Moderation of the Expectancy–Alcohol Use Relation by Private Self-Consciousness: Data From a Longitudinal Study

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This study investigated whether the relation between alcohol outcome expectancies and alcohol use may be moderated by individual differences in private self-consciousness (PSC). Quantity/frequency of alcohol use, expectancies, and PSC in a sample of young adults were assessed annually over 4 years. Regression equations were used to predict alcohol use from expectancies, PSC, and their interaction while controlling for sex and family history of alcoholism. High PSC was associated with a stronger association between expectancies and alcohol use than was low PSC, although only in participants of legal drinking age. Also, PSC was negatively associated with alcohol use for underage participants when expectancies were statistically controlled, consistent with previous work linking PSC to adherence to legal proscriptions. Findings are discussed in relation to a model of expectancy accessibility.

In recent years, expectancies have been investigated in the context of understanding the psychosocial correlates and determinants of alcohol use and abuse (e.g., Goldman, Brown, & Christiansen, 1987; Goldman, Brown, Christiansen, & Smith, 1991; Leigh & Stacy, 1991) as well as other substance use (e.g., Copeland, Brandon, & Quinn, 1995; Schafer & Brown, 1991). Alcohol outcome expectancies may be construed as beliefs or predictions concerning the likely positive (or negative) consequences of alcohol consumption. Expectancies are hypothesized to be stored in memory (e.g., Stacy, Leigh, & Weingardt, 1994) and, depending on their accessibility, to positively or negatively influence drinking motivation (e.g., Rather & Goldman, 1994). Alcohol outcome expectancies have been identified in many diverse samples, including young children (Miller, Smith, & Goldman, 1990), and have been shown to concurrently and prospectively predict alcohol use in adolescents (e.g., Christiansen & Goldman, 1983; Mann, Chassin, & Sher, 1987; Smith, Goldman, Greenbaum, & Christiansen, 1995), college students (Sher, Wood, Wood, & Raskin, 1996), and other adults (Brown, Goldman, & Christiansen, 1985).

Although the finding that alcohol outcome expectancies predict alcohol use has been well established, some important issues remain. Whereas several studies have shown that expectancies moderate relationships between various environmental and individual difference factors (such as negative life events, anxiety, and gender) and alcohol use (e.g., Cooper, Russell, & George, 1988; Cooper, Russell, Skinner, Frone, & Mudar, 1992; Kushner, Sher, Wood, & Wood, 1994), relatively few studies have examined variables—particularly stable, individual difference variables—that may moderate the association between outcome expectancies and alcohol use, although such work has been encouraged (e.g., McCarthy & Smith, 1996; Stacy, Widaman, & Marlatt, 1990). In the current study, we examined whether pri-

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vate self-consciousness (PSC) may serve such a moderating role.

PSC has been described as the consistent tendency to direct attention inward (Fenigstein, Scheier, & Buss, 1975) and as a tendency to focus on covert, or private, aspects of the self (Echebarria & Valencia, 1994), such as attitudes, motives, feelings, and values. The concept of self-consciousness was derived from self-awareness theory (Duval & Wicklund, 1972). Self-consciousness differs from self-awareness in that self-awareness is considered a temporary state that can be invoked using self-referencing tactics (e.g., presence of mirrors or video cameras, hearing one's name, etc.), whereas self-consciousness is considered a stable, individuating trait (Fenigstein et al., 1975).[1]

Theoretically, behavior should be better predicted by beliefs for individuals who are more aware of their beliefs either temporarily or dispositionally. Research indicates that people who are aware of and focus on private self-aspects (Echebarria & Valencia, 1994; Snyder & Ickes, 1985), or whose self-regulatory style is autonomous (characterized by access to and awareness of one's inner preferences) (Koestner, Bernieri, & Zuckerman, 1992), display greater correspondence between attitudes and behaviors than those low in such traits. However, the extent to which expectancy-behavior correspondence may be affected by PSC is unclear. The self-awareness literature suggests that self-focus should bring behavior in-line with attitudes or personal standards. However, expectancies are not synonymous with either of these concepts.[2] Indeed, with respect to alcohol-related expectancies, Stacy, Widaman, and Marlatt (1990) have demonstrated that expectancies and attitudes are not mere proxies for one another. Expectancy models typically distinguish positive and negative expectancies, whereas attitude models typically combine positive and negative feelings or cognitions into a single bipolar construct (Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Fishbein & Ajzen, 1975). Stacy, Widaman, and Marlatt (1990) found that although positive expectancies and attitudes independently predict intentions to drink, positive outcome expectancies are superior to both drinking attitudes and negative outcome expectancies in predicting alcohol use.

Because of the distinction between attitudes and expectancies, researchers cannot assume that similar constructs will moderate their relations to behavior. Moderator variables such as PSC have not been examined in the alcohol expectancy literature. However, moderation of expectancy effects has been shown in an entirely different context. Miller and Grush (1986) investigated whether several individual difference factors relate to correspondence between expectancies and school-related behaviors (e.g., studying). Their findings indicated that expectancy-behavior correspondence was greatest among individuals high in PSC and low in self-monitoring. Miller and Grush concluded that only individuals with heightened dispositional awareness of their expectancies are likely to consistently make rational choices based on the expected consequences of their behavior.

Clearly, previous work points to PSC as a potential moderator of the expectancy-behavior relation in general. However, some constraints on this hypothesis may be appropriate when predicting the drinking behavior of late adolescents and young adults. Research has shown that individuals high in PSC are especially sensitive to explicit behavioral proscriptions and social sanctions against illegal or antinormative behavior. For example, laboratory studies have shown that high PSC is associated with conformity to proscriptions against aggression (Scheier, Fenigstein, & Buss, 1974) and cheating (Deiner & Wallbom, 1976). It has been suggested in previous studies (e.g., Chassin, Mann, & Sher, 1988) that underage (i.e., illegal) drinking may be considered such a proscribed behavior. Alcohol use is typically illegal (but not antinormative) for 18- to 20-year-olds. As such, alcohol use can lead to sanctions (real or perceived) from family or other authority figures (e.g., police, university officials) during this developmental period. In addition, obtaining alcohol generally involves various illegal or illicit activities (e.g., using fake forms of identification, sneaking into bars, lying, etc.), which high PSC individuals may be less likely to engage in. Accordingly, minors high in PSC may limit their alcohol use until they reach the legal drinking age.

