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Positive and Negative Alcohol-Related Consequences: Associations with Past Drinking

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Drinking alcohol has long been a favorite pastime of college students in the United States (Straus & Bacon, 1953), with over 80% of contemporary college students reporting drinking in the last year and over 40% engaging in heavy episodic drinking at least once in the prior two weeks (Johnston et al., 2009). Along with this alcohol consumption come serious problems and potentially destructive consequences to the individual drinker, the college campus, and surrounding communities (Hingson et al., 2002; 2005; Perkins, 2002). Despite the occurrence of negative consequences, many students continue to drink and anecdotally report drinking and alcohol-related experiences as defining characteristics of their college experience (Rabow & Duncan-Schill, 1995; Schulenberg & Maggs, 2002). While the negative effects of alcohol use have been widely documented, particularly among college populations (e.g., Hingson et al., 2002, 2005; Perkins, 2002; Wechsler et al., 1998), positive effects of alcohol use have not been as carefully examined by researchers (Bondy, 1996; Graham, 2003). Although short-term positive consequences may be of less concern to public health researchers because they have less direct impact on individual or community health, the experience of rewarding positive consequences that are attributed to drinking may have great theoretical and practical importance as reinforcers of the same behavior (drinking) that produces harmful negative consequences. Therefore, it is important that research focusing on heavier-drinking populations, such as late adolescents, simultaneously consider both positive and negative consequences.

Alcohol-related Consequences as a Component of a Feed-forward Process of Alcohol Use

Various research literatures have addressed the positive and negative aspects of alcohol use. While there has been a plethora of research conducted on what individuals anticipate to receive from drinking alcohol (i.e., alcohol outcome expectancies), reasons for drinking (i.e., drinking motivations), and positive associations of expectancies and motivations with high-

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risk drinking and consequences (Fromme et al., 1993; Neighbors et al., 2003; Read et al., 2004; Sher et al., 1996; Wood et al., 1996), the examination of consequences (or an individual's attribution of certain effects resulting from alcohol) is different and equally important. Many theories of health behavior approach the initiation and maintenance of alcohol use from an expectancy-value approach, including Subjective Expected Utility (Edwards, 1954), Theory of Reasoned Action (Fishbein & Ajzen, 1975), Theory of Planned Behavior (Ajzen, 1985, 1991), and Health Beliefs Model (Rosenstock, 1990). In each of these, an individual's values (e.g., appraisals) or beliefs (e.g., expectations) about the likely consequences of a behavior are theorized to be an important determinant of engagement in or maintenance of the behavior. Alcohol expectancies are believed to be information stored in memory about the contingencies relating alcohol with its consequences (Goldman, 1994; Goldman, Brown, & Christiansen, 1987) and are formed as a result of direct, as well as vicarious, experiences with alcohol (Goldman, Brown, Christiansen & Smith, 1991; Oei & Baldwin, 1994). From a social learning perspective, bi-directional relationships exist between the individual, environment, and behavior suggesting that these direct experiences with alcohol (consequences) may represent learned information which reinforces future expectancies and behavior, and thus future consequences (Bandura, 1986; Bandura, 1977; Maisto et al., 1999; Wall et al., 2003). For example, students' beliefs and attributions of experiences with alcohol (e.g., "I became more social as a result of drinking") may perpetuate future alcohol-related expectancies (belief that drinking leads to sociability) and motivations (drinking in order to be more social next time), and future drinking itself, becoming a feed-forward process partially explaining the maintenance of high-risk drinking among young adults.

Importance of Examining Positive and Negative Alcohol-related Consequences

To date, research has almost solely focused on *negative* physical, social, and behavioral consequences. Only a handful of studies have formally studied the positive, reinforcing consequences of alcohol use among college students. Subjectively positive consequences have been found to be more frequently reported by college students and experienced at higher levels than negative consequences, and are positively related to alcohol use and future drinking (Park, 2004; Park & Grant, 2005). In addition, positive consequences are positively correlated with the importance of experiencing positive consequences in the future and with plans to drink (Corbin et al., 2008; Patrick & Maggs, 2008). Despite the similarity and natural correlation between positive consequences with positive outcome expectancies, Corbin et al. (2008) found that positive consequences accounted for unique variance in drinking after controlling for positive expectancies, suggesting that consequences can be discriminated from expectancies and warrant separate evaluation.

