Perceived Norms, Outcome Expectancies, and Collegiate Drinking: Examining the Mediating Role of Drinking Motives

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Wahesh, E., Lewis, T., Wyrick, D.L., Ackerman, T. (2015). Perceived Norms, Outcome Expectancies, and Collegiate Drinking: Examining the Mediating Role of Drinking Motives. *Journal of Addictions & Offender Counseling, 36*(2), 81-100.

Abstract:

The authors examined the mediational role of drinking motives in explaining the associations among psychosocial antecedents and collegiate drinking. Results indicated that drinking motives partially mediated the relationships between outcome expectancies, perceived norms, alcohol use intensity, and alcohol-related negative consequences.

Keywords: collegiate drinking | drinking motives | perceived norms | outcome expectancies

Article:

Hazardous alcohol consumption by college students remains a significant public health concern. According to the American College Health Association (2013), nearly 65% of college students consumed alcohol within the past 30 days, and 55% of these students reported heavy episodic drinking (i.e., consumed five or more drinks in a sitting) within the past 2 weeks. College students pay a high price for alcohol consumption; 33% of college student drinkers reported some form of public misconduct (e.g., driving while intoxicated), and 22% experienced a serious personal problem, such as an injury or a sexual assault during the past year (Core Institute, 2013). Rates of heavy episodic drinking and alcohol-related negative consequences among college students have been on the rise in recent years (National Institute on Alcohol Abuse and Alcoholism, 2007), with increases in unintentional alcohol-related injury deaths (Hingson, 2010) and hospitalization rates for alcohol intoxication and alcohol-related injuries (White, Hingson, Pan, & Yi, 2011).

Colleges have implemented a number of prevention and intervention efforts to address the prevalence of hazardous drinking by undergraduates. In a meta-analysis of collegiate drinking interventions, Carey, Scott-Sheldon, Carey, and DeMartini (2007) found that, although motivational and cognitive behavior interventions reduced rates of drinking, they yielded small-to-moderate effect sizes that diminished over time. Furthermore, these interventions were less effective in reducing alcohol problems among individuals who drink heavily. These authors suggested that future approaches be designed to target specific social and personal factors that influence alcohol use. Larimer and Cronce (2007) reported similar results in a qualitative review of collegiate interventions, recommending that researchers examine how to design tailored interventions that account for the various determinants of alcohol use among college students.

A myriad of determinants have been associated with drinking among both male and female college students. These include perceived drinking norms (Borsari & Carey, 2001), alcohol outcome expectancies (Fromme, Stroot, & Kaplan, 1993), and drinking motives (Cooper, 1994). Although a number of etiologic factors have been identified in the literature, a criticism of collegiate drinking research is that few researchers have examined the many determinants of collegiate drinking simultaneously to discover how each factor uniquely influences drinking behaviors (Baer, 2002). Furthermore, when multiple correlates of alcohol use have been studied together, many of these studies did not use a coherent theoretical approach to elucidate the complex relationships among these variables (Oei & Morawska, 2004). By examining the specific pathways of college student drinking and using theory as a guide, researchers and counselors can design interventions that target contributing factors in more meaningful and effective ways (Dowdall & Wechsler, 2002).

A promising framework for studying multiple determinants of collegiate drinking is the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1988 2004). According to the model, cognitive and social determinants of drinking influence alcohol use through four discrete drinking motives. Drinking motives represent the value placed on the desired effects of alcohol and are hypothesized to be the final path to alcohol use in which more distal psychosocial influences are mediated (Cooper 1994; Cox & Klinger, 1988, 1988 2004). Two drinking motives—coping drinking motives (i.e., drinking to alleviate negative affect) and enhancement drinking motives (i.e., drinking to increase positive affect)—serve as a conduit for beliefs associated with the chemical effects of alcohol. Social reinforcement drinking motives (i.e.,

drinking for social reward) and conformity drinking motives (i.e., drinking to avoid social rejection) serve as a pathway for beliefs related to the instrumental, or indirect, effects of consuming alcohol.

