COGNITIVE EFFECTS
The Long Arm of Expectancies: Adolescent Alcohol Expectancies Predict Adult Alcohol Use
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Abstract — Aims: Alcohol expectancies are strong concurrent predictors of alcohol use and problems, but the current study addressed their unique power to predict from adolescence to midlife. Method: Long-term longitudinal data from the national British Cohort Study 1970 (N = 2146, 59.8% female) were used to predict alcohol use and misuse in the mid-30s by alcohol expectancies reported in adolescence. Results: Cohort members with more positive alcohol expectancies at age 16 reported greater alcohol quantity concurrently, increases in alcohol quantity relative to their peers between ages 16 and 35, and a higher likelihood of lifetime and previous year alcohol misuse at age 35, independent of gender, social class in family of origin, age of alcohol use onset, adolescent delinquent behavior and age 16 exam scores. Conclusions: Alcohol expectancies were strong proximal predictors of alcohol use and predicted relative change in alcohol use and misuse across two decades into middle adulthood.

Theories such as social learning theory (Bandura, 1977), the theory of planned behavior (Ajzen, 1991) and expectancy-value theory (Hays, 1985) converge on the idea that what individuals expect to happen when they drink alcohol is important in determining their behavior. Alcohol expectancies describe an individual’s anticipation that drinking alcohol will result in specific positive or negative consequences. Research has confirmed the role of alcohol expectancies in predicting alcohol use cross-sectionally and longitudinally over months and up to 9 years (e.g. Leigh, 1989; Goldman et al., 1999; Komro et al., 2001; Baer, 2002). Whether adolescent alcohol expectancies predict alcohol use and misuse longitudinally into middle adulthood remains unknown. The answer to the question of whether adolescent expectancies have long-lasting implications for behavior is important for understanding early determinants of adult drinking patterns and for identifying potential opportunities for intervention. The current study examines the extent to which positive and negative alcohol expectancies during adolescence predict alcohol use concurrently, longitudinally at ages 26 and 35 (controlling for previous use), and lifetime as well as past year alcohol misuse at age 35 in a national British birth cohort.

POSITIVE EXPECTANCIES OF ALCOHOL USE
Positive expectancies of alcohol use are the beliefs a person holds (either consciously or not) about the likelihood of experiencing positive consequences of drinking alcohol (e.g. to become more friendly; Leigh, 1989; Goldman and Roehrich, 1991; Cooper, 1994; Baer, 2002; Kuntsche et al., 2005). A wealth of literature indicates that having positive expectancies (i.e. anticipating rewarding consequences from alcohol) in adolescence predicts higher rates of alcohol use concurrently (Cable and Sacker, 2008), across periods of 6 months to 5 years (Gerrard et al., 1996; Aas et al., 1998; Grube and Agostinelli, 1999; Griffin et al., 2000; Goldberg et al., 2002) and 9 years later (Stacy et al., 1991). Studies of university students converge with those of adolescents: positive alcohol expectancies are associated with alcohol use several days later (Del Boca et al., 2004), 1 month later (Carey, 1995), 1 year later (Bartholow et al., 2000; Zamboanga et al., 2006) and 4 years later (Sher et al., 1996). All of these longitudinal studies (with the exception of Griffin et al., 2000 who studied 7th graders) controlled for previous alcohol use; the frequency of use was most commonly used as a control, although several studies controlled for both frequency and quantity of use (Carey, 1995; Sher et al., 1996; Bartholow et al., 2000) and Zamboanga et al. (2006) controlled for previous reports of hazardous use with the AUDIT scale. Thus, the evidence is quite strong that adolescents and young adults who hold more positive expectancies about the rewards of alcohol are likely to drink more alcohol.

In the same birth cohort analyzed in the current paper, Cable and Sacker (2007) demonstrated that adolescents’ positive expectancies at age 16 predicted heavy alcohol use and alcohol misuse at age 30 among men and women, independent of age 30 psychological distress, unemployment and cognitive skill deficits. Their analyses are extended here by also controlling for previous alcohol use, because experiences with alcohol use can be formative for beliefs about the effects of alcohol (e.g. fun, relaxation) (Cox and Klinger, 1988; Cooper, 1994).

