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## Are Social Norms the Best Predictor of Outcomes Among Heavy-Drinking College Students?\*

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### Abstract

**Objective**—This research was designed to evaluate the relative contribution of social norms, demographics, drinking motives, and alcohol expectancies in predicting alcohol consumption and related problems among heavy-drinking college students.

**Method**—Participants included 818 (57.6% women) first-year undergraduates who reported at least one heavy-drinking episode in the previous month. In addition to providing demographic information (gender and fraternity/sorority membership) participants completed Web-based assessments of social norms (perceived descriptive norms regarding typical student drinking, injunctive norms regarding friends' and parents' approval), motives (social, enhancement, coping, and conformity), and expectancies and evaluations of positive and negative alcohol effects.

**Results**—Regression results indicated that descriptive and injunctive norms were among the best predictors of college student drinking. With respect to alcohol problems, results indicated that coping motives accounted for the largest proportion of unique variance. Finally, results revealed that alcohol consumption mediated the relationships between predictors and problems for social norms, whereas coping motives, negative expectancies, and evaluation of negative effects were directly associated with alcohol problems despite having relatively weak or null unique associations with consumption.

**Conclusions**—The results of this study substantiate social norms as being among the best predictors of alcohol consumption in this population and suggest that drinking to cope is a better predictor of problems. The findings are discussed in terms of practical prevention and treatment implications.

Heavy Alcohol Consumption is both a prevalent and a problematic behavior among college students. Approximately 40%–45% of students nationwide report engaging in heavy episodic drinking (e.g., O'Malley and Johnston, 2002; Wechsler and Kuo, 2000). Consequences of heavy drinking in this population are widespread and include criminal behavior, academic problems, unwanted sexual experiences, injuries, and death (Hingson et al., 2002, 2005; Johnston et al., 2004; Wechsler et al., 1994). Previous research has identified a number of specific factors associated with heavy drinking, including demographic characteristics (gender and fraternity/sorority membership); descriptive and injunctive social norms; enhancement, social, coping, and conformity drinking motives; positive and negative alcohol expectancies; and subjective evaluations of positive and negative alcohol effects. Surprisingly little research has evaluated the relative contribution of different factors in predicting alcohol consumption and related problems. The present research was designed to begin to address this gap in the

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literature by evaluating the relative predictive utility of several factors that have been previously associated with heavy drinking among college students.

Identifying the relative strength of predictors of problem drinking has important practical implications for theory and intervention approaches. Theoretical perspectives are often evaluated in relative isolation, consequently failing to account for, or even consider, alternative explanations. When examining predictors of drinking in isolation, it is not possible to determine the extent to which apparently distinct explanations actually account for unique variance in a behavior. Predictors that account for distinct variance suggest distinct explanations, whereas predictors that account for shared variance suggest more complex explanations (e.g., mediation).

With respect to intervention implications, campuses have limited resources to plan programs designed to reduce harmful drinking practices. Identifying the relative priority of factors associated with drinking can inform policy makers in designing programs that directly target factors that are likely to have the greatest impact on drinking. For example, if positive expectancies are most strongly associated with problem drinking, it would make sense to tailor interventions that attempt to reduce these expectancies (e.g., expectancy challenge), rather than expend limited resources on programs that are more heavily focused on factors that are less strongly associated with drinking.

Second, indicated prevention strategies tend to include multiple components that focus on multiple factors associated with drinking (Larimer and Cronce, 2002; Walters and Neighbors, 2005). A limitation of these studies is often the inability to evaluate the unique contribution of components that target specific factors (e.g., social norms, expectancies, motives).

Moreover, components that target some factors may have no effect over and above components that target other factors. Research has not yet established which components are actually necessary, in part because of the complexity and expense required to evaluate the relative contribution of intervention components. The present study presents a less costly preliminary strategy designed to evaluate the relative contribution of factors associated with drinking in accounting for variance in consumption and problems.

In the present research we selected several factors that have been consistently associated with problem drinking in the college student population, including demographic variables, social norms, drinking motives, alcohol expectancies, and subjective evaluation of alcohol effects. In addition to demonstrating consistent associations with college student drinking outcomes, these factors were selected based on their incorporation into existing interventions, either as proposed moderators of intervention efficacy or as direct targets of intervention content (e.g., Borsari and Carey, 2003; Dimeff et al., 1999; Marlatt et al., 1998; Neighbors et al., 2004b; Perkins, 2002).