Different drinking motives account for specific drinking behaviors (Cooper, 1994). Whereas social reinforcement and enhancement motives are related to alcohol use intensity, drinking motives associated with the regulation of negative affect (i.e., coping and conformity motives) are predictors of alcohol-related negative consequences among college students (Martens, Rocha, Martin, & Serrao, 2008). The relationship between social reinforcement and enhancement motives (i.e., drinking to increase positive affect) and alcohol-related negative consequences is indirect and is mediated by alcohol use intensity (Merrill & Read, 2010). The direct relationship between alcohol use intensity and alcohol-related negative consequences is established in the literature (Cooper, Frone, Russell, & Mudar, 1995; LaBrie, Ehret, Hummer, & Prenovost, 2012; Merrill & Read, 2010; Yurasek et al., 2011); however, less evidence exists supporting the role of drinking motives as a mediator between etiologic factors, such as perceived norms and outcome expectancies, and alcohol use intensity and alcohol-related negative consequences (Kuntsche, Knibbe, Engels, & Gmel, 2007; Read, Wood, Kahler, Maddock, & Palfai, 2003).

Another important determinant of heavy drinking among college students is perceived norms. Perceived drinking norms explain considerable variation in drinking behaviors among college students (Borsari & Carey, 2001). Two types of perceived norms have been discussed within the literature: injunctive and descriptive norms (Borsari & Carey, 2003). Injunctive norms reflect the perceptions of others' approval of alcohol use, whereas descriptive norms represent the perceptions of others' quantity and frequency of drinking. As students overestimate the levels of permissiveness and use by their peers, they increase their own use so that it adheres to the misperceived norms (Berkowitz, 2004). Both types of norms have been found to be associated with alcohol use intensity and alcohol-related negative consequences in collegiate samples (Cho, 2006; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007).

Read et al. (2003) found that social reinforcement drinking motives partially mediated the relationship between perceived norms and alcohol consumption in a sample of undergraduates. To date, no study has simultaneously examined the mediating roles of social reinforcement and conformity motives when investigating the relationship between perceived norms and collegiate drinking behaviors. Examining these complex associations is warranted. Neighbors, Larimer, and Lewis (2004), for example, found that an intervention in which students received accurate feedback on drinking norms was more effective in reducing drinking and alcohol-related negative consequences among students who reported drinking for social reinforcement reasons. Thus, identifying the specific pathways of the influence of social norms on alcohol use intensity and alcohol-related negative consequences (e.g., through drinking motives) may inform the development of tailored intervention strategies.

In addition to drinking motives and peer influence, an individual's beliefs about the anticipated chemical effects of consuming alcohol, known as alcohol outcome expectancies, have been linked to alcohol use intensity and alcohol-related negative consequences among college students (Ham & Hope, 2003). Alcohol outcome expectancies have been operationalized across two global dimensions that represent the positive and negative effects of alcohol use (Jones, Corbin,

& Fromme, 2001). Stronger positive outcome expectancies, or beliefs in the positive effects of alcohol (e.g., drinking reduces tension, drinking increases courage), encourage drinking behaviors. Furthermore, negative outcome expectancies, or beliefs that drinking produces undesirable effects (e.g., drinking results in cognitive impairment), have also been found to be associated with higher rates of alcohol use intensity and alcohol-related negative consequences among college student drinkers (Hasking, Lyvers, & Carlopio, 2011; Neighbors et al., 2007).

Although no study to date has examined the mediating role of coping and enhancement drinking motives on the relationship between both types of global outcome expectancies and collegiate drinking behaviors, evidence exists that drinking motives may act as a pathway between these variables (Kuntsche et al., 2007; Kuntsche, Wiers, Janssen, & Gmel, 2010). For example, Read et al. (2003) found that outcome expectancies related to tension reduction indirectly influenced alcohol-related negative consequences through coping motives, whereas outcome expectancies related to social lubrication indirectly influenced alcohol use via enhancement motives. Further elucidating this relationship may help improve prevention and treatment efforts. Interventions designed to challenge outcome expectancies of college students have produced mixed outcomes in reducing alcohol consumption and alcohol-related negative consequences, leading to a call for closer examination of the role that motivation plays in activating outcome expectancies (Cronce & Larimer, 2011; Labbe & Maisto, 2011; Scott-Sheldon, Terry, Carey, Garey, & Carey, 2012).