NEGATIVE EXPECTANCIES OF ALCOHOL USE
Links between negative expectancies, or the beliefs a person holds about the likelihood of experiencing negative consequences of alcohol (e.g. to feel ill), and alcohol use have been less consistently demonstrated. Negative expectancies may be inversely associated with alcohol use and misuse (e.g. Leigh, 1989; Goldman and Roehrich, 1991; Cooper, 1994; Petrakis et al., 1995; Baer, 2002; Kuntsche et al., 2005) or positively associated with alcohol use intentions (Patrick and Maggs, 2008). Among adolescents, negative alcohol expectancies predicted less alcohol use 1 and 2 years later (Grube and Agostinelli, 1999; Thush and Wiers, 2007). Negative alcohol expectancies also predicted less alcohol use concurrently in a sample of adults over age 35 (Leigh and Stacy, 2004). On the other
hand, as adolescents' engagement in risk behaviors (including alcohol use) increased over a 3-year longitudinal study, they anticipated experiencing more negative consequences (Gerrard et al., 1996). Yet other studies have shown that positive expectancies, but not negative expectancies, are linked to alcohol use (Fromme et al., 1993), and that the link between negative expectancies and alcohol consumption can be accounted for by third variables of age, gender and personality (Kilbey et al., 1998). The lack of consistent findings with negative expectancies may be because they have received less research attention relative to research on positive expectancies (see the review by Jones et al., 2001).

LONGITUDINAL PREDICTION

Notwithstanding the previous longitudinal studies on alcohol expectancies, it remains unclear just how long expectancies reported in adolescence matter into adulthood. Understanding whether adolescent alcohol expectancies predict adult alcohol use and misuse many years later will contribute to our knowledge of the role of adolescent beliefs and experiences in shaping long-term, and not just proximal, patterns of alcohol use. Therefore, the current study examines whether positive and negative alcohol expectancies reported at age 16 are predictive of alcohol use and misuse one and two decades later, after controlling for earlier alcohol use, to shed light on whether adolescent expectancies have lasting importance for alcohol behaviors into adulthood.

GENDER AND SOCIAL CLASS

Sociodemographic characteristics including gender and social class have been shown to be associated with alcohol attitudes and alcohol use. Men tend to have stronger positive expectancies and to rate the positive effects of alcohol use as more important and the negative effects of alcohol use as less important than do women (Jones et al., 2001; Patrick and Maggs, 2008). In one longitudinal study, positive alcohol expectancies predicted alcohol use among boys but not among girls (Griffin et al., 2000). In addition, a great deal of cross-cultural evidence demonstrates that men consume greater amounts of alcohol than women (Wilsnack and Wilsnack, 2002). The process by which adolescent alcohol expectancies are associated with adult alcohol use also may be different for men and women. For example, Cable and Sacker (2007) found that the relationship between expectancies and heavy alcohol use was moderated by psychological distress for men but not for women. Based on extant literature, we predict that the link between positive expectancies and alcohol use should be stronger for men. Social class is used as a control variable in these analyses because middle- and upper-class status in Britain predicts heavier alcohol use (Richards et al., 2005; Maggs et al., 2008), although working-class status is associated with higher alcohol-related mortality rates among British men (Harrison and Gardiner, 1999). Therefore, gender and social class are tested as main effects, and gender as a moderator of expectancies, in predicting alcohol use and misuse.

THE CURRENT STUDY

In sum, there is evidence that alcohol expectancies in adolescence predict alcohol use across adolescence and early adulthood, but the extent to which adolescent expectancies are associated with alcohol use and misuse into middle adulthood is unknown. Adolescent alcohol expectancies are important candidate targets for intervention programs that aim to reduce alcohol problems (Darkes and Goldman, 1993; Wood et al., 2007); thus, it is important to clarify the longevity of their impact on alcohol use in adulthood. We build on previous work in at least three ways: (a) by testing the long-term prediction of positive expectancies on alcohol use and misuse through age 35 (a longer time interval); (b) by controlling for previous alcohol use to determine whether age 16 alcohol expectancies predict relative changes in alcohol use between ages 16 and 26 and between ages 26 and 35; and (c) by including negative alcohol expectancies.

The research regarding expectancies is consistent with research from a variety of disciplines indicating that humans are generally more motivated by positive rewards than by negative consequences (Solomon, 1980). In their 2001 review, Jones and colleagues reconciled discrepant findings with positive and negative expectancies by arguing that positive expectancies are responsible for initiating and maintaining alcohol use, while the role of negative expectancies lies in limiting consumption and ceasing use. Based on our knowledge of extant literature, we predicted that positive expectancies for alcohol use reported during adolescence would be more predictive of long-term alcohol use and misuse than negative expectancies.