## Gender

Past research has consistently demonstrated that male college students drink more than female students: Male students consume larger quantities of alcohol, drink more frequently, and engage in heavy episodic drinking more often than female college students (Clements, 1999; O'Malley and Johnston, 2002; Read et al., 2002; Valliant and Scanlan, 1996; Wechsler et al., 1994; 1995a,b). Some authors have suggested that gender differences in drinking patterns among college students are diminishing (Keeling, 2002; Martin and Hoffman, 1993; Young et al., 2005). Epidemiological data, however, suggest that although this appears to be true among high-school seniors, gender differences in heavy drinking among college students have remained relatively stable since 1980 (Johnston et al., 2005).

Prior research has also demonstrated that male college students are more likely to experience alcohol-related problems (Geisner et al., 2004; Perkins, 2002). However, recent research has suggested that men are more likely to experience problems that are public, whereas women are more likely to experience problems that are more private (Perkins, 2002). Moreover, research relating to negative consequences of alcohol consumption generally assesses problems more likely to be experienced by men than women (e.g., public consequences; Ham and Hope, 2003), which potentially contribute to gender differences found in negative consequences. In addition to gender differences in consumption and problems, there are biological differences, such as fat-to-water ratios, that affect blood alcohol levels (Holmila and Raitasalo, 2005).

### **Fraternity/sorority affiliation**

Research examining fraternity/sorority affiliation and college student drinking has consistently found that fraternity/sorority members consume more alcohol (Borsari and Carey, 1999; Cashin et al., 1998; Kahler et al., 2003; Larimer et al., 2000; Meilman et al., 1999). The difference between fraternity and nonfraternity men is larger than the difference between sorority and nonsorority women (Larimer et al., 2000, 2004). Research suggests that both selection and socialization effects contribute to heavier drinking by fraternity- or sorority-affiliated students (Baer et al., 1995; Kahler et al., 2003; McCabe et al., 2005; Read et al., 2002; Sher et al., 2001).

### **Social norms**

Perceived descriptive drinking norms refer to the perceived prevalence of drinking (e.g., the perceived number of drinks per week consumed by the typical college student). Research examining college student drinking has found that students who report higher perceived descriptive norms for alcohol use among their peers also report heavier drinking themselves (Baer et al., 1991; Borsari and Carey, 2000; Lewis and Neighbors, 2004; Neighbors et al., 2006a). Correcting this misperception has been identified as a promising strategy for reducing alcohol use among heavy-drinking students (Borsari and Carey, 2000; Larimer and Cronce, 2002; Lewis and Neighbors, 2004, 2006; Mattern and Neighbors, 2004; Neighbors et al., 2006a; Perkins, 2002).

Perceived injunctive norms refer to the perceptions of how much others approve of a particular behavior. Much of the research in this area indicates that injunctive norms are salient predictors of heavy drinking among college students; however, this relationship may depend on the reference group being examined (Borsari and Carey, 2003). Injunctive norms are roughly synonymous with subjective norms, as operationalized in evaluations of the Theories of Reasoned Action (Ajzen and Fishbein, 1980) and Planned Behavior (Ajzen, 1991).

In the extensive literature evaluating these theories, norms have been most often operationalized as the extent to which one perceives close others (e.g., friends and parents) as approving or disapproving of a given behavior (e.g., perception of friends' approval of his/her drinking). Several studies have documented the relationship between perceived friends' and parents' approval of one's drinking and alcohol use among college students (Baer, 1994; Keefe, 1994; Knee and Neighbors, 2002; Kuther and Higgins-D'Alessandro, 2003). Previous research has suggested that although social norms have been strongly associated with consumption, they may have less relevance for understanding alcohol problems (Benton et al., 2006). An alternative conceptualization may be that relationships between social norms and alcohol problems may be mediated by consumption.

In addition to gender and fraternity/sorority status relating to consumption and problems, research has also considered their relationships with social norms (Larimer et al., 2004; Lewis

and Neighbors, 2004). For example, research has found that perceptions of same-gender descriptive drinking norms were more strongly associated with drinking behavior than perceptions of drinking behavior for the typical student, especially for women (Lewis and Neighbors, 2004).

