CONCEPTUALIZING ADDICTION

A review of expectancy theory and alcohol consumption

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Abstract
Research is reviewed on the association between alcohol outcome expectancies and consumption which has led many to argue that manipulating expectancies might be a route to manipulating consumption for problem prevention and treatment. Studies indirectly and directly evaluating this latter position are reviewed. Expectancies predicting treatment outcome: two studies have shown that the more positive expectancies held at treatment, the poorer is treatment outcome, but five other studies have failed to find this. Three related studies have shown that the more negative expectancies held at treatment, the better the treatment outcome. This evaluation provides evidence consistent with the main position but is limited by measuring consumption changes over only 1–2 hours. Prevention programmes with expectancy components: seven projects are reviewed in which positive expectancies were targeted, but only two report an expectancy change analysis and in both cases the expectancy change did not relate to subsequent consumption. This evaluation provides evidence inconsistent with the main position. Expectancy challenge: two related studies are reviewed in which positive expectancy challenges reduce subsequent consumption but changes in expectancy were not evaluated as predictors of consumption change. Two studies are reviewed which found a reduction in positive expectancy following expectancy challenge but no reduction in consumption. One study is reviewed in which when negative expectancy was increased in treatment there was a better treatment outcome at 3 months follow-up than when it was not. This evaluation provides evidence inconsistent with the main position for positive expectancy and limited consistent evidence for negative. It is concluded that the research has still to be done that securely links expectancy manipulations with subsequent changes in consumption, and fulfils the early promise from association studies.

Introduction
There is variability in alcohol beverage consumption: different individuals drink differently both in terms of quantity and style and individuals drink differently at different times in their lives both in the long and the short term. When
'differently' goes beyond use to include the problems of misuse, abuse and dependence, the differences impact negatively on important aspects of life: family, friendships, job and finances as well mental and physical wellbeing. The negative consequences also have corporate, local and national implications. As far as alcohol consumption is concerned, therefore, there are good reasons for not wanting use to extend to misuse, abuse and dependence. Consequently, alcohol education (as interventions for problem prevention) and alcohol treatment (as interventions to retard problem escalation and foster problem resolution) should be important features of any culture in which alcohol is readily available. Efforts to understand the variability in alcohol consumption are basic to alcohol education and treatment and alcohol motivations have begun to play an increasingly prominent role in this. Expectancy Theory is part of the interest in alcohol motivations.

**Alcohol motivations**

The term ‘motivation’ has been used in different ways in relation to alcohol consumption. It has been viewed as a moral trait. It has been viewed as a patient deficit that explained treatment failure but not as a characteristic that explained treatment success. This has given way to an alternative view in which motivation is regarded as inextricably implicated in both—to the extent that enhancing patient motivation, itself, might be a legitimate treatment goal. Indeed, for some therapists, enhancing patient motivation has become the principal treatment goal. This shift in view raises the questions of what motivation might be, how it might be measured and how it might be modified. Addressing these representation questions has been a prominent activity of both basic psychological science and (as part of programmes of alcohol education and treatment) of applied psychological science. Within the framework of psychological science, Expectancy Theory (once stripped of the problems of teleology and tautology derived from the mid-century motivation/reinforcement theory debate, Bolles, 1967) provides one particularly explicit representation of alcohol motivations; but it is towards two other representations of motivation, from which the recent motivation impetus has derived its force, that this paper first, briefly, turns. First, Stages of Change frameworks, first proposed by Prochaska & DiClemente (1982), have provided one representation of motivation that has become widespread within health and social care. Specifically, this framework relates to an individual’s preparedness or readiness to change any behaviour (such as smoking or drinking) from levels of involvement that have problems associated with them to levels that have less. Within this framework, rather than being described as simply motivated or not, a finer grain description is used through which an individual occupies one of a series of ordinaly discrete but systematically related stages of change (or stages of motivation for change). Resolution of the problem behaviour in question (such as smoking or drinking) entails the orderly progression through these stages, either unassisted (natural recovery) or with the assistance of formal intervention. One formal intervention comprises the second widely used representation of motivation, Motivational Enhancement through counselling or interviewing (Miller & Rollnick, 1991), which takes such individuals through a structured process that provides them with opportunities to consider the circumstances giving rise to whatever has brought them through treatment’s door.

These two frameworks have in common the fact that they do not satisfactorily addresses the question of what motivation might be in terms of basic science (for example, psychological science). A fine-grain description through the use of stages is at the centre of one framework and although the processes and principles underpinning both stage tenure and change have been articulated within the framework itself (for example, Prochaska, Norcross & DiClemente, 1994), they have only been articulated in the very broadest of terms and are not readily tested. Within the other framework, motivation is represented only as an emergent property of the relationship between therapist and client: little is said about the nature of the emergent property in terms that relate to basic science. This does not, of course, detract from the demonstrable successes that have derived from the use of these two frameworks in a number of different problem domains—but they do contrast starkly with the third representation of motivation that has developed in parallel during the last 25 years and which, it is claimed, is built on more solid principles of psychological science, Expectancy Theory. This paper reviews the progress of
Expectancy Theory in efforts to achieve a better understanding of alcohol consumption variability and related problems.

