

Adolescent Alcohol Expectancies in Offspring from Families at High Risk for Developing Alcoholism*

SA SHEN, PH.D., JEANNETTE LOCKE-WELLMAN, M.B.A., AND SHIRLEY Y. HILL, PH.D.†

Department of Psychiatry, University of Pittsburgh School of Medicine, 3811 O'Hara Street, Pittsburgh, Pennsylvania 15213

ABSTRACT. *Objective:* The present study investigated alcohol expectancies derived from the Alcohol Expectancy Questionnaire (AEQ) in parents and their adolescent offspring. It was of interest to determine whether alcohol expectancies would differ by risk status, and whether those differences were influenced by parental beliefs. *Method:* Children/adolescents aged 8 to 18, from families at high risk for developing alcoholism ($n = 69$; 37 males) and from low-risk control families ($n = 46$; 25 males), were evaluated annually. At every assessment, each child and one parent were administered the AEQ and interviewed to determine drinking status. Data for two time points approximately 3 years apart were analyzed. *Results:* In early adolescence, high-risk offspring expected more improvement in social functioning when under the influence of alcohol than did low-risk controls. However, by age 16, risk group differences were not seen. Higher scores on two of the AEQ scales (Social Behavior and Relaxation) predicted the age of onset for regular drinking, whereas one scale (Social Behavior) predicted drinking be-

havior. In addition, high-risk offspring were found to have beliefs about the effects of alcohol that were similar to those of their parents, in contrast to low-risk offspring and their parents, who displayed significant negative correlations. *Conclusions:* This report confirms previous studies relating alcohol expectancies to drinking behavior (frequency, quantity per occasion, social consequences). Alcohol expectancies also were found to predict the age of onset to begin regular drinking in the combined group of adolescents studied, although risk differences in age of onset were not influenced by differing expectations concerning the effects of alcohol. These results suggest that the risk differences in expectancies that were seen in young adolescents (approximately age 13) may be due to the transmission of parental beliefs to their offspring. The absence of risk differences by late adolescence (approximately age 16) suggests that other factors (e.g., peer influences or experience drinking alcohol) also play a role. (*J. Stud. Alcohol* 62: 763-772, 2001)

THE ALCOHOL EXPECTANCY Questionnaire (AEQ) is among the most widely used instruments for measuring the beliefs individuals have about the effects of alcohol consumption. Two forms have been developed: an adolescent version (Christiansen et al., 1982) and an adult version (Brown et al., 1980). The original instrument was factor-analytically derived and was developed to measure the degree to which individuals expect alcohol to produce both global positive effects and specific effects (e.g., enhanced social and physical pleasure; enhanced sexual experience and performance; greater arousal, including perceived enhancement of power and aggression; greater social assertiveness; and enhanced ability to relax and reduce tension) (Brown et al., 1980). In their landmark study, Brown and colleagues (1980) demonstrated for the first time that a large number of expectancies could be verbalized and reduced to six factors.

Several studies have shown that alcohol-related expectancies are associated with drinking-related behavior in both adult (Brown, 1985a,b; Brown et al., 1980, 1985, 1987a; Williams and Ricciardelli, 1996) and adolescent popula-

tions (Grube and Agostinelli, 1999; Rönnback et al., 1999). In college students, drinking expectancies have been found to predict problematic and nonproblematic drinking (Brown, 1985b). Positive expectancies have been found to correlate closely with both the frequency of drinking and the quantity of drinking per occasion (Goldman et al., 1997; Rönnback et al., 1999; Williams and Ricciardelli, 1996). Among the expectancies predicting frequency and quantity of use are scores on the Sexual Enhancement, Physical and Social Pleasure, Social Assertion and Tension Reduction scales of the adult AEQ (Goldman et al., 1997).

Expectancies appear to differ by gender. Williams and Ricciardelli (1996) reported that, whereas both male and female adults who expect increased social assertiveness from drinking tended to drink larger quantities per occasion, only women expected increased physical and social pleasure. In addition, scores on the Arousal and Power and Sexual Enhancement scales predicted frequency of drinking in women, although no effect was seen in men. In adolescents, Rönnback et al. (1999) found that drinking frequency in males could be predicted by scores on the Social Behavior scale (Scale 2), while the Cognitive and Motor Enhancement scale (Scale 3) predicted the quantity of alcohol consumed per drinking occasion.

The effect of family history of alcoholism on alcohol-related expectancies has been studied in early adolescents (Reese et al., 1994), adolescents in treatment for alcohol

Received: January 2, 2001. Revision: May 30, 2001.

*This study was supported by National Institute on Alcohol Abuse and Alcoholism grants AA05909 and AA08082.

†Correspondence concerning this manuscript should be addressed to Dr. Shirley Y. Hill at the above address.

abuse (Brown et al., 1987b), high school students (Mann et al., 1987) and college students (Lundahl et al., 1997; Sher et al., 1991). Brown et al. (1987b) examined the effects of family history and adolescent drinking patterns, finding a significant interaction between adolescent alcohol abuse and parental alcoholism. Adolescents with a positive family history for alcoholism expected greater cognitive and motor enhancement from drinking than did family-history-negative adolescents. Furthermore, six of the seven AEQ scores were significantly more positive in alcohol abusers compared to nonabusers. Using both family history and drinking status, abusing adolescents with a positive family history scored higher than nonabusers (with or without a positive family history) on Scale 7 (Relaxation/Relief) and higher than all other groups on Scale 3 (Cognitive and Motor Enhancement). Mann et al. (1987) examined alcohol expectancies in high- and low-risk high school age offspring, finding significantly higher expectancies of enhanced cognitive and motor functioning, tension reduction and behavioral functioning in the high-risk adolescents and expectancies for increased social behavior in the low-risk drinkers.