## Drinking motives

Drinking motives have also been consistently associated with drinking outcomes among college students and are most commonly assessed by Cooper's (1994) Drinking Motives Questionnaire. Motivational models for drinking (Cooper, 1994; Cox and Klinger, 1988) often include social rewards, coping with negative affect, enhancement, and conformity. Motives have been argued to be more proximal than expectancies and have been described as varying on two dimensions. Motives vary by source of reinforcement (internal [enhancement and coping] versus external [social and conformity]) and by type of reinforcement (positive [enhancement and social] versus negative [coping and conformity]). Empirically, social and enhancement motives have been most strongly associated with consumption, whereas coping motives have been more strongly associated with problems. Conformity motives have been less consistently and sometimes negatively associated with drinking (McCabe, 2002; Neighbors et al., 2004a; Read et al., 2003; Schall et al., 1991; Stewart and Devine, 2000; Wood et al., 1992).

## Alcohol expectancies

According to expectancy theory (Brown et al., 1980) and based on findings from previous research (e.g., Fromme et al., 1993; Neighbors et al., 2003; Read et al., 2004; Sher et al., 1996; Wood et al., 1996), alcohol expectancies (i.e., likelihood and subjective evaluations of effects) have been consistently linked to heavy drinking among college students. Expectancies can be defined as individuals' beliefs about the likelihood that consuming alcohol will result in positive (e.g., social lubrication, enhanced sexuality, and tension reduction) and negative (e.g., cognitive impairment, risk, and aggression) outcomes.

Subjective evaluations can be defined as the extent to which effects of alcohol are viewed favorably versus unfavorably. A number of moderators of expectancy effects have been identified, including gender (Jones et al., 2001). Positive expectancies and evaluations have been more strongly associated with drinking than negative expectancies and evaluations, although negative expectancies and evaluations have been shown to predict unique variance over and above positive expectancies and evaluations (Jones et al., 2001; Valdivia and Stewart, 2005).

## Summary and aims

Demographic characteristics, social norms, drinking motives, alcohol expectancies, and subjective evaluations of alcohol effects have all been shown to predict heavy drinking among college students and have been directly or indirectly incorporated in existing interventions (Larimer and Crouce, 2002; Walters and Neighbors, 2005). Social norms in particular have been argued to be among the strongest predictors of drinking in this population (e.g., Borsari and Carey, 2003; Perkins, 2002; Wood et al., 2001); however, few studies have evaluated their relative contribution in comparison with other factors that have also been consistently and strongly associated with drinking behavior. The present research consisted of three primary aims: to evaluate empirically the unique influence of factors that have been consistently associated with college student drinking and/or related problems, to tentatively rank these factors in terms of predictive utility, and to distinguish the extent to which predictors' associations with alcohol problems are mediated by consumption.

## Method

### Participants and procedures

Participants included 818 (57.6% women) first-year undergraduate college students enrolled at a large, public, West-coast university who completed screening and baseline assessment measures during the fall quarter of their freshman year as part of a larger intervention study. Participants ranged in age from 17 to 21 years (mean [SD] = 18.14 [0.46]). Ethnicity was 65.2% white, 24.3% Asian, and 10.5% classified as other. Fraternity/sorority membership was reported by 22.5% of participants. Participants received \$10 for completing the screening survey and an additional \$25 for completing the baseline assessment.

First-year students were invited to complete a Web-based screening survey as part of a larger social-norms intervention study ( $N = 4,103$ ). Of these, 2,095 (51.1%) completed the screening survey, and all students meeting inclusion criteria (five/four or more drinks in one occasion for men/women;  $n = 896$ ; 42.7%) were immediately invited to the larger study and were directed to the baseline survey. Of those invited, 818 (91.3%) completed the baseline survey and were used in the present study. Recruitment rates were comparable to other large-scale studies in this population (e.g., Marlatt et al., 1998; McCabe et al., 2002). The combined screening and baseline assessments took approximately 50 minutes to complete.

### Measures

**Alcohol consumption**—To assess quantity and frequency of alcohol consumption, the Daily Drinking Questionnaire (DDQ; Collins et al., 1985) was used. Participants were asked, “Consider a typical week during the last three months. How much alcohol, on average (measured in number of drinks), do you drink on each day of a typical week?” Participants responded by reporting the typical number of drinks consumed on each day of the week. Weekly drinking was calculated by summing participants’ responses for each day of the week. This measure has demonstrated good test-retest reliability and convergent validity with measures of drinking (Baer et al., 1991; Borsari and Carey, 2000; Neighbors et al., 2004b, 2006a).