**Alcohol outcome expectancy theory**

Outcome Expectancy Theory has a Social Learning perspective (Rotter, Chance & Phares, 1972, Bandura, 1977). It collaborates principles of learning established through research on observable behaviour with constructs based on cognitive processes that are, themselves, not directly observable (White, Bates & Johnson, 1990). Within Expectancy Theory, behaviour is explained by individuals having expectations of particular reinforcing effects as the outcome of performing the behaviour in question (more properly described as Expectancy Outcome Theory: the shorter term is more usually used). With respect to alcohol, therefore, consumption (the behaviour in question) is explained by individuals having alcohol outcome expectations, for they appear to consume alcohol in a way that delivers the effects they expect. Whether the outcome expectations are valid or validly derived is unimportant; to have an impact on behaviour, they simply need to be held. It is a feature of the social learning framework that the particular alcohol outcome expectations held by an individual are the result of their direct and indirect experience with alcohol and alcohol paraphernalia. Such histories will be different across individuals, of course, and the consequent variability in alcohol outcome expectations held is thought to explain the consumption behaviour variability seen. A simple view is that positive expectations (such as ‘I expect to be the life and soul of the party if I have a few drinks’) represent an important component of motivation to drink while negative expectations (such as ‘I expect to have a hangover if I have a few drinks’) represent an important component of motivation to restrain (Cox & Klinger, 1988; Lang & Michalec, 1990; Jones & McMahon, 1998). In this sense, through well-established principles of the psychology of learning and the psychology of cognition, Expectancy Theory within a social learning framework might provide a more articulated representation of the structure and process of alcohol motivations than has been provided elsewhere. Moreover, there is potential to address the dual motivation conundrum, to drink and to restrain, not simply to restrain.

As well as being built on well-established principles, Expectancy Theory provides the opportunity to understand alcohol consumption at all points of the continuum of consumption within a single common framework. Single common frameworks predicate on fewer assumptions than does a set of qualitatively different frameworks and, in this sense, are more elegant (Occam’s razor) but, as well as being explanatorily aesthetic, they also are able to generate a larger corpus of integrated knowledge through extrapolations along the continuum. A larger corpus of knowledge and fewer basic assumptions ensure that such a framework is capable of more rather than less extensive evaluation and this is an added benefit.

**Alcohol outcome expectancies**

Alcohol expectancies are regarded as structures in long-term memory that have impact on cognitive processes governing current and future consumption. Population inventories of different alcohol expectancies that might be conceivably held are derived using a variety of procedures that range from the structured interviewing of representative samples, through the use of focus groups, to committees of researchers using their own intuitions combined with pre-existing inventories. Inventory compacting techniques (e.g. Floyd & Widaman, 1995) are used to generate sets of ‘lean and mean’ items that become expectancy questionnaires.

A typical expectancy questionnaire comprises 75 items with an identified factor or subscale structure. In use, individuals endorse each questionnaire item as to whether or not they hold that particular expectancy. A simple sum of the expectancy endorsements represents the individual’s ‘overall alcohol outcome expectancy’ and sums of the different factor/subscale components represent a more fine grain assessment. Once corresponding consumption data are collected, associations between expectancies held and alcohol consumed can be explored.

**Evaluating Expectancy Theory**

If Expectancy Theory has any application in understanding the variability in alcohol consumption and consumption-related problems, there should be lawful relationships between the alcohol outcome expectancies that individuals
hold and the alcohol they consume. Positive associations should be found between positive expectancies and consumption and negative associations between negative expectancies and consumption. Associations do not entail cause, of course, and this difficulty is especially prominent within the social learning framework in which the potential for reciprocal causality is a key feature (Bandura, 1977). Consequently, evaluations extending from more conveniently executed cross-sectional studies to studies permitting prospective analyses will be important in evaluating expectancies’ role as agents impacting on future as well as concurrent drinking (and drinking-related problems). Evaluations should also provide potential for exploring the effect of current drinking practice on future expectancies. A more critical test of cause, however, would be through manipulating expectancies held by individuals and relating this to whatever changes in consumption might be subsequently found over the short, medium and long term. This sort of test would be critically important for claims that expectancies might be the target of alcohol education and problem treatment programmes.

Confidence in alcohol expectancies as representing an important component of the drinking equation would be increased by a consistency in findings across quite different projects and type of project. Important project differences will include (i) the assessment instruments themselves (purpose for which they were conceived and the method of construction); (ii) nature of the individuals assessed (age, gender, social and civic standing); (iii) their consumption (quantity and style); (iv) the nature and context of the design (survey or experiment; field or laboratory); and (v) the time window over which relationships are sought (immediate, hours/days, months or years). The process of ‘doing science’ will ensure that such variability will naturally occur and the test for consistency is through an analysis of the published results. This analysis is reported below.