Whether alcohol-related expectancies change with age and/or experience has also been investigated, with differing results (Dunn and Goldman, 1998; Lundahl et al., 1997). Studies addressing the effects of age typically are confounded by experience drinking; as adolescents become older, their probability of experiencing the effects of alcohol will increase. Lundahl et al. (1997) studied expectancies in a college-age sample in which some participants were under and some were over the legal drinking age. Those who were under the legal drinking age were more likely to expect greater global positive changes, social assertion, sexual enhancement and increased power and aggression following alcohol consumption than did subjects who were over the legal drinking age. Furthermore, one scale remained significantly more positive when the effects of age were combined with family history and gender: Younger family-history-positive females had greater expectancies for enhanced social and physical pleasure compared with both older family-history-positive females and younger family-history-positive males. These results appear to suggest that, as adolescents/young adults acquire experience with drinking, the positive expectancies appear to dampen. In contrast, Dunn and Goldman (1998), studying alcohol expectancies in 2,324 children in Grades 3, 6, 9 and 12, found age-related changes, but suggested that older children associated more attractive outcomes with drinking. They also reported that expectancies of children who were drinking heavily were most similar to adult expectancies, not those associated with their lower-drinking peers.

Alcohol expectancies investigated in adults undergoing treatment for alcohol dependence have been shown to be related to treatment outcome (Brown, 1985c). Failure to abstain at a 1-year follow-up was found to be significantly

correlated with five of the six alcohol-reinforcement expectancy scores, as well as the total expectancy score. Adolescents in treatment for alcohol abuse expected more positive reinforcement from alcohol on numerous scales compared with a peer group of nonabusers (Brown et al., 1987b). These results suggest that the combined effects of high expectations for alcohol reinforcement and stressful environmental conditions may increase the risk of relapse in recovering alcoholics (Brown, 1985c) and may explain some of the motivation behind drinking.

Based on previous work showing that expectancies differed by risk groups, it was expected that parental beliefs about alcohol effects might directly affect the offspring's beliefs. The present study was designed to determine if the correlations in alcohol expectancies between high- and low-risk offspring and their parents might differ by comparing scale scores for the AEQ (adult version), administered to parents, and the adolescent version, administered to offspring. Although the adolescent and adult forms of the AEQ were not developed specifically for the purpose of mapping the same concepts, scale to scale, similar expectancies are tapped by the two instruments. Administration of both the adult and adolescent AEQ forms to a group of college students showed modest relationships between the two forms (Brown et al., 1987a). Adolescents and adults shared significant overlap in the Global Positive Changes, Sexual Enhancement, Relaxation and Tension Reduction, and Arousal scales. Therefore, the existence of positive correlations between the two forms makes it possible to test the similarity of expectancies of parents who received the adult form and their offspring who were administered the adolescent version. A major goal of the study was to determine if parents transmit beliefs about alcohol to their offspring. If so, does this vary by age and risk status? It was previously demonstrated that high- and low-risk adolescents differed in drinking behaviors and consequences of drinking, as well as the age at which they initiated regular drinking (Hill and Yuan, 1999; Hill et al., 2000). High-risk adolescents drank more frequently, consumed more alcohol and began to drink earlier than low-risk adolescents. Thus, this study was further designed to assess the impact of differing beliefs about alcohol on (1) frequency and quantity typically consumed, (2) consequences of drinking and (3) age to begin regular drinking.

Method

A total of 115 (62 male) children/adolescents (aged 8-18 years) from high-risk (HR) and low-risk (LR) families were evaluated yearly. Each child and one parent were administered the AEQ and interviewed, to determine the drinking status of the child at each assessment. The present analysis was conducted on the earliest data available (the AEQ is valid for children 13 years old or older) and on

data from the last time a majority of the children had been evaluated at approximately the same age.

High-risk families. Ascertainment of families was based on the presence of two adult alcoholic brothers who met criteria for definite alcoholism by Feighner criteria (Feighner et al., 1972), with one member of the pair being in inpatient treatment for alcoholism at the time the family was identified. With the treated alcoholic's consent, eligible family members (parents of the adult alcoholic brothers and all living siblings) were asked to participate in a large-scale family study. An in-person, structured interview (Diagnostic Interview Schedule; Robins et al., 1981) was performed blindly for all living and available parents, grandparents, aunts and uncles of the adolescent participants by M.A.-level interviewers who had achieved 90% reliability with a trainer before beginning assessments. A second unstructured interview was performed by an M.A.- or Ph.D.-level psychologist to arrive at a "best estimate" consensus diagnosis as described by Weissman et al. (1987). For those relatives not assessed by a face-to-face interview (less than 40%), a minimum of two family-history reports were used to arrive at an appropriate family history diagnosis. (This study typically obtained a family history report for all known relatives, even when that relative had been diagnosed in person, providing validity estimates for the family history data.) Families were not included if recurrent major depression, bipolar disorder, a primary substance use disorder other than alcohol dependence, or schizophrenia disorders were present in either the proband pair of adult alcoholic brothers or their first-degree relatives. Alcohol dependence must have been diagnosed as occurring at least 1 year before other drug dependence (e.g., opioid dependence, cocaine dependence) was present.

Low-risk control. Community controls were identified through an index case (male adult) who responded to a newspaper advertisement. Families were chosen on the basis of having the same structural characteristics as the high-risk families (at least two adult brothers). Family members were interviewed using the same diagnostic procedures used for the high-risk families. Each potential control family was screened for the presence of alcohol or drug dependence using the family history report of the index case. Presence of a definite diagnosis of alcoholism by Feighner criteria or alcohol or drug dependence by DSM-III (American Psychiatric Association, 1980) in the index case or his first-degree relatives disqualified a potential control family. Low-risk families were included if all first- and second-degree relatives of the index case were free of alcohol and drug dependence. The study design, which included obtaining family history and direct interviews of family members from both sides of the family, ensured that the control children/adolescents came from bilineal low-risk-for-alcoholism pedigrees.

Alcohol Expectancy Questionnaire. The adult AEQ, which was administered to the parent, consists of items that determine whether alcohol consumption in moderate quantities produces a specific effect. The six expectancies measured by the adult AEQ are (1) Global Positive Changes (e.g., drinking makes the future seem brighter); (2) Sexual Enhancement (e.g., feeling sexier after having a few drinks); (3) Physical and Social Pleasure (e.g., having a few drinks is a nice way to celebrate special occasions); (4) Increased Social Assertiveness (e.g., a few drinks makes it easier to talk to people); (5) Relaxation and Tension Reduction (e.g., alcohol makes me worry less); and (6) Arousal and Aggression (e.g., drinking makes me feel flushed).