**Alcohol problems**—The Rutgers Alcohol Problem Index (RAPI; White and Labouvie, 1989) was used to assess alcohol problems. The scale contains 23 items that ask for the frequency that each event occurred while drinking or because of alcohol use during the past 3 months. Example items are “Got into fights, acted bad, or did mean things” and “Kept drinking when you promised yourself not to.” Two items were added to assess frequency of driving after consuming two and four or more drinks. Response options range from 1 = never to 5 = more than 10 times. RAPI scores were computed as the sum of the 25 items ( $\alpha = .92$ ).

**Perceived norms**—Perceived descriptive norms of typical student drinking practices were measured using the Drinking Norms Rating Form (DNRF; Baer et al., 1991). The DNRF mirrors the DDQ and asks participants to estimate the number of drinks they think the typical student has on each day of the week. Perceived weekly descriptive drinking norms were calculated by summing the participants’ estimations for each day of the week. This measure has demonstrated good test-retest reliability and convergent validity with measures of drinking (Baer et al., 1991; Borsari and Carey, 2000; Neighbors et al., 2004b, 2006a).

Perceived injunctive norms for friends and parents were examined using a measure developed by Baer (1994). Participants were asked to respond to four items assessing perceptions of their friends’ approval of their alcohol use and four items assessing perceptions of parents’ approval of their alcohol use. The items asked about perceived approval of drinking alcohol every weekend, drinking alcohol daily, driving a car after drinking, and drinking enough alcohol to

pass out (e.g., “How would your friends feel if you drank alcohol every weekend?”). Response options ranged from 1 = strong disapproval to 7 = strong approval. The four items for each referent were averaged to create one variable of participants’ perceptions of friends’ overall approval ( $\alpha = .72$ ) and perceptions of parents’ overall approval of risky alcohol use ( $\alpha = .69$ ).

**Drinking motives**—The 20-item Drinking Motives Questionnaire (DMQ; Cooper, 1994) was used to assess frequency of drinking to achieve the 20 motives along four factors: social (five items; e.g., “because it makes social gatherings more fun”;  $\alpha = .85$ ), coping (five items; e.g., “to forget your worries”;  $\alpha = .82$ ), enhancement (five items; e.g., “because it gives you a pleasant feeling”;  $\alpha = .84$ ), and conformity (five items; e.g., “because your friends pressure you to drink”;  $\alpha = .84$ ) along a 5-point scale from 1 = almost never/never to 5 = almost always/always.

**Alcohol expectancies and evaluations of alcohol effects**—The Comprehensive Effects of Alcohol (CEOA) questionnaire (Fromme et al., 1993) was used to assess students’ perceived likelihood of 38 positive and negative effects (4-point scale: 1 = disagree to 4 = agree) and the perceived value of the effect independent of likelihood (5-point scale: 1 = bad, 3 = neutral, 5 = good). Positive effects are assessed by 20 items related to sociability, tension reduction, liquid courage, and sexuality. Negative effects are assessed by 18 items related to cognitive and behavioral impairment, risk and aggression, and negative self-perception.

Students are asked the likelihood that consuming alcohol would result in the effect (i.e., expectancy) and the extent to which they view the effect as bad or good. Alphas were .86 and .81 for positive and negative expectancies, respectively. Alphas were .90 and .95 for evaluations of positive and negative effects, respectively.

## Results

### Preliminary analyses and analysis strategy

On average, participants reported consuming 11.66 (10.81) drinks per week. The average score on the RAPI was 6.93 (7.77). Table 1 presents means and SDs for all predictor variables and their zero-order correlations with drinking outcomes. Correlations were for the most part consistent with previous research. Although many of the correlations were relatively small, all predictors were significantly and positively associated with either consumption or consequences, and most were associated with both. The major objectives of this research were to parse out the unique contributions of predictors of consumption and problems and to evaluate their relative predictive utility. Accordingly, primary analyses were conducted using multiple regression with simultaneous entry to evaluate unique contributions (Cohen et al., 2003).