It should be noted that some conceptual asymmetry exists in the measurement of consequences: some negative consequences involve "objective or observable" outcomes (e.g., physical and behavior consequences, such as getting an underage legal citation), whereas the majority of positive outcomes involve "subjective" outcomes (e.g., relaxation and having fun). However, not all negative consequences are objective, as many may also include interpretation from the individual (e.g., felt embarrassed, got out of control).

Domains of Alcohol-related Consequences

Research suggests that alcohol expectancies, drinking motivations, as well as negative consequences, can be grouped into important domains depending on the measure and theory utilized (e.g., Cooper, 1994; Fromme et al., 1993; Martens, Neighbors, Dams-O'Connor, Lee, & Larimer, 2008). For example, expectancies and motives have been found for social

enhancement or social rewards, tension reduction or coping, image enhancement, negative physical and behavioral effects, and aggressive behavior, to name just a few. To date, consequence research has mainly focused on summary scores of negative consequences and has not examined the relationship between alcohol use and different domains of positive consequences.

Present Study

Based on social learning theory and prior research suggesting that alcohol-related consequences are distinct from alcohol expectancies, we examined the association between alcohol-related consequences and alcohol use as a way to verify the first part of a feed-forward process underlying alcohol use. Utilizing domains shown by the alcohol expectancy and drinking motivations literature to be salient and/or relevant to late adolescent students, positive (Fun/Social, Relaxation/Coping, and Positive Image) and negative (Physical, Behavioral, and Driving) consequences were assessed. The first aim was to examine the prevalence of both positive and negative alcohol-related consequences, comparing across the six domains. Expectancy-value models of behavior would suggest that positive reinforcing effects of alcohol would occur more frequently and would be uniquely associated with alcohol use, providing preliminary support for the initial link in the feed-forward process of alcohol use. Thus, we hypothesized that the three domains of positive consequences would be reported more frequently than negative consequences. Second, we hypothesized that positive consequences would account for unique variance in prior alcohol use, beyond the association with negative consequences. Positive consequences were expected to be more strongly linked with drinking than negative consequences.

Method

Participants & Procedures

Participants for the present study were drawn from a sample of recent high school graduates ($N=742$; 54% females, mean age of 18.4 years [$SD=.53$]), who had registered to attend their first semester at a large ($>30,000$ students) state university in the Southwest United States the following fall semester. During the summer, these incoming first-year students were required to attend a two-day "Freshman Orientation." They were invited to participate in the present study after a group dinner and before hearing a presentation on campus resources and healthy adjustment to college. The principal investigator (second author) or the senior graduate student managing the study gave a brief introduction to the purpose and nature of the study, including an explanation of the voluntary and confidential nature of their possible participation, and invited the students to ask questions. Questionnaire booklets included informed consent information. All campus presenters moved to the back of the room or left the room during the survey. The survey took approximately 20 minutes to complete and the students were offered a T-shirt and a raffle ticket to enter a drawing for a \$20 cash prize as incentives. The project was overseen by the University's IRB.

Nearly one thousand ($N = 960$) students from one incoming first-year cohort (approximately 6000 students) were approached to participate in the Orientation Survey. Of these, 943 (98%) traditional-aged college students completed a survey that assessed alcohol use, experienced alcohol-related consequences, and other psychosocial characteristics. Eighty-three percent of the sample were European American (Non-Hispanic), 6.5% were Hispanic, 4% were Asian American, 4% were multicultural, 2% were African American (Non-Hispanic), and 0.5% were Native American, which was representative of the larger incoming first-year cohort. Abstainers, defined as students who indicated not drinking at all during the past 12 months, were excluded from the present analyses, consistent with Park and Grant (2005) and Wechsler et al. (1994; 1998), leaving a final sample size of 719 (54%

women). The exclusion of abstainers creates a more conservative analysis, as abstainers by definition would not experience any alcohol-related consequences.

