (e.g., individual differences). And, because expectancies anticipate which behaviors will be reinforced in a given context, the confounding of context-related (e.g., bar) expectancies and alcohol expectancies must be considered.

**Expectancy as Cognition.** As alcohol expectancy research moves into the “cognitive age,” it, perhaps unwittingly, inherits long-standing debates regarding almost every facet of information processing (e.g., Foster and Jelicic, 1999). For instance, debates regarding the nature and number of memory systems and associated processes (issues central to understanding the operation of alcohol expectancies, again addressing the question, “what is expectancy?”) have occupied memory researchers for several decades (e.g., Roediger et al., 1999; Weldon, 1999). The merging of those debates with the historical foci of expectancy research culminates in a complex combination. Alcohol expectancy research has, as noted previously, focused on individual differences, context, and change, whereas cognitive psychology has most often sought universal principles of cognitive operation. Alcohol expectancy researchers have oftentimes been obsessive and contentious regarding the psychometric properties of their measures (e.g., Goldman et al., 1991; Leigh, 1989; Leigh and Stacy, 1991), and this practice should continue as they adopt methods from other areas, including cognitive research. History suggests that expectancy researchers must continue to expect much of their assessment tools, whether implicit or explicit.

**Conclusion.** Several decades of alcohol expectancy research both inform and justify the expectancy studies of today and the future. As expectancy research breaks new ground, it should also seek consistency with the expansive network of expectancy findings already in existence. The past holds many lessons that, rather than forgotten or minimized, should be considered and built upon as expectancy research encounters the new questions of its future. The studies that follow represent the merging of lessons of the past and themes of the future.

**INVESTIGATING THE UTILITY OF ALCOHOL EXPECTANCY CHALLENGE AMONG HEAVILY DRINKING COLLEGE STUDENTS**

Mark D. Wood

This study sought to address unresolved issues in the expectancy challenge area relating to the replicability and extension of expectancy challenge effects and demonstration of the processes by which alcohol expectancy challenges influence drinking behavior. Only one study to date has observed positive outcomes for women (Wiers and Kummeling, 2001), with another recent study showing the opposite pattern of effects (Dunn et al., 2000). Moreover, follow-up periods in expectancy challenge studies have been quite brief, ranging from 2 to 4 weeks, and have not presented evidence for reductions in heavy drinking or alcohol-related problems, an important outcome for harm reduction-oriented interventions. With respect to mechanisms of effects, although expectancy challenges have produced observable reductions in alcohol expectancies, analyses indicating that changes in outcomes are mediated by changes in expectancies have not been presented. Accordingly, as noted by Jones et al. (2001), it is difficult to make strong inferences about the active ingredients in challenge approaches.

The current study (conducted with Nancy Brand and Christy Capone, to be published in detail later) had two major research questions: First, can a two-session experiential alcohol expectancy challenge targeting social and sexual expectancies reduce alcohol use and heavy drinking among college men and women at 1 and 3 month follow-up periods? Second, do changes in explicit alcohol expectancies (e.g., from standardized expectancy measures) mediate expectancy challenge effects on alcohol use?

Participants at baseline were 204 college students (110 women; 46%) with a mean age of 20.9 (SD = 0.9) of predominantly white ethnicity (91%). Mean drinks per week at baseline were 22.8 (SD = 10.77) for men and 15.4 (SD = 6.59) for women. Attrition from the study was high (28%), largely due to the demands of the two group session expectancy challenges. Those who quit did not differ from others on drinking variables at baseline. Eligible partici-
participants received baseline assessments and were randomly assigned to one of four experimental conditions: expectancy challenge (EC), individualized feedback (IF), combined expectancy challenge and individualized feedback (EC-IF), and assessment-only control (AO). The EC condition largely replicated the procedure used by Darkes and Goldman (1993, 1998). In addition to an alcohol/placebo manipulation, information was presented on chemical effects versus beliefs about the effects of alcohol, differing effects of alcohol according to dose, and media and popular culture portrayals of alcohol expectancies. Consistent with Darkes and Goldman (1993, 1998), there were two experiential challenge sessions, but unlike these studies there were no review or booster sessions. IF participants monitored their alcohol use for 2 weeks before the session and received individualized reports on their drinking and related consequences that were discussed in a non-confrontational manner with a trained facilitator. Given that the focus of the symposium was on alcohol expectancy challenge and there were no interaction effects between EC and IF, this condition and IF results are not presented here. EC-IF participants received both the EC and IF protocol with counterbalancing, and AO participants only completed baseline, 1 month, and 3 month follow-ups. From a larger battery of measures, we focus here on three sets of putative mediators: the Social/Sexual subscales of the Expectancy Context Questionnaire (Darkes and Goldman, 1993; α = 0.79–0.92), the Sociability and Sexuality subscales of the Comprehensive Effects of Alcohol Questionnaire (Fromme et al., 1993; α = 0.79–0.88), and a four-item (α = 0.74–0.88) expectancy challenge process measure of our own construction designed to assess key aspects of the challenge protocol (e.g., consideration of expected effects of alcohol, consideration of dose-response effects, consideration of media portrayals). Outcome measures included past 30-days overall and peak drinking, and past 2 weeks heavy episodic drinking from the Timeline Follow-Back (TLFB; Sobell and Sobell, 1995) as well as typical and peak weekly drinking from the Daily Drinking Questionnaire (DDQ; Marlatt et al., 1998).