We first examined alcohol consumption as a function of demographics, social norms, drinking motives, expectancies, and subjective evaluation of alcohol effects. Next we examined alcohol problems as a function of the same predictors. Regression analyses were conducted using simultaneous entry to evaluate each predictor’s unique association with alcohol consumption and problems. Finally, we used hierarchical regression to evaluate the extent to which the relationships between predictors and problems were mediated by consumption. In the latter analysis, problems were regressed on consumption at Step 1 and all predictors were added at Step 2. Preliminary analyses were conducted to evaluate potential collinearity problems. The average correlation among predictors was .14. The largest correlation (.63) was between social drinking motives and enhancement motives. Collinearity diagnostics included examination of tolerance values and variance inflation factors (VIF). The lowest tolerance value was .48 (VIF = 2.06). No collinearity statistics approached levels indicating problems (e.g., tolerance < .17, VIF > 6; Cohen et al., 2003; Maruyama, 1998).

### Predictors of alcohol consumption

In examining predictors of alcohol consumption, number of drinks per week was simultaneously regressed on demographics (gender and fraternity/sorority affiliation), descriptive norms and injunctive norms (perceived approval of friends and perceived approval of parents), drinking motives (social, enhancement, conformity, and coping), and alcohol expectancies (positive expectancies and subjective evaluations and negative expectancies and subjective evaluations). Regression results are presented in Table 2.

Overall, adjusting for the number of predictors, the set of predictors accounted for 37% of the variance in alcohol consumption. Cohen's  $d$  was included as an index of effect size using the formula  $d = 2t / \sqrt{df}$  (Rosenthal and Rosnow, 1991). Effect sizes of .2, .5, and .8 are typically considered small, medium, and large, respectively (Cohen, 1992). Results revealed a unique large effect of descriptive norms in predicting alcohol consumption. Gender, fraternity/sorority affiliation, injunctive norms (friends), and enhancement motives had small to medium unique effects ( $d$ : .29–.47) in predicting drinking. Injunctive norms (parents) had a small unique effect in predicting consumption. In the context of the other predictors in the model and consistent with previous research (Cooper, 1994), conformity motives were negatively associated with consumption.

### Predictors of alcohol problems

In examining predictors of alcohol-related problems, we again used regression analysis. Results are presented in Table 2 and revealed that, overall, the set of predictors accounted for 24% of the variance in alcohol-related problems, after adjusting for the number of predictors in the model. Results indicated small to medium unique effects of coping motives ( $d = .39$ ) and negative expectancies ( $d = .36$ ) in predicting alcohol-related problems. Smaller unique effects were observed for descriptive norms, injunctive norms (friends and parents), and evaluation of negative effects ( $d$ : .18–.25).

### Alcohol consumption as a mediator of the relationship between predictors and alcohol problems

Our final aim in this research was to illuminate the relationship between predictors and problems by examining alcohol consumption as a mediator. Evidence of mediation is present when a relationship is established between the predictor (X) and the mediator (M); X and the criteria (Y); M and Y controlling for X; and when the relationship between X and Y is no longer significant or is substantially reduced when controlling for M (Baron and Kenny, 1986; MacKinnon and Dwyer, 1993). In the context of the full set of predictors, the first three criteria were evident in the preceding analyses only for the three social norms variables: descriptive norms, injunctive norms (friends), and injunctive norms (parents). To evaluate the fourth criteria, we conducted a hierarchical regression examining alcohol problems as a function of alcohol consumption at Step 1 and all predictors at Step 2.

Results are presented in Table 3 and indicated that neither descriptive norms nor injunctive norms (friends) remained significant predictors of problems after controlling for consumption. In contrast, injunctive norms (parents) remained a significant predictor of problems. Sobel (1982) tests indicated that after accounting for consumption, the relationship between each of the three predictors and alcohol problems was significantly reduced: descriptive norms ( $z = 8.79, p < .001$ ); injunctive norms (friends:  $z = 5.06, p < .001$ ); and injunctive norms (parents:  $z = 2.13, p < .05$ ). Thus, the relationships between social norms and alcohol-related problems appear to be, in large part, the result of their relationship with heavier consumption, with the exception that the perceived approval or disapproval of one's parents also appears to have a unique effect on alcohol problems independent of its relationship with consumption. Coping motives, negative expectancies, and evaluation of negative effects were uniquely associated

with alcohol problems despite not having unique relationships with consumption, suggesting that these variables have direct relationships with alcohol problems that are not accounted for by variability in consumption.