METHOD

Participants

Data were drawn from the ongoing national longitudinal British Cohort Study 1970 (Butler et al., 1985; Bynner et al., 1997, 2000; Ferri et al., 2003). Individuals born in 1 week in April 1970 were assessed at birth with a 96.7% response rate and in ongoing follow-ups using a multi-method, multi-informant approach. Data from ages 16, 26 and 35 are used in the present study. The original study focused on health and has successively expanded to examine physical, educational and social development. Retention at age 35 was 73% of the target sample for that wave and 58% of the original sample (Simmonds et al., 2007).

Cases were included for the current analysis if they had complete data on predictors of interest at age 16 (N = 2146, 59.8% female). Due to an unforeseen teacher strike at the age 16 data collection, the number of total cases available was decreased (Goodman and Butler, 1996). Despite this reduction, Sullivan (2006) found that data were generally representative of pupils across school types. Extensive analyses have been conducted to examine response bias on the obtained sample at age 16 compared to the previous wave at age 10. On a variety of indicators including academic ability, child smoking, family structure, social class, poverty and disability, Shepherd (1997) concluded that no large differences emerged between the retained sample and attrited cases. Moreover, power remains substantial due to the large sample size.
Social class background in the present analyses was coded based on the highest occupational category reported by either parent at age 5, age 10 or age 16. About a quarter of participants had manual social backgrounds as reflected by parents in manual occupations (23.4%), as defined by the Registrar General’s social classifications (RGSC) of skilled manual (IIIM), partly skilled (IV) and unskilled (V) labor categories. The remainder (76.6%) were from non-manual social backgrounds, that is, skilled non-manual (IIINM), managerial/technical (II) and professional (I) occupational categories.

Measures

**Alcohol expectancies at age 16.** The stem question to assess positive alcohol expectancies was ‘What pleasant effects does alcohol have on you?’ and participants were asked to check all statements that applied (i.e. 0/1 response format) (Goodman and Butler, 1996; Cable and Sacker, 2007). Six items (α = 0.74) assessed positive alcohol expectancies (i.e. it makes me: less shy/more chatty, feel happy, more friendly, feel more relaxed and confident, forget my problems and feel sexy). These six items reflected a single dimension in factor analysis. Cable and Sacker (2007) used four of these items (omitting the last two) based on their narrower focus on social disinhibition expectancies, which were identified as a risk factor for adult alcohol use. In the present analyses, we use all six items to encompass the broader conceptual domain of positive expectancies. Eight items (α = 0.53) assessed negative alcohol expectancies. In response to the question ‘What unpleasant effects does alcohol have on you?’, participants were asked to check all that applied (i.e. it makes me: feel depressed, feel ill, fall asleep, actually sick, black out, have a headache, violent and abusive). These items are identical to those used in Cable and Sacker (2008), were shown to represent a single factor in factor analysis and alpha was maximized by including all items. All adolescents responded to positive and negative expectancies questions regardless of their drinking behavior. It should be noted that the positive and negative expectancy measures reflect different domains of functioning: the positive expectancy items largely reflect social facilitative effects, while the negative expectancies items focus more on physical symptoms.

**Age of alcohol use onset.** At age 16, adolescents reported the age at which they first began to drink with friends with responses from 6 to 15 years. For analysis, the variable was coded from 1 (6 years) to 10 (15 years), with adolescents who had not yet consumed alcohol with friends coded as 11.

**Age 16 delinquent behavior.** At age 16, adolescents reported whether they had engaged in 26 delinquent behaviors and how frequently (α = 0.82). Items ranged from mild (e.g. lied about age, swore at teacher) to criminal (e.g. deliberately broke windows, used physical force to steal something). Response options were: no (0), yes but not in the past year (1), once in the past year (2), two to five times in the past year (3), six to ten times in the past year (4) and eleven or more times in the past year (5). Responses to the 26 items were averaged.

**Age 16 exam scores.** At age 16, cohort members were eligible to take Certification for Secondary Education (CSE) exams or O-level exams in various subjects. We used a weighted sum of CSE and O-level exam scores, with greater weight placed on O-level exams as they reflect preparation for higher education (e.g. Schoon and Parsons, 2002).