Therefore, although we argue that individuals high in PSC are likely to be particularly aware of their expectancies, the potentially punishing consequences of illegal drinking also may be especially salient to these individuals, which may inhibit them from behaving in accordance with their expectancies as minors. If so, PSC may not reliably moderate expectancy effects in individuals younger than the legal drinking age. Such moderation may be observed only after the threat of sanctions from illegal alcohol use is eliminated among high PSC individuals.

Overview, Study Goals, and Hypotheses

The primary goal of the present study was to examine whether PSC moderates the relationship between outcome expectancies and alcohol use throughout a 4-year period in a sample of young adults. To our knowledge, this study is the first to test moderation of alcohol expectancy effects using such an individual difference variable.

We hypothesized a significant interaction between expectancies and PSC in predicting alcohol use. That is,

the strength of the association between expectancies and alcohol use was predicted to be greater among people high in PSC. However, due to the prohibited nature of alcohol use for young people, and because high PSC has been associated with adherence to legal regulations and internal standards (e.g., Deiner & Wallbom, 1976; Scheier et al., 1974), moderation of expectancy effects by PSC was not hypothesized for Years 1 and 2. Also, given the longitudinal nature of our data set, we examined whether the findings from our moderator model could be replicated prospectively.

In addition, main effect predictions were made for both expectancies and PSC. In keeping with previous research in this area (e.g., Brown et al., 1985; Sher et al., 1996), we predicted a significant and positive relation between expectancies and alcohol use at each year of the study. Furthermore, we predicted a negative main effect of PSC on alcohol use during the first 2 years of the study and no main effect in Years 3 and 4.

METHOD

Participants

Participants for the current study took part in a multiyear assessment designed to track the development of alcohol use and its correlates. For reasons unrelated to the current study, participant selection criteria were established to create a sample in which participants with and without a family history of alcoholism were equally represented. The current study does not focus on the influence of family history, however. A full description of participant ascertainment and classification by family history status appears elsewhere (Sher, Walitzer, Wood, & Brent, 1991) and is reviewed here.

Approximately 80% (n = 3,156) of all first-time freshmen (N = 3,944) at a large, Midwestern university participated in the initial screening phase of a 4-year study. During initial questionnaire and interview sessions, participants completed a screening battery including several personality measures, alcohol use questions, and a version of the Short Michigan Alcoholism Screening Test (SMAST) adapted for assessing alcoholism in biological mothers (M-SMAST) and fathers (F-SMAST) (Crews & Sher, 1992). Participants were then interviewed using sections of the Family History-Research Diagnostic Criteria interview (FH-RDC) (Endicott, Andreason, & Spitzer, 1978). Following these interviews, the final sample was selected based on a comparison of each participant's adapted SMAST scores and FH-RDC interview; participants were excluded for a number of methodological reasons, including incompatible SMAST and FH-RDC scores.

The final sample on whom Year 1 analyses were based (n = 489) was composed of roughly equal numbers of males and females (ns ranging from 113 to 134) and roughly equal numbers of FH+ (positive for family history of paternal alcoholism) and FH– (negative for family history of paternal alcoholism) participants. At the time of Year 1 screening, the mean age of this sample was 18.2 years, and 94% of participants were White. The percentage of participants in college decreased from virtually 100% in Year 1 to 88% in Year 2 to 84% in Year 3 to 77% by Year 4.

Despite our efforts to retain the entire sample over the 4-year period reported in this study, a number of individuals (n = 34) did not provide data at one or more study years on the variables of interest. Sample bias was assessed by comparing these 34 participants with those for whom all relevant data were available at each year (n = 455) on Year 1 mean levels of alcohol use, alcohol outcome expectancies, and PSC using t tests and on differences in sex and family history classification using chi-square tests of association. No significant between-groups differences were found on any of these variables (all $ps > .10$).

Measures

At each of 4 years of data collection, participants were interviewed and completed questionnaire measures of alcohol use, alcohol outcome expectancies, personality factors, and demographic information (e.g., sex determined at Year 1, age determined each year).[3]

Alcohol use. Alcohol use was measured using a questionnaire in which participants were asked to estimate their alcohol involvement during the previous 30 days and also during the past year. Quantity/frequency of alcohol consumption (ALC) at each year was calculated by multiplying per week alcohol quantity and frequency estimates for all alcoholic beverages (based on past year).

Alcohol outcome expectancies. A broad range of positive expectancies regarding the effects of alcohol were assessed via a 44-item questionnaire. Previous research using this measure (e.g., Kushner et al., 1994; Sher et al., 1996) identified four subscales: tension reduction (9 items, $\alpha = .89$), for example, "Drinking helps me to calm down when I'm angry"; social lubrication (8 items, $\alpha = .88$), for example, "Drinking makes me feel less shy"; activity enhancement (9 items, $\alpha = .85$), for example, "Drinking makes dancing more enjoyable"; and performance enhancement (9 items, $\alpha = .81$), for example, "Drinking improves my concentration." For the purposes of the present study, and due to high correlations between subscales, scores from each of the four subscales were summed to create a global positive expectancy composite score (EXP) at each year (αs ranged from .85 to .88 over the course of the study). Test-retest

correlations for this composite ranged from .68 to .73 over 1 year, .61 to .64 over 2 years, and .63 over 3 years.