### Outcome expectancies and drinking behaviour

Beginning with the seminal work of Brown and her colleagues in 1980, countless studies have documented an association between alcohol outcome expectancies and alcohol use. Self-reported drinking behaviour is significantly and positively associated with positive expectancies and inversely associated with negative expectancies (Christiansen & Goldman, 1983; Brown, Christiansen & Goldman, 1987; Fromme, Stroot & Kaplan, 1993, Fromme & D’Amico, 2000). Earlier reports described the alcohol expectancies of individuals with various drinking styles, finding, for example, that heavier drinkers reported more positive expectancies than lighter drinkers (Southwick et al., 1981). The positive expectancies of alcoholics have also been shown to differ from those of medical patients and college students (Brown, Goldman & Christiansen, 1985) and from those of problem and non-problem drinkers (Connors et al., 1986). Increased drinking experience is consistently associated with increased endorsement of positive expectancies.

Efforts to identify the specific expectancies of different types of drinkers, however, have yielded less reliable findings. In their first report, Brown and colleagues found that heavier drinkers expected more global positive changes than lighter drinkers (Brown et al., 1980). In their later studies, heavier drinking was associated with expectations of social and physical pleasure, social assertion and tension reduction for adults (Brown et al., 1985) and with altered social behaviour and enhanced cognitive and motor functioning for adolescents (Christiansen & Goldman, 1983). Other investigators found that alcoholics and non-problem drinkers differed on virtually all expectancies measured, specifically global positive changes, sexual arousal, physical and social pleasure, assertiveness, tension reduction and arousal/aggression (Connors et al., 1986). Such discrepant findings led to questions about the independence of expectancy factors (Leigh, 1989; Collins et al., 1990; Leigh & Stacy, 1991) and, subsequently, to the development of associative network models of the expectancy construct (Goldman et al., 1991; Rather et al., 1992; Goldman, 1999).

**Expectancies and the quantity and frequency of alcohol use**

To understand more effectively the effect of outcome expectancies on alcohol use, research has examined the association between alcohol expectancies and different aspects of drinking behaviour, specifically the frequency of use (i.e. number of drinking occasions) and the quantity
consumed (i.e. amount consumed per drinking occasion). Frequency and quantity are distinctly important aspects of drinking behaviour (Vogel-Spratt, 1974, 1983) to which expectancies might contribute differentially. Indeed, expectancies are consistently and more strongly associated with quantity than with frequency of drinking. This finding is robust among adolescents (Chen, Grube & Madden, 1994; Fromme & D’Amico, 2000), college students (Mooney et al., 1987; Carey, 1995) and community samples (McMahon, Jones & O’Donnell, 1994; Lee, Greeley & Oei, 1999).

Studies have shown further that expectancies explain incremental variance in the frequency and quantity of drinking behaviour, even when demographic factors that are known to contribute to drinking (e.g. age and gender) are considered. For instance, expectancies explained an additional 6% of the variance in frequency and 15% of the variance in quantity of drinking in a cross-sectional study (Mooney et al., 1987). The incremental variance explained by alcohol expectancies is typically smaller, however, when previous drinking behaviour or attitudes toward drinking are included in the analyses. In a short-term longitudinal study (Carey, 1995), expectancies accounted for only an additional 1% of the variance in frequency and 2% of the variance in quantity of consumption, when gender and previous drinking levels were included in the regression analyses. Similarly, but in a cross-sectional study using three different expectancy questionnaires and controlling for age, gender and attitudes toward drinking, Leigh (1989) determined that expectancies accounted for an additional 1–3% of the variance in frequency of drinking occasions and 2–3% of the variance in quantity consumed per occasion. Thus, in both cross-sectional and longitudinal studies such as these alcohol expectancies clearly relate to alcohol use, but their contribution beyond simple demographics and attitudinal measures is, although significant, modest.

The most important contribution of alcohol expectancies may be their utility to predict changes in drinking and the development of alcohol-related problems. Among a sample of adolescents (aged 11–14 years), approximately 25% of the variance in drinking at year 2 was explained by expectancies for changes in social behaviour and improvement in cognitive and motor functioning measured 1 year earlier (Christiansen et al., 1989). Expectancies for enhanced or impeded social behaviour also predicted adolescents’ transition from non-problem to problem drinking during the next 12 months, although initial alcohol use was not controlled statistically (Christiansen et al., 1989). Subsequent research, using structural equation modeling and controlling for concurrent drinking and expectancies, tested the reciprocal prospective effects of expectancies and drinking behaviour. Among adolescents, drinking at year 1 predicted expectancies at year 2 when year 1 expectancies were statistically controlled. In addition, year 2 expectancies predicted year 3 drinking when controlling for year 2 drinking (Smith et al., 1995). Subsequent research with college students suggested that measurement interval is critical in evaluating the expectancy–behaviour relationship. When examined over a 1-year interval, alcohol use was more strongly associated with subsequent alcohol expectancies, but when measured over a 3-year period, alcohol expectancies were more strongly predictive of alcohol use (Sher et al., 1996).

Prospective analyses among these different age groups are particularly informative because of the relative stability of adolescent and college student alcohol use. Drinking among the adolescent sample increased substantially over the course of the 3-year study, whereas drinking among the college sample remained relatively stable (Smith et al., 1995, Sher et al., 1996). Because alcohol expectancies were associated prospectively with drinking in both samples, expectancies therefore appear to contribute to both the initiation and the maintenance of drinking behaviour.

