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Rose-Colored Beer Goggles: The Relation between Experiencing Alcohol Consequences and Perceived Likelihood and Valence

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Abstract

Although experiencing alcohol-related consequences has some influence on future drinking, this effect may be stronger based on the degree to which the consequence is viewed as positive versus negative, either by the individual or pre-defined by researchers. This study explored the relationship between experiencing positive and negative alcohol-related consequences and college students' perceptions of how likely those consequences were to occur in the future (i.e. likelihood), and their view of how positive or negative experiencing those consequences would be if they did experience them as a result of drinking (i.e. valence). Data were collected from 491 college students (mean age = 19.26; 56.4% female; 55.0% Caucasian; 33.2% Asian/Pacific Islander) through a computerized survey. Results indicated that experiencing more positive consequences in the past year was associated with viewing those consequences as both more likely to occur and more positive, while experiencing more negative consequences was associated with viewing them as less negative and no more likely to occur, except for those who had experienced the highest levels of negative consequences. These findings suggest that finding ways to reduce both perceptions as well as consequences themselves may be effective intervention tools.

Keywords

alcohol; consequences; college students; expectancies; likelihood

College drinking continues to pose significant concerns.. Recent national data indicated that 69% of college students had used alcohol in the past month, with 34% of women and 49% of men consuming five or more drinks in one occasion in the past two weeks (Johnston,

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O'Malley, Bachman & Schulenberg, 2009). Despite decreases in other demographics, heavy drinking rates have remained the same for college men and increased for women (Gruza, Norberg, & Bierut, 2009), and adolescents who enter college increased their heavy drinking following high school graduation (Timberlake et al., 2007). Heavy drinkers are at increased risk for alcohol abuse and dependence (Knight et al., 2002), and the college age cohort produces the highest prevalence of diagnosable alcohol use disorders (Department of Health and Human Services [DHHS], 2007).

College student drinking leads to serious consequences, including 1,800 unintentional deaths, 500,000 injuries, and 600,000 assaults each year (Hingson, Zha, & Weitzman, 2009) as well as increased risks for sexual assaults, legal problems, academic and health-related concerns (Hingson, Heeren, Winter, & Wechsler, 2005; Perkins, 2002). Nevertheless, these negative consequences are generally weak predictors of plans to reduce drinking (Patrick & Maggs, 2008), especially compared with positive experiences (Burden & Maisto, 2000; Corbin, Morean, & Benedict, 2008). Alcohol expectancies (i.e., beliefs individuals hold about consequences they will have while drinking) show a similar pattern, with positive expectancies being stronger predictors of alcohol consumption than negative expectancies (Greenbaum, Del Boca, Darkes, Chen-Pin, & Goldman, 2005; Lee, Greely, & Oei, 1999; Stacey, Widaman, & Marlatt, 1990).

Prior research has examined why positive consequences might have such strong effects. Although reports of both consequences increase with consumption, positive consequences are reported earlier and at lower levels of drinking (Nystrom, 1992; Park & Grant, 2005). Moreover, experiencing positive consequences may reinforce positive expectancies, which in turn lead to increased use (Park & Grant, 2005). Perceived likelihood may also play a role as students report positive consequences as more frequent and influential than negative consequences (Park, 2004).

Research has also explored why negative consequences are less impactful. Students tend to overestimate the amount of drinks needed to experience negative consequences (Mallett, Lee, Neighbors, Larimer & Turrisi, 2006). Consequences such as hangovers or blackouts, classified as negative by researchers, are rated by students as less undesirable (Leigh, 1987), more neutral or even positive (Mallett, Bachrach, & Turrisi, 2008). Experiencing most consequences had weak effects on evaluations of drinking sessions (Lee et al., 2010). Students experiencing many consequences rated negative ones less important and positive ones more important (Patrick & Maggs, 2008), and heavy episodic drinkers endorsed fewer negative expectancies compared with those who rarely drink heavily (Gaher & Simons, 2007). This suggests that the association between experiences and perceptions may differ across the level of consequences.