The adolescent AEQ is composed of items designed to elicit information on the adolescent's expectations regarding alcohol consumption. It differs from the adult AEQ in that negative expectancies are included. In addition, items are worded to allow adolescents with minimal alcohol experience to respond. Seven expectancies are covered by the adolescent AEQ: (1) Global Positive Changes (e.g., alcohol makes the future seem brighter); (2) Changes in Social Behavior (e.g., alcoholic beverages make parties more fun); (3) Improved Cognitive and Motor Abilities (e.g., it is easier to play sports after a few drinks of alcohol); (4) Sexual Enhancement (e.g., alcohol makes sexual experiences easier and more enjoyable); (5) Cognitive and Motor Impairment (e.g., people may lose control and run into things after drinking alcohol); (6) Increased Arousal (e.g., alcohol makes people feel stronger and more powerful and makes it easier to fight); and (7) Relaxation and Tension Reduction (e.g., drinking alcohol relaxes people).

Onset of regular drinking. The onset of drinking was determined by utilizing both self-report data (Adolescent Alcohol Involvement Scale [AAIS; Mayer and Filstead, 1979]) and a clinician-administered child psychiatric interview (Schedule for Affective Disorders and Schizophrenia for School-Aged Children [K-SADS; Chambers et al., 1985], present and lifetime) that was administered to both the child and the parent by trained master's-level interviewers. Using these two instruments, data were obtained through multiple evaluations that the children/adolescents completed as part of the larger longitudinal study, and the point at which regular drinking began could be determined. In cases in which the two instruments were discrepant, the earliest date was used.

Every child classified as a drinker was drinking at least 1-2 times per month. If drinking was as infrequent as 1-2 times a year, supporting evidence was required indicating that alcohol was used in sufficient quantities to have a pharmacological effect (individual drank two or more drinks per occasion; reported ever being high, drunk or ill as result of drinking; had ever passed out; or experienced memory loss [blackout]), as determined by the AAIS. This

insured that those children who had only taken a sip of an alcoholic drink would not be considered as regular drinkers.

Drinking behavior. The adolescent's drinking behavior was determined using the Adolescent Alcohol Involvement Scale (AAIS), which contains categorical measures for frequency of drinking, quantity consumed per drinking occasion, physical consequences ("What is the greatest effect you have had from alcohol?") and social consequences ("How do others see you?" and "What is the greatest effect drinking has had on your life?")

Statistical analysis. The high-risk group comprised 69 children/adolescents (37 males); the low-risk group comprised 46 children/adolescents (25 males). All children are white; they entered the longitudinal study at different ages and have not completed the same number of repeated assessments. They were evaluated an average of 4.9 times, although some have completed as many as seven annual assessments. Therefore, data for Time 1 were selected from the evaluation closest to age 13 (13.52 [1.05] years and 13.72 [1.19] years for HR and LR, respectively), since the AEQ is not valid before that age. Most children in the data set have multiple data waves. To maximize the number of cases having a follow-up visit at approximately the same point in time, Time-2 data were analyzed for the evaluation occurring approximately 3 years later (15.84 [1.78] years and 16.22 [1.62] years for HR and LR, respectively). Statistical analyses were based on the self-report of children/adolescents and their parents on the Alcohol Expectancy Questionnaire (AEQ) they received (adolescent version for children, adult version for parents). A total of 71 mothers (4 of whom were alcoholic) and 44 fathers (23 of whom were alcoholic) provided parental data at the first completion of the AEQ. At the last assessment, 72 mothers (5 of whom were alcoholic) and 43 fathers (21 of whom were alcoholic) provided parental data.

Confirmatory factor analysis has been widely used in modeling the latent construct and covariance structure of the Alcohol Expectancy Questionnaire (Goldman et al., 1997; Reese et al., 1994; Rönnback et al., 1999; Schafer and Fals-Stewart, 1997). In the present study, confirmatory factor analysis of categorical data was conducted, using Mplus (Muthén and Muthén, 1998), to assess the influence of parents' alcohol-related expectancies on offspring. Analyses were focused on scales that had been shown to have overlapping content. When both the adult and adolescent versions of the AEQ were administered to college students (Brown et al., 1987a), some scales showed moderate correlations for the two versions. Use of only those scales showing modest to high correlations insured that the scales for the parent and child were tapping the same domain.

A first-order correlated 13-factor model (seven factors for the adolescent AEQ and six factors for the adult AEQ) was first tested to assess the influence of risk status on the adolescent and adult AEQ scores, using familial risk (high

risk was coded as 1 and low risk was coded as 2) as a background variable (covariate). Separate first-order models were used to estimate the correlations between high- and low-risk offspring and their parents at the two different time points (first AEQ completion and last AEQ completion). Similar analyses were also used to determine the relationship between the parents' beliefs about alcohol and those of their offspring. Another first-order confirmatory factor construct model was then tested to explore the effect of familial risk status and the adolescent alcohol-related expectancies on the adolescent's drinking behavior (e.g., frequency, quantity per occasion, physical consequences and social consequences). Each of these variables was tested separately.

In the confirmatory factor analyses, individual AEQ items were combined into parcels that were used as indicators of the observed variables (Goldman et al., 1997). The parcels were formed by arranging the items from each subscale of the adolescent and adult AEQ into three approximately equal sets of sequential items (21 parcel scores in the adolescent version and 18 parcel scores in the adult version). The three parcel scores were then used to determine the score for each scale. Weighted least-square parameter estimation with robust standard errors and mean- and variance-adjusted chi-square test statistic (WLSMV) was used to estimate the free parameters in the models. Tests of significance of each alcohol-related expectancy factor in both versions and the factor intercorrelations were provided by the corresponding *t* statistic, which was the ratio of the coefficient estimate and its standard error. Model fit was evaluated using a chi-square test statistic (χ^2) and two other goodness-of-fit indices, the nonnormed fit index (NNFI; Duncan et al., 1999) and the comparative fit index (CFI; Bentler and Wu, 1995). Values of the NNFI and CFI of about 0.9 or more suggest a close fit of the model.