Measures

Prior Alcohol use—Items measuring alcohol use and heavy drinking were adapted from previous research (Donovan et al., 1985; Donovan et al., 1991; Health-and-Welfare-Canada, 1988). Students were instructed that one drink equals one glass or can of beer, one glass of wine, one mixed drink, or one shot of liquor. *Frequency of Alcohol* use was assessed with the question, ‘During the past 12 months, how often, on average, did you drink beer, wine or liquor?’ Response options were scored as 0=not at all, 1=less than once a month, 2=once a month, 3=once every 2 weeks, 4=once a week, 5=2-3 days a week, 6=4-6 days a week, or 7=everyday. *Typical quantity* was measured with the question, ‘Think of all the times during the past 12 months when you drank beer, wine or liquor. On average, how many drinks did you have on each occasion?’ Possible responses included: 0=none, 1=1, 2=2 or 3, 3=4-6, 4=7-9, 5=10-12, and 6=more than 12. *Frequency of heavy episodic drinking (HED)* was measured with the question, ‘In the past 12 months, about how often did you have 5 or more drinks of beer, wine, or liquor on a single occasion?’ Response options were the same as for frequency of alcohol use, described above.

Positive and negative consequences of drinking—Students were asked to indicate how often in the past year they had experienced each of 50 consequences of drinking (26 positive and 24 negative consequences). Items were initially created by 22 undergraduate university students ($n = 87$ items) and 8 expert raters (psychology graduate students, 4 male) coded these items as representing the hypothesized domains with over 90% agreement (Maggs et al., 2009). Further evaluation of importance of experiencing or avoiding consequences was assessed and items were further reduced to the resulting 50. Possible responses for each item ranged from 0=*never happened in the past year* to 4=*happened 4 or more times in past year*. Positive consequences (both positive and negative reinforcing consequences) were measured in three domains: Fun/Social (12 items; e.g., have more fun, felt close to your friends; $\alpha = .95$), Relaxation/Coping (7 items; e.g., helped you to unwind, became more relaxed; $\alpha = .91$) and Positive Image (7 items; e.g., looked older to others, maintained your wild image; $\alpha = .88$). Negative consequences were also measured in three domains: Physical (10 items; e.g., felt hung-over, passed out; $\alpha = .90$), Behavioral (8 items; e.g., ended up doing something stupid, got into a fight; $\alpha = .89$), and Driving-related (6 items; e.g., getting into a car accident, worrying about driving safely; $\alpha = .71$). Items in each domain were averaged to create six domain scores.

Results

Descriptive Statistics

Means, standard deviations, and correlations for alcohol consumption and domains of positive and negative consequences are presented in Table 1. Examination of means revealed that students reported drinking an average of one time every 2 weeks in the past 12 months and drank nearly 4-6 drinks on an average occasion. Students also indicated they drank enough to feel drunk or high from alcohol once every two weeks. Students reported experiencing both positive and negative consequences. All correlations among drinking variables, positive consequences, and negative consequences were positive and significant at the $p < .001$ level. While correlations were strong among indicators of alcohol consumption and positive and negative consequences, regression diagnostics did not indicate any evidence of multicollinearity (Cohen et al., 2003). All tolerance values exceeded .2.

Positive versus Negative Consequences

Our first objective was to describe and compare the prevalence of the six domains of positive and negative consequences. A one-factor within-subjects ANOVA with 6 levels indicated an overall mean difference among the different types or domains of consequences, $F(6, 714) = 444.87, p < .001$. As seen in Table 1, on average, Fun/Social consequences were the most frequently endorsed consequences and driving-related consequences were the least frequently endorsed. In the negative domains, physical consequences were the most frequently endorsed. To examine whether positive or negative consequences were reported more frequently overall, post-hoc tests indicated that all pairs of consequence domains were significantly different, $p < .001$, and the three negative consequences were reported less often than the three positive consequences domains, $p < .001$.

Alcohol Consumption and Positive versus Negative Consequences

To assess aim 2, a series of three hierarchical regression analyses (Cohen et al., 2003) was conducted to evaluate whether positive consequences were uniquely associated with prior and planned alcohol consumption, over and above negative consequences. We were also interested in examining which specific types of positive and negative consequences were uniquely and consistently associated with alcohol consumption. Prior alcohol consumption variables were specified as the criterion variables for parsimony given that correlation and regression analyses are empirically non-directional in nature (Cohen et al., 2003).

To examine associations between prior drinking and consequences, regression analyses included prior behavior (i.e., prior frequency, quantity, and HED) predicted from negative consequences (Physical, Behavioral, and Driving-related consequences) at step 1. Positive consequences (Fun/Social, Relaxation, and Positive Image consequences) were added at step 2. An $R^2\Delta$ test was conducted to evaluate whether positive consequences accounted for unique variance over and above negative consequences. This represents a conservative test given the strong correlations between positive and negative consequences. The tests of parameter estimates at step 2 were used to evaluate the unique associations of specific types of negative and positive consequences with drinking. Given the large sample size, a conservative alpha level of .01 was adopted.