We first conducted a series of 2 × 2 × 2 × 2 (gender × IF × EC × time) analyses of covariance with baseline alcohol use as a covariate and the alcohol use outcome measures described previously. For past 30 days drinking on the TLFB, there were significant main effects for EC at both 1 [F(1,165) = 3.99, p < 0.05] and 3 [F(1,165) = 3.98, p < 0.05] month follow-ups, with EC participants demonstrating significantly lower levels of overall alcohol use at both time points. In addition to these main effects, we observed a significant EC × gender × time interaction [F(1,165) = 4.04, p < 0.05]. At 1 month follow-up, women in the EC condition reported the lowest levels of alcohol use with a modest increase in drinking by the 3 month follow-up. In contrast, at 1 month follow-up, men in the EC condition reported only slightly lower levels of drinking than non-EC men, with a larger decrease in drinking by 3 month follow-up. For a typical week’s drinking on the DDQ at 3 month follow-up, we observed a significant EC × gender interaction [F(1,165) = 4.95, p < 0.05], indicating that the EC was effective in reducing drinking for men but not for women. This interaction was further qualified by a significant EC × gender × time interaction [F(1,165) = 6.29, p < 0.05], mirroring the one observed with the TLFB. No significant main or interaction effects for EC were observed for measures of heavy drinking (TLFB–peak drinking, TLFB–past 2 weeks’ heavy episodic drinking, DDQ–peak drinking).

To address our second major question regarding the processes by which the EC influences alcohol use, we conducted mediational analyses by using path analyses for each of the dependent variables for which significant main or interaction effects were observed. For both TLFB past 30 days drinking and DDQ weekly drinking at 3 month follow-up, mediational analyses were conducted separately by gender. Because there was no evidence of mediational effects, these analyses are not discussed further. Criteria suggested by Baron and Kenny (1986) and MacKinnon (1994) were followed. EC was included as an exogenous (dummy-coded) variable along with baseline measures of alcohol use, explicit social and sexual expectancies, and the EC process measure. Gender was also included as an exogenous manifest variable, covaried with other exogenous variables with paths estimated to alcohol use at follow-up. Additional models, which included IF and the IF-EC interaction terms (contrast coded), were computed and did not differ from those presented here. After controlling for strong autoregressive effects between baseline and 3 month follow-up alcohol use, we observed a modest, significant intervention effect such that assignment to EC condition was associated with lower levels of alcohol use at follow-up. To test whether the observed intervention effect was mediated by changes in explicit expectancies or changes in the expectancy process measure, subsequent models included paths from EC to the expectancy and expectancy process measures and from these putative mediators to alcohol use at 3 month follow-up. There was no evidence that the EC changed targeted social and sexual expectancies, but robust intervention effects were observed for the EC process measure. Moreover, the EC process measure significantly predicted drinking at 3 month follow-up, and the t test for the indirect effect was significant (t = −2.17, p < 0.05), indicating that changes in the EC process measure partially mediated the observed intervention effect on alcohol use at 3 month follow-up.

Expectancy theory (Goldman et al., 1999a,b) suggests that changes in expectancies mediate the effects of expectancy challenges on drinking. In this study, explicit mediational analyses (e.g., Baron and Kenny, 1986) did not provide evidence consistent with this hypothesis. Unlike some previous experiential expectancy challenge studies with review and booster sessions (Darkes and Goldman, 1993, 1998; Dunn et al., 2000), our two-session challenge did not result in changes in targeted social and sexual expectancies when an explicit measure of alcohol expectancies was used. However, as has been previously noted (Jones et al., 2001), these studies did not conduct the type of analyses typically accepted as strong evidence for mediation. Although we did see some evidence for expectancy challenge effects on measures of negative expect-
The notion of effects on overall alcohol use and our focus on challenging heavy drinking and alcohol-related problems. Despite the questions remain to be addressed. Chief among these are challenges may influence alcohol use. Nonetheless, a number of inferences about the mechanisms by which expectancy conducted the kind of statistical analyses (e.g., Baron and Kummeling (2001), our findings suggest that expectancy challenges may have utility in reducing drinking of college women. Second, we extended previously observed expectancy change effects from 4 to 12 weeks. Third, we conducted the kind of statistical analyses (e.g., Baron and Kenny, 1986; MacKinnon, 1994) necessary to make strong inferences about the mechanisms by which expectancy challenges may influence alcohol use. Nonetheless, a number of questions remain to be addressed. Chief among these are whether the expectancy challenge can result in changes in heavy drinking and alcohol-related problems. Despite the effects on overall alcohol use and our focus on challenging the notion of “more is better” with respect to drinking, we did not observe EC effects on measures of heavy drinking at either 1 or 3 month follow-up. There is also a need for further research investigating mediators of EC effects, as well as more work on the potential moderating role of gender and other personal and situational factors.