The second stage of the analysis was designed to explore the association between adolescents' alcohol-related expectancies and their initiation of regular drinking. The adolescent's age of onset of regular drinking was treated as the survival time, which was measured in years. Those adolescents who were free of drinking at the time of their last interview were considered to be "right censored," with a survival time equivalent to their current age. For each of the seven adolescent expectancies, scale scores obtained at the age corresponding to the adolescent's survival time and risk status, along with the interaction of these variables, were entered as covariates in the Cox proportional hazards regression model (BMDP 2L). Selection of a parsimonious subset of predictors was made based on results of a stepwise procedure, in which the default limit for significance to enter was 0.1 and to remove was 0.15, utilizing the maximum partial likelihood ratio (MPLR) method. In this method, predictors were entered or removed on the basis of program calculated probabilities.

Results

Effect of risk status on drinking behavior. Beliefs about the effects of alcohol have been shown to influence drinking behavior (Brown et al., 1980, 1985; Williams and Ricciardelli, 1996). The intriguing possibility is that this relationship is mediated through differences in risk status. Individuals who have multiple family members with heavy use patterns may conclude that alcohol use is highly reinforcing; this belief, in turn, influences their behavior. Risk differences in quantity of alcohol consumed and consequences of drinking have been reported previously (Hill and Yuan, 1999; Hill et al., 2000), based on a similar data set to that studied in the present report. As expected, high-risk adolescents in the present report were found to drink more frequently ($t = -3.27$; 379 df, $p = .002$), consume larger quantities of alcohol ($t = -2.27$; 161 df, $p = .04$) and experience greater consequences (drunk, sick) from drinking ($t = -2.16$; 158 df, $p = .03$) than were low-risk adolescents.

Effect of risk status on adolescent alcohol expectancies. The effect of risk status on alcohol expectancies was tested for the two time points chosen for analysis (age 13 and age 16). Confirmatory factor analysis for data obtained at the first assessment revealed that high- and low-risk adolescents obtained significantly different scores on the social behavior factor ($t = -2.14$, $p = .03$). These results suggested that, in comparison to low-risk controls, high-risk offspring expected more improvement in social behavior (e.g., drinking alcohol makes people feel more friendly) as a consequence of drinking. However, analyses using the AEQ scores obtained at the last evaluation (Time 2) failed to reveal risk differences for any of the scales. In fact, low-risk adolescents scored significantly higher than high-risk adolescents in regard to expectations for relaxation and tension reduction ($t = 1.99$, $p = .04$).

In order to determine if expectancies differed by drinking status among the adolescents studied, analyses were performed comparing drinkers to nondrinkers. At both time

points, adolescents (HR and LR combined) who had begun to drink reported higher scores for the expectation that alcohol use would enhance their social functioning, compared with nondrinkers. At the first assessment, when the adolescents were approximately 13 years old, 12 out of 97 children were drinking regularly, with those drinking differing from nondrinkers in their beliefs about the effects of alcohol on social functioning, ($t = 3.26$, $p < .001$). By the second assessment, at approximately 16 years of age, 50 of 97 children were drinking regularly, with drinkers differing from nondrinkers in their beliefs about the effects of alcohol on social functioning ($t = 4.41$, $p < .001$ at last assessment). Within the high-risk group, the drinkers (11 of 57) expected greater enhancement of social behavior than did the nondrinkers at the first time point ($t = 2.46$, $p = .03$) and again at the second time point ($t = 2.68$, $p = .02$).

Correlations between parent and offspring expectancy scores. Using a method similar to that used by Goldman et al. (1997), a first-order correlated 13-factor model was tested for HR and LR offspring at the two time points. A good fit to the data was indicated in all four models considered and in all of the parent/child correlations tested (the CFI ranged between 0.81 and 0.92, the NNFI ranged between 0.82 and 0.93). Only those scales found by Brown et al. (1987a) to be significantly correlated in the adult and adolescent versions of the AEQ were considered in the present set of analyses.

The numerous significant parent/child correlations seen in Table 1 indicate that beliefs about alcohol's effects were related in parents and their offspring; this relationship was found to differ by risk status and changed with time. Analyses of the low-risk parent/offspring pairs revealed significant negative correlations. Overall, low-risk parents and offspring did not share similar beliefs about the effects of alcohol. In contrast, high-risk offspring exhibited significant positive correlations with their parents, indicating that they held similar beliefs about alcohol. It is noteworthy that, as they got older and continued to be exposed to the influence of their parents' beliefs, the high-risk offspring

TABLE 1. AEQ correlations between parents and offspring

Offspring's AEQ	Parent's AEQ	Time 1		Time 2	
		High risk	Low risk	High risk	Low risk
Global Changes	Global Changes	0.27 [†]	-0.30*	0.18	-0.27
Changes in Social Behavior	Physical and Social Pleasure	0.04	-0.33*	0.16	-0.19
Changes in Social Behavior	Social Assertion	0.12	0.07	-0.04	-0.09
Cognitive and Motor Enhancement	Global Changes	0.05	-0.95 [†]	0.19*	-0.70 [†]
Sexual Enhancement	Sexual Enhancement	0.12	-0.43 [†]	-0.06	-0.40 [†]
Cognitive and Motor Impairment	Arousal and Aggression	-0.15	0.02	-0.09	0.07
Arousal	Social Assertion	0.16	-0.42	0.16	0.17
Arousal	Arousal and Aggression	0.22	-0.55 [†]	0.06	-0.31
Relaxation and Tension Reduction	Social Assertion	0.11	0.002	0.26*	-0.20
Relaxation and Tension Reduction	Relaxation and Tension Reduction	0.08	0.03	0.33 [†]	-0.26

* $p < .05$; [†] $p < .01$.