PSC. Levels of PSC were determined using the 10-item subscale from the Fenigstein et al. (1975) Self-Consciousness Scale. This measure assesses an individual's dispositional tendency to focus attention on covert aspects of the self, such as thoughts, feelings, attitudes, motivations, and behavioral tendencies (scores ranged from 0 to 40, αs ranged from .65 to .76 over the course of the study). Fenigstein et al. reported 2-week stability for this measure of .79. Because the measurement intervals in the present study were considerably longer, our test-retest reliability coefficients were somewhat lower (1-year stability ranged from .56 to .65, 2-year stability ranged from .52 to .60, 3-year stability was .52).

RESULTS

Moderator Model
Analytic Approach

Our hypotheses were tested using the moderational analytic scheme outlined by Baron and Kenny (1986). We first conducted separate hierarchical multiple regression analyses, with ALC as the dependent variable, for each of the 4 years studied. These analyses were structured such that main effects of sex, FH, and the Sex × FH interaction were entered on the first step. Although sex and FH effects are not of interest in this study, these variables were included to control for their effects because they were major design components of the larger study from which the current sample was drawn and because they are known to be important predictors of alcohol use.[4] The second step included the main effect terms of PSC and EXP. The quadratic vectors associated with EXP and PSC were entered in the third step (to control for potential spurious moderator effects, see Lubinski & Humphreys, 1990). In the fourth step, the two-way interactions involving sex, PSC, and EXP were entered into the model. To control for potential collinearity effects, all main effect terms were centered prior to the creation of cross-product terms (Aiken & West, 1991). Because of the longitudinal nature of our data set, we also constructed additional, prospective models to extend any significant cross-sectional findings.

Sample Size
Adjustments by Year

For purposes of analysis, abstainers (participants who reported having consumed no alcohol during the previous 12 months) at each year were excluded because abstainers represent a qualitatively distinct subgroup of individuals whose nondrinking status is often determined by religious proscription, medical condition, and (in the case of women) pregnancy. That is, abstaining is not simply the low point on a drinking continuum and, thus, it is difficult to make predictions concerning the association between individual difference and motivational variables and drinking behavior when abstainers are included in the overall sample. That abstention from a behavior represents a qualitative departure from low levels of a behavior has been demonstrated convincingly by Krueger and colleagues (Krueger et al., 1994), who also stress that abstainers from certain behaviors may have distinct (i.e., nonnormative) personality profiles.

In addition, participants who were 21 years or older at Years 1 or 2 ($n = 16$) were excluded from the analyses of those years because the legal drinking age for our sample was 21. The developmental nature of our hypotheses implies that individuals at more advanced developmental stages during Years 1 and 2 do not accurately represent the population to whom our findings are most applicable.[5] Data from these older participants were retained for analyses of Years 3 and 4. Similarly, participants who were not 21 years old by the Year 4 assessment were excluded from the analyses at Year 4. Finally, participants who were not excluded for abstention or age but for whom complete data was not available on the variables of interest were excluded. Sample sizes and frequencies of participants excluded for these reasons at each year are presented in Table 1.[6]

Bivariate Relations
Among Study Variables

Correlations among study variables were examined for each year separately. The bivariate relation between ALC and EXP was positive and significant and increased over Years 1 through 4 (rs = .30, .35, .41, and .45, respectively; ps < .001). PSC and ALC were marginally and positively correlated at Year 4 ($r = .08$, $p < .10$) but were not significantly correlated at any other year (Year 1 $r = -.07$, Year 2 $r = -.04$, Year 3 $r = .05$, ps > .10). Although we hypothesized a significant negative correlation between PSC and ALC in Years 1 and 2, the formal test of this hypothesis using regression analyses to control for the effects of sex, FH, and EXP is described below. Finally, the bivariate association between EXP and PSC was positive at each year (rs = .09, .14, .12, and .19, respectively; ps < .05).

Means of Study
Variables Across Years

Mean levels of EXP, PSC, and ALC were examined using 2 (sex) × 2 (FH+, FH–) × 4 (years of data collection) repeated-measures analyses of variance. Figure 1 presents the mean levels of ALC and EXP by study year.

The analysis of ALC means revealed that across the entire study period, men tended to drink more than did women, $F(1, 424) = 28.70$, $p < .001$, and FH+ participants

TABLE 1: Initial Sample Sizes, Number of Participants Excluded, and Resulting Sample Sizes at Each Year of Study

	Year 1	*Year 2*	*Year 3*	*Year 4*
Initial sample size	489	485	471	471
n excluded for abstention	38	38	25	31
n additional excluded for age[a]	7	11	N/A	6
n additional excluded for missing data	1	0	0	1
Resulting sample size	443	436	446	433

a. Participants who were older than age 20 during Years 1 and 2 were excluded from the analyses at those years but were included in the analyses of Years 3 and 4 (see text). In addition, participants who were younger than age 21 during Year 4 were excluded from Year 4 analyses. Participants' age was not an exclusionary factor for Year 3 because significant portions of the sample were representing both the 20 or younger age group (74.6%) and the 21 or older age group (25.4%) during that year.

drank more than did FH– participants, $F(1, 424) = 12.98$, $p < .001$. In addition, a generally declining trend in alcohol use over the course of the study was observed, $F(3, 1,272) = 2.02$, $p < .10$, consistent with other studies showing that alcohol use decreases as young adults gain more drinking experience (e.g., Chen & Kandel, 1995). No interactions were reliable (*p*s > .50). Similarly, analysis of the EXP means revealed that men reported higher outcome expectancies than did women, $F(1, 424) = 11.17$, $p < .001$, and that FH+ participants reported higher expectancies than did FH– participants, $F(1, 424) = 9.17$, $p < .001$. EXP means also declined over the course of the study, $F(3, 1,272) = 32.63$, $p < .001$. Again, no interaction effects were reliable (*p*s > .24). Finally, mean levels of PSC declined over the study, $F(3, 1,263) = 12.38$, $p < .001$, although mean differences between years were not large (Year 1 $M = 23.84$, Year 2 $M = 23.41$, Year 3 $M = 22.79$, Year 4 $M = 22.39$). No sex or FH effects and no interactions were evident for PSC (*p*s > .35).