## Discussion

Results of this research provide empirical substantiation for social norms being among the best predictors of college student drinking, at least with respect to typical weekly consumption. In this sample, most of the unique variance that was accounted for in drinking by demographics, social norms, motives, and expectancies was attributable to perceived descriptive norms and perceived approval of friends. Conversely, in predicting alcohol problems, coping motives were the strongest predictor, accounting for roughly half of all variance accounted by the entire set of predictors. Negative expectancies and favorable evaluations of negative alcohol effects were also strongly and uniquely associated with alcohol-related problems. Although all three norms variables were associated with problems, this was primarily because of their associations with alcohol consumption.

The positive association between negative expectancies and alcohol-related problems is somewhat counterintuitive, in that one might expect a person who expects negative things to occur as a function of consumption to drink less and have *fewer* problems. It may be that as long as positive expectancies outweigh negative expectancies, one continues to drink. In addition, given that favorable evaluation of negative effects was positively related to problems, these “negative” effects may not be perceived as negative to all students but may be viewed as desirable states or outcomes for some. Alternatively, and more consistent with these results, is the likelihood that students who drink problematically are most aware of the potential negative effects of drinking.

Additionally, both positive and negative expectancies have typically been associated with alcohol use (e.g., Adams and Nagoshi, 1999; Bartholow et al., 2000; Sher et al., 1996). In the current findings, when examining correlations for expectancies with drinking and problems, positive expectancies were positively correlated to both drinking and problems, whereas negative expectancies were positively correlated only to problems. The finding that negative expectancies showed a robust and positive association with problems in the regression analysis whereas positive expectancies did not may be because of shared variance between positive and negative expectancies and with other variables in the model, as found in previous research (Jones et al., 2001; Valdivia and Stewart, 2005). Negative expectancies may explain more unique variance that is not accounted for by other predictors.

This research is consistent with previous suggestions that college student drinkers can be distinguished according to whether they drink primarily for social or enhancement reasons and/or positive reinforcement or as a means of coping and/or negative reinforcement (Mohr et al., 2001, 2005; Stewart and Devine, 2000; Stewart et al., 2001; Wilkie and Stewart, 2005). Most heavy drinking among college students can be attributed to social factors, including social norms and social contexts (Borsari and Carey, 2001, 2003). Although drinking appears to be less motivated by using alcohol as a means of dealing with one’s problems, this kind of drinking is particularly problematic and, we suspect, more strongly linked with the development of longer-term problems and dependence.

A unique contribution of this study is the simultaneous evaluation of multiple predictors of college student drinking and related problems. As such, its results provide tentative implications for the choice of intervention targets and content. Fraternity/sorority membership was uniquely associated with greater consumption and problems, supporting efforts to provide prevention programs for these groups of students (Larimer et al., 2001). All other things being



equal, these results further suggest that strategies that are effective in changing perceived norms (e.g., Lewis and Neighbors, 2007; Neighbors et al., 2004b, 2006b) might have a larger impact on drinking than strategies without a normative component.

Additionally, the results provide support for strategies that are effective in changing alcohol expectancies (Cruz and Dunn, 2003; Darkes and Goldman, 1993, 1998) as a way to impact alcohol-related problems more directly. Although the present findings support both social norms and alcohol expectancies as possible mechanisms of change for reducing alcohol consumption and problems, social norms-based interventions (as they are typically operationalized) can reach a larger audience with lower cost than expectancy challenge strategies as typically operationalized (i.e., delivered in person and often involving alcohol administration).

The results also support intervention strategies that directly address drinking motivations, such as functional analyses of benefits attributed to alcohol (e.g., enhancement and coping) and exploration of potential substitute behaviors or activities that can have the same effects (Baer et al., 1992; Kivlahan et al., 1990).

The present research also extends previous examinations of the relationships among norms, consumption, and alcohol-related problems (Benton et al., 2006). The finding that consumption largely mediates the relationship between social norms and problems suggests that students who overestimate the drinking of their peers and who perceive their friends as more approving of alcohol have more problems *because they drink more*.

This research reiterates the influence that friends and parents have on drinking. Many existing intervention approaches for college student drinking focus on descriptive norms for typical students. Although this approach has shown considerable promise, these results suggest that interventions that also incorporate friends and parents might improve effectiveness. In the context of brief interventions, additional discussion of strategies for addressing friends' expectations regarding alcohol use might be worthwhile. In these data, perceived parent approval of drinking had both direct and indirect unique effects on alcohol problems, suggesting the utility of more widely incorporating effective intervention approaches that already incorporate parents (Turrisi et al., 2001).