TABLE 2. Regression coefficients of Adolescent Alcohol Expectancy Questionnaire scores on drinking behavior (standard errors in parentheses)

Drinking behavior	Adolescent scales						
	Global Changes	Social Behavior	Cognitive/Motor Enhancement	Sexual Enhancement	Cognitive/Motor Impairment	Arousal	Relaxation/Tension Reduction
Frequency	0.11 (0.06)	0.74 (0.04) [†]	0.01 (0.08)	0.25 (0.06)*	-0.05 (0.06)	0.20 (0.07)*	0.17 (0.06)*
Quantity per occasion	-0.05 (0.08)	0.35 (0.08)*	0.17 (0.11)	0.03 (0.09)	-0.02 (0.08)	-0.04 (0.11)	-0.07 (0.09)
Physical consequences	0.06 (0.09)	0.24 (0.10)*	0.05 (0.12)	0.10 (0.10)	-0.06 (0.08)	0.37 (0.12)*	0.01 (0.10)
Social consequences I ^a	0.13 (0.14)	0.52 (0.21)*	-0.26 (0.10)	0.03 (0.15)	-0.27 (0.13)*	0.31 (0.11)*	-0.07 (0.06)
Social consequences II ^b	0.06 (0.12)	0.24 (0.14)	0.21 (0.14)	0.14 (0.13)	-0.06 (0.10)	0.50 (0.13)*	0.02 (0.13)

* $p < .05$; [†] $p < .01$.

^aQuestionnaire: How do others see you?

^bQuestionnaire: What is the greatest effect drinking has had on your life?

continued to share similar beliefs about alcohol (several positive correlations were evident). In contrast, the low-risk parents and their offspring continued to display negative correlations, although there were fewer significant ones.

Effect of risk status and adolescent AEQ scores on drinking behavior. A first-order confirmatory factor model with familial risk status as a covariate was used to test for a possible relationship between alcohol expectancies and the adolescent's alcohol-related behaviors measured at all time points. Separate analyses were performed for each of the

drinking variables in relation to each AEQ scale. Several scale scores predicted drinking behaviors (frequency of use, quantity consumed, physical and social consequences) in the combined sample of high- and low-risk offspring (Table 2). However, the only high-risk/low-risk difference observed for alcohol expectations was found for Scale 2 (Social Behavior). Therefore, further analyses were focused on this scale as a possible predictor of drinking behavior in conjunction with risk status (see Figure 1). Goodness-of-fit statistics for five separate models (each drinking behavior)

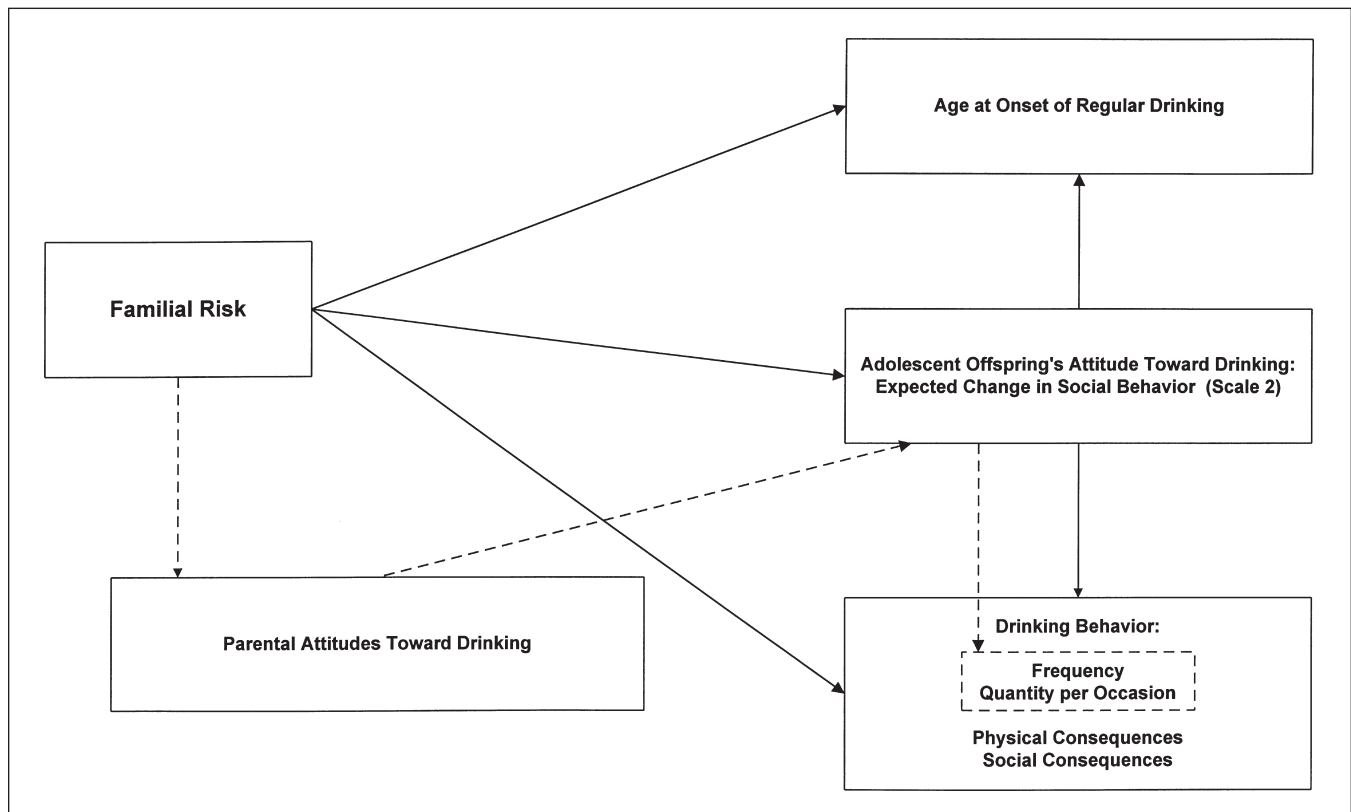


FIGURE 1. A pathway is proposed describing the relationship between familial risk, adolescent AEQ (Scale 2) scores, parental AEQ scores and adolescents' age at onset of regular drinking and subsequent drinking behaviors. Solid line represents the significant effect of adolescent beliefs concerning the effects of alcohol on social functioning (Scale 2) and four separate alcohol behaviors (frequency, quantity per occasion, physical and social consequences of drinking). The broken line represents the significant effect of Scale 2 scores on frequency (low-risk adolescents) and quantity per occasion (high-risk adolescents).