Alcohol expectancies have also been used to predict the emergence and persistence of alcohol dependence symptoms among a community sample of young adults (Kilbey, Downey & Breslau, 1998). Lower expectancies of negative effects from drinking alcohol identified those individuals who developed alcohol dependence over a 3.5-year follow-up period, but this effect became non-significant when age, gender, extroversion and positive affective measures were included in the analyses (Kilbey et al., 1998). When predicting the persistence of alcohol dependence over the follow-up period, however, expectancies for improved sexual and social experiences emerged as the only significant predictors. As found for adolescents who developed
drinking-related problems (Christiansen et al., 1989), the expectation of enhanced social behaviour again seems to be important in the maintenance of problematic alcohol use.

In summary, prospective analyses have shown that expectancies predict the initiation and maintenance of drinking behaviour, as well as the onset of drinking problems. The magnitude of effects for expectancies on drinking behaviour and problems, however, is small.

**Positive versus negative alcohol expectancies**

As evident from the preceding review, positive alcohol expectancies (beliefs about the beneficial effects of drinking) have received the most research attention. This relates, in part, to the idea that immediate positive consequences are thought to influence behaviour more strongly than delayed negative effects (Rohsenow, 1983) and from the finding that positive expectancies are more readily accessible from memory than negative expectancies (Stacy, Widaman & Marlatt, 1990). From a practical perspective, the research emphasis on positive expectancies also stems from an overwhelming reliance on the Alcohol Expectancy Questionnaire (AEQ, Brown et al., 1980) which was designed to assess only positive expectancies.

Despite the focus on positive alcohol expectancies, recent evidence supports the importance of negative expectancies in influencing drinking behaviour (Adams & McNeill, 1991). It has been suggested, for example, that positive expectancies might lead individuals to begin drinking whereas negative expectancies might serve to limit the amount consumed (Lee et al., 1999). Negative expectancies might also provide the motivation for problem drinkers to reduce or stop drinking (Jones & McMahon, 1993). When positive and negative expectancies are tested simultaneously, findings have differed by population and expectancy measure used.

In a community sample of adults and using the AEQ and the Negative Alcohol Expectancy Questionnaire (NAEQ), McMahon et al. (1994) found that negative but not positive expectancies were associated with alcohol consumption. Conversely, in a sample of college students and using the Comprehensive Effects of Alcohol (CEOA) questionnaire, Fromme et al. (1993) found that positive but not negative expectancies were associated with three alcohol use measures. This discrepancy most probably relates to the types of negative expectancies measured by these expectancy questionnaires. The NAEQ taps both proximal (e.g. direct cognitive and behavioural effects of alcohol) and distal (e.g. next day, such as hangover and long-term effects, such as losing a partner or job) consequences of drinking whereas the CEOA only measures proximal effects (e.g. feeling dizzy).

McMahon et al. (1994) have made a compelling argument for the differential effects of proximal versus distal negative effects of drinking and this distinction may help to reconcile discrepant findings regarding the relative effects of positive and negative expectancies on alcohol use and problems. Moreover, it may indeed be that positive expectancies motivate the initiation and maintenance of drinking whereas negative expectancies influence its cessation.

**Subjective evaluations of expected effects**

Expectancy research typically includes only measures of the endorsement (agree/disagree) or perceived likelihood (likely/unlikely) of experiencing certain effects from drinking alcohol. It has been suggested, however, that the subjective evaluation of those expected effects might also be important determinants of drinking behaviour (Leigh, 1987; Fromme et al., 1993). For instance, the more favourably people evaluate the impairment effects of drinking, the greater their overall alcohol use (Leigh, 1987; Werner, Walker & Greene, 1993; Fromme & D’Amico, 2000). When separate ratings for likelihood and subjective evaluations were considered simultaneously, stronger and more favourable positive expectancies were associated with greater use of alcohol regardless of whether expectancies were measured with a standardized questionnaire (Fromme et al., 1993) or were self-generated (Wood, Sher & Strathman, 1996). For negative expectancies, neither subjective evaluations or expected effects were significantly associated with alcohol use when they were tested concurrently with positive expectancies (Fromme et al., 1993). Other studies, however, have found that likelihood estimates for positive expectancies but subjective evaluations for negative effects contribute to alcohol use. Stronger likelihood ratings for positive expectancies and more favourable evaluations of negative effects were associated
with heavier drinking and more alcohol-related health consequences (Werner et al., 1993). When viewed from the perspective of utility theory, likelihood estimates and subjective evaluations for alcohol expectancies are multiplied to form subjective expected utility estimates (Bauman et al., 1985, Wall, Hinson & McKee, 1998). Use of such multiplicative estimates has yielded somewhat mixed findings, with some studies indicating that alcohol use is associated with positive expectancy–value estimates (Stacy et al., 1990) and others finding use to be associated with negative expectancy–value estimates (Jones & McMahon, 1996a). Further, Jones & McMahon (1996a) found that the multiplicative composite for negative expectancy was related to abstinence survivorship when entered separately from expectancy and value (as performed in previous studies) while the positive composite was not. When the multiplicative composite was included in an analysis with expectancy and value (as recommended by Evans, 1991) the composite score for negative expectancy was no longer predictive of abstinence survivorship.