Taken together, students experiencing negative consequences may perceive them as less severe or less likely to occur, and thus may be more prone to continue heavy drinking, which may then lead to experiencing more negative consequences. Students experiencing positive consequences may perceive them as more desirable and more likely, reinforcing future use. The goal of the current study was to examine the associations between experiencing consequences and perceptions of the likelihood (belief it will occur) and valence (positivity or negativity) of future consequences. Although the true relations between experiences and perceptions are likely to be bidirectional, we chose to predict current perceptions based on recent experience. We hypothesized that experiencing positive consequences would predict more positive valence and increased likelihood, with negative consequences related to less negative valence and decreased likelihood. We also considered the magnitude of experienced consequences (i.e., whether very high levels of consequences

were harder to minimize), and whether the effects of experience on perceived likelihood were moderated by perceived valence, and vice versa.

Method

Participants and Procedure

Data were collected from 491 college students (mean age = 19.26; 56.4% female; 55.0% Caucasian; 33.2% Asian/Pacific Islander) enrolled in lower level courses at a university in the Pacific Northwest. Participants completed a computerized survey and received extra course credit. The study was reviewed and approved by the university's Institutional Review Board.

Measures

Alcohol Consequences—Thirty-five items measured negative consequences, with 23 items from the Young Adult Alcohol Problem Screening Test (YAAPST; Hurlburt & Sher, 1992) such as “Have you ever gotten into physical fights while drinking?” (4 help-seeking items were excluded) and 12 items from Mallett et al. (2008) including “Have you ever taken illegal drugs because you were drinking?” Responses ranged from “0” (never experienced) to “9” (experienced 40 or more times in the past year). As our interest was in recent consequences, we collapsed items “never experienced” and “not experienced in the past year” into a single category. These items were presented alternating with 14 items from the Positive Drinking Consequences Questionnaire (PDCQ; Corbin, Morean & Benedict, 2008, e.g. “Have you found it easy to make conversations while drinking?”) to minimize response bias. The past year mean intensity (number of consequences and the frequency of those consequences) was used for analyses, with Cronbach's $\alpha = .83$ for the negative measure and $\alpha = .88$ for the PDCQ.

Perceived Likelihood—We assessed participants' perceived likelihood of experiencing the same negative (35 items) and positive (14 items) consequences described above. Participants reported what they would expect to happen while drinking (e.g. “I would get into physical fights while drinking.”) with seven response options ranging from “Not at all likely” to “Extremely likely.” Separate means were computed for the perceived likelihood of negative and positive consequences, with $\alpha = .94$ for negative consequences and $\alpha = .90$ for positive consequences.

Perceived Valence—We measured the perceived valence of the above consequences with items rated on a 5-point scale ranging from “Extremely negative” to “Extremely positive” to have each consequence occur because of drinking (e.g. “If you were to get into a physical fight because of your drinking, how positive or negative would this experience be?”). Separate means were computed with $\alpha = .93$ for negative consequence valence and $\alpha = .89$ for positive valence.

Alcohol Use—Similar to other studies (e.g., King, Molina, & Chassin, 2009), alcohol use was measured as the product of quantity (range (0) “No drinks” to (8) “Nine or more drinks”) and frequency (range (1) “Not at all” to (7) “Everyday”) over the past three months.

Demographics—Covariates included age, gender, Asian American ethnicity, and father's education (as a proxy variable for socioeconomic status). Education and ethnicity were included due to prior research suggesting differential associations with substance use (Wills, McNamara, & Vaccaro, 1995; SAMHSA, 2009). No interactions ($p < .05$) with alcohol consequences or perceived likelihood or valence were found with any of the demographic variables.

Results

Data Analysis

This study examined how experiencing recent consequences related to perceptions of the likelihood and valence of future consequencesⁱ. We first tested bivariate correlations, and then tested how experiencing positive and negative consequences predicted perceived likelihood and valence in four separate modelsⁱⁱ. We included a quadratic (squared) term to test whether the effect depended on the level of experienced consequences. We also tested whether valence and likelihood interacted with each other by including them as moderators of the linear and quadratic effects of experienced consequences. All predictors were centered to facilitate interpretation of the interactions and quadratic effects (Cohen, Cohen, West, & Aiken, 2003), with effects probed at the mean and one standard deviation above and below (Aiken & West, 1991).