were performed. All of the models tested fit the data well (all p values were $< .001$, NNFI ranging from 0.89 to 0.94, CFI ranging from 0.84 to 0.91). Scores on Scale 2 significantly predicted four of the five drinking behaviors measured (t values ranged from 2.52 to 20.56, all p values were $< .01$). These results indicated that adolescents (HR and LR combined) who scored higher on expectations regarding the positive effects of alcohol on social functioning drank more frequently, drank larger quantities per occasion, experienced a greater number of negative physical consequences (e.g., became ill or passed out) or experienced more social consequences (e.g., friends or family thought they should control their drinking or seek help for it, or had attempted to get treatment for them). Risk status and scores on Scale 2 jointly predicted drinking behavior. A belief that drinking would provide greater enhancement of social functioning (Scale 2) predicted higher frequency of drinking in the low-risk controls ($t = 4.36, p < .001$). It is interesting to note that this expectation was associated with drinking higher quantities per occasion in the high-risk group ($t = 2.38, p = .02$); however, expectancy effects were not shown to mediate the relationship between risk status and drinking. The risk effect remained significant as a predictor along with AEQ scores on drinking behavior (Figure 1).

Effect of alcohol expectancies on the onset of regular drinking. The next question addressed whether beliefs about alcohol would predict the age at onset to begin drinking. The mean (SD) age of onset to begin regular drinking was

15.2 (1.2) years old for high-risk adolescents and 16.5 (1.2) years old for low-risk adolescents. The proportion of cases censored was 45% and 63% for high- and low-risk adolescents, respectively. The relationship between all of the adolescent AEQ scale scores and age at onset of regular drinking was examined for all adolescents. Adolescent AEQ score at the point of survival, the adolescent's risk status and the interaction of the variables were used as predictors in the Cox's proportional hazards model. The age at onset of regular drinking during adolescence was predicted by the individual's social behavior (Scale 2) ($\chi^2 = 13.38, 1 \text{ df}, p = .0002$) and the capacity to relax (Scale 7) ($\chi^2 = 5.48, 1 \text{ df}, p = .02$) (Table 3). Survival analyses also showed risk status was a significant factor in predicting the age of onset outcome for all scales (χ^2 range: 5.88-6.97, p values were $< .01$). As expected based on previous work with this population (Hill and Yuan, 1999; Hill et al., 2000), high-risk offspring were shown to have significantly earlier ages at onset of regular drinking than low-risk offspring. These results suggest that adolescents may begin drinking at an earlier age when they expect greater enhancement in social functioning and tension reduction as a result of drinking alcohol. The interaction between risk status and expectancies were tested in relation to the adolescent drinking behaviors assessed. No significant differences were found, indicating that beliefs predict the age of onset to drink in both high- and low-risk children and the effect is relatively uniform across risk groups.

TABLE 3. Effect of seven scales of the Adolescent Alcohol Expectancy Questionnaire on the onset of regular drinking

Dependent variable	Independent variables	Significant effects
Onset of drinking	Global Changes (Scale 1) Risk Risk \times Scale 1	Risk ($\chi^2 = 5.88, 1 \text{ df}, p = .02$)
Onset of drinking	Social Behavior (Scale 2) Risk Risk \times Scale 2	Scale 2 ($\chi^2 = 13.38, 1 \text{ df}, p = .0002$) Risk ($\chi^2 = 6.97, 1 \text{ df}, p = .01$)
Onset of drinking	Cognitive/Motor Enhancement (Scale 3) Risk Risk \times Scale 3	Risk ($\chi^2 = 5.88, 1 \text{ df}, p = .02$)
Onset of drinking	Sexual Enhancement (Scale 4) Risk Risk \times Scale 4	Risk ($\chi^2 = 5.88, 1 \text{ df}, p = .02$)
Onset of drinking	Cognitive/Motor Impairment (Scale 5) Risk Risk \times Scale 5	Risk ($\chi^2 = 5.88, 1 \text{ df}, p = .02$)
Onset of drinking	Arousal (Scale 6) Risk Risk \times Scale 6	Risk ($\chi^2 = 5.88, 1 \text{ df}, p = .02$)
Onset of drinking	Relaxation/Tension Reduction (Scale 7) Risk Risk \times Scale 7	Scale 7 ($\chi^2 = 5.48, 1 \text{ df}, p = .02$) Risk ($\chi^2 = 5.88, 1 \text{ df}, p = .02$)

Discussion

Alcohol expectancies and risk status. The present analysis indicates that risk status influences beliefs about the effect that alcohol consumption will have on social functioning, with high-risk adolescents expecting more social enhancement in early adolescence (approximately age 13) than low-risk controls. These results are consistent with previous reports showing greater alcohol expectancies in college-age children of alcoholics (Sher et al., 1991) and in family-history-positive high school students (Mann et al., 1987). They are also consistent with results showing an interactive effect of family history and social expectancies on quantity-frequency outcomes (Reese et al., 1994). However, the present results differ from those obtained by Lundahl et al. (1997), who found that family history was not an independent predictor of any alcohol-related expectancy.

In the present study, families were selected for an especially high density of alcohol dependence by ascertainment through a double proband methodology (two adult male alcoholics). These individuals are the fathers and uncles of the adolescents studied. This increased loading may have provided the opportunity for greater transmission of positive beliefs about alcohol to the offspring generation. It is interesting to note that the risk group differences seen in early adolescence disappeared by late adolescence (Time-2 risk group effects were not significant). This suggests that, by late adolescence, peer group influences may become more important to both HR and LR groups, and the beliefs that differed by risk group, presumably as a result of risk group differences in parental beliefs about the global effects of alcohol, were no longer important.

Alcohol expectancies and experience drinking. The present analysis found that adolescents' previous drinking experience changes their expectations regarding alcohol effects, relative to those who have not begun to drink. Adolescents who had begun to drink alcohol, whether high- or low-risk by family background, report higher expectations that alcohol would facilitate their ability to function socially. This relationship was also present within the high-risk group. The high-risk youth who had begun to drink displayed greater expectations that alcohol use would facilitate social interactions. These results suggest that drinking in high-risk adolescents is highly reinforcing; beliefs that alcohol will enhance social interactions persist after the adolescent has experienced drinking and in spite of the fact that some experiences may have been negative (e.g., becoming sick or be admonished by parents for underage drinking). This is consistent with earlier reports by Smith et al. (1995) showing that experience drinking facilitates positive evaluations of alcohol effects. Because a majority of drinkers (91.7%) at Time 1 were high-risk adolescents, the joint effect of familial risk and drinking status could

not be examined. However, the constellation of results suggests that high-risk offspring may enter adolescence with greater expectations that alcohol will have a globally positive effect, in part transmitted by familial background and beliefs, and as they begin to drink these beliefs are maintained in spite of negative consequences.