**Moderators of alcohol expectancies**

Age and gender have been found to moderate the effect of expectancies on drinking behaviour. Children report many of the same expectancies as adults (Dunn & Goldman, 1996), with expectancies being well formed by age 12 (Christiansen, Goldman & Inn, 1982). In a study of students in 3rd, 6th, 9th and 12th grades, higher drinking youth were more likely to associate positive effects with alcohol cues (Dunn & Goldman, 1998), thereby suggesting that the significant association between drinking and positive expectancies is evident at early ages. Whereas younger children tend to report negative expectancies, positive expectancies increase with age (Miller, Smith & Goldman, 1990). There is also evidence, however, that positive expectancies increase from childhood through adolescence, but they may ‘plateau’ and moderate in adulthood (Sher et al., 1996, p. 571).

Although age and drinking experience are typically confounded, both may contribute to the development of alcohol expectancies. Age might contribute through increased exposure to cultural messages about alcohol, whereas personal experience might contribute through actual reinforcement of alcohol’s effects (Aas et al., 1995). As the individual acquires more drinking experience their expectancies may become personalized, thereby yielding more reliable measures of expectancy.

In addition to being heavier drinkers, men tend to hold stronger positive and weaker negative expectancies than do women. The few studies that have evaluated the specific expectancies of men and women also tend to suggest different patterns of reinforcement or motivation to drink among the sexes. Whereas the quantity consumed per drinking occasion was associated with similar expectations of enhanced social and physical pleasure for men and women, the frequency with which they drank was associated with different alcohol expectancies (Mooney et al., 1987). Frequency of use was associated with expectations of global positive effects, sexual enhancement and social and physical pleasure for men, but with expectations of tension reduction for women (Mooney et al., 1987). In a large sample of college students identified by family history of alcoholism (positive or negative), Sher and colleagues determined that men reported higher levels of expectancies than women for tension reduction, social lubrication, activity enhancement and performance enhancement (Sher et al., 1996). Carey (1995), however, found no significant gender differences in the alcohol expectancies of male and female college students. Hence, the degree to which gender moderates the effect of alcohol expectancies on drinking behaviour may also be a function of other measures of individual difference (for example, within the domain of personality).

**Experimental and treatment outcome research on alcohol expectancies**

Based on the well-established relationship between alcohol expectancies and drinking behaviour, many have argued that alcohol expectancies can and should be an integral part of treatment and prevention efforts targeting alcohol problems. However, studies showing a strong relationship between alcohol use and expectancies are not sufficient to support such arguments. For this reason a number of longitudinal and experimental studies have been conducted to bolster this position. Longitudinal studies have examined alcohol expectancies and changes in alcohol expectancies as predictors of treatment outcome. Laboratory experiments have examined the ef-
effects of expectancy manipulations on *ad libitum* alcohol consumption. Treatment and prevention trials have been conducted to determine the efficacy of alcohol expectancy challenges, individually or as part of larger treatment and prevention programmes. Both positive and negative alcohol outcome expectancies have been examined, although negative expectancies have generally been under-represented.

*Expectancies as predictors of treatment outcome*

Brown (1985) was the first to use alcohol expectancies to predict outcome following treatment for alcoholism. Higher positive alcohol outcome expectancies were found to predict a decreased likelihood of both year-long abstinence and treatment compliance of 42 male veterans, while controlling for other variables including drinking history and social support. Alcohol expectancies also predicted the length of sobriety among members of Alcoholics Anonymous (Rather & Sherman, 1989). In addition, alcohol expectancies of sexual enhancement and social and physical pleasure were related to desire to drink and quality of life as reported by participants. In a more recent study, both self-efficacy expectations and alcohol effect expectancies changed in the expected directions during the course of in-patient treatment for alcoholism (Brown et al., 1998). Neither changes in alcohol consumption nor the relationship between expectancy change and drinking changes was reported.

Connors, Tarbox & Faillace (1993) also examined the ability of alcohol expectancies to predict outcome of treatment. The authors again found that alcohol expectancies were predictive of treatment outcome, although alcohol expectancies did not change significantly during treatment. Alcohol use decreased immediately following treatment, but changes in alcohol expectancies were not found until 18-month follow-up. This suggests that changes in alcohol expectancies are not necessary for changes in alcohol use, and that expectancies may naturally decrease following a reduction in consumption.

In general, the relationship between positive expectancies and treatment outcome is an inverse one, with lower positive expectancies associated with more positive outcomes of treatment. However, post-treatment scores on the AEQ subscale, arousal with feelings of power, were shown to increase despite decreased alcohol use at 18-month follow-up (Connors et al., 1993). Thus, greater ‘positive’ expectancies were related to positive treatment outcome. This finding was supported by Ryan, Plant & O’Malley (1995) who found that higher scores on the alcohol with feelings of power and AEQ global subscales were associated with decreased risk for treatment dropout. These unexpected finding may be due to the fact that items on positive alcohol expectancy subscales are not always evaluated subjectively as positive by respondents (Leigh, 1987; Fromme et al., 1993). Based on somewhat inconsistent findings regarding positive alcohol expectancies and theoretical arguments regarding the importance of negative expectancies (Adams & McNeil, 1991; Jones & McMahon, 1992; Lee et al., 1999), both positive and negative expectancies have now been assessed as predictors of treatment outcome.