Descriptive Information

Descriptive statistics are presented in Table 1. Perceived likelihood of negative consequences was not correlated with either alcohol consumption or past experience of positive consequences. All other correlations were significant. Experiencing positive consequences was more strongly related to perceptions of the likelihood and valence of positive consequences than negative ones, and vice versa. Positive consequences ($M = 1.33$, $SD = 1.26$) were also over twice as likely to be reported compared with negative consequences ($M = 0.51$, $SD = 0.65$).

Predicting Likelihood of Consequences

Table 2 summarizes the models predicting perceived likelihood of both positive and negative consequences from experienced consequences (both linear and quadratic effects), perceived valence, and the interactions between experience and valence. Older students reported lower likelihood of all consequences, and men reported a higher likelihood of positive consequences. Viewing positive consequences as more positive and negative consequences as less negative was associated with perceiving both as being more likely to occur.

There was a linear (but not quadratic) effect of experiencing positive consequences on perceived likelihood of those consequences occurring in the future. Conversely, there was a quadratic effect of experiencing negative consequences on perceived likelihood (Figure 1). The effects of experiencing negative consequences was negative at low levels but only approached significance ($B = -.26$, $p = .056$); this effect changed as participants reported experiencing more consequences, such that at the mean level of experience there was no association, but at high levels of experience, the association was strong and positive ($B = .24$, $p < .001$).

Predicting Valence of Consequences

Table 3 summarizes the models predicting perceived valence from the linear and quadratic effects of experience, perceived likelihood, and their interactions. Women were more likely

ⁱWe also tested whether the associations between consequences and the outcomes could be better accounted for by individual variation in alcohol consumption, which is strongly related to alcohol-related consequences. Adding alcohol consumption as a predictor did not substantively change the effects of either the main effects or the interactions in any of the models. Thus we present the more parsimonious models below.

ⁱⁱWe also tested the effects of an “overall consequences model” to determine whether the models could generalize across types of consequences. The results of these analyses (which produced coefficients near the middle of the separate analyses), and the disparate results for positive and negative items presented below, indicate that the findings were not interpretable. Thus for the final analyses consequences were split into positive and negative categories for predicting positive and negative perceptions, respectively.

to report all consequences as more positive than men, and individuals whose fathers were more educated were more likely to report positive consequences as more positive. For positive consequences, more positive valence was associated both with greater experience and greater perceived likelihood. The quadratic effect was not significant and there were no interactions between experience and perceived likelihood in predicting the valence of those consequences.

Predicting valence of negative consequences was more complicated with significant linear, quadratic, and interaction effects. We probed the quadratic effect at high, mean and low levels of experience and found as experience increased, the effects on valence weakened and disappeared at high levels. In other words, individuals experiencing few consequences tended to see them as less negative than those experiencing many of them. Second, perceived likelihood moderated the linear effect of experience on valence (which effectively changed the “tilt” of the curve). We probed this interaction across levels (-1 SD, Mean and $+1$ SD) to test how the instantaneous linear effect of experience changed as a function of likelihood. Figure 2 illustrates that at low levels of likelihood, experience was unrelated to perceived valence regardless of experience, although this effect began to trend negative at high levels ($B = -.25, p = .08$). As likelihood increased, the effects of experience on valence became stronger and more positive, but the effect still diminished at high levels of experience due to the quadratic effect. For example, at high levels of perceived likelihood, the instantaneous linear slope of experienced consequences weakened from $B = .50, p < .01$ at low levels of experiences to $B = .28, p < .01$.

Discussion

Prior research showed that continued alcohol use may be due in part to positive consequences that reinforce the behavior more strongly than negative consequences punish it. Our findings indicate a “rich get richer” relationship, where positive consequences were related to a greater perceived likelihood and valence. Conversely, recent experiences of negative consequences were associated with viewing them as less negative and no more likely to occur, except at high levels of experience. In other words, the good gets better and happens more, while the bad does not get any worse or more frequent.

Correlations were stronger within experiences and perceptions of positive consequences and within experiences and perceptions of negative consequences, supporting the distinction between these types of consequences (e.g. Park, 2004; Patrick & Maggs, 2008). We found significant effects of age and gender, indicating that younger students and men experienced more consequences, although in one model women experienced more positive consequences.