Associations with Past Drinking Behavior

Drinking frequency—Regression results for drinking frequency are presented in Table 2. Negative consequences accounted for 44% of the variance in drinking frequency, $F(3, 717) = 187.23, p < .001$, at step 1. The addition of positive consequences explained an additional 5% of the variance, $F(3, 711) = 23.49, p < .001$, at step 2. Examination of parameter estimates at step 2 revealed that three of the six types of consequence—Physical, Driving-related, and Fun/Social—were uniquely associated with drinking frequency, but behavioral, relaxation, and image consequences were not. All parameter estimates were positive. Thus, students who reported drinking more frequently experienced more Physical, Driving-related, and Fun/Social consequences.

Typical quantity—Regression results for typical quantity are presented in Table 2. Results were similar to those for frequency. Negative consequences accounted for 31% of the variance in typical quantity, $F(3, 714) = 106.63, p < .001$, at step 1. The addition of positive consequences explained an additional 3% of the variance in typical quantity, over and above negative consequences, $F(3, 711) = 8.728, p < .001$, at step 2. Examination of parameter estimates at step 2 revealed that Physical, Driving-related, and Fun/Social consequences were uniquely and positively associated with typical drinking quantity.

Frequency of HED—Table 2 also presents regression results for frequency of heavy episodic drinking. Negative consequences accounted for 46% of the variance in HED, $F(3, 714) = 205.00, p < .001$. The addition of positive consequences explained an additional 3% of the variance in HED, over and above negative consequences, $F(3, 711) = 14.19, p < .001$. Examination of parameter estimates at step 2 revealed that Physical, Driving, and Fun/Social consequences were uniquely and positively related to HED.

Additional considerations—There was significant overlap in positive and negative consequences in their relationship to the dependent variables measuring drinking in the past 12 months. Additional analyses examining positive consequences entered at step 1 revealed that positive consequences accounted for 44%, 29%, and 43% of the variance in drinking frequency, quantity, and frequency of heavy episodic drinking, while negative consequences entered at step 2 accounted for 6%, 5%, and 9% of the variance in those respective outcomes.

Discussion

The present study examined both the positive and negative alcohol-related consequences among recent high school graduates about to enroll in college. The sample was similar in its drinking patterns compared to national studies of twelfth graders and college students (Johnston et al., 2009; Presley et al., 1996; Wechsler et al., 1994; Wechsler et al., 1998). Because alcohol use is widespread among this age group, it is important that researchers try to understand the full set of experiences that adolescents and young adults have with alcohol, including the rewarding positive benefits and consequences they experience when drinking (Maggs, 1997; Park, 2004; Schulenberg & Maggs, 2002). Consistent with hypotheses guided by social learning theory, expectancy-value models and prior research, results indicated that Fun/Social consequences were reported more frequently than any other domain of positive or negative consequences. Negative consequences in the prior year were related to prior drinking, primarily Physical and Driving consequences. However, positive consequences in the prior year accounted for unique variance in prior drinking, after controlling for experienced negative consequences, and were at least as strongly associated with prior drinking as were negative consequences. Students' attributions of experiences with alcohol (e.g., becoming more social as a result of drinking) may perpetuate future alcohol-related expectancies and future drinking, becoming a feed-forward process partially explaining the maintenance of high-risk drinking among young adults.

However, no single consequence is experienced in isolation. Rather, a variety of positive and negative consequences may be experienced simultaneously, either in the moment or across a single drinking occasion (e.g., one night). The question remains, why do students drink or drink heavily? Following a decision-making perspective (Furby & Beyth-Marom, 1992), students who want to maximize their positive consequences may think it is in their best interest to initiate and continue drinking, sometimes referred to by students as “chasing the buzz” (i.e., more alcohol is better), and is often a target of empirically supported prevention programs (Borsari & Carey, 2000; Dimeff et al., 1999; Marlatt et al., 1998). With each additional drink, drinkers may become less rational in their decision making, becoming less able to consciously weigh the pros and cons of consuming more alcohol. In particular, they may be less concerned about probabilistic consequences or losses due to the rewarding salience of short-term gains. As a result, they become less concerned about the risk for negative or unpleasant effects, which tend to occur later in the drinking episode or the next day.