Drinking motives, perceived norms, and outcome expectancies have been identified within the literature as key predictors of alcohol use intensity and alcohol-related negative consequences among college students (Ham & Hope, 2003). In the few studies in which these variables were used together to examine alcohol use and negative consequences, each variable was found to have a significant relationship with drinking outcomes (Atwell, Abraham, & Duka, 2011; Neighbors et al., 2007). A limitation of these studies, however, is that they did not use a theoretical or mediational approach to clarify the complex interrelations that each variable plays in explaining collegiate drinking. Furthermore, neither study investigated the potential moderating influence of gender. Although perceived norms, outcome expectancies, and drinking motives have been linked to collegiate drinking for men and women (Baer, 2002), and although a narrowing of the gap in drinking rates between male and female students has been observed (Corbin, Vaughan, & Fromme, 2008), confirming that these associations are consistent across gender can improve the utility of these variables in the development of personalized interventions.

The Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1988 2004), in which drinking motives act as the final pathway for more distal psychosocial factors to influence alcohol use, provides a coherent framework for examining the unique influences of outcome expectancies, perceived norms, and drinking motives. Testing this conceptual framework with undergraduates and assessing the fit of the model between male and female students will provide evidence for the utility of the Motivational Model of Alcohol Use as a method for understanding the many etiologic variables that contribute to hazardous drinking. It will also inform prevention and treatment by clarifying what factors are most salient to college students based on their specific motives for alcohol use.

The present study sought to test a mediational model of collegiate drinking based on the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1988 2004). Thus, our aims were to (a) assess the fit of the model with a college sample, (b) test for measurement invariance across male and female students, and (c) evaluate the mediational role of drinking motives. We hypothesized that the proposed model would be a satisfactory fit for the data and, more specifically, that the model would fit for both male and female students. Furthermore, we proposed the following specific mediational hypotheses: (a) Enhancement motives will mediate the positive relationship between outcome expectancies and alcohol use intensity, (b) coping motives will mediate the positive relationship between outcome expectancies and alcohol-related negative consequences, (c) social reinforcement motives will mediate the positive relationship between perceived norms and alcohol use intensity, (d) conformity motives will mediate the positive relationship between perceived norms and alcohol-related negative consequences, and (e) alcohol use intensity will mediate the positive relationship between social reinforcement and enhancement motives and alcohol-related negative consequences.

METHOD

Participants and Procedure

After receiving institutional review board approval, we recruited an initial pool of 535 participants from classes in a wide range of academic majors (i.e., communication studies, kinesiology, public health education, and sociology) at a midsize university in the southeastern United States. Eligible participants were full-time students (ages 18 to 24 years) who consumed alcohol during the past year. Eighty-five participants (15.9%) reported abstaining from alcohol use during the past year, four participants (0.7%) reported that they were not undergraduates, and one participant (0.2%) exceeded the maximum age parameter for inclusion. Thus, the final sample consisted of 445 participants (302 women, 143 men). The average age was 20.49 years (*SD* = 1.45). Most participants identified as Caucasian (53.0%), followed by African American (30.6%), Asian (5.6%), biracial/multiracial (5.6%), Hispanic (4.0%), and other (1.2%). A majority of participants reported that they were upperclassmen (67.2%); fewer participants were 1st- (17.3%) and 2nd-year (15.5%) students.

Measures

Alcohol use intensity. Alcohol use intensity was measured utilizing the three-item Alcohol Use Disorders Identification Test–Consumption (AUDIT-C; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998). The AUDIT-C assesses frequency of alcohol use, quantity of alcohol use, and frequency of heavy episodic drinking during the past year. Each item is scored on a Likert-type scale, and responses are summed to provide an overall score of alcohol use intensity. Higher scores reflect more intense involvement with alcohol. Researchers have found that the AUDIT-C possesses strong convergent validity as a measure of past-year alcohol use intensity (Thombs, O'Mara, Tobler, Wagenaar, & Clapp, 2009) and good internal consistency (Lewis & Myers, 2010). In the present study, the Cronbach's alpha was .78.