Testing PSC as Moderator at Each Year of Study

The results of the models evaluating whether PSC moderated the association between EXP and ALC at the 4 study years are presented in Table 2. The sex and FH effects entered in Step 1 accounted for significant model variance at each year, and the individual effects are consistent with the results of the ANOVA reported earlier. As stated previously, these effects are not of interest to the present study and will not be discussed further. Step 2, containing main effects for EXP and PSC, resulted in a significant increase in R^2 at each year. As predicted, a strong, positive relationship between EXP and ALC was found at each year. Also in accordance with our predictions, the individual betas for PSC were negative and significant at Years 1 and 2, indicating that high PSC individuals drank less than those low in PSC during the first 2 years (when accounting for EXP effects). No quadratic effects (Step 3) were reliable at any year. Inclusion of the two-way interactions (Step 4) significantly increased R^2 at Year 3 (and nearly so at Year 4, $p < .07$). The predicted EXP × PSC interaction was significant at Year 3 and Year 4. Figure 2 displays the relations between EXP and ALC as a function of PSC at each year. At Years 3 and 4, the alcohol use of high PSC individuals was better predicted by their expectancies than was the alcohol use of low PSC individuals.[7] It is important to note that although the predicted EXP × PSC interaction might appear smaller at Year 4 than at Year 3 (a finding not predicted by our model), a structural equation analysis found no difference between the parameter estimates at Year 3 and Year 4, change in $\chi^2(3\ df) = 4.07$, $p > .20$.

Analyses Using the Legal Drinking Age at Year 3

The primary analyses testing PSC as a moderator at each study year indicated that PSC was an important factor in determining the strength of the association between EXP and ALC, but only at Years 3 and 4. We have argued that the legal drinking age is an important determinant of the alcohol use of high PSC individuals, suggesting that age should emerge as a significant moderator of the EXP × PSC two-way interaction at Year 3 (the year at which a significant proportion of both legal age and underage participants were in the study sample). To test this hypothesis, we coded Year 3 participants into legal age ($n = 107$) and underage ($n = 339$) categories and then conducted a series of hierarchical regressions including age as a dichotomous predictor (coded 0 = younger than age 21, 1 = age 21 or older).

Table 3 presents the results of the Year 3 model including age. The results of Steps 1 through 4 generally replicate the findings of the Year 3 analyses presented in Table 2. Step 5 involving the Age × EXP × PSC interaction significantly incremented the variance accounted for by the model and resulted in a significant beta for the interaction term. This effect was probed using separate hierarchical models for the underage and legal age groups. These analyses indicated that PSC significantly moderated the EXP effect for legal age participants ($\beta = .22$, $p < .001$) but not for underage participants ($\beta = .08$, $p > .10$).[8]

Prospective Replication of Moderator Effects

To extend the interaction effects observed in our cross-sectional analyses at Years 3 and 4, we examined whether the Year 3 effects (EXP × PSC and Age × EXP × PSC) would replicate prospectively when predicting alcohol use at Year 4. In this analysis, Step 1 contained

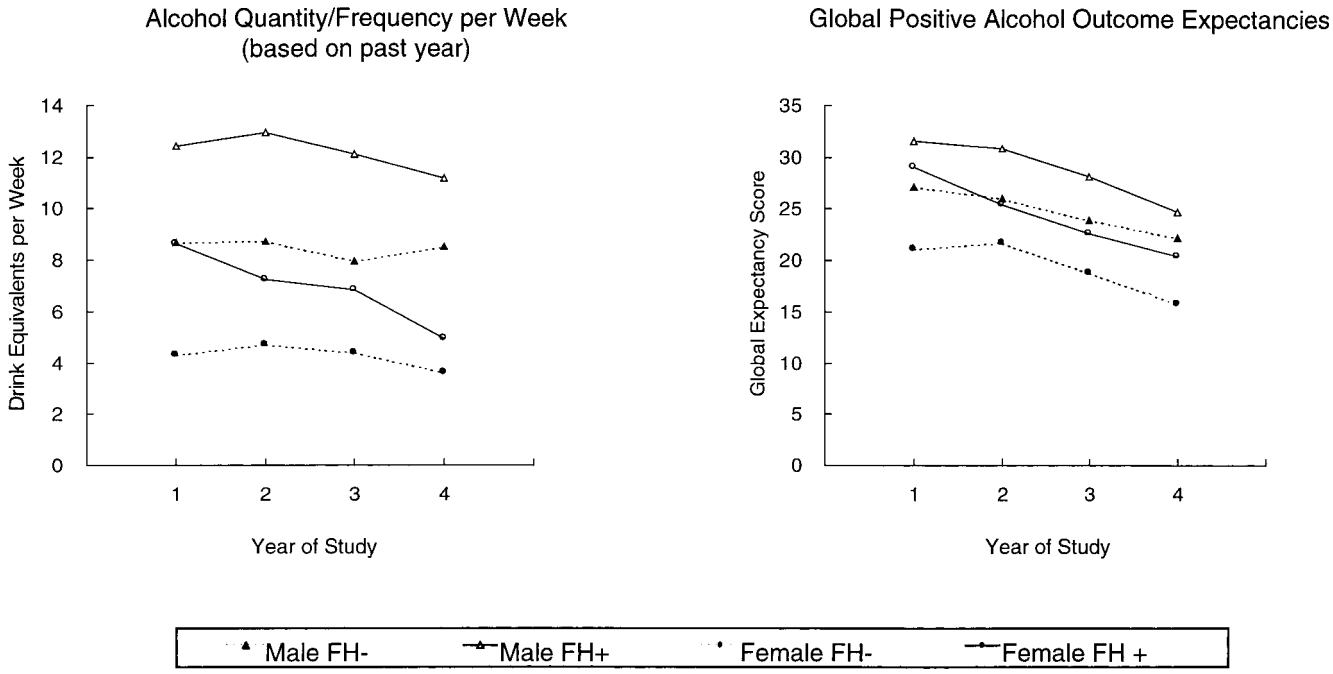

Figure 1 Mean levels of quantity/frequency of alcohol use and global positive alcohol outcome expectancies as a function of sex and family history classification, by study year.