Experiencing alcohol consequences was associated with the level of perceived likelihood, but this depended on whether the consequences were positive or negative. Consistent with Subjective Expected Utility Theory (Beyth-Maroon, Austin, Fischhoff, Palmgren, & Jacobs-Quadrel, 1993; Furby & Beyth-Maroon, 1992) which posits decisions are made by individuals by considering the costs and benefits along with probability of an outcome, we found that experiencing positive consequences was associated with higher perceptions of likelihood, but experiencing negative consequences was only associated with higher likelihood at high levels of experience. The experience of positive consequences is more common (Park, 2004) and begins at lower levels of drinking (Park & Grant, 2005), thus more drinkers are experiencing (and expecting) them. Conversely, our findings suggest that predictions of the likelihood and the actual experience of consequences are only connected at higher levels of consequences. This suggested that heavy drinkers become accurate either

because their experiences begin to shape their perceptions of likelihood, or because believing in a higher likelihood of negative consequences makes them more likely to occur.

Our findings are consistent with prior findings that students view negative consequences as less important (e.g. Mallett et al., 2006, 2008) and are more willing to experience them (Mallett, Varvil-Weld, Turrisi, & Read, 2011). Our results indicated that experience was also related to valence: consequences were viewed as more positive for those who had more experience with *either* positive or negative alcohol consequences, and also for those who thought them to be more likely. Valence was only diminished among those who either reported many negative consequences or a combination of few consequences and low likelihood, which may suggest that valence is shaped by experience at high levels of consequences, but may shape experience among very light users (in that very negative perceptions may be protective against drinking). However, prospective research is needed to determine the direction of these effects.

Although these “rose-colored” perceptions help explain how experience maintains behavior, it remains unclear why negative consequences were generally viewed as less likely and less negative. These findings may be explained by cognitive dissonance (e.g. Festinger, 1957), particularly when one’s behavior prompts a positive expectancy (Draycott & Dabbs, 1998). Specifically, individuals may use dissonance-reduction strategies to avoid changing deeply held beliefs (Simon, Greenberg, & Brehm, 1995), and in turn begin to view the experience as less negative, maintaining the attitude that drinking provides positive experiences. Our findings are also consistent with positive memory biases, which suggest events are recalled as more positive than they were experienced at the time, either because events are viewed as pleasant more often than unpleasant in general, or because affect related to positive events is maintained longer than negative experiences (see Walker, Skowronski, & Thompson, 2003 for a review). Developmental theory offers another explanation: Cauffman and colleagues (2010) found individuals aged 18–21 demonstrated the greatest approach behaviors for positive consequences, thus showing a greater sensitivity to positive outcomes and risk-taking behaviors. This same age group was also the most sensitive to negative feedback, which combined with our findings that consequences were perceived as less negative, suggests the “loss” (negative consequences) would be considered minimal compared to the gain (of positive consequences).

These findings have important implications for intervention efforts. Consistent with strategies described as effective for college students (National Institute on Alcohol Abuse and Alcoholism, 2002), these findings highlight the importance of focusing on positive expectancies and positive experiences related to alcohol use. Challenging expectancies through placebo discussions and alternative behaviors to achieve these positive consequences (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Miller, Kilmer, Kim, Weingardt, & Marlatt, 2001) might have a greater impact on drinking behaviors. These findings also suggest focusing on minimal negative consequences may not be as useful as students may both devalue the negativity and diminish their potential likelihood. However, strategies to reduce dissonance without confrontation (e.g. Motivational Interviewing, Miller & Rollnick, 2002) could be effective. Finally, given the reciprocal relationship between alcohol experiences and cognitions (Gerrard, Gibbons, Benthin, & Hessling, 1996), adding protective behavioral strategies (PBS; Martens et al., 2004) to target behaviors (reducing drinking and consequences directly) would likely also impact perceptions.

Several limitations should be noted. First, the use of a convenience sample of college students with limited age and racial variability reduces generalizability of the current findings. Second, although the approach for the current study was to examine the effects of recent consequences on current perceptions, the true associations are likely to be bi-

directional, and the current cross-sectional data limits causal interpretations. Finally, although the accuracy of self-reported alcohol use (e.g., Babor, Steinberg, Anton, & Del Boca, 2000; Babor, Stephens, & Marlatt, 1987), and more specifically web-based self-report measures (Miller et al., 2002), among college students has been supported, recall bias is still a consideration.