Alcohol expectancies and drinking behavior. Alcohol expectancies have been demonstrated by numerous studies to have a major effect on drinking behavior (Brown et al., 1987a; Dunn and Goldman, 1998; Goldman et al., 1997; Grube and Agostinelli, 1999; Rönback et al., 1999; Smith et al., 1995; Williams and Ricciardelli, 1996). Higher drinking levels have also been shown to influence subsequent expectancies for social facilitation in adolescents (Smith et al., 1995). Consistent with previous analyses of this data set, the present study indicates that adolescents from high-risk families had a higher likelihood to drink more frequently, consume more alcohol and have a greater effect from drinking (e.g., drunk or sick) compared with low-risk controls (Hill et al., 2000; Hill and Yuan, 1999).

Alcohol expectancies, risk status and drinking behavior – quantity and frequency. Previous results have addressed the joint effects of risk status and alcohol expectancies (Mann et al., 1987; Reese et al., 1994). Mann et al. (1987) found that low-risk status and expectancies for social enhancement predicted drinking in low-risk participants but not in high-risk ones. In contrast, Reese et al. (1994) found that expectancies of social enhancement predicted drinking in children of alcoholics. Because beliefs about the effects of alcohol have been demonstrated to influence drinking behavior, it was hypothesized that any risk group differences seen in alcohol expectancies might moderate or mediate alcohol use behavior. High-risk offspring from the present sample have been shown to drink a greater quantity per occasion and experience more consequences of drinking when they drink (Hill and Yuan, 1999; Hill et al., 2000). In the present study, high-risk adolescents who held the belief that alcohol use would enhance their social interactions, in contrast to those who did not, tended to drink a significantly greater quantity of alcohol per occasion when they drank.

Age at onset of regular drinking. Previous research from this laboratory has also demonstrated that high-risk children begin to drink earlier than low-risk children (Hill and Yuan, 1999; Hill et al., 2000). Therefore, it was of interest to determine if the age of onset to begin regular drinking was related to specific expectancies about alcohol effects by risk. Expectations regarding social enhancement had a significant effect on the age of onset to drink. Those adolescents who believed that use of alcohol would produce greater social enhancement began to drink at an earlier age. Risk status also predicted the adolescent's initiation of drinking, as found previously (Hill and Yuan, 1999; Hill et al., 2000); however, an interaction between risk status and

beliefs about the social enhancement effects of alcohol was not found. This may have been due to the fact that familial risk status is highly predictive of the age of onset to begin drinking during adolescence; thus, beliefs about alcohol effects add very little to the explained variance. Nevertheless, the present results indicate that adolescent beliefs concerning the effects of alcohol consumption on social functioning expectation are an important determinant of age at onset to begin drinking during adolescence.

Alcohol expectancies and familial transmission of alcohol abuse/dependence. Because transmission of alcohol behavior appears to cross generations through the influence of social as well as familial/genetic factors, it was of interest to determine whether alcohol expectancies might be different in families in which there is a high risk for alcoholism. Also, because transmission across generations is probably moderated in part by parental beliefs acquired by offspring through exposure to the parent, it was predicted that parent/offspring correlations would appear by risk status.

The results of the present study indicate that parental beliefs regarding alcohol's effects have an impact on the offspring's beliefs and behavior. Important differences were noted by risk group status. High-risk offspring tended to have beliefs about alcohol effects that were similar to their parents, as evidenced by positive correlations for specific AEQ scales. In contrast, low-risk offspring tended to have expectations that differed from their parents, based on significant negative correlations for some of the AEQ scales. The negative correlation in low-risk offspring was largely due to the low-risk adolescent's view about the effect of alcohol, which was generally more positive than that of their parents.

In conclusion, the present results suggest that alcohol expectancies differ in association with familial loading for alcohol dependence. The means by which familial loading and parental beliefs are transmitted to offspring could not be determined in the context of the present study. The high-risk families had a much higher loading for alcohol dependence than is seen in the general population, suggesting greater genetic loading. However, the multiple relatives with alcohol dependence in these families also provided an atypical family environment, characterized by higher than normal opportunities for observing relatives with excessive drinking behavior. These differing expectations were most evident in early adolescence. Although the high-risk adolescents tended to begin regular use of alcohol before low-risk adolescents, there was no evidence that this was the result of either mediating or moderating effects of differing expectations regarding the positive effects of alcohol. Among high-risk offspring, there was a tendency toward higher levels of consumption per occasion for those who believed alcohol consumption would enhance social interaction. For the combined group of adolescents, both high and low risk, beliefs that alcohol would improve social func-

tioning was associated with drinking more frequently, drinking higher quantities per occasion and experiencing more negative physical and social consequences of alcohol use. Together, these results suggest that modifying beliefs about the effects of alcohol could have a positive impact on prevention efforts, even in high-risk offspring who are most vulnerable to the devastating effects of high levels of adolescent alcohol use.