NOTE: FH+ = positive for family history of paternal alcoholism, FH– = negative for family history of paternal alcoholism.

TABLE 2: Regression Models Predicting Quantity/Frequency of Alcohol Use From Outcome Expectancies and Private Self-Consciousness by Study Year

	Year 1		*Year 2*		*Year 3*		*Year 4*	
	Adj R^2		*Adj* R^2		*Adj* R^2		*Adj* R^2	
Step 1 = sex and FH	.03**		.03**		.04**		.11**	
Sex		–.11**		–.11**		–.14**		–.27**
FH		.09†		.07		.09*		.08*
FH × Sex		.00		–.01		–.03		–.05
Step 2 = main effects	.08**		.10**		.11**		.17**	
EXP		.27**		.39**		.39**		.45**
PSC		–.10*		–.10*		.00		.02
Step 3 = quadratics	.00		.00		.00		.00	
EXP		.03		–.07		–.04		–.07
PSC		.01		–.01		–.05		.00
Step 4 = two-ways	.00		.00		.02*		.01†	
EXP × Sex		.03		–.04		.00		–.06
PSC × Sex		.02		.04		.06		–.03
EXP × PSC		–.06		–.07		.15**		.09‡

NOTE: FH = family history classification (positive = 1, negative = 0), PSC = private self-consciousness, EXP = global positive alcohol outcome expectancies. Sex was coded 0 for males, 1 for females. Adj ΔR^2 = change in adjusted R^2 (by adding the step), β = standardized regression coefficient. †$p < .07$. ‡$p = .05$. *$p < .05$. **$p < .01$.

sex, FH, and their interaction; Step 2 added main effects of EXP, PSC, and age; Step 3 added quadratic effects; and Step 4 added the two- and three-way interactions.

The results from this model replicated the cross-sectional analyses. Year 3 EXP was a strong prospective predictor of Year 4 ALC (β = .38, $p < .001$). Adding the interactions significantly increased explained model variance (R^2 change = .02, $p < .05$) and produced a significant EXP × PSC interaction (β = .10, $p < .05$) and, more important, a significant Age × EXP × PSC interaction (β = .10, $p < .05$). This effect was further probed by examining the

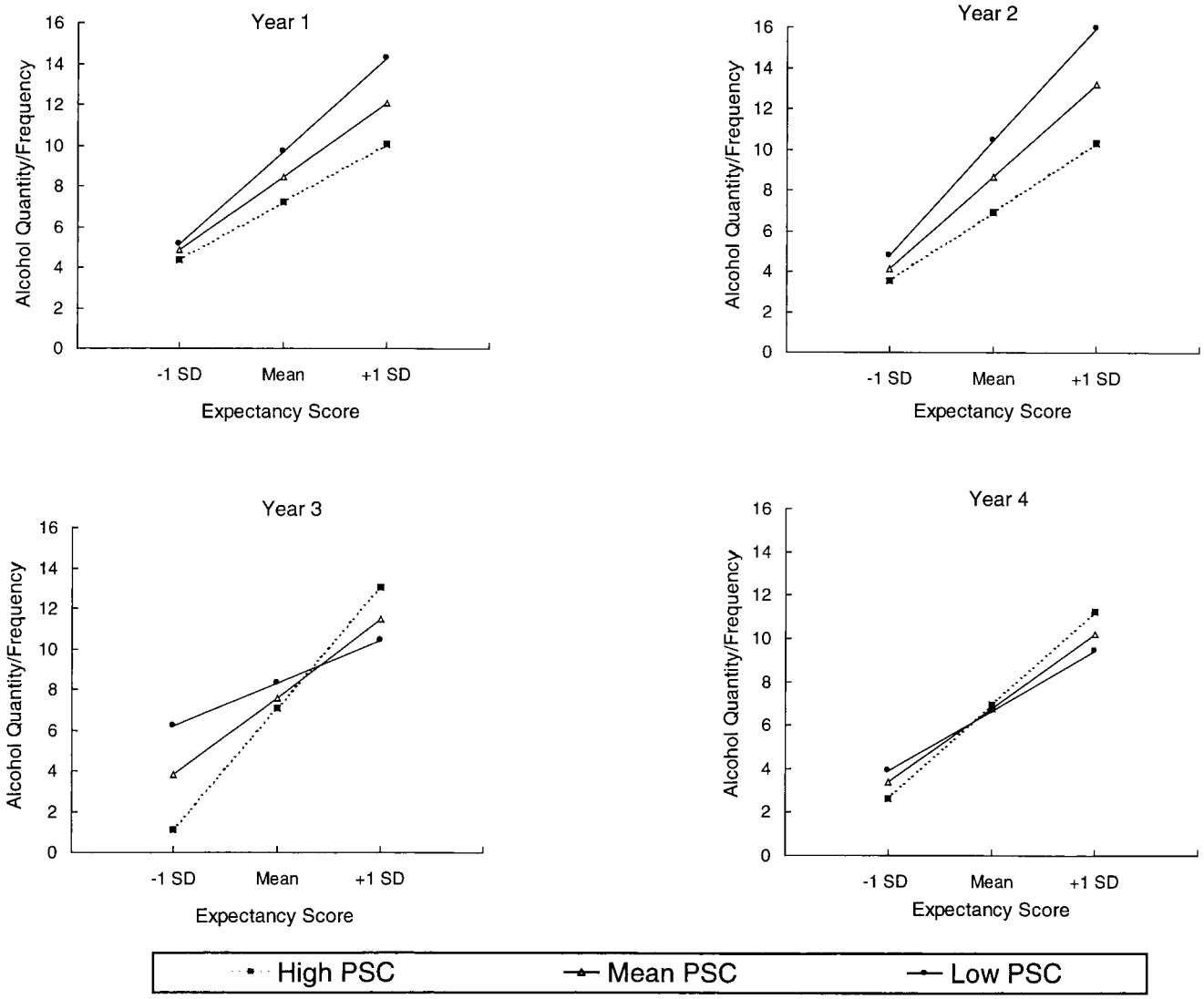

Figure 2 Quantity/frequency of alcohol use at each year as a function of expectancy score and levels of private self-consciousness (PSC). NOTE: Expectancy scores and PSC were centered prior to analyses and plotting. High PSC = 1 *SD* above the mean of PSC; low PSC = 1 *SD* below the mean of PSC. For expectancy score, +1 *SD* and –1 *SD* refer to 1 *SD* above and below the mean, respectively.