Furthermore, it remains an empirical question whether students view negative effects of alcohol, as defined in this study, as neutral or even positive (Leigh, 1989; Mallett, Bachrach,

& Turrise, 2008). Understanding how subjectively rewarding drinking consequences are evaluated may be vital to understanding what is perceived to be gained by alcohol use that carries risk for severe negative health and social consequences (e.g., Fromme et al., 1993). Furthermore, regardless of their evaluations, students may value positive consequences so highly that they are willing to suffer with a number of negative consequences in order to participate fully in a party with friends or to experience the subjective positive consequences of drinking. The goal-oriented action perspective (e.g., Silbereisen & Eyferth, 1986) asserts that students may engage in substance use to achieve a goal, such as making new friends. The consideration of avoiding negative consequences (e.g., throwing up) may not be as important or as salient to college students as the reward of achieving the positive consequences (e.g., having fun, becoming less inhibited; Park, 2004; Park & Grant, 2005; Patrick & Maggs, 2008). Future research should examine both the evaluations students make and the actual consequences they experience, in addition to how these experiences and evaluations influence future decision-making regarding drinking.

Limitations and Implications

The present results should be evaluated in light of limitations of the data and of the design. The present study used retrospective self-reports of students' alcohol use and experienced consequences. An individual's average drinking patterns over longer periods of time (e.g., one year) are more useful for studying long-term consequences of drinking (e.g., cirrhosis of the liver). When examining short-term consequences (e.g., having a good time or having a hangover), assessing a single drinking episode would be more valuable for determining causal relationships between alcohol use and short-term consequences. In addition, positive consequences explained a relatively small amount of unique variance in the current study. The importance of positive consequences may come more from students' *evaluations* of positive consequences as very positive or only slightly positive, and such evaluations may be better predictors of behavior and whether there is variability in positive drinking experiences. Future research would benefit from including positive and negative expectancies in the model to determine of whether consequences, particularly positive consequences, contribute uniquely to the variance in drinking above and beyond expectancies, or whether the relationships between consequences and future behavior are based largely on expectancies. It may be that experienced subjectively positive consequences, particularly social consequences, may be the result of an expectancy effect (Hull & Bond, 1986; Marlatt & Rohsenow, 1980); however, the theoretical importance of examining these as consequences in a feed-forward process of alcohol use remains. Finally, our definition of a standard drink did not include specific ounces of alcohol in the definition, which may have lead to different interpretations of what a standard drink is. Future research should utilize a more standardized definition which includes ounces in the definition.

The results of the present study help to inform prevention and intervention programming for individuals transitioning from high school to college. There is a growing body of research suggesting motivational enhancement interventions are efficacious for reducing alcohol use in the context of selective and indicated prevention (IOM, 1990) for college students (for review see Larimer & Cronce, 2002; 2007; also Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Borsari & Carey, 2000). Motivational Interviewing (MI, Miller & Rollnick, 2002) is a nonjudgmental, non-confrontational approach that enhances intrinsic motivation to change behavior by exploring and resolving ambivalence about change. Within MI, ambivalence can be illustrated as a balance where individuals have specific benefits and costs associated with a behavior, such as how the costs and benefits of drinking are different depending on maintenance or changing of behavior (Miller & Rollnick, 2002). Discussion of positive consequences may be useful in motivational interventions to build rapport with students, in decisional balance exercises where the pros and cons are weighed, and in

discussions about barriers to changing behavior (e.g., costs to friendships and social activities if drinking is reduced) and finding alternative activities which may serve the same underlying purpose for the student.

The present study makes several important contributions to the literature. It is among the first to examine positive consequences among U.S. high school graduates, as well as different domains of consequences, adding to the knowledge base of what late adolescents experience when they drink alcohol. This provides evidence for the importance of assessing subjectively rewarding aspects of alcohol use in order to fully understand why adolescents drink and drink heavily. In order to further understand and mitigate adolescent and young adult drinking, a shift of attention is needed from the sole examination of negative consequences to the examination of both positive and negative consequences and their relation to each other needs to take place among the research, prevention, campus, and general communities.