The current study extends existing research by examining the associations between experiencing both positive and negative alcohol related consequences and perceptions of their valence and likelihood. As the temporal relationship between experience and perceptions is likely complex and bidirectional, this study adds to previous research by predicting the attitudes from the behaviors rather than vice versa. This study fills in a gap in the literature by testing quadratic and interaction effects among predictors of cognitions. It adds to the literature on consequences and perceptions by demonstrating the importance of differentiating positive and negative consequences and documenting the different effects of these consequences on perceptions. We offer a few theories (cognitive dissonance, positive memory bias, and approach versus avoidance behaviors) as explanations for the greater influence of positive consequences compared with negative ones, and the differential perceptions associated with each. Future studies should utilize a longitudinal prospective design to further examine the direction and magnitude of effects among alcohol consumption, related consequences, and perceptions.

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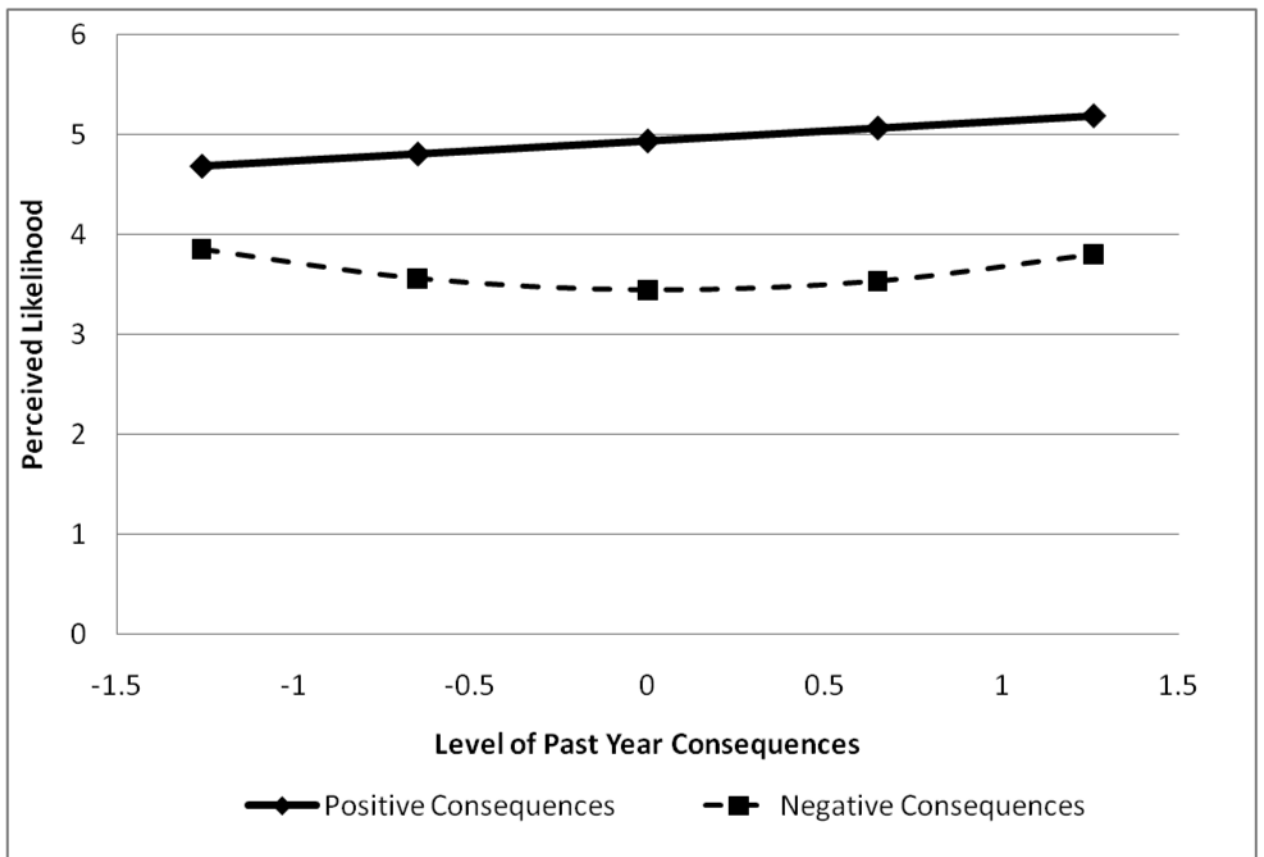


Figure 1. The linear effects of experiencing positive consequences on perceived likelihood and the quadratic effects of experiencing negative consequences on perceived likelihood from low to high levels of experienced consequences.