model separately for participants in the two age categories. These analyses again replicated the cross-sectional finding: The EXP × PSC interaction was not significant for underage participants ($\beta = .00$, $p > .80$; R^2 change = .00, $p > .10$) but was significant for legal age participants ($\beta = .22$, $p < .05$; R^2 change = .02, $p < .05$). As a more conservative strategy, we modeled autoregressivity in our ALC data by including Year 3 ALC as a covariate along with the other prospective predictors. Because Year 3 ALC accounted for a large proportion of the variance in Year 4 ALC ($\beta = .70$), our predicted interaction was not significant using this strategy ($p > .10$). However, the direction of the effect was as predicted and the standardized coefficient was similar to that obtained in our other analyses ($\beta = .10$). Year 3 EXP remained a significant predictor ($\beta = .23$, $p < .01$).

DISCUSSION

Review of Major Findings

The findings of the present study represent a considerable advance in research linking outcome expectancies and alcohol use for several reasons. First, given that a large body of evidence indicates that expectancies significantly predict alcohol involvement (e.g., Goldman et al., 1991; Leigh & Stacy, 1991; Sher et al., 1996), researchers have recently suggested that the next step in alcohol expectancy research should be the identification of moderators of this effect (e.g., McCarthy & Smith, 1996).

TABLE 3: Regression Model Predicting Quantity/Frequency of Alcohol Use From Age, Expectancies and Private Self-Consciousness at Year 3

	Adj R^2	
Step 1 = sex and FH	.05**	
Sex		–.16**
FH		.13**
Sex × FH		–.01
Step 2 = main effects	.11**	
EXP		.31**
PSC		.00
Age		–.01
Step 3 = quadratics	.00	
EXP		.00
PSC		–.04
Step 4 = two-way interactions	.03*	
EXP × Sex		.00
PSC × Sex		.05
Age × PSC		–.07
Age × EXP		.02
EXP × PSC		.17**
Step 5 = three-way interactions	.01*	
Age × EXP × PSC		.10*

NOTE: FH = family history classification (positive = 1, negative = 0), PSC = private self-consciousness, EXP = global positive alcohol outcome expectancies. Sex was coded 0 for males, 1 for females. Age also was coded dichotomously (age 20 and younger = 0, 21 and older = 1). Adj ΔR^2 = change in adjusted R^2 (by adding the step), β = standardized regression coefficient.
*$p < .05$. **$p < .01$.

The present findings indicate that PSC may be one such moderator in that the relationship between EXP and drinking behavior was strongest among individuals high in PSC (in Years 3 and 4). Second, our multiyear study design allowed us to examine the changing nature of the association between PSC, expectancies, and alcohol use across an important developmental period (i.e., late adolescence to young adulthood). Finally, our major findings—moderation of expectancies by PSC and the importance of age in driving this effect—were demonstrated cross-sectionally and were largely replicated prospectively.

The present findings also are consistent with prior evidence (e.g., Deiner & Wallbom, 1976) linking PSC with adherence to prescribed behavioral standards and regulations. In the first 2 years of this study, when our participants were younger than the legal drinking age, high PSC was associated with less drinking, albeit slightly (when EXP effects were modeled).[9] Our bivariate correlational analyses showed that the relation between EXP and PSC was small but significant at each year. Taken together, these findings support the notion that minors high in PSC drink less than their low PSC peers, but only clearly so when the positive association between PSC and EXP is controlled. According to the reasoning advanced by Chassin et al. (1988), underage individuals high in PSC may be especially sensitive to explicit legal proscriptions against alcohol use or to implicit sanctions against drinking from family or other influences. It is important to note that Chassin et al. made this argument based on data from high school students. The current results extend this reasoning to older adolescents whose environment generally is more conducive to alcohol use and, as such, provide compelling evidence that high PSC minors appear to limit their alcohol involvement, even in the face of increasing social pressure to drink.

Our data suggest that the legal drinking age was an important factor in determining the alcohol use of high PSC participants. As we have argued, heightened PSC may lead not only to increased awareness of expectancies and other knowledge structures but also to increased salience of the potential negative consequences of underage drinking. This suggests that two somewhat contradictory processes may be operating to influence the behavior of underage high PSC individuals: Heightened focus on and awareness of expectancies should strengthen the expectancy-behavior relationship, in general. In the case of alcohol use, however, the salience of potential consequences for violating legal proscriptions also makes these individuals less likely to act on their expectancies, until it becomes appropriate to do so. Therefore, although individuals high in PSC are highly aware of their expectancies prior to the legal drinking age, the impact of expectancy awareness on alcohol use is not apparent until after these individuals come of age. The analyses of the Year 3 data including age as a predictor (Table 3 and related text) indicate that it is the transition to legal drinking status that determines the change in alcohol use among those high in PSC. Conceptually, these relationships may be represented by a model in which expectancies have a consistent and direct influence on alcohol use. However, the influence of PSC and the interaction between PSC and expectancies are both determined, to some extent, by the legal drinking age.