**Weekly units of alcohol at ages 16, 26 and 35.** At ages 16, 26 and 35, individuals reported on the units of beer, wine and/or liquor consumed in the last week. One unit is equal to a ½ pint of beer, a small glass of wine and a standard pub measure of spirits (25 ml). Outliers were recoded to a maximum possible score equal to 4 standard deviations above the mean (Maggs et al., 2008) to reduce their undue influence on results. Age 30 units of alcohol were not used due to field survey measurement problems with the assessment of beer use as documented by Elliott and Dodgeon (2007).

**CAGE alcohol misuse at age 35.** Misuse of alcohol was assessed at age 35 using the CAGE (Mayfield et al., 1974; Smart et al., 1991). This concise measure has been widely used in community samples to assess lifetime and past year alcohol problems (Bisson et al., 1999) with acceptable internal consistency across a range of samples (Shields and Caruso, 2004). At age 35, self-reports of lifetime and past year experiences of four types of alcohol misuse were obtained (i.e. felt the need to cut down, annoyed or angered others, felt guilty about drinking, had a drink first thing in the morning (‘eye-opener’)). The CAGE provides an efficient self-report estimate of drinking misuse, although it does not reflect diagnoses of alcohol abuse or dependence. An affirmative response to two of the four items is traditionally considered clinically significant (Shields and Caruso, 2004), suggesting a higher likelihood that the respondent would screen positive with a full diagnostic measure. However, sensitivity for identifying harmful alcohol use is increased by employing a cut-point of one rather than two (e.g. Knight et al., 2003; Matano et al., 2003), particularly for women (Bradley et al., 1998). We conducted separate analyses employing the CAGE 1+ and 2+ cutoffs for annual as well as lifetime reports of alcohol misuse.

**Plan of analysis**

Hierarchical ordinary least-squares (OLS) regression analyses were used to predict concurrent (age 16) and future (ages 26 and 35) alcohol use. Hierarchical logistic regression analyses predicted lifetime and past year alcohol misuse (assessed at age 35, i.e. CAGE 1+ and CAGE 2+ scores). The first step in analyses predicting age 26 and age 35 outcomes controlled for the variance associated with units of alcohol consumed at the prior wave. Therefore, the coefficients associated with subsequent predictors represent the unique prediction of relative change in alcohol use, above and beyond the level of drinking that would be expected based on prior use. The second step (first step in analyses predicting age 16 concurrent alcohol use) added gender, social class, age of drinking initiation, age 16 delinquent behavior and age 16 exam scores to control for level differences in alcohol use and misuse. Positive and negative alcohol expectancies reported at age 16 were entered on the next step. Finally, to test whether associations between expectancies and alcohol use and misuse were different for males and females, two-way interactions were tested in the final step for gender × positive expectancies and gender × negative expectancies. Unique variance for each step (R²) is reported in addition to the total R².
Table 1. Predicting weekly units of alcohol at ages 16–35 by alcohol expectancies

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Units of alcohol consumed in 1 week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age 16 / β (SE)</td>
</tr>
<tr>
<td></td>
<td>Age 26 / β (SE)</td>
</tr>
<tr>
<td></td>
<td>Age 35 / β (SE)</td>
</tr>
<tr>
<td>Step 1, $R^2$</td>
<td></td>
</tr>
<tr>
<td>Units at previous age</td>
<td>0.182***</td>
</tr>
<tr>
<td>Gender (male)$^a$</td>
<td>0.10 (0.13)**</td>
</tr>
<tr>
<td>Social class</td>
<td>0.02 (0.15)</td>
</tr>
<tr>
<td>Step 2, $R^2$</td>
<td></td>
</tr>
<tr>
<td>Age of drinking onset</td>
<td>-0.13 (0.10)**</td>
</tr>
<tr>
<td>Delinquent behavior</td>
<td>0.34 (0.27)**</td>
</tr>
<tr>
<td>Exam scores</td>
<td>0.02 (0.01)</td>
</tr>
<tr>
<td>Step 3, $R^2$</td>
<td></td>
</tr>
<tr>
<td>Positive expectancies</td>
<td>0.22 (0.47)**</td>
</tr>
<tr>
<td>Negative expectancies</td>
<td>0.03 (1.03)</td>
</tr>
<tr>
<td>Step 4, $R^2$</td>
<td></td>
</tr>
<tr>
<td>Gender × positive expectancies</td>
<td>0.07 (0.44)**</td>
</tr>
<tr>
<td>Gender × negative expectancies</td>
<td>0.02 (0.03)</td>
</tr>
</tbody>
</table>

$^a$ Male = 1, Female = -1.
$^b$ Non-manual = 1, Manual = -1.
$^c$ $β$ (SE) = standardized beta (standard error).