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References

- Ajzen, I. From intentions to actions: A theory of planned behavior. In: Kuhl, J.; Beckman, J., editors. Action-control: From cognition to behavior. Springer; Hiedelberg, Germany: 1985. p. 11-39.
- Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991; 50:179–211.
- Baer JS, Kivlahan DR, Blume AW, McKnight P, Marlatt GA. Brief intervention for heavy-drinking college students: 4-year follow-up and natural history. *American Journal of Public Health*. 2001; 91:1310–1316. [PubMed: 11499124]
- Bandura, A. Social foundations of thought and action: A social cognitive theory. Prentice-Hall, Inc.; Upper Saddle River, NJ: US: 1986.
- Bandura, A. Social learning theory. Prentice-Hall; Oxford, England: 1977.
- Bondy SJ. Overview of studies on drinking patterns and consequences. *Addiction*. 1996; 91:1663–1674. [PubMed: 8972924]
- Borsari B, Carey KB. Effects of a brief motivational intervention with college student drinkers. *Journal of Consulting and Clinical Psychology*. 2000; 68:728–733. [PubMed: 10965648]
- Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. Applied multiple regression/correlation analysis for the behavioral sciences. 3rd ed. Lawrence Erlbaum Associates, Publishers; Mahwah, NJ: US: 2003.
- Cooper ML. Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*. 1994; 6:117–128.
- Corbin WR, Morean ME, Benedict D. The Positive Drinking Consequences Questionnaire (PDCQ): Validation of a new assessment tool. *Addictive Behaviors*. 2008; 33:54–68. [PubMed: 17618063]
- Dimeff, LA.; Baer, JS.; Kivlahan, DR.; Marlatt, GA. Brief Alcohol Screening and Intervention for College Students (BASICS): A harm reduction approach. Guilford Press; New York, NY: 1999.
- Donovan, JE.; Costa, FM.; Jessor, R. Health Questionnaire. University of Colorado, Institute of Behavioral Science; Boulder, CO: 1985.
- Donovan JE, Jessor R, Costa FM. Adolescent health behavior and conventionality^unconventionality: An extension of problem-behavior therapy. *Health Psychology*. 1991; 10:52–61. [PubMed: 2026131]
- Edwards W. The theory of decision-making. *Psychological Bulletin*. 1954; 51:380–417. [PubMed: 13177802]

- Fishbein, M.; Azjen, I. Belief, attitude, intention, and behavior: An introduction to theory and research. Addison-Wesley; Reading, MA: 1975.
- Fromme K, Stroot EA, Kaplan D. Comprehensive effects of alcohol: Development and psychometric assessment of a new expectancy questionnaire. *Psychological Assessment*. 1993; 5:19–26.
- Furby L, Beyth-Marom R. Risk taking in adolescence: A decision-making perspective. *Developmental Review*. 1992; 12:1–44.
- Goldman MS. The alcohol expectancy concept: Applications to assessment, prevention, and treatment of alcohol abuse. *Applied and Preventive Psychology*. 1994; 3:131–144.
- Goldman, MS.; Brown, SA.; Christiansen, BA. Expectancy theory: Thinking about drinking. In: Blane, HT.; Leonard, KE., editors. *Psychological theories of drinking and alcoholism*. Guildford; New York: 1987. p. 181-226.
- Goldman MS, Brown SA, Christiansen BA, Smith GT. Alcoholism and memory: Broadening the scope of alcohol-expectancy research. *Psychological Bulletin*. 1991; 110:137–146. [PubMed: 1891515]
- Graham K. The yin and yang of alcohol intoxication: Implications for research on the social consequences of drinking. *Addiction*. 2003; 98:1021–1023. [PubMed: 12873233]
- Health-and-Welfare-Canada. Canada's health promotion survey: technical report. Minister of Supply and Services Canada; Ottawa: 1988.
- Hingson RW, Heeren T, Zakocs RC, Kopstein A, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U. S. college students ages 18-24. *Journal of Studies on Alcohol*. 2002; 63:136–144. [PubMed: 12033690]
- Hingson R, Heeren T, Winter M, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18-24: Changes from 1998 to 2001. *Annual Review of Public Health*. 2005; 26:259–279.
- Hull JG, Bond CF. Social and behavioral consequences of alcohol consumption and expectancy: A meta-analysis. *Psychological Bulletin*. 1986; 99:347–360. [PubMed: 3714923]
- Institute of Medicine. Broadening the base of treatment for alcohol problems. National Academy Press; Washington, DC: 1990.
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Monitoring the Future national survey results on drug use, 1975–2008. Vol. Volume I, Secondary school students. National Institute on Drug Abuse; Bethesda, MD: 2009. NIH Publication No. 09-7402
- Larimer ME, Cronce JM. Identification, prevention, and treatment: a review of individual-focused strategies to reduce problematic alcohol consumption by college students. *Journal of Studies on Alcohol*. 2002:148–163.
- Larimer ME, Cronce JM. Identification, Prevention, and Treatment Revisited: Individual-focused College Drinking Prevention Strategies 1999-2006. *Addictive Behaviors*. 2007; 32:2439–2468. [PubMed: 17604915]
- Leigh BC. In search of the seven dwarves: Issues of measurement and meaning in alcohol expectancy research. *Psychological Bulletin*. 1989; 105:361–373. [PubMed: 2660178]
- Maggs, JL. Alcohol use and binge drinking as goal-directed action during the transition to post-secondary education. In: Schulenberg, J.; Maggs, JL.; Hurrelmann, K., editors. *Health risks and developmental transitions during adolescence*. Cambridge University Press; New York: 1997. p. 345-371.
- Maggs, JL.; Vesterdal, WJ.; Galambos, N. The importance of consequences of drinking (ICOD) measure: Motivations for alcohol use in college students. 2009. Manuscript in review
- Maisto, SA.; Carey, KB.; Bradizza, CM. Social learning theory. In: Leonard, K.; Blane, H., editors. *Psychological theories of drinking and alcoholism*. 2nd ed. Guilford Press; New York, NY: US: 1999. p. 106-163.
- Mallett KA, Bachrach RL, Turrisi R. Are all negative consequences truly negative? Assessing variations among college students' perceptions of alcohol related consequences. *Addictive Behaviors*. 2008; 33:1375–1381. [PubMed: 18639384]
- Marlatt GA, Baer JS, Kivlahan DR, Dimeff LA, Larimer ME, Quigley LA, et al. Screening and brief intervention for high-risk college student drinkers: results from a 2-year follow-up assessment. *Journal of Consulting and Clinical Psychology*. 1998; 66:604–615. [PubMed: 9735576]