PSC and Expectancy-Behavior Correspondence

We have argued that greater awareness of expectancies, alleged to accompany high levels of PSC, should result in stronger associations with behavior. However, the mechanism through which this occurs has not been fully discussed. A model recently proposed by Stacy and colleagues (e.g., Stacy, 1997; Stacy et al., 1994; Weingardt, Stacy, & Leigh, 1996) suggests that the strength of association between expectancies and behavior may be a function of expectancy accessibility. According to their expectancy accessibility model, drinking behavior and its outcomes become more strongly associated in memory as they are activated together more fre-

quently. Using a word association task, Stacy et al. (1994) found that individual differences in drinking experience were related to the accessibility of thoughts about alcohol use and its outcomes. Furthermore, Stacy, Dent, et al. (1990) found that outcome expectancies for smokeless tobacco that were made temporarily more accessible better predicted intentions to use this substance than did less accessible expectancies. The model predicts that circumstances in which expectancies are more accessible will strengthen the expectancy-behavior relation.

In discussing the general class of theories related to this issue, Stacy et al. (1994) emphasized that specification of the individual-level or environmental-level variables that may relate to increases in construct association is crucial. We argue that PSC may serve as one such individual-level variable. Individuals high in PSC are thought to be particularly introspective and to have increased access to internal states and cognitive structures (e.g., Carver & Scheier, 1981). Outcome expectancy measures are thought to reflect cognitive processes that are available to introspection, that is, expectancies represent explicit cognitive processes associated with reasoned or deliberate decision making (Stacy, 1997). Hence, when presented with opportunities to make decisions about alcohol use, individuals who are more introspective and whose expectancies are more accessible should be more likely to base drinking decisions on expectancies than would people whose expectancies are less accessible. As a result, a better correspondence between expectancies and behavior should emerge for those with greater expectancy accessibility.

Although other explanations may be tenable, conceptualizing PSC as related to decisions about alcohol and accessibility of related constructs provides a parsimonious explanation for the current findings. In situations requiring a decision about whether to use alcohol, those high in PSC are likely to access not only their expectancies but also cognitions related to internal and external standards of behavior. As minors, those high in PSC may be more influenced by the salience of the proscribed nature of alcohol use and, as such, may limit their drinking. Once this proscription is lifted, however, high PSC individuals' decisions about alcohol use should be increasingly driven by expectancies, which are likely to be highly accessible and, therefore, likely to exert a powerful influence on drinking behavior (Stacy et al., 1994).

Limitations

As we have mentioned, the measurement intervals used in this study were not designed specifically to test differences in the strength of the association between expectancies and alcohol use. Conceptually, it is unclear whether year-long intervals are appropriate for modeling expectancy-behavior consistency over time. Under these conditions, and given that significant autoregressivity is apparent in our alcohol use data (*r*s between study years ranged from .34 to .61), the utility of our prospective analyses is limited; prospective effects have been shown to depend critically on the length of interval between measurement occasions (e.g., Sher et al., 1996; Sher & Wood, 1997). Stacy, Widaman, and Marlatt (1990) have provided some evidence that 4-week intervals may be more appropriate for examining expectancy-behavior relations over time. Despite this potential limitation, the results of our primary prospective analysis replicated our cross-sectional findings with respect to significant interactions. Additional analyses showed that even when the autoregressive effect of previous alcohol use was controlled, the hypothesized direction of the interaction persisted. However, the interaction did drop to nonsignificance when modeling autoregressivity, making interpretation of the finding slightly more ambiguous. Prospective replication of the present findings using measurement intervals specifically designed to test this question is needed.

Another potential limitation of expectancy research of this kind is that participants' responses may be biased by self-perception in two ways. First, participants may merely be reporting past-year alcohol use based on current expectancies, perhaps by using current expectancies as biased recall cues to prior drinking (e.g., McFarland, Ross, & Conway, 1984). Stacy, Widaman, and Marlatt (1990) addressed this issue by obtaining independent reports of participants' alcohol use from participants themselves and from their close friends, along with a measure of participants' expectancies. These authors found that a model in which all three parameters were freely estimated did not differ from a competing model in which the path from expectancies to peer-reported drinking was constrained to be equal to the path from expectancies to self-reported drinking. Therefore, Stacy, Widaman, and Marlatt (1990) concluded that self-reports of alcohol use reasonably can be trusted in expectancy research. That is, significant associations between expectancies and self-reported alcohol use are not due merely to self-perception processes at the time of measurement, self-report response sets, or other method effects related to self-report (Stacy, Widaman, & Marlatt, 1990). Hence, we believe our participants' self-reported level of alcohol use is reliable.

A second potential limitation related to self-perception is that participants may be reporting current expectancies based on memories of their most recent drinking episode. Certainly, evidence suggests that expectancies are based in part on previous direct experience (e.g., Olson, Roese, & Zanna, 1996). However, Stacy (1997) recently has shown that expectancies remain important,

independent predictors of alcohol use, even when controlling for the effects of alcohol memory activation and previous alcohol use, indicating that neither expectancies nor memory activation represent a mere epiphenomenon. Also, young children with no direct alcohol experience report alcohol outcome expectancies (Miller et al., 1990), suggesting that at least some aspects of expectancies are not entirely based on experience. Related to this issue, certain critical aspects of alcohol outcome expectancies are culturally shared and thus are not necessarily related to one's direct personal experience (e.g., see Olson et al., 1996; Stacy et al., 1994).

On a related note, another potential concern with the current findings is that because high PSC participants have greater access to their internal states, they merely may have based their self-reported drinking behavior on their previous drinking experience to a greater extent than did low PSC participants. Because participants were asked to recall their alcohol use over the past year, it is difficult to rule out this possible alternative explanation. However, our prospective findings at Year 3 provide evidence to the contrary given that the hypothesized interaction was observed when predicting future alcohol use (Year 4) with prior expectancies (Year 3) and that expectancies remain a reliable predictor after controlling for the effects of previous drinking.

In addition, the study design did not permit the collection of data with which to test our speculations concerning the link between PSC, expectancy accessibility, and drinking behavior. As such, the specific process by which PSC strengthens expectancy-behavior correspondence has yet to be directly modeled. Future studies should use priming procedures (e.g., Weingardt et al., 1996) and response latency measures to directly examine individual differences in the accessibility of alcohol outcome expectancies related to levels of PSC.