RESULTS

Descriptive statistics

Age 16 positive alcohol expectancies ($M = 0.32, SD = 0.28$, range $0–1$) and negative alcohol expectancies ($M = 0.08, SD = 0.12$, range $0–1$) were correlated, $r = 0.35$ ($P < 0.001$). The mean weekly quantity of alcohol use at age 16 was 6.13 units ($SD = 4.17$; women $M = 3.21, SD = 5.02$; men $M = 5.66, SD = 7.51$), at age 26 was 10.85 ($SD = 13.50$; women $M = 6.48, SD = 7.96$; men $M = 18.46, SD = 17.52$) and at age 35 was 12.42 ($SD = 14.22$; women $M = 5.86, SD = 7.90$; men $M = 15.65, SD = 16.19$). At age 35, at least one indicator on the lifetime CAGE measure of alcohol misuse was endorsed by 38.9% (32.0% of women, 48.5% of men) and at least one indicator on the past year CAGE was endorsed by 26.3% (21.6% of women, 34.4% of men). Two or more indicators of alcohol misuse on the lifetime CAGE were endorsed by 9.1% (6.3% of women, 12.2% of men), and two or more indicators of the past year CAGE were endorsed by 7.2% (4.6% of women, 9.9% of men).

Regressions: previous alcohol use and background variables

Tables 1 and 2 present regression results for alcohol use and misuse, respectively. On Step 1 of the OLS and logistic regressions, weekly units of alcohol at the previous wave positively predicted all adult outcome variables. On Step 2, gender predicted quantity of alcohol use but not alcohol misuse. Men reported drinking more alcohol than women at age 16 and greater alcohol use at ages 26 and 35 independent of drinking at the prior wave. Social background was not uniquely predictive of alcohol use or misuse. Beginning alcohol use at an earlier age and engaging in adolescent delinquent behaviors predicted greater alcohol use at age 16 and greater relative alcohol use at ages 26 and 35 with prior use controlled (trend level of significance for age of onset), but neither uniquely predicted alcohol misuse reported in adulthood. Exam scores from age 16 were predictive of alcohol use at age 26 only. Exam scores predicted lifetime CAGE 1+ scores, but no other measures of alcohol misuse.

Regressions: positive and negative expectancies

Beyond the effects of prior alcohol quantity, gender, social class, age of drinking onset and delinquency, positive expectancies predicted greater alcohol use at all ages. That is, individuals who at age 16 reported more positive alcohol expectancies tended to not only drink more alcohol concurrently but to increase their use relative to others in the sample between ages 16 and 26 and between ages 26 and 35 (as indicated by the unique prediction after controlling for previous use and other covariates). Furthermore, adolescent positive alcohol expectancies uniquely predicted lifetime (CAGE 1+) and past year (CAGE 1+ and CAGE 2+) alcohol misuse at age 35, beyond effects of prior alcohol use and the other covariates. Greater endorsement of negative expectancies of alcohol use at age 16 did not uniquely predict concurrent or future alcohol use or misuse reported in adulthood.

Regressions: interactions by gender and expectancies

On Step 4, two-way interactions of gender × positive expectancies and gender × negative expectancies were added. Gender significantly moderated positive (but not negative) alcohol expectancies to predict alcohol use at ages 16, 26 and 35 (trend level of significance for age 35). Interactions were probed using strategies recommended by Holmbeck (2002). Slopes were positive and significant for both men and women at ages 16 and 35 and significant for men only at age 26. Figure 1 illustrates the shape of this interaction predicting alcohol use at age 16, calculated as predicted units of alcohol for females and males with positive expectancies at ± 0.75 standard deviations from the mean. Patterns were similar at the other waves. As predicted, the association between positive expectancies at age 16 and alcohol use in adolescence and adulthood was stronger for men than for women.