EFFECTS OF AN EXPECTANCY CHALLENGE ON IMPLICIT AND EXPLICIT EXPECTANCIES AND DRINKING

Reinout W. Wiers

Given the rather consistent association found between positive-arousal expectancies and alcohol (ab)use, Darkes and Goldman (1993) developed the expectancy challenge procedure that aims to decrease the strength of positive arousal expectancies and in this way to reduce excessive drinking in young (male) heavy drinkers. After a successful replication by the authors (Darkes and Goldman, 1998), several other studies have been less successful (see Jones et al., 2001). However, when challenge studies are compared, two dimensions should be acknowledged (Wiers, 2002, see also Del Boca and Darkes, 2001): (1) whether the challenge consists of an experiential disconfirmation or of information only and (2) the number of sessions. Until now, only two other studies investigated a multiple session experiential expectancy challenge: Dunn et al. (2000) found a change in expectancies in men but not in women, and Wiers and Kummeling (2001) found a change in expectancies and drinking in women but not in men. However, both studies are difficult to interpret: Dunn et al. (2000) did not include a control group, and Wiers and Kummeling (2001) had a small sample size due to recruitment difficulties for multiple sessions.

Recently, investigators have begun to investigate more implicit assessments of alcohol-related cognitions (Stacy, 1997; Wiers et al., 2002a; Zack et al., 1999). Implicit assessment next to explicit assessment of alcohol-related cognitions can be important for several reasons: (1) they may tap different underlying motivational processes (Stacy, 1997; Wiers et al., 2002b); (2) they may predict unique variance in behavior or unique aspects of behavior (see Wiers et al., 2002b); and (3) they are less vulnerable to socially desirable responses (Greenwald et al., 1998), which is important in the present context.

The present study (conducted with Jade van de Luitgaarden, Esther van den Wildenberg, and Fren Smulders, to be published in detail later) was designed to (1) test the efficacy of a single extended session experiential expectancy challenge procedure (one full afternoon) in a large sample of heavy drinking male and female college students in mixed-gender groups; (2) investigate how the challenge influenced implicit and explicit expectancies and alcohol (ab)use, and if so, whether a change in implicit and/or explicit expectancies mediated a change in alcohol consumption; and (3) test longer term outcomes of the intervention (4 months compared with past studies with 1 month or shorter follow-up). Furthermore, it was decided to introduce a “fake alcohol experiment” in the same bar lab as the control condition to control for potential context effects of drinking alcohol in a group in a bar lab. The expectancy challenge consisted of the complete contents of the original three-session protocol (Darkes and Goldman, 1993), as adapted for use in a mixed-gender group by Wiers and Kummeling (2001). Two challenges were done, in which participants received a glass of vodka-tonic or placebo: the social challenge and the adapted sexual challenge, both followed by information on expectancies. After the second challenge, additional information concerning alcohol effects in relation to blood alcohol level was given, after the BASICS method of Dimeff et al. (1999). Finally, participants in the challenge condition received homework assignments aimed at cognitive elaboration on the expectancy challenge (collect ads, try an evening out without alcohol, write an essay about alcohol expectancies).

In the week before and after the intervention, alcohol expectancies were assessed in two dimensions: arousal-sedation (“arousal”) and positive-negative (“valence”), in line with results from multidimensional scaling (Goldman et al., 1999b). This was done both with explicit measures (paper and pencil visual analog scales) and with implicit measures (two versions of the Implicit Association Test, IAT; Wiers et al., 2002b). Alcohol use was assessed retrospectively (beginning of the study) and prospectively (1 month after the study). In addition, 5 months later participants were requested to fill out an alcohol diary concerning their alcohol use during the past month (follow-up of month 4 after the intervention), and 72% complied.
The first positive finding in this study relates to feasibility. It was much easier to recruit participants for the adapted long single-version challenge than for the previous multiple session version: 96 participants were recruited in 2 months time (Wiers and Kummeling, 2001, could include only 25 after 6 months of similar recruitment efforts). Four dropped out during the initial phase of the study, leaving 92 participants (46 males) with an average alcohol consumption of 29.5 drinks per week (men 34.6, women 24.4), who were randomly assigned to the expectancy challenge or control condition. The second positive finding was that explicit arousal expectancies decreased \( p = 0.02 \) and sedation expectancies increased \( p = 0.04 \) in the expectancy challenge condition compared with the control condition, in men and women alike. Hence, the extended single-session challenge was effective in changing explicit expectancies. In contrast, no changes were found on the implicit associations, in either dimension \( p > 0.50 \). The results on the implicit tests replicated our earlier findings (Wiers et al., 2002b): on the valence IAT, heavy drinkers demonstrated strong implicit associations between alcohol and “negative” (like light drinkers), and on the arousal IAT, heavy drinkers demonstrated strong alcohol arousal associations (unlike light drinkers). Test-retest reliability proved adequate for both IATs (0.68 and 0.73); hence, the lack of change in implicit associations was not due to unreliable assessment.