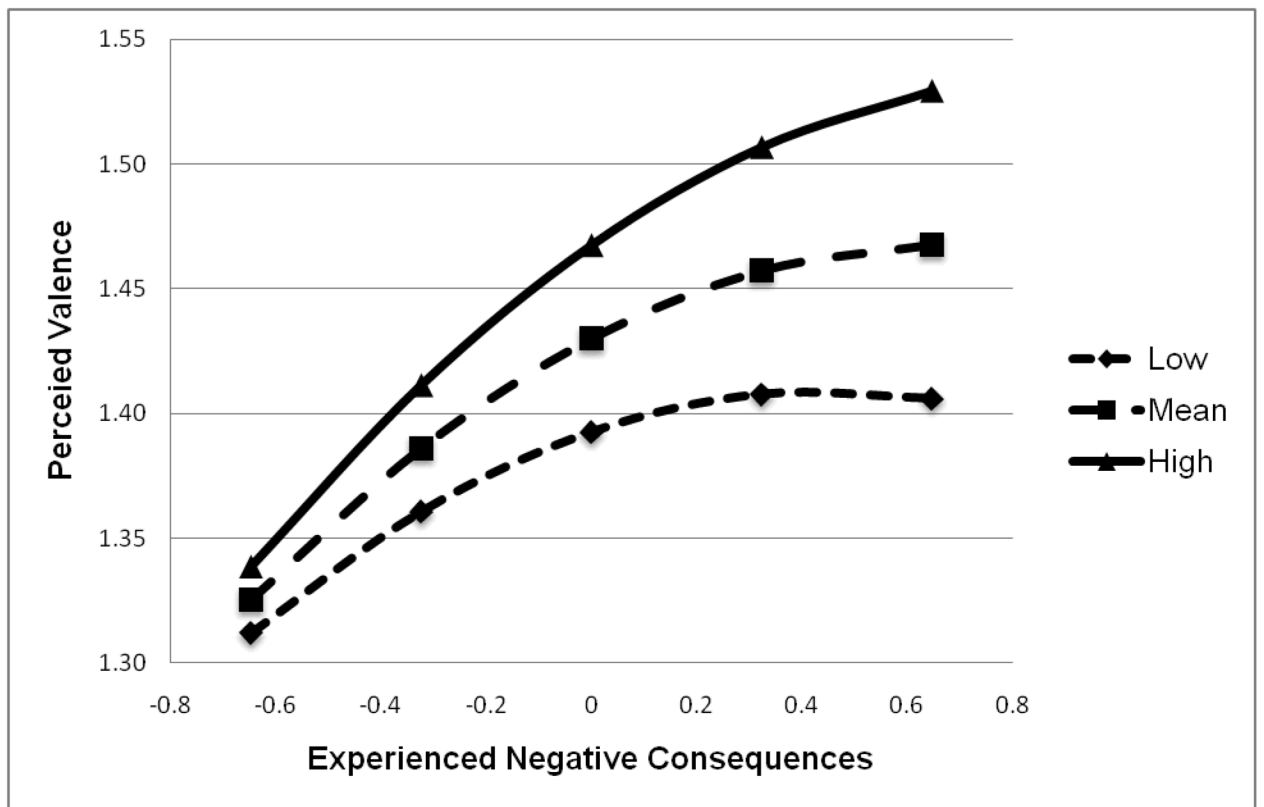


Figure 2.

The effects of experiencing negative consequences (graphed from -1 SD below the mean to $+1$ SD above the mean) on perceived valence of those negative consequences at -1 SD below the mean, mean, and $+1$ SD above the mean of perceived likelihood of those consequences. Higher valence scores indicate greater positive evaluations of negative consequences.