DISCUSSION

Building on and extending previous studies, this paper provides the strongest evidence to date that the links of adolescent positive expectancies with alcohol use and misuse extend well into adulthood for both men and women. In a national sample, adolescents’ positive alcohol expectancies (but not negative expectancies) predicted concurrent alcohol use, and relative changes in alcohol use and alcohol misuse one and two decades later, independent of prior drinking. This effect, observed for both men and women, was more pronounced for men. The long-term prediction over a significant period of the life course, which includes major transitions in every domain of life, is striking. For example, the positive association between age 16 exam scores and age 26 alcohol use perhaps reflects an increase in drinking that accompanies post-secondary education (Bachman et al., 1997). Such longitudinal effects provide clear support for the importance of the early formation of beliefs about alcohol in the primary school years (Miller et al., 1990) and the need
use and misuse than were negative expectancies, consistent with some previous literature (Jones et al., 2001). However, we did not find unique prediction of negative expectancies in the presence of covariates in this study, a finding that differed from others that reported positive (Gerrard et al., 1996; Patrick and Maggs, 2008) or negative (Leigh, 1989; Goldman and Roehrich, 1991; Cooper, 1994; Petrakis et al., 1995; Baer, 2002; Kuntsche et al., 2005) associations with alcohol use. Positive and negative expectancies were positively inter-correlated and correlated with age 16 drinking, suggesting that stronger expectancies of both types may be indicative of greater prior drinking experience. Furthermore, the positive expectancies measure used here described social facilitation expectancies while the negative expectancies measure described expectancies that alcohol would lead to adverse physical symptoms. Future research should include items regarding negative effects on social interactions to compare the perceived effects of alcohol on positive and negative consequences for social relationships that are so important to adolescents (e.g. Allen et al., 2005).

Third, with respect to gender, the effect of positive expectancies on alcohol consumption was stronger for males than for females. This finding builds upon previous research documenting that men’s and women’s drinking may be differentially sensitive to expectancies and motivations (Griffin et al., 2000; Jones et al., 2001; Patrick and Maggs, 2008). More investigation is needed to determine whether this gender difference could be the result of differences between men and women in personality, previous experience with alcohol use or social role expectations.

**CLINICAL AND PREVENTION IMPLICATIONS**

Expectancies and beliefs about alcohol use during adolescence represent potentially pivotal targets for preventing or reducing harmful alcohol use across adulthood. Adolescence has long been understood as a period of development during which enduring values, beliefs and lifestyles are being formed (Mannheim, 1952; Erikson, 1968; Jessor et al., 1998). The present results underscore the importance of acknowledging

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**Table 2. Predicting alcohol problems at age 35 by alcohol expectancies**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Lifetime</th>
<th>Annual</th>
<th>Lifetime</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>β (SE)</td>
<td>OR</td>
<td>β (SE)</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>Step 1, $\chi^2$</td>
<td>178.01***</td>
<td>99.42***</td>
<td>24.45***</td>
<td>15.85***</td>
</tr>
<tr>
<td>Units at previous age</td>
<td>0.05 (0.01)</td>
<td>1.06***</td>
<td>0.03 (0.01)</td>
<td>1.03***</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>0.03 (0.06)</td>
<td>1.03</td>
<td>−0.10 (0.12)</td>
<td>0.91</td>
</tr>
<tr>
<td>Social class backgroundb</td>
<td>0.08 (0.07)</td>
<td>1.09</td>
<td>0.03 (0.13)</td>
<td>1.03</td>
</tr>
<tr>
<td>Age of drinking onset</td>
<td>−0.03 (0.05)</td>
<td>0.97</td>
<td>0.10 (0.09)</td>
<td>1.11</td>
</tr>
<tr>
<td>Delinquent behavior</td>
<td>0.14 (0.12)</td>
<td>1.15</td>
<td>0.35 (0.18)</td>
<td>1.42</td>
</tr>
<tr>
<td>Exam scores</td>
<td>0.01 (0.00)</td>
<td>1.01***</td>
<td>0.00 (0.01)</td>
<td>1.00</td>
</tr>
<tr>
<td>Positive expectancies</td>
<td>0.64 (0.22)</td>
<td>1.90**</td>
<td>0.02 (0.40)</td>
<td>1.02</td>
</tr>
<tr>
<td>Negative expectancies</td>
<td>0.58 (0.47)</td>
<td>1.79</td>
<td>−0.11 (0.85)</td>
<td>0.89</td>
</tr>
</tbody>
</table>

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**Fig. 1. Positive alcohol expectancies reported at age 16 predicting units of alcohol consumed at age 16 as moderated by gender. Low (high) expectancies represent values 0.75 SD below (above) the sample mean.**