Alcohol-related negative consequences. Alcohol-related negative consequences were measured using the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ; Kahler, Strong,

& Read, 2005). The BYAACQ assesses 24 alcohol-related negative consequences during the past year using a dichotomous (yes–no) format. Types of alcohol-related consequences include interpersonal, academic, impaired control, engagement in high-risk behaviors, and experience of physiological dependence symptoms. "Yes" responses are summed to create a total score. The BYAACQ has demonstrated strong concurrent validity (Kahler et al., 2005) and good internal consistency (DeMartini & Carey, 2012) with college populations. In the present study, the Cronbach's alpha was .88.

Outcome expectancies. The Comprehensive Effects of Alcohol Questionnaire (CEOAQ; Fromme et al., 1993) was used to measure positive and negative outcome expectancies. The CEOAQ contains 38 statements about the effects of alcohol use; respondents rate their level of agreement on a 4-point Likert-type scale ranging from 1 (*disagree*) to 4 (*agree*). Twenty items compose the Positive Outcome Expectancies subscale, which includes anticipated outcomes such as tension reduction (e.g., "I would feel calm"), liquid courage (e.g., "I would feel courageous"), and sexuality (e.g., "I would feel sexy"). Eighteen items make up the Negative Outcome Expectancies subscale, which includes anticipated outcomes such as cognitive and behavioral impairment (e.g., "My senses would be dulled"), risk and aggression (e.g., "I would be dominant"), and negative self-perception (e.g., "I would feel guilty"). Mean scores were used for each subscale. The CEOAQ has acceptable criterion validity, factorial validity, and temporal stability (Fromme et al., 1993; Ham, Stewart, Norton, & Hope, 2005); internal consistency has been good, with Cronbach's alphas as high as .91 for Positive Outcome Expectancies and .85 for Negative Outcome Expectancies (Neighbors et al., 2007). In the present study, the Cronbach's alphas for the Positive Outcome Expectancies subscale and the Negative Outcome Expectancies subscale were .91 and .87, respectively.

Drinking motives. Drinking motives were measured using the Drinking Motives Measure–Revised (DMM-R; Cooper, 1994). Based on the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1988 2004), the DMM-R is a 20-item instrument designed to assess four categories (five items each) of motives for alcohol use: social (e.g., "to celebrate special occasions with friends"), enhancement (e.g., "because it gives you a pleasant feeling"), coping (e.g., "to forget about your problems"), and conformity (e.g., "because your friends pressure you to drink"). Respondents rate frequency of drinking for each reason on a 5-point Likert-type scale ranging from 1 (*almost never or never*) to 5 (*almost always or always*). Mean scores were used for each subscale. The four-factor model of the DMM-R has been confirmed with collegiate populations (Martens et al., 2008), and each subscale has demonstrated good internal consistency: .84 for Coping, .84 for Enhancement, .87 for Social Reinforcement, and .85 for Conformity (Merrill & Read, 2010). The Cronbach's alphas in the present study were .87 (Social Reinforcement), .87 (Enhancement), .86 (Coping), and .84 (Conformity).

Perceived norms. The four-item Injunctive Norms Rating Questionnaire (Baer, 1994) was used to assess perceived injunctive norms. This measure assesses perceived approval by friends of four specific drinking behaviors: drinking every weekend, drinking daily, driving after drinking, and drinking enough to pass out. Respondents rate each item on a 7-point Likert-type scale ranging from 1 (*strong disapproval*) to 7 (*strong approval*); a composite injunctive norms score is the average of the four items. The questionnaire has strong concurrent validity (Neighbors et

al., 2008) and acceptable internal consistency (Neighbors et al., 2007). In the present study, the Cronbach's alpha was .65.

Three items from the Alcohol and Other Drug Survey (Thombs, 1999) were used to measure perceived prevalence of alcohol use intensity by typical students of the same sex at the participants' university. These items assess frequency of alcohol use, quantity of alcohol use, and frequency of heavy episodic drinking. Response options are summed to provide an overall score representing perceived prevalence of alcohol use intensity. Researchers have demonstrated that this score predicts alcohol use within a collegiate sample and that it possesses acceptable internal consistency (Lewis & Clemens, 2008). The Cronbach's alpha in the present study was .62.