- Miller, WR.; Rollnick, S. Motivational interviewing: Preparing people for change. 2nd edition. Guilford; New York: 2002.
- Marlatt, GA.; Rohsenow, D. Cognitive processes in alcohol use: Expectancy and the balanced placebo design. In: Mello, NK., editor. Advances in substance use: Behavioral and biological research. JAI; Greenwich, CO: 1980. p. 159-199.
- Martens MP, Neighbors C, Dams-O'Connor K, Lee CM, Larimer ME. The factor structure of a dichotomously scored Rutgers Alcohol Problems Index. *Journal of Studies on Alcohol and Drugs*. 2007; 68:597–606. [PubMed: 17568966]
- Miller, WR.; Rollnick, S. Motivational interviewing: Preparing people for change. Guilford Press; New York: 2002.
- Neighbors C, Walker DD, Larimer ME. Expectancies and evaluations of alcohol effects among college students: Self-determination as a moderator. *Journal of Studies on Alcohol*. 2003; 64:292–300. [PubMed: 12713205]
- Oei TPS, Baldwin AR. Expectancy theory: A two-process model of alcohol use and abuse. *Journal of Studies on Alcohol*. 1994; 55:525–534. [PubMed: 7990462]
- Park CL. Positive and negative consequences of alcohol consumption in college students. *Addictive Behaviors*. 2004; 29:311–321. [PubMed: 14732419]
- Park CL, Grant C. Determinants of positive and negative consequences of alcohol consumption in college students: Alcohol use, gender, and psychological characteristics. *Addictive Behaviors*. 2005; 30:755–765. [PubMed: 15833579]
- Patrick ME, Maggs JL. Short-term changes in plans to drink and importance of positive and negative alcohol consequences: Between- and within-person predictors. *Journal of Adolescence*. 2008; 31:307–321. [PubMed: 17651796]
- Perkins HW. Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol*. 2002; (Supplement 14):91–100. [PubMed: 11925064]
- Presley, CA.; Meilman, PW.; Cashin, JR.; Lyerla, R. Alcohol and drugs on american college campuses: Use, consequences, and perceptions of the campus environment. Southern Illinois University of Carbondale; Carbondale, IL: 1996. Ref Type: Generic
- Rabow J, Duncan-Schill M. Drinking among college students. *Journal of Alcohol and Drug Education*. 1995; 40:52–64.
- Read JP, Wood MD, Lejuez CW, Palfai TP. Gender, alcohol consumption, and differing alcohol expectancy dimensions in college drinkers. *Experimental and Clinical Psychopharmacology*. 2004; 12:298–308. [PubMed: 15571447]
- Rosenstock, I. The health belief model: Explaining health behavior through expectancies. In: Glanz, K.; Lewis, FM.; Rimer, BK., editors. Health behavior and health education: Theory, research, and practice. Jossey-Bass; San Francisco: 1990. p. 39-62.
- Schulenberg JE, Maggs JL. A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol, Suppl14*. 2002:54–70.
- Sher KJ, Wood MD, Wood PK, Raskin G. Alcohol outcome expectancies and alcohol use: A latent variable cross-lagged panel study. *Journal of Abnormal Psychology*. 1996; 105:561–574. [PubMed: 8952189]
- Silbereisen, RK.; Eyferth, K. Development as action in context. In: Silbereisen, RK.; Eyferth, K.; Rudinger, G., editors. Development as action in context: Problem behavior and normal youth development. Springer-Verlag; New York: 1986. p. 3-16.
- Straus, R.; Bacon, SD. Drinking in college. Yale University; Hew Haven: 1953.
- Wechsler H, Dowdall GW, Maenner G, Gledhill-Hoyt J, Lee H. Changes in binge drinking and related problems among American college students between 1993 and 1997. *Journal of American College Health*. 1998; 47:57–68. [PubMed: 9782661]
- Wall AM, Thrussell C, Lalonde RN. Do alcohol expectancies become intoxicated outcomes? A test of social-learning theory in a naturalistic bar setting. *Addictive Behaviors*. 2003; 28:1271–1283. [PubMed: 12915168]