References

- AMERICAN PSYCHIATRIC ASSOCIATION. Diagnostic and Statistical Manual of Mental Disorders (DSM-III), Washington, DC, 1980.
- BENTLER, P.M. AND WU, E. EQS Structural Equations Program Manual, Encino, CA: Multivariate Software, 1995.
- BROWN, S.A. Context of drinking and reinforcement from alcohol: Alcoholic patterns. *Addict. Behav.* **10**: 191-195, 1985a.
- BROWN, S.A. Expectancies versus background in the prediction of college drinking patterns. *J. Cons. Clin. Psychol.* **53**: 123-130, 1985b.
- BROWN, S.A. Reinforcement expectancies and alcoholism treatment outcome after a one-year follow-up. *J. Stud. Alcohol* **46**: 304-308, 1985c.
- BROWN, S.A., CHRISTIANSEN, B.A. AND GOLDMAN, M.S. The Alcohol Expectancy Questionnaire: An instrument for the assessment of adolescent and adult alcohol expectancies. *J. Stud. Alcohol* **48**: 483-491, 1987a.
- BROWN, S.A., CREAMER, V.A. AND STETSON, B.A. Adolescent alcohol expectancies in relation to personal and parental drinking patterns. *J. Abnorm. Psychol.* **96**: 117-121, 1987b.
- BROWN, S.A., GOLDMAN, M.S. AND CHRISTIANSEN, B.A. Do alcohol expectancies mediate drinking patterns of adults? *J. Cons. Clin. Psychol.* **53**: 512-519, 1985.
- BROWN, S.A., GOLDMAN, M.S., INN, A. AND ANDERSON, L.R. Expectations of reinforcement from alcohol: Their domain and relation to drinking patterns. *J. Cons. Clin. Psychol.* **48**: 419-426, 1980.
- CHAMBERS, W.J., PUIG-ANTICH, J., HIRSCH, M., PAEZ, P., AMBROSINI, P.J., TABRIZI, M.A. AND DAVIES, M. The assessment of affective disorders in children and adolescents by semistructured interview: Test-retest reliability of the Schedule for Affective Disorders and Schizophrenia for School-Age Children, present episode version. *Arch. Gen Psychiat.* **42**: 696-702, 1985.
- CHRISTIANSEN, B.A., GOLDMAN, M.S. AND INN, A. Development of alcohol-related expectancies in adolescents: Separating pharmacological from social-learning influences. *J. Cons. Clin. Psychol.* **50**: 336-344, 1982.
- DUNCAN, T.E., DUNCAN, S.C., STRYCKER, L.A., LI, F. AND ALPERT, A. An Introduction to Latent Variable Growth Curve Modeling: Concepts, Issues and Applications, Mahwah, NJ: Lawrence Erlbaum, 1999.
- DUNN, M.E. AND GOLDMAN, M.S. Age and drinking-related differences in the memory organization of alcohol expectancies in 3rd-, 6th-, 9th-, and 12th-grade children. *J. Cons. Clin. Psychol.* **66**: 579-585, 1998.
- FEIGNER, J.P., ROBINS, E., GUZE, S.B., WOODRUFF, R.A., JR., WINOKUR, G. AND MUNOZ, R. Diagnostic criteria for use in psychiatric research. *Arch. Gen. Psychiat.* **26**: 57-63, 1972.
- GOLDMAN, M.S., GREENBAUM, P.E. AND DARKES, J. A confirmatory test of hierarchical expectancy structure and predictive power: Discriminant validation of the Alcohol Expectancy Questionnaire. *Psychol. Assess.* **9**: 145-157, 1997.
- GRUBE, J.W. AND AGOSTINELLI, G.E. Perceived consequences and adolescent drinking: Nonlinear and interactive models of alcohol expectancies. *Psychol. Addict. Behav.* **13**: 303-312, 1999.
- HILL, S.Y., SHEN, S., LOWERS, L. AND LOCKE, J. Factors predicting the onset of adolescent drinking in families at high risk for developing alcoholism. *Biol. Psychiat.* **48**: 265-275, 2000.

- HILL, S.Y. AND YUAN, H. Familial density of alcoholism and onset of adolescent drinking. *J. Stud. Alcohol* **60**: 7-17, 1999.
- LUNDAHL, L.H., DAVIS, T.M., ADESSO, V.J. AND LUKAS, S.E. Alcohol expectancies: Effects of gender, age, and family history of alcoholism. *Addict. Behav.* **22**: 115-125, 1997.
- MANN, L.M., CHASSIN, L. AND SHER, K.J. Alcohol expectancies and the risk for alcoholism. *J. Cons. Clin. Psychol.* **55**: 411-417, 1987.
- MAYER, J. AND FILSTEAD, W.J. The Adolescent Alcohol Involvement Scale: An instrument for measuring adolescent use and misuse of alcohol. *Curr. Alcsm* **7**: 169-181, 1979.
- MUTHÉN, L.K. AND MUTHÉN, B. *Mplus User's Guide*, Los Angeles, CA: Muthén & Muthén, 1998.
- REESE, F.L., CHASSIN, L. AND MOLINA, B.S.G. Alcohol expectancies in early adolescents: Predicting drinking behavior from alcohol expectancies and parental alcoholism. *J. Stud. Alcohol* **55**: 276-284, 1994.
- ROBINS, L.N., HELZER, J.E., CROUGHAN, J. AND RATCLIFF, K.S. National Institute of Mental Health Diagnostic Interview Schedule: Its history, characteristics, and validity. *Arch. Gen. Psychiat.* **38**: 381-389, 1981.
- RÖNNBACK, S.A., AHLUND, N.K. AND LINDMAN, R.E. Confirmatory factor analysis of the AEQ-A questionnaire in Finland. *Scand. J. Psychol.* **40**: 11-19, 1999.
- SCHAFFER, J. AND FALS-STEWART, W. Confirmatory analyses of the three scoring systems for the 90-item Alcohol Expectancy Questionnaire. *J. Stud. Alcohol* **58**: 508-512, 1997.
- SHER, K.J., WALITZER, K.S., WOOD, P.K. AND BRENT, E.E. Characteristics of children of alcoholics: Putative risk factors, substance use and abuse, and psychopathology. *J. Abnorm. Psychol.* **100**: 427-448, 1991.
- SMITH, G.T., GOLDMAN, M.S., GREENBAUM, P.E. AND CHRISTIANSEN, B.A. Expectancy for social facilitation from drinking: The divergent paths of high-expectancy and low-expectancy adolescents. *J. Abnorm. Psychol.* **104**: 32-40, 1995.
- WEISSMAN, M.M., GAMMON, G.D., JOHN, K., MERIKANGAS, K.R., WARNER, V., PRUSOFF, B.A. AND SHOLOMSKAS, D. Children of depressed parents: Increased psychopathology and early onset of major depression. *Arch. Gen. Psychiat.* **44**: 847-853, 1987.
- WILLIAMS, R.J. AND RICCIARDELLI, L.A. Expectancies relate to symptoms of alcohol dependence in young adults. *Addiction* **91**: 1031-1039, 1996.