Finally, our predicted interaction appeared less robust at Year 4 than at Year 3. It could be argued that this effect should be even stronger during Year 4 if it depends on a developmental transition (to legal drinking status) that more participants have made by that time. Nevertheless, we argue that the Year 4 effect should be considered important, for several reasons. The difficulty inherent in detecting interaction effects in nonexperimental field studies, in spite of theoretically compelling reasons for expecting such effects, has been discussed at length by McClelland and Judd (1993). Reasons for this difficulty include inflation in overall model error in field studies, the exacerbation of measurement error inherent in computing cross-product terms, and other differences in the joint distributions of the predictor variables between field and lab studies. In addition, Evans (1985) argued that moderator effects are so difficult to detect that even those explaining only 1% of total variance should be considered important. In this light, that our results indicate moderation in 2 consecutive years, as predicted, is rather impressive. Furthermore, because this study was not conducted in a lab setting but was conducted with a sample systematically ascertained as freshmen (many of whom were no longer students at later years of the study), over a period of 4 years, our sample was highly heterogeneous. As such, the current results should be considered quite generalizable, particularly when compared to studies conducted using college freshmen sampled from specific classrooms (i.e., introductory psychology). Perhaps more important, our test of beta equivalence using nested structural equation models indicated that the size of the moderator effect was similar across Years 3 and 4. Nevertheless, this is an issue that ultimately must be resolved in the literature in future studies.

Conclusions

This study represents an important advance in the search for individual difference factors that may moderate the expectancy–alcohol use relation. Our data demonstrate that PSC predicts the extent to which expectancies relate to alcohol use, but our findings were qualified by the changing age of our participants. More work is needed to further investigate whether the effects reported here are driven by the legal drinking age per se, as we have argued, or whether other developmental processes related to this age period provide a more compelling explanation. Furthermore, our data provide some support for a previously hypothesized (Chassin et al., 1988) relation between PSC and limited underage drinking among late adolescents and young adults. This finding has important implications for researchers using longitudinal data sets to study the development of drinking patterns among young adults whose behavior is multiply influenced by peers, parents, legal authorities, and their own developing preferences and needs.

NOTES

1. However, the Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975) taps the same kind of phenomenological experiences as do manipulations of self-awareness (Scheier & Carver, 1982).

2. We thank an anonymous reviewer for clarifying this point for us.

3. Due to the extensive screening at Year 1, the measurement interval between the first 2 years ranged from 9 to 12 months. The remaining intervals (Years 2 to 3, 3 to 4) were all roughly 12 months.

4. Because FH+ (positive for family history of paternal alcoholism) individuals initially were oversampled, we believe that controlling for the effects of FH represents a more conservative approach to demonstrating our effects of interest. Nevertheless, we conducted a series of analyses in which the family history variable was not included in the model and found that our results were essentially identical.

5. Inclusion of these participants, in separate analyses, did not change the nature of any of the findings.

6. To further assess demographic characteristics of the sample, those excluded from the analyses at each year were compared to those retained on levels of the main predictor variables. At Year 1, those

included had higher EXP than those excluded ($p < .01$). Also, at Year 2, the proportion of FH+ participants was higher than the proportion of FH– (negative for family history of paternal alcoholism) among those excluded (64% FH+, $p < .05$) and the proportion of men was higher than the proportion of women among those excluded (60% men, $p < .05$). Sex and FH status were roughly equally represented at each year among those included (numbers ranged from 46% to 54%). No other differences were found.

7. To rule out the possibility that our results differed for males and females, an additional model was run in which the Sex × Global Positive Alcohol Outcome Expectancies (EXP) × Private Self-Consciousness (PSC) interaction term was included as a fifth step. This three-way interaction term was not significant and did not result in a significant increment in explained variance at any year. We also examined whether our predicted interaction differed according to FH status by including FH × EXP × PSC into the model in Step 5. Again, this three-way interaction was not significant at any year and did not increase R^2. This analysis did produce a significant FH × EXP interaction at Year 2 ($p < .05$), indicating that EXP were better predictors for FH+ participants during Year 2. However, this effect was not predicted, was not replicated in any other year, and is not of interest, so will not be discussed further.

8. Although participants in the legal age category were at least 21 at the time of the Year 3 assessment, their age at the time of consumption is most important for our claim that age is an important moderator of the EXP × PSC interaction. Because our measure of alcohol use is based on the past year, data for participants who were drinking legally at assessment but were drinking illegally much of the previous year may have been included. To address this concern, we conducted an ancillary analysis of reported alcohol use during only the 30 days prior to assessment for only those participants who became of legal age prior to the onset of those 30 days ($N = 89$). The results of this analysis replicated our main findings (EXP × PSC interaction: $\beta = .23$, $p < .01$).

9. That alcohol use and PSC were negatively related in the first 2 years of the study (after controlling for sex, FH, and EXP) provides support for our hypothesis but does not demonstrate that high PSC minors limit their drinking because of their internal behavioral standards. In an attempt to further clarify this finding, we examined participants' responses at Years 1 and 2 to several items regarding their reasons for limiting drinking. Specifically, participants were asked to rate their agreement with statements concerning limiting drinking due to religious beliefs and due to a fear of "getting into trouble." These ratings were correlated with alcohol use, separately for low and high PSC participants (tertile split). Among high PSC participants, responses to these items were significantly related to reported alcohol use in Year 1 (rs = –.19 and –.14, $p < .05$ for religious conviction and fear of trouble, respectively), whereas neither relationship was significant for low PSC participants (rs = –.05 and –.01 respectively, ps > .05). A similar pattern was seen in Year 2 (high PSC: rs = –.22 and –.16, ps < .05 for religious conviction and fear of trouble, respectively; low PSC: rs = .00 and –.12, respectively, ps > .05). Although not entirely conclusive, these findings support our contention that high PSC minors limit their drinking due to concerns over their internal behavioral standards and the proscribed nature of underage alcohol use.

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