Demographics. Participants reported demographic information, including year in college, enrollment status (full-time/part-time), gender, age, and race/ethnicity.

Data Analytic Plan

Path analysis was chosen to assess the proposed model because this method permits for the examination of multiple hypothesized paths of direct and indirect influence simultaneously and provides indices of overall model fit. First, we entered data into the SPSS (Version 20.0) computer software package to assess for assumptions of path analysis. To specify the proposed model, we calculated and entered a covariance matrix into the LISREL (Version 8.8) computer software program. The root mean square error of approximation (RMSEA), comparative fit index (CFI), standardized root mean square residual (SRMR), and model chi-square were used as model fit indices. Good model fit is indicated by a nonsignificant model chi-square value, values of .95 or above for the CFI, and values of .05 or less for the RMSEA and SRMR (Schumacker & Lomax, 2010). We consulted modification indices provided by LISREL and made alterations to the model to improve the overall fit. During this process, we also considered previous research, including research on drinking motives conducted by Read et al. (2003) and Neighbors et al. (2007), to ensure that model respecifications were theoretically meaningful and did not capitalize on chance associations (Kline, 2011).

Next, we conducted invariance testing on the final model to assess fit between male and female participants. To test the hypothesis that the model would be invariant across gender, we first tested a model with all of the paths free to vary between male and female participants. We then estimated a model with these paths constrained equally across these groups. We compared the fully constrained and unconstrained models using model chi-square values. If the difference in fit between these models was found to be nonsignificant, then gender invariance can be assumed.

Finally, we examined mediational hypotheses (based on the final model) using a nonparametric bias-corrected bootstrapping procedure developed by Preacher and Hayes (2008). Bias-corrected bootstrapping is a procedure in which indirect effects are estimated from multiple resamples from the data set. An advantage of this procedure is that it allows for inclusion of covariates in the development of the indirect effect models. By controlling for the influence of other related variables, this procedure provides a more accurate presentation of the indirect relationship of the specified independent variable on the dependent variable through the mediator variable. During this process, each bootstrap sample is adjusted to correct for potential bias in the estimate of the

statistic (MacKinnon, 2008). Point estimates for each indirect effect and a 95% confidence interval (CI) for the distribution are estimated from the multiple resamples of the data set. For the present study, the bootstrap estimates are based on 5,000 bootstrap samples. CIs that do not include zero indicate significance of the indirect effect (Preacher & Hayes, 2008).

RESULTS

Preliminary Analyses

We assessed data for missingness, multicollinearity, normality, and outliers. Missingness varied from 0.0% to 5.4% across variables, and 11.24% of the cases had incomplete data. We imputed missing values using the multiple imputation module in SPSS. Fully conditional specification was used as the imputation method because the pattern of missing data was arbitrary; Little's missing completely at random test was nonsignificant, $\chi^2(97) = 87.91$, $p = .710$, indicating no systematic pattern of missing data. Multiple imputation was used because removing participants with missing data (i.e., listwise deletion) would have resulted in lower statistical power. Inspection of the Pearson product–moment correlations indicated that the data did not violate the assumptions of multicollinearity, because no correlation between independent variables was higher than $r = .72$. Skewness and kurtosis statistics revealed that conformity motives possessed a leptokurtic distribution. Because normality is an assumption of path analysis (Kline, 2011), we used a log10 transformation before conducting the analysis to better approximate a normal distribution for the variable. Cook's distance revealed no values greater than 1.00, indicating that no case exerted an undue influence on the data (Field, 2013).

Sample Characteristics

Table 1 presents the means, standard deviations, and bivariate correlations among the variables. Approximately 78% of the participants reported alcohol use during the past 30 days. All drinking motives were associated with alcohol-related negative consequences; however, alcohol use intensity was correlated with only three of the motives (coping, social reinforcement, and enhancement). Both perceived norms variables (descriptive and injunctive) were associated with alcohol use intensity and alcohol-related negative consequences. Although positive outcome expectancies were associated with all the other variables, negative outcome expectancies were not related to the perceived norms variables or alcohol use intensity.