The key question was whether alcohol consumption changed due to the intervention. Here we had to distinguish between women and men, as indicated by a significant time \( \times \) condition \( \times \) gender interaction \( p = 0.003 \).

For women, at 1 month follow-up there was no difference between those in the experimental and control condition: both showed a significant decrease in alcohol consumption \( p < 0.001 \). This suggests that the fake alcohol experiment was as effective in changing women’s drinking in the short term as the expectancy challenge. Indeed, many women in the control condition were surprised by the large effects of only a moderate dose of alcohol. At long-term follow-up there was again no difference between the groups. For men, at 1 month follow-up, a significant interaction was found between condition and time \( p = 0.05 \). The experimental group decreased drinking in weeks 3 and 4, after a slight increase in drinking in weeks 1 and 2. This could indicate a “sleeper effect” (not unlikely given the homework assignment) or a chance finding. Mediational analyses (similar to the ones reported in the previous study) showed that the significant decrease in explicit arousal expectancies partially mediated the reduced levels of alcohol consumption in week 3 in the expectancy challenge condition \( p = 0.08 \), marginally significant. In the long-term follow-up, men in the experimental condition showed reduced drinking compared with men in the control condition and women in both conditions (significant gender \( \times \) condition interaction, \( p = 0.044 \); after we controlled for alcohol use before the intervention, this interaction became marginally significant, \( p = 0.058 \)).

The results of this study show that (1) explicit arousal expectancies can successfully be reduced in a single extended experiential expectancy challenge in mixed-gender groups in men and women; (2) the same procedure does not influence implicit expectancies, as assessed with two versions of the IAT; (3) the reduction in explicit arousal expectancies in men partially mediated a reduction in alcohol consumption that began only 3 weeks after the challenge; and (4) there is suggestive evidence that the challenge resulted in reduced drinking in men 4 months later. These results are encouraging for further research on the efficacy of the expectancy challenge procedure in young heavily drinking men but less so for young heavily drinking women. Alternatively, one could argue that the challenge was successful for women on the short-term outcomes (reduced arousal expectancies and drinking) and that perhaps giving actual feedback (as in the control condition) could be added to the procedure. This suggestion should be tested in a new experiment.

Finally, one may wonder why the implicit associations were not changed as a result of the intervention. There are several possible answers to this question. One possibility is that the particular measures used (valence IAT and arousal IAT; Wiers et al., 2002b) are not sensitive to change. This is unlikely, however, because other studies reported changes after a brief intervention using the IAT (e.g., Dasgupta and Greenwald, 2001). These changes were usually measured earlier after the intervention (within 24 hr versus 1 week), so perhaps we were too late with our implicit assessment. Alternatively, one could argue that the assessment was too early: perhaps implicit associations change only after more cognitive elaboration and/or behavioral experience. In any case, we believe that the dissociation between the effects of the intervention on implicit and explicit measures adds to the evidence that these tap different underlying processes (Stacy, 1997; Wiers et al., 2002b). Furthermore, one may question to what extent implicit associations are changed in other interventions (Stacy and Ames, 2001) or how one could change implicit associations in heavy drinkers (e.g., cue exposure, naltrexone) and what effect a successful change in implicit associations would have on behavior. These issues should be addressed in future studies and may be helpful in the development of more effective interventions.

EFFECTS OF GRAPHIC FEEDBACK AND SIMULATED BAR ASSESSMENTS ON ALCOHOL EXPECTANCIES AND CONSUMPTION

William R. Corbin

Alcohol expectancies have increasingly become a target of prevention and treatment efforts. Methods have ranged from comprehensive programs that include an expectancy component (D’Amico and Fromme, 2000; Marlatt et al.,...
1998) to more focused “expectancy challenge” procedures (Corbin et al., 2001; Darkes and Goldman, 1993, 1998). Although a number of comprehensive programs have demonstrated positive outcomes with respect to drinking behavior, there is little evidence suggesting that reductions in alcohol expectancies are responsible for changes in drinking behavior (D’Amico and Fromme, 2000; Fromme et al., 1986). Results of expectancy challenge studies have also been mixed with respect to changes in expectancies and drinking behavior (Jones et al., 2001).

There is some evidence that “experiential” expectancy challenges are successful in reducing both expectancies and drinking behavior (Darkes and Goldman, 1993, 1998), although some attempts to replicate have been unsuccessful (Maddock et al., 1999). Even in the absence of making judgments about beverage content, as in the typical “experiential” challenge study, consuming alcohol in a simulated bar setting may be instructive. Participants are able to observe how they feel at different blood alcohol content levels and how those around them behave at similar blood alcohol content levels. In many alcohol administration studies, participants also have the opportunity to see how they perform on cognitive and behavioral tasks before and after consuming alcohol.