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$a$Male = 1, Female = −1.
$b$Non-manual = 1, Manual = −1.
$cP < 0.10$, $*P < 0.05$, $**P < 0.01$, $***P < 0.001$.
$eta$ (SE) = beta (standard error), OR = odds ratio.
perceived positive consequences of alcohol use as salient and important beliefs that predict behavior both concurrently and over decades. Among alcohol misuse prevention and intervention programs for late adolescents and adults, motivational enhancement approaches targeting beliefs about alcohol have reported some of the highest effect sizes (Larimer and Conrce, 2002; Tevya and Monti, 2004; Walters and Neighbors, 2005; White et al., 2006). Similarly, expectancy challenge programs have been shown to alter alcohol expectancies and subsequently reduce alcohol use (Darkes and Goldman, 1993). The central role of alcohol expectancies in predicting alcohol use points to the potential for intervention approaches targeting adolescent alcohol cognitions to have a lasting impact into midlife by reducing problematic alcohol use.

Based on the present results, prevention efforts focused on positive, rather than negative, expectancies may have a greater impact on reducing alcohol use and misuse across the lifespan. It will likely be important for prevention messages to be built in a promotion and harm reduction framework [e.g. promoting the idea that drinking is more fun in moderation (‘getting a buzz’) than in excess (passing out)] rather than focusing exclusively on educating adolescents about the associated dangers (e.g. alcohol poisoning may lead to death) (Higgins, 1997). In addition, given the predictive power of positive alcohol expectancies on alcohol use and misuse in adulthood, the effects of media and advertising that promote adolescents’ perceptions that alcohol is rewarding should be carefully considered (Austin and Knaus, 2000; Fleming et al., 2004).

However, the long-term longitudinal prediction in these analyses should not be assumed to be deterministic. A long-term association between alcohol expectancies at age 16 and adult alcohol use outcomes does not represent an unalterable pathway, as represented by the concepts of multifinality and equifinality (e.g. Curtis and Cicchetti, 2003). In other words, alcohol use so many years later may not be accurately projected for individuals based on earlier expectancies because of the various planned and spontaneous life experiences that occur. Recent research has also failed to show a heritable influence on alcohol expectancies (Agrawal et al., 2007), which suggests that expectancies may be responsive to environmental influences and experiences that could be modified through intervention efforts.

LIMITATIONS AND FUTURE DIRECTIONS

There are several notable limitations to the current study. First, despite the longitudinal data, the design is correlational and thus the analyses cannot test a causal link between positive expectancies and alcohol use. Second, no alcohol use measures were available prior to age 16, yet early use may predict both alcohol expectancies and behavior later in life (Jones et al., 2001). Third, the available measures of alcohol use assessed the quantity consumed the previous week. Though this measure is not necessarily representative of a typical week, our analyses provide evidence for its validity, given the concurrent and longitudinal associations with expectancies and alcohol misuse. In addition, the CAGE measure of alcohol misuse is considered a screening tool for potential problems but does not provide a diagnosis of alcohol abuse or dependence. Finally, the available negative alcohol expectancies measure had a low internal consistency. These latter two measurement limitations are likely to have reduced our ability to document systematic associations among these variables. However, these nationally representative data have considerable strengths in their ability to demonstrate long-term sequelae of adolescent expectancies. Indeed, given the measurement limitations of the study, our findings suggest that positive expectancies at age 16 tap into a construct that is quite robust in its prediction over time.

Though we tried to account for several key factors associated with alcohol use and misuse, other third variables not available to the present analyses may explain the association between positive adolescent expectancies regarding alcohol and more adult alcohol use. For example, sensation-seeking (Zuckerman, 1979), neurological vulnerability to alcohol (Tapert et al., 2004/2005; Tarter et al., 2004) or familial risk for alcoholism (Zuck and Wong, 2006) may be associated with the development of expectancies and with alcohol use behaviors, although we were unable to test the associations in the current study. Future research should continue to address how expectancies develop and change across childhood, adolescence and adulthood in a broader context. In addition, some understanding of the continuities and discontinuities in alcohol use itself should be explored in relation to the development of expectancies and experiences with positive and negative consequences resulting from alcohol use. Overall, these results highlight the need for increased attention to alcohol expectancies and recognition of their particular importance during the sensitive period of adolescence.

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