Jones & McMahon (1994a) were the first to examine both positive and negative alcohol outcome expectancies, finding that negative expectancies predicted abstinence at 3 months post-treatment. The same authors found that total negative expectancy scores predicted post-treatment time to first alcohol use, whereas the total positive expectancy score did not. When positive and negative subscales were included, only expected negative consequences (next day) were significant predictors of treatment outcome (Jones & McMahon, 1994b).

In addition to establishing negative expectancy as a predictor of treatment outcome, Jones & McMahon (1996b) assessed the relationship between changes in alcohol expectancies and treatment outcome. Consistent with their previous research, pre-treatment negative expectancies predicted treatment outcome, whereas positive expectancies did not. Examination of changes in expectancies indicated that positive expectancies decreased significantly, whereas negative expectancies did not change significantly. Despite the significant change in expectancies during treatment, change in positive expectancy did not relate to treatment outcome. Change in negative expectancy, including pre-treatment expectancies in the model, did predict treatment outcome. Thus, treatment resulted in significant changes in positive alcohol expectancies, but it was the non-significant changes in negative expectancies that related to treatment outcome.

Although longitudinal studies have provided some support for the importance of both positive
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and negative alcohol expectancies, such studies cannot establish a causal relationship. Thus, researchers have attempted to directly alter alcohol expectancies to determine the effects on alcohol consumption. Both controlled laboratory and treatment outcome studies have attempted to alter expectancies, both positive and negative. These have attempted either to activate expectancies and related this to subsequent changes in expectancy measures and consumption or to change the knowledge base giving rise to those expectancies that might be invalid or have been invalidly derived.

Expectancy manipulations and ad libitum alcohol consumption

Several studies have attempted to activate alcohol expectancies and observe ad libitum alcohol consumption. Three of these studies used a modified Stroop task to activate alcohol expectancies through the presentation of words believed to be part of the alcohol expectancy network. The first of these studies (Roehrich & Goldman, 1995) found that individuals primed with positive expectancy-related words consumed significantly more alcohol than did individuals presented with neutral words. The results of this study were confirmed by a more recent study by the same group of researchers (Stein, Goldman & Del Boca, 1997). This study included a mood-induction and a manipulation check in the expectancy priming condition to confirm that participants were processing the expectancy-related information. The results indicated greater alcohol consumption in the expectancy manipulation condition compared to the mood induction or control groups, and showed that the participants were processing the alcohol-related information.

An independent laboratory also found greater alcohol consumption in a group of individuals primed with positive alcohol-related words (Carter et al., 1998). In addition, individuals primed with negative alcohol-related words consumed significantly less than the control group. A study by Sharkansky & Finn (1998) provided additional evidence for reductions in alcohol consumption following a negative expectancy manipulation. Participants who were given negative expectancies for performance on a cognitive task consumed less alcohol and expected worse performance. Thus, activation of both positive and negative alcohol-related information resulted in changes in alcohol consumption.

We are aware of only one attempt to directly manipulate positive and negative alcohol expectancies in a naturalistic setting. Drinkers asked to focus on either the positive or negative outcomes of drinking evidenced increases and decreases in alcohol consumption, respectively (Oei, Foley & Young, 1990). Thus, short-term changes in alcohol consumption were apparent following manipulation of alcohol expectancies in both laboratory and naturalistic settings.

Although expectancy priming studies provide compelling evidence for a causal relationship between expectancies and use, changes in alcohol consumption were short term (1–2 hours). For expectancy manipulations to be useful in prevention and treatment efforts, longer-term changes in alcohol consumption must be demonstrated. Numerous prevention programmes have incorporated expectancy-related information in attempts to reduce alcohol consumption and related risky behaviours.

Prevention programmes with an expectancy component

The first prevention programme including an alcohol expectancy component produced significant reductions in alcohol consumption without significant changes in alcohol expectancies (Fromme, Kivlahan & Marlatt, 1986). Furthermore, changes in alcohol expectancies during the programme were not associated with alcohol consumption at 4-month follow-up. Additional studies of the Alcohol Skills Training Program (ASTP; Kivlahan et al., 1990) demonstrated its efficacy in reducing alcohol consumption among college students. A comparison of two modes of presentation of the ASTP (group presentation or manual self-help) and a one-session professional advice condition (Baer et al., 1992) found that all three groups decreased their alcohol consumption significantly during the course of the study. The conditions were not significantly different in terms of drinking outcomes, although the manual self-help group had a significantly lower rate of treatment completion. See Fromme et al. (1994) for a more extensive review of the ASTP.

The BASICS programme incorporated com-
ponents of the ASTP and the one-session professional advice condition (Dimeff et al., 1999). An evaluation of the BASICS programme found greater decreases in alcohol use compared to a high-risk control group and a random sample of participants from the same university population (Marlatt et al., 1998). In addition to decreased alcohol consumption, the BASICS group reported fewer alcohol-related problems, and these changes were maintained at 2-year follow-up. Although the ASTP and BASICS programmes included a component designed to challenge positive alcohol outcome expectancies, changes in expectancies following these programmes were not reported.