Although experiential challenges show promise, administration of alcohol is not appropriate in most treatment settings or for primary prevention. Thus, attempts have been made to develop “explicit” challenge procedures that more directly target individual beliefs about the effects of alcohol. Although readily applicable in most settings, research on explicit challenges has not supported their utility in changing drinking behavior (Corbin et al., 2001; Jones et al., 2001). Furthermore, a number of explicit challenge studies have failed to even demonstrate changes in self-reported expectancies (Austin and Johnson, 1997; Corvo et al., 2001). Thus, efforts to identify alternate methods of challenging alcohol expectancies continue.

Social norms approaches have shown promise as a strategy for reducing alcohol consumption and related negative consequences in both universal (Haines and Spear, 1996) and individual-level interventions (Borsari and Carey, 2000). The goal of these programs is to correct misperceptions about the drinking behavior of peers. Most college students overestimate how much their peers are consuming (Perkins et al., 1999) and may therefore drink more heavily to try to “keep up.” This approach might be useful in altering alcohol expectancies given that college students also overestimate the likelihood that peers will experience various effects of alcohol (Leigh, 1987).

The current study (conducted with Kim Fromme and colleagues) evaluated a prevention program called the Lifestyle Management Class (LMC). This comprehensive program included presentation of individualized graphic feedback regarding participant expectancies, alcohol use, and participant perceptions of peer expectancies and alcohol use. The LMC project also included assessments in a simulated bar for a subset of participants. The study design provided the opportunity to assess the individual and combined impact of individualized feedback about alcohol expectancies and alcohol administration in a simulated bar lab. Based on the presentation of graphic feedback, participants in the LMC conditions were expected to demonstrate reductions in perceptions of peer alcohol use and positive alcohol expectancies. Participation in either the LMC class or the simulated bar was expected to reduce positive alcohol expectancies and drinking behavior. Changes in alcohol expectancies were a proposed mediator of reductions in drinking.

Participants were recruited through advertisements in a university paper and through flyers distributed in the community. Those meeting admission criteria were randomly assigned to one of two treatment conditions (peer-led LMC and professionally led LMC) or a control condition. Participants of legal drinking age were eligible to be assigned to complete their pre- and postintervention assessments in a simulated bar lab. These assessments included administration of alcohol to participants and completion of sober and intoxicated measures of cognitive functioning. Participants completed measures of alcohol consumption, alcohol expectancies, and perceptions of peer alcohol use and expectancies before and after the intervention.

To assess the impact of the LMC class and participation in the simulated bar, participants were categorized into four groups: no LMC and no bar experience ($n = 103$); LMC and no bar experience ($n = 216$); no LMC and bar experience ($n = 33$); and LMC and bar experience ($n = 119$). Participation in the LMC classes was associated with reductions in perceptions of peer use but no changes in perceptions of peer expectancies. Furthermore, there was a trend toward increased positive expectancies of sociability for participants who attended the LMCs. Relative to controls, LMC participants who were high in readiness to change before the intervention showed decreases in heavy alcohol consumption at posttest. Changes in alcohol expectancies from pre- to postintervention were not associated with changes in drinking behavior. Participation in the alcohol administration component of the study was associated with decreases in alcohol expectancies of cognitive and behavioral impairment but was not associated with differential changes in alcohol consumption.

Consistent with past research on social norming approaches, presentation of graphic feedback about self and peer alcohol use led to reductions in perceptions of peer use. However, graphic feedback about self and peer alcohol expectancies did not affect personal expectancies despite an overestimation bias. Before the intervention, participants indicated that their peers had significantly stronger beliefs about both positive and negative effects of alcohol, relative to themselves. Although additional research is necessary to determine the reason for the lack of reductions in perceptions of peer expectancies, one reason may be participants’ levels of confidence in their assessments of peer
expectancies. Unlike peer drinking behavior, which is directly observable, peer expectancies are hard to assess. The result may be a lack of dissonance when presented with this type of feedback. In other words, the individual may not be at all surprised to find that he or she was inaccurate in assessing peer beliefs about alcohol’s effects.

Participation in the simulated bar reduced negative expectancies of cognitive and behavioral impairment but did not affect positive expectancies. The bar experience also failed to affect the drinking behavior of participants. This suggests that participation in a simulated bar without the “experiential challenge” component may not be an effective prevention or intervention strategy. It is worth noting that participation in the alcohol administration component of this study was not intended to be an intervention. Thus, it is possible that this type of experience may affect expectancies and/or drinking behavior if additional efforts were made to make the experience therapeutic. For example, participants could be provided with graphic feedback regarding their blood alcohol levels throughout the protocol, and debriefing could provide additional education about alcohol effects. Regardless, further research is needed to dismantle the components of experiential challenges to determine the active components. It is unclear, for example, if it is necessary to administer alcohol or if the same results could be achieved by giving a placebo to all participants. In addition to improving our understanding of experiential challenges, we must continue to search for alternate strategies for effectively reducing alcohol expectancies in high-risk populations.