Table 1

Means, Standard Deviations, and Zero-order Correlations

Variable	M	SD	1	2	3	4	5	6	7
1. Alcohol use	22.11	21.07	-						
<i>Experienced consequences</i>									
2. Positive	1.33	1.26	.81**	-					
3. Negative	0.51	0.65	.84**	.86**	-				
<i>Perceived likelihood of consequences</i>									
4. Positive	3.67	1.15	.25**	.42**	.32**	-			
5. Negative	2.09	0.81	.06	.08	.23**	.63**	-		
<i>Perceived valence of consequences</i>									
6. Positive	3.04	0.67	.21**	.36**	.23**	.59**	.20**	-	
7. Negative	1.48	0.34	.23**	.23**	.31**	.24**	.26**	.37**	-

Note. N= 491.

p < .01.

Table 2
Hierarchical Regression Results for Perceived Likelihood of Alcohol-Related Consequences

Predictor	Positive				Negative			
	<i>b</i>	<i>SE</i>	β	95% CI	<i>b</i>	<i>SE</i>	β	95% CI
Intercept	4.94	.65		[3.66, 6.21]	3.45	.57		[2.34, 4.56]
Age	-.07	.03	-.08*	[-0.13, -0.01]	-.08	.03	-.11**	[-0.13, -0.02]
Gender	.23	.08	.10**	[0.08, 0.39]	.05	.07	.03	[-0.09, 0.19]
Ethnicity	-.12	.09	-.05	[-0.30, 0.06]	.04	.08	.02	[-0.11, 0.20]
Education	-.01	.01	-.01	[-0.03, 0.02]	-.01	.01	-.02	[-0.03, 0.02]
Positive Consequences	.20	.04	.22***	[0.12, 0.29]	-.02	.09	-.01	[-0.19, 0.17]
Positive Consequences ²	.03	.02	.07	[-0.01, 0.08]	.24	.07	.30**	[0.10, 0.38]
Positive Valence	.84	.09	.49***	[0.65, 1.02]	.63	.14	.27***	[0.36, 0.90]
Positive Valence × Positive Consequences	-.10	.06	-.07	[-0.22, 0.02]	.30	.25	.14	[-0.19, 0.80]
Positive Valence × Positive Consequences ²	-.01	.04	-.01	[-0.08, 0.07]	-.22	.11	-.26	[-0.44, 0.00]

Note. *n* = 491.

* *p* < .05.

** *p* < .01.

*** *p* < .001. Education = Father's Education Level.

Table 3
Hierarchical Regression Results for Perceived Valence of Alcohol-Related Consequences

Predictor	Positive				Negative			
	<i>b</i>	<i>SE</i>	β	95% CI	<i>b</i>	<i>SE</i>	β	95% CI
Intercept	2.78	.39		[2.00, 3.55]	1.43	.23		[0.99, 1.88]
Age	.01	.02	.02	[-0.03, 0.05]	.00	.01	.01	[-0.02, 0.03]
Gender	-.15	.05	-.11**	[-0.25, -0.05]	-.15	.03	-.21***	[-0.20, -0.09]
Ethnicity	-.02	.06	-.02	[-0.13, 0.09]	.05	.03	.06	[-0.02, 0.11]
Education	.02	.01	.10**	[0.01, 0.04]	.01	.01	.07	[0.00, 0.02]
Positive Consequences	.07	.03	.13*	[0.01, 0.12]	.11	.04	.20**	[0.03, 0.18]
Positive Consequences ²	-.02	.02	-.05	[-0.05, 0.02]	-.08	.04	-.23*	[0.15, 0.00]
Positive Likelihood	.37	.04	.63***	[0.30, 0.44]	.11	.03	.26***	[0.05, 0.16]
Positive Likelihood × Positive Consequences	.04	.02	.10	[0.00, 0.09]	.12	.05	.22*	[0.02, 0.23]
Positive Likelihood × Positive Consequences ²	-.02	.01	-.12	[-0.05, 0.01]	.04	.03	.14	[-0.02, 0.09]

Note. *n* = 491.

* *p* < .05.

** *p* < .01.

*** *p* < .001. Education = Father's Education Level.