Skills training prevention programmes with adolescents have also been shown to be effective in reducing alcohol consumption (Life Skills Training Program, LSTP; Botvin & Tortu, 1988; Botvin et al., 1990a, 1990b). Although this intervention did not directly target alcohol expectancies, changes in attitudes toward alcohol use (which included positive expected effects of use) were assessed. Results did not indicate differential decreases in attitudes toward alcohol use for the treatment groups.

A recent study applied many of the techniques used in the ASTP, LSTP and BASICS prevention programmes to an adolescent population. The Risk Skills Training Program (RSTP, D’Amico & Fromme, 2000) provided one 50-minute session in a school setting. This programme showed greater decreases in alcohol consumption, as well as a number of other risk behaviours, compared to a control group and a group assigned to the Drug Abuse Resistance Education (DARE) programme. No differential changes in alcohol expectancies were found across treatment groups. Thus, brief skills training approaches appear to be effective with both adolescents and young adults.

Although all these prevention programmes included an intervention component targeting alcohol expectancies, only two reported analyses of changes in alcohol expectancies, and the two that did found no differences between treatment groups (Fromme et al., 1986; D’Amico & Fromme, 1997). Thus, there is little evidence that expectancy reductions contributed to the positive outcomes of these prevention efforts. Researchers have now begun to conduct prevention efforts that focus more exclusively on changing alcohol expectancies. Both primary and secondary prevention programmes have been evaluated.

Expectancy challenges as primary and secondary prevention

Primary prevention efforts have generally been conducted with elementary school-aged children, given that children begin to develop alcohol expectancies long before they begin engaging in alcohol consumption (Dunn & Goldman, 1998; Miller et al., 1990). Only one study, to date, found partial support for an expectancy-based prevention programme. Kraus, Smith & Ratner (1994) compared two 10-minute videotapes designed to target alcohol expectancies. One videotape (featuring puppet models) reduced alcohol expectancies, whereas the other (featuring adult models) increased alcohol expectancies. These changes were maintained at 4-week follow-up. The other two primary prevention efforts identified in the literature failed to produce changes in alcohol expectancies following the prevention programme or at 3-year follow-up (Austin & Johnson, 1997; Corvo & Persse, 1998). Thus, only short-term changes in alcohol expectancies of children have been found, and results have been inconsistent across studies. Furthermore, the effects of expectancy-based primary prevention programmes on future alcohol use has yet to be examined.

Several secondary prevention programmes have been designed specifically to reduce alcohol expectancies and subsequent alcohol use. Gustafsson (1986) was the first to attempt to change alcohol outcome expectancies in college students. Providing straightforward information that contradicted expectations of increased aggression from alcohol use was not effective in reducing expectancies. Gustafsson concluded that ‘more powerful techniques are needed to change alcohol-related expectancies’.

Since the time of Gustafsson’s seminal work, Goldman and his colleagues have conducted a total of five experiential expectancy challenges in a college population with promising results. The two most recent and comprehensive of these studies (Darke & Goldman, 1993, 1998) demonstrated decreases in both alcohol expectancies and alcohol use following the expectancy intervention. The second of these studies also demonstrated that challenges in two different
domains of expectancies (social/sexual and affective/cognitive arousal) were effective in reducing alcohol use and that these changes were maintained over a 6-week follow-up. Although both expectancy challenges effectively reduced alcohol consumption, only the social/sexual challenge resulted in reductions in alcohol expectancies that were significantly different from control participants. Changes in expectancies were not evaluated as a predictor of changes in alcohol consumption in either of the Darkes & Goldman studies. Thus, although the expectancy challenge procedure may be an effective means for reducing alcohol use, it is not yet clear that reduction of alcohol expectancies is the mechanism of change.

Attempts to replicate the work of Darkes & Goldman have been unsuccessful. An expectancy challenge similar to that of Darkes & Goldman, although more brief (one session versus three), found reductions in alcohol expectancies without significant reductions in alcohol consumption (Maddock et al., 1999). Similar results were found following a more direct challenge of beliefs about alcohol use in which participants refuted items endorsed on an expectancy questionnaire (Corbin, Carter & McNair, 1998). One additional expectancy challenge failed to show significant changes in alcohol use compared to a control group, although changes in alcohol expectancies were not reported (Jones, Silvia & Richman, 1997).

Expectancy challenges targeting negative alcohol expectancies have not been studied systematically. However, based on theoretical conceptualisations of negative expectancies, currently existing treatment approaches may be expected to impact negative expectancies. Jones & McMahon (1993) make a compelling argument that negative expectancies reflect an individual’s motivation to reduce their alcohol consumption. If one accepts this interpretation of negative expectancy, then existing treatments that attempt to increase motivation for change (Miller & Rollnick, 1991; Miller, 1992; Miller et al., 1995) might be expected to lead to reductions in negative expectancies. Limited support for this is provided by a single study (Jones & McMahon, 1998), in which those negative expectancy items (NAEQ) endorsed as 'possible' in an assessment for a Motivational Enhancement session were formally targeted in each individual’s subsequent feedback session. A control group had generalised feedback based on NAEQ endorsement norms for individuals in treatment. Admission-to-discharge changes in negative expectancy (when admission expectancy was controlled) predicted abstinence survivorship and survival to first heavy drinking session for both groups; but the former group was significantly more successful 3 months after discharge than the latter. Future studies assessing changes in negative expectancies associated with motivational enhancement strategies may provide additional evidence that negative expectancies are an important target for intervention.