Despite the failure to reduce perceptions of peer alcohol expectancies and counter therapeutic changes in expectancies (increased positive), the LMC class led to a reduction in heavy drinking for participants high in readiness to change. This adds to the existing literature showing divergent outcomes for alcohol consumption and alcohol expectancies (Corbin et al., 2001; D’Amico and Fromme, 2000). Although expectancy challenge procedures have shown some promise, it is clear that changes in expectancies are not essential for effective prevention and treatment. Furthermore, there remain significant obstacles to effective use of expectancy challenge strategies including (1) relatively small effects and/or failures to replicate in experiential challenge studies, (2) limited applicability of experiential challenges in treatment and primary prevention, and (3) a lack of effective nonexperiential alternatives.

IMPLICIT ALCOHOL ASSOCIATIONS AND CONTEXT

Barry T. Jones

Some of the efforts to understand causes of relapse after periods of abstinence from alcohol abuse or dependence have focused on physical entities (cues) that might be implicated. The possible roles of such cues (that were once alcohol-neutral but have acquired an alcohol-related status from consumption experience) have been explored through their effect on a wide range of physiologic, behavioral, and subjective responses that might initiate, partly initiate, or accompany relapse—for example, changes of heart rate (McCusker and Brown, 1995), skin conductance (Stormark et al., 1993), event related potentials (Herrmann et al., 2001), salivary flow (Monti et al., 1990), reaction time (Sayette et al., 1994), craving (Monti et al., 1999), and intentions and desires to drink (Schulze and Jones, 1999, 2000). Cue exposure treatment has been developed to weaken cue-response links (Heather and Greeley, 1990) often with additional, accompanying skill-training to help (Rohsenow et al., 2001). Although traditionally cast within a conditioned learning framework, alcohol cue reactivity is also thought of as a property of a memory comprising networks of connected nodes with activation spreading through the connections that become modified through experience (Gautier and Spencer, 1999).

During the last 10 years (independent of cue reactivity research, in which interests have been principally restricted to the abusive/dependent pole of the consumption continuum), Stacy has used the spreading activation network model to explain variability in alcohol consumption across its range (e.g., Stacy, 1997; Stacy et al., 1994). In common with traditional alcohol cue reactivity research, the links between alcohol cues and changes in responses that might promote alcohol consumption have been explored. Also in common with traditional alcohol cue reactivity research, the activation and operation of the links are thought to be processes that are outside of awareness (sometimes called an automatic or implicit process). The nature of the cues that have interested Stacy are, however, quite different. Whereas within traditional alcohol cue reactivity research, the cues to which reactions are measured are principally physical entities (sights, sounds, smells), Stacy and colleagues have addressed the possible cueing function of cognitions of subjective states (such as feeling relaxed, fulfilled, ashamed, fatigued, proud, disgusted, or distressed) that are normally generated as a consequence of carrying out some behavior or other. He has proposed that links between network nodes representing behaviors (e.g., drinking alcohol) and nodes representing behavioral outcomes (e.g., feeling relaxed) strengthen when they co-occur. If this were the case, then heavier drinkers would have stronger links than would lighter drinkers, to the extent that a heavier drinker contemplating relaxation would be more likely to have alcohol consumption “pop into mind” as a contending solution than would a lighter drinker—which, in turn, would increase the likelihood of consumption occurring. In this way, memory structures established through consumption experience are thought to influence (or cue) future consumption. Stacy has explored the alcohol-cueing effect of individuals thinking about different categories of behavioral outcomes by using an Associations Questionnaire (AQ) whose items comprise the following outcome categories: (1) positive outcomes of alcohol consumption that he had previously shown were...
culturably available (i.e., they demonstrated a high frequency of occurrence in the study used to generate the items for the AQ in which participants were asked to list good or pleasant things that happened to them when they drank alcohol, P-HF), (2) positive alcohol consumption outcomes that were idiosyncratically available (collected as for 1 but with low, not high, frequency of occurrence, P-LF), and (3) positive outcomes of behaviors that were not alcohol consumption (control items, P-C). Participants complete the AQ by writing down a behavior of theirs that would normally cause them to experience the outcome represented in each AQ item. Their responses are subsequently coded as “alcohol responses” (i.e., alcohol consumption) or not.

In a prospective design using the AQ, Stacy (1997) showed a positive relationship between participants’ typical consumption and the number of alcohol responses made to P-HF items but not to P-LF or P-C items (both of which are control categories). Because considerable care was taken to ensure that participants were not aware that the study was alcohol-related, Stacy concluded that thoughts about alcohol consumption outcomes (from participants reading the P-HF items) could, indeed, cue thoughts about alcohol consumption (alcohol responses made by participants to the P-HF items) and that such cuesu! thoughts affected subsequent consumption. Jones and Gadon (2001) replicated and extended this finding in a quite different drinking culture with an independently derived AQ containing three additional categories of high- and low-frequency negative outcomes of alcohol consumption (N-HF, N-LF) and negative outcomes of other behaviors (N-C). In their study, they found a positive relationship between consumption and the number of alcohol responses to both P-HF and N-HF and no relationship between consumption and alcohol responses to the different types of control outcomes.