Additional work is needed to identify and address alcohol use as a means of regulating negative affect and cognitions. Whether the addition of components such as coping-skills training to existing interventions would be sufficient for coping drinkers is unclear, and more work needs to be done specifically targeting this population.

Several limitations should be considered in interpreting the present results. The cross-sectional nature of the data limits our ability to draw causal inferences. Although the preponderance of previous literature supports the assumption that the predictors included here do have some causal influence on alcohol consumption and problems, it also seems clear that at least in some cases the temporal relationship is probably bidirectional. For example, although changes in norms have been associated with changes in drinking, the reverse is also true, suggesting, at least to some extent, that estimates of perceived norms may reflect behavioral justification (i.e., perceived norms, to some degree, probably represent personal drinking behavior; Kahler et al., 2003; Neighbors et al., 2006a). As noted above, this may also in part explain the strong relationship between negative expectancies and alcohol-related problems.

In addition, we included a relatively large number of predictors in our regression analyses. The resulting alpha inflation combined with the absence of specific hypotheses regarding the relative contribution of each predictor necessitates caution in interpreting the results. Our sample was restricted to male/female students who reported drinking five/four drinks on at

least one occasion in the previous month, and results may not generalize to samples that include a large proportion of abstainers and light drinkers. In addition, the sample consisted of first-year students and may not generalize to older students who have had more extensive exposure to the college environment.

Another limitation is the disjunctive in reference groups between descriptive and injunctive norms. Ongoing research has begun to evaluate the importance of considering different reference groups in operationalizing social norms. In this research, we elected to use reference groups according to how they have been most often operationalized in the literature (typical students for descriptive norms and friends and parents for injunctive norms). Additional work is needed to tease apart the influences of different reference groups and their importance in evaluating the impact of both descriptive and injunctive norms.

Finally, the results of this research are limited to the constructs that were included and the manner in which they were assessed. The indicator of typical drinks per week has been empirically shown to be a relatively good indicator of alcohol consumption in comparison with other indicators of consumption (Borsari et al., 2001; Smart et al., 2000). Less research has focused on different measures of alcohol problems among college students (Read et al., 2006), and additional work is needed to evaluate the extent to which different factors may be associated with different kinds of problems.

With respect to predictors of drinking outcomes, those we chose to include were based on our initial review of the literature and the primary aims of the larger study from which the data were drawn. In retrospect, we might have included additional variables that have also been associated with drinking among college students and young adults, such as attitudes (Benton et al., 2006) and/or personality variables (e.g., impulsivity/disinhibition, extraversion/sociability, and neuroticism/emotionality; Baer, 2002).

Despite these limitations, the present research offers a rare examination of the relative influence of several commonly included factors related to alcohol consumption and problems among college students. The majority of studies examining the etiology of problem drinking focus on a single factor or smaller set of factors designed to test narrow theoretical propositions. Although this strategy is appropriate for theory testing, it ignores the considerable overlap in variance accounted for by other predictors that are not included in the models and does not give any indication of which are the best predictors of drinking outcomes. Additional studies evaluating multiple factors related to consumption and problems using longitudinal designs are a logical next step. Ultimately, systematic examination of the relative contribution of factors may help us to better understand mechanisms of drinking and develop more effective interventions that precisely target factors most strongly associated with problematic drinking.

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**Table 1**

Means, SDs, and correlations between predictors and drinking outcomes

Variables	Mean (SD)	Drinks per week	Alcohol-related consequences
Gender	0.42 (0.49)	.20 <sup>‡</sup>	.09*
Fraternity/sorority membership	0.23 (0.42)	.27 <sup>‡</sup>	.10 <sup>†</sup>
Descriptive norm	20.75 (11.62)	.41 <sup>‡</sup>	.17 <sup>‡</sup>
Injunctive norm (friends)	2.65 (0.98)	.39 <sup>‡</sup>	.27 <sup>‡</sup>
Injunctive norm (parents)	1.43 (0.60)	.20 <sup>‡</sup>	.16 <sup>‡</sup>
Social motives	3.47 (0.94)	.17 <sup>‡</sup>	.19 <sup>‡</sup>
Coping motives	2.04 (0.90)	.13 <sup>‡</sup>	.35 <sup>‡</sup>
Enhancement motives	3.31 (0.96)	.28 <sup>‡</sup>	.22 <sup>‡</sup>
Conformity motives	1.80 (0.86)	.03	.24 <sup>‡</sup>
Positive expectancies	2.97 (0.42)	.15 <sup>‡</sup>	.17 <sup>‡</sup>
Evaluation of positive effects	4.04 (0.54)	.08*	.04
Negative expectancies	2.55 (0.41)	.04	.25 <sup>‡</sup>
Evaluation of negative effects	1.97 (0.50)	.18 <sup>‡</sup>	.30 <sup>‡</sup>

Notes: Gender and fraternity/sorority membership variables were dummy coded and means represent proportion of men and fraternity/sorority members, respectively.