Thus, whereas positive expectancy challenges show some promise, failure to replicate these findings suggest that very specific intervention components may be necessary for producing behaviour change. For example, experiential expectancy challenges may be more successful than attempts to directly challenge expectancies, and briefer interventions may not be as effective as more intensive ones. At least within a college population, challenging expectancies of sexual enhancement and social and physical pleasure may provide the greatest benefit. At this point, the important characteristics of negative expectancy challenges remain poorly identified, pending further research. Indeed, further research is warranted to determine the relative efficacy of different types of expectancy manipulations on both positive and negative expectancies.

Moderators of expectancy challenge

The work of Darkes & Goldman (1993, 1998) suggests that expectancy challenges may be more effective with heavier drinking male participants compared to lighter drinking males. Thus, level of alcohol use and alcohol-related problems may moderate the effects of expectancy manipulations. Gender may also moderate the effects of expectancy challenges. Whereas expectancy-related interventions have been found effective with lighter drinking females, studies of heavier drinking females have been less consistent. Corbin et al. (1998) found that an expectancy manipulation that reduced positive outcome expectancies resulted in increased alcohol use for females. In addition, Jones & McMahon (1996b) found that negative expectancies were inversely related to treatment outcome for females. Although both these studies had rela-
tively small numbers of participants, the results suggest that additional research is necessary to determine the efficacy of expectancy manipulations for this population. Finally, age may moderate the effectiveness of expectancy-based interventions. Preliminary evidence suggests that manipulation of positive expectancies may be more effective for younger drinkers, whereas manipulation of negative expectancies may be more effective for older, more experienced drinkers.

In summary, alcohol expectancies are related to outcomes of treatment and prevention efforts. At the same time, it is clear that changes in alcohol consumption can be attained without targeting or effectively changing alcohol expectancies. Furthermore, reductions in alcohol expectancies do not always lead to reductions in alcohol consumption. The relative importance of positive and negative expectancies remains unclear and may depend upon the population being targeted. Future research must attempt to establish more clearly that expectancy challenge procedures effectively change behaviour by altering alcohol expectancies. In addition, the relative efficacy and effectiveness of expectancy interventions, compared to other well-established interventions, needs to established. Thus, while expectancy challenges provide a potentially promising new strategy for reducing alcohol-related problems, much work remains.

An evaluation of Expectancy Theory does not, however, predicate upon expectancy research snuggly fitting into a motivation framework; nor does it predicate upon a motivation framework maintaining a prominent position within contemporary alcohol education, problem prevention and treatment. A test of Expectancy Theory simply, but critically, rests on the ability of researchers to establish a causal link between expectancies held by individuals and the alcohol they subsequently consume. One prominent view is that this has already been achieved (Goldman, Del Boca & Darkes, 1999) and what remains is, at its weakest, only fine tuning or exploitation, and at its strongest, opportunities to discover more about cognitive life in relation to alcohol through the tools of cognitive neuroscience. The foregoing review, however, reveals that this view might be premature because it is not supported consistently by the data.

As is common in psychological science, the focus of Expectancy Theory has been on positive research findings, with null results and failures to replicate receiving far less attention. For example, countless studies have supported an association between expectancies and drinking behaviour. An inference is then made that the relation is causal and that expectancies might provide a mechanism for changing alcohol use. In any developing field, such inference and hypothesis formation represent important early steps. A point of view can only be sustained, however, if secure generalizations emerge from the range of studies that are designed to test it. In the most critical areas of expectancy/consumption (i.e. areas that impact directly on education, problem prevention and treatment), the range of studies is limited, the absolute number of studies published is small, independent replications are few, and contradictory findings are frequent.

This might be a firm enough platform for speculation and certainly one from which promissory notes might be defensibly issued; but it is, perhaps, not yet sufficiently firm to properly support some of the views that are currently held on the cognitive role of and cognitive processes underpinning positive expectancy (Goldman, Boca & Darkes, 1999) and negative expectancy (Jones & McMahon, 1998) in relation to alcohol consumption variability—particularly with respect to problem prevention and treatment.

Concluding remarks
Although it is not proposed that Expectancy Theory provides the sole substrate for alcohol motivations, it has been proposed that its contribution is substantial. There are other components, of course: subjective alcohol cue responses are now usefully seen as part of a motivation framework (Schulze & Jones, 1999) and representations of these cue responses include expectancy components (Love, James & Willner, 1998; Willner et al., 1998). The potential value of the motivation framework is that it will not only encourage applied psychological science (practice) and basic psychological science (theory) to engage but it will also encourage different research domains within basic psychological science (for example, expectancy and cue-reactivity or positive and negative expectancy research) to do the same. This is not a novel perspective (for example, Cox & Klinger, 1988).
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