From these studies it appears that AQs are capable of measuring alcohol cue reactivity in social drinkers—with thoughts about “states” that represent alcohol consumption outcomes as the contending alcohol cues and thoughts about alcohol consumption as the cued response. This raises the question of the extent to which other contextual cues might add to this process—cues that do not derive from the AQ items but from the context within which the AQ items are addressed. To explore this, three different groups of undergraduate students (18–26 years old) were tested in three different situational contexts found within a heavily used campus building. The Neutral context was a very large common area used for casual study, meeting, and socializing. From this area connecting hallways lead to other areas, one of which is for the sale and consumption of alcohol. The Prebar context was the hallway leading only to the licensed area, and the Bar context comprised the licensed area itself. Participants who were recruited for the study took part seated at one of the many small tables at the fringe of the Neutral and Bar contexts and for the Prebar context at one of several small tables arranged in alcoves along the hallway. Participants were recruited singly, asked whether English was their first language (it was not an inclusion criterion), and invited to take part in an experiment about English words and phrases for which they would be paid a fee of £5. Participants in the Bar context were recruited as they entered the bar and before they had bought a drink. In common with the implicit methodology used with the AQ, the alcohol-related nature of the study was not explicitly revealed to participants. Participants completed the AQ, handed it over, and then completed—pro forma on demographic information—a timeline follow-back for the previous week’s alcohol consumption and questions on whether they had consumed alcohol or had had a hangover on the day of testing. Only participants who had not consumed alcohol on the day of testing and who did not report a hangover were included in the current analysis. However, a much greater volume of testing was carried out in the common area and it proved possible to create a fourth context group for the current analysis, NeutralH—participants recruited in the Neutral context reporting a hangover on the day of testing. Testing was carried out between mid- and late afternoon throughout the semester.

The study used a one-way between-participants design with four levels representing the four different contexts of testing (Neutral, Prebar, Bar, and NeutralH). Fifty participants per group were used. No significant differences were found between the four groups for ANOVAs of age, consumption, and age at which consumption at the current level became regular. Six discrete analyses of covariance were carried out on the alcohol responses made to each of the six different categories of item of the AQ. A measure of the previous week’s consumption was included as a covariate because current consumption and AQ alcohol cue responses are known to positively relate (Jones and Gadon, 2001; Stacy et al., 1994).

Context effects on the alcohol responses made were not found for the two control categories of items designed in the construction of the AQ to be unrelated to alcohol: P-C items \([F(3,195) = 0.75, p > 0.05]\) and N-C items \([F(3,195) = 1.79, p > 0.05]\). Context effects were also not found for the two control categories that were designed to be only idiosyncratically related to alcohol: P-LF items \([F(3,195) = 1.80, p > 0.05]\) and N-LF items \([F(3,195) = 1.59, p > 0.05]\). Of the two categories of items that had been designed to be alcohol-related in the construction of the AQ and, therefore, might be expected to show differential context effects, P-HF items showed no effect \([F(3,195) = 1.22, p > 0.05]\) but N-HF did \([F(3,195) = 5.80, p < 0.001]\). Differential context effects on alcohol responses to N-HF AQ items (i.e., states designed in the construction of the AQ to represent the negative outcomes of consuming alcohol) were further analyzed by using tests for contrasts on adjusted means. Participants in the Bar context made significantly more alcohol responses to N-HF items than those in Neutral context (adjusted \(Mn = 5.92\) and 4.52, \(p < 0.01\)) as
did those in the Prebar context (adjusted \( Mn = 5.76 \) and 4.52, \( p < 0.05 \)). Participants in the Neutral context who had reported a hangover that day made more alcohol responses than those in the Neutral context who had not (adjusted \( Mn = 6.85 \) and 4.52, \( p < 0.001 \)).

What causes (or cues) the increase in alcohol responses from the Neutral to the Prebar and Bar contexts? Physical entities typical of bars would have been present at the time of testing, and these sights, smells, and sounds would appear to be contending contributors as in other more traditional cue reactivity paradigms. The fact that participants have entered the bar also indicates a number of intentions and decisions that may have also contributed to the activation of links influencing alcohol consumption responses (in much the same way as described earlier). Neither set of cues would have been present to any degree in the Neutral context. Participants in the Prebar context might be intermediary between those in the Neutral and Bar contexts, sharing the intentions of those in the Bar but not subject to the Bar-local cues.