\*  $p < .05$ ;

<sup>†</sup>  $p < .01$ ;

<sup>‡</sup>  $p < .001$ .

**Table 2**  
Simultaneous regression results for alcohol consumption and alcohol-related problems

Predictor	Alcohol consumption				Alcohol-related problems			
	B	$\beta$	t	d	B	$\beta$	t	d
Gender	3.71	.17	5.76 <sup>#</sup>	.41	0.96	.06	1.89	.13
Fraternity/sorority membership	5.03	.19	6.67 <sup>#</sup>	.47	1.30	.07	2.19*	.15
Descriptive norm	0.32	.34	11.88 <sup>#</sup>	.84	0.07	.10	3.07 <sup>†</sup>	.22
Injunctive norm (friends)	2.04	.18	5.49 <sup>#</sup>	.39	0.75	.09	2.56*	.18
Injunctive norm (parents)	1.20	.07	2.16*	.15	1.17	.09	2.66 <sup>†</sup>	.19
Social motives	-0.13	-0.01	-0.29	.02	0.25	.03	0.69	.05
Coping motives	0.82	.07	1.93	.14	1.85	.21	5.50 <sup>#</sup>	.39
Enhancement motives	1.78	.16	4.14 <sup>#</sup>	.29	0.53	.07	1.57	.11
Conformity motives	-1.35	-0.11	-2.97 <sup>†</sup>	.21	0.04	.00	0.12	.01
Positive expectancies	0.67	.03	0.70	.05	-0.42	-.02	-0.56	-.04
Evaluation of positive effects	-0.25	-0.01	-0.39	.03	-0.52	-.04	-1.02	-.07
Negative expectancies	-0.34	-0.01	-0.41	.03	3.35	.18	5.05 <sup>#</sup>	.36
Evaluation of negative effects	1.33	.06	1.89	.13	1.99	.13	3.56 <sup>#</sup>	.25

Notes:  $R^2 = .37$  for alcohol consumption.  $R^2 = .24$  for alcohol-related problems;  $\beta$  refers to the standardized regression coefficient. Cohen's  $d$  was included as an index of effect size (.2, .5, and .8 are typically considered small, medium, and large, respectively; Cohen, 1992).

\*  $p < .05$ ;

<sup>†</sup>  $p < .01$ ;

<sup>#</sup>  $p < .001$ .



**Table 3**  
Hierarchical regression results for alcohol-related problems

Step	Predictor	B	$\beta$	t	D
Step 1	Drinks per week	0.31	.44	13.76 <sup>†</sup>	.97
Step 2	Gender	-0.03	.00	-0.06	.00
	Fraternity/sorority membership	-0.04	.00	-0.06	.00
	Descriptive norm	-0.02	-.03	-0.92	-.06
	Injunctive norm (friends)	0.21	.03	0.74	.05
	Injunctive norm (parents)	0.85	.07	2.05*	.14
	Social motives	0.29	.03	0.83	.06
	Coping motives	1.63	.19	5.13 <sup>†</sup>	.06
	Enhancement motives	0.06	.01	0.18	.01
	Conformity motives	0.40	.04	1.19	.08
	Positive expectancies	-0.59	-.03	-0.84	-.06
	Evaluation of positive effects	-0.46	-.03	-0.94	-.07
	Negative expectancies	3.44	.18	5.51 <sup>†</sup>	.39
	Evaluation of negative effects	1.63	.11	3.10 <sup>†</sup>	.22

Notes: Step 1  $R^2 = .19$ . Step 2  $R^2 = .33$ .  $\beta$  refers to the standardized regression coefficient. Cohen's  $d$  was included as an index of effect size (.2, .5, and .8 are typically considered small, medium, and large, respectively; Cohen, 1992).

\*  $p < .05$ ;

<sup>†</sup>  $p < .01$ ;

<sup>‡</sup>  $p < .001$ .