- Wechsler H, Isaac NE, Grodstein F, Sellers DE. Continuation and initiation of alcohol use from the first to the second year of college. *Journal of Studies on Alcohol*. 1994; 55:41–45. [PubMed: 8189724]
- Wood MD, Sher KJ, Strathman A. Alcohol outcome expectancies and alcohol use and problems. *Journal of Studies on Alcohol*. 1996; 57:283–288. [PubMed: 8709587]

Means, Standard Deviations, and Zero-order Correlations of Alcohol Behaviors and Consequences

Table 1

	Mean (SD)	Correlations						
		1	2	3	4	5	6	7 8
1. Drinking Frequency	3.01 (1.59)	1.00						
2. Typical Quantity	3.86 (1.17)	0.52	1.00					
3. Binge Frequency	2.03 (1.81)	0.81	0.70	1.00				
4. Physical Consequences	1.46 (1.07)	0.65	0.54	0.67	1.00			
5. Behavioral Consequences	1.26 (1.05)	0.58	0.47	0.58	0.83	1.00		
6. Driving Consequences	0.83 (0.83)	0.53	0.45	0.54	0.67	0.66	1.00	
7. Fun/Social Consequences	2.41 (1.27)	0.65	0.52	0.63	0.77	0.70	0.57	1.00
8. Relax Consequences	1.35 (1.23)	0.54	0.41	0.54	0.66	0.65	0.56	0.69 1.00
9. Image Consequences	1.05 (1.11)	0.46	0.44	0.51	0.65	0.68	0.60	0.64 0.61

Note. N = 721-745 depending on missing data. All mean-level differences between domains of consequences and all correlations, $p < .001$.

Table 2
Regression Analysis Examining Alcohol Use as a Function of Positive and Negative Consequences

Variable	Frequency			Quantity			HED		
	β	SE	B	β	SE	B	β	SE	B
Step1 Negative Consequences	$\Delta R^2 = .44$ 0.49***	0.08	0.08	$\Delta R^2 = .31$ 0.45***	0.07	0.07	$\Delta R^2 = .46$ 0.54***	0.09	0.09
Physical									
Behavioral	0.08	0.08	0.08	-0.01	0.07	0.07	0.03	0.09	0.09
Driving Related	0.15***	0.08	0.08	0.15**	0.06	0.06	0.15***	0.08	0.08
Step 2 Positive Consequences	$\Delta R^2 = .05$ 0.33***	0.06	0.06	$\Delta R^2 = .03$ 0.22***	0.05	0.05	$\Delta R^2 = .03$ 0.22***	0.07	0.07
Fun/Social									
Relaxation	0.07	0.05	0.05	-0.02	0.04	0.04	0.08	0.06	0.06
Positive Image	-0.08	0.06	0.06	0.09	0.05	0.05	0.03	0.07	0.07

 $p < .001$.

**
 $p < .01$.