This raises the question of why there is a context effect augmenting alcohol responses to the alcohol cues provided by the negative high frequency (N-HF) items of the AQ and not the positive (P-HF). Wall et al. (2001), using an explicit methodology, showed positive alcohol outcome expectancies to be consistently more readily generated in a natural bar setting compared with a laboratory setting, but this was not found for negative expected outcomes (although McCusker, 2001, for example, argued that the methodologies are far from equivalent and that they measure different alcohol cognitions that are not necessarily related). Further developments in the AQ and its use might provide more sensitive assessments of alcohol cue reactivity to positive outcomes of alcohol consumption. Future research is required to explore the relationship between alcohol cue reactivity as measured by the AQ and current or impending session tenure (including consumption). Finally, the results show that participants in the Neutral context reporting a hangover (NeutralH) make significantly more alcohol responses to the alcohol cues provided by the negative high-frequency items that do those in the Neutral context not reporting a hangover (Neutral). The fact that 50 of 890 who were tested throughout the semester in the Neutral context reported a hangover (inclusion criterion for NeutralH) and only 2 of 100 in the Prebar or Bar context reported the same (an exclusion criterion) might suggest that there is a level of alcohol cue reactivity to negative high-frequency items that is inconsistent with visiting a bar.

Moreover, accumulating evidence suggests that there appears to be a reciprocal influence process between expectancies and drinking over time; expectancies predict consumption and consumption predicts expectancies. Because of the directional influence of expectancies on consumption, it is not surprising to see the current interest in attempting to alter expectancies for the purposes of reducing alcohol consumption. As Darkes discussed earlier, experimental procedures designed to alter individually held expectancies have been evaluated for 10 years now and have yielded some promising findings. Thus, previous research suggests that laboratory techniques designed to alter expectancies can have salutary effects on reducing drinking and could represent an important new tool in prevention and treatment efforts.

However, as revealed in the studies by Mark Wood, Reinout Wiers, William Corbin, and their colleagues, although there appear to be promising effects of this general approach in different labs in Europe and North America, findings are inconsistent in a number of key ways such as the strength and mechanism (i.e., mediators) of effects, durability of effects, generalizability across gender, and generalizability across alternative measures of drinking and expectancies. Moreover, as documented by Jones and colleagues, there are strong state-like effects of context on expectancy, suggesting that procedures that are lab-based, are short in duration, and focus on a limited set of situations may have only modest effects. Reflecting on the current set of studies, a few interrelated ideas spring to mind.

First, many diverse treatment approaches that have been used over the years to treat alcohol dependence can be hypothesized to exert their effects by altering expectancies of alcohol effects. Almost 225 years ago, Benjamin Rush ([Rush, 1789, p. 174, in Elkins, 1991]) conceptualized treatment as altering how an alcoholic viewed the effects of alcohol. Various forms of aversion treatment are still used, and it would be useful to examine changes in implicit and explicit expectancies as a function of treatment and the degree to which these altered expectancies predict real-life drinking behavior. As Darkes noted at the beginning of the symposium, a large body of data points to a close association between expectancies that individuals hold concerning the effects of alcohol consumption and actual patterns of alcohol use.
likely that other forms of both drug and psychological treatments exert their effects, in part, on changes in expectancies. For example, the opiate antagonist naltrexone may block some of the reinforcing properties of ethanol, and thus alcoholics who drink alcohol while on naltrexone (O'Malley, 1996) have new experiences that could weaken expectancies for positive reinforcement as a function of these new experiences. Twelve-step and cognitive behavioral approaches that actively seek to sensitize individuals to the negative effects of alcohol consumption on their lives seem likely to strengthen negative outcome expectancies of alcohol. The idea that behavioral or cognitive behavioral principles might be useful for understanding treatments based on very different theoretical foundations and using different technologies has been around for a long time (Dollard and Miller, 1950; Wachtel, 1977). There are undoubtedly a number of approaches to both weakening positive expectancies and strengthening negative expectancies, and restricting expectancy change procedures to a small group of techniques developed in the context of expectancy research may be nearsighted and may impede successful exploitation of the role of expectancies in treatment and prevention.

Additionally, the finding of reciprocal influence between expectancies and consumption (e.g., Sher et al., 1996) suggests that it is possible that reduction of drinking by any means (even if not initially mediated by expectancy change) can, ultimately, alter expectancies if drinking changes are large and persistent. This is, of course, somewhat speculative, but it seems likely that prolonged abstinence would reduce the expectancies of benefits and increase the expectancies of costs by mechanisms such as self-perception processes (Bem, 1972) that bring individually held beliefs into alignment with demonstrated behavior.

A broadening of the notion of “expectancy challenge” then moves us beyond consideration of a narrow set of procedures designed to raise individuals’ awareness of the incongruities between expected and pharmacological effects of alcohol to an extremely wide array of interventions that may not typically be considered. It would be ironic if treatments not typically thought of as expectancy manipulations turned out to be those that demonstrated a central role of expectancy change in alcohol prevention and treatment. In conclusion, the present symposium indicated, on the one hand, that further research into the exact mechanisms of the expectancy challenge procedure is necessary, both for theoretical and for practical reasons (questions of mediation, gender specificity, role of context, feasibility of nonexperiential challenges, etc.), and, on the other hand, that considering the role of changing expectancies in natural change processes and in interventions not explicitly aimed at changing expectancies could be important.

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