TABLE 1

Descriptive Statistics and Bivariate Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	M	SD
1. Positive	—										2.83	0.53
2. Negative	.34*	—									2.45	0.51
3. Injunc	.25*	−.01	—								2.27	0.87
4. Descrip	.17*	.06	.32*	—							6.01	1.89
5. Coping	.43*	.35*	.19*	.08	—						1.89	0.90
6. Conform	.16*	.22*	−.04	−.01	.38*	—					1.48	0.66
7. Enhance	.59*	.18*	.33*	.17*	.54*	.28*	—				2.60	1.03
8. Social	.57*	.21*	.35*	.20*	.53*	.34*	.72*	—			3.14	1.04
9. AUI	.36*	.01	.56*	.39*	.25*	.01	.51*	.44*	—		4.13	2.40
10. Conseq	.39*	.24*	.35*	.20*	.40*	.24*	.49*	.46*	.58*	—	6.40	4.88

Note. Positive = positive outcome expectancies; negative = negative outcome expectancies; injunc = perceived injunctive norms; descrip = perceived descriptive norms; coping = coping motives; conform = conformity motives; enhance = enhancement motives; social = social reinforcement motives; AUI = alcohol use intensity; conseq = alcohol-related negative consequences.
*$p < .01$, two-tailed.

Research Question 1: Model Testing

Evaluation of the global fit statistics indicated that the hypothesized model was a poor fit for the data, $\chi^2(20) = 3{,}216.79$, $p = .00$, RMSEA = .18, CFI = .86, SRMR = .18. Standardized solutions of the hypothesized model are presented in Figure 1. Because of the poor fit, we consulted modification indices provided by LISREL and previous research to improve the model fit. We made several alterations to the model, including (a) specifying direct parameters from perceived norms (descriptive and injunctive) to alcohol use intensity, (b) specifying a direct parameter from perceived injunctive norms to enhancement motives, (c) specifying a direct parameter from positive outcome expectancies to social reinforcement motives, and (d) specifying direct parameters from negative outcome expectancies to conformity motives and alcohol-related negative consequences.

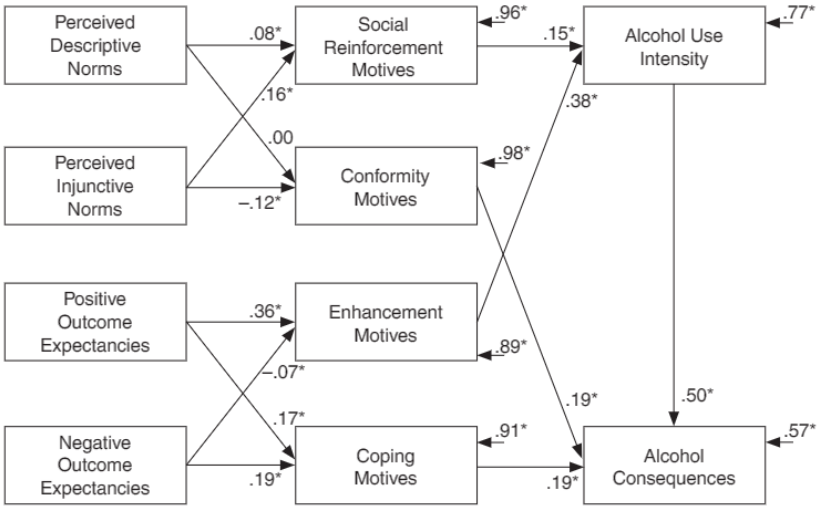

FIGURE 1

Standardized Solutions of Hypothesized Model

Note. N = 445. Alcohol consequences = alcohol-related negative consequences.
*p < .01, two-tailed.

Goodness-of-fit statistics revealed that the revised model (see Figure 2) provided a more acceptable fit for the data, $\chi^2(14) = 31.41$, $p < .01$, RMSEA = .05, CFI = .99, SRMR = .04. Furthermore, the chi-square difference test comparing models was statistically significant, $\Delta\chi^2(6) = 285.38$, $p < .01$, suggesting that the revised model was a better fit for the data. Overall, the revised model accounted for 46% of the variance in alcohol use intensity ($R^2 = .46$) and 44% of the variance in alcohol-related negative consequences ($R^2 = .44$). The standardized solutions for both the hypothesized and revised models are presented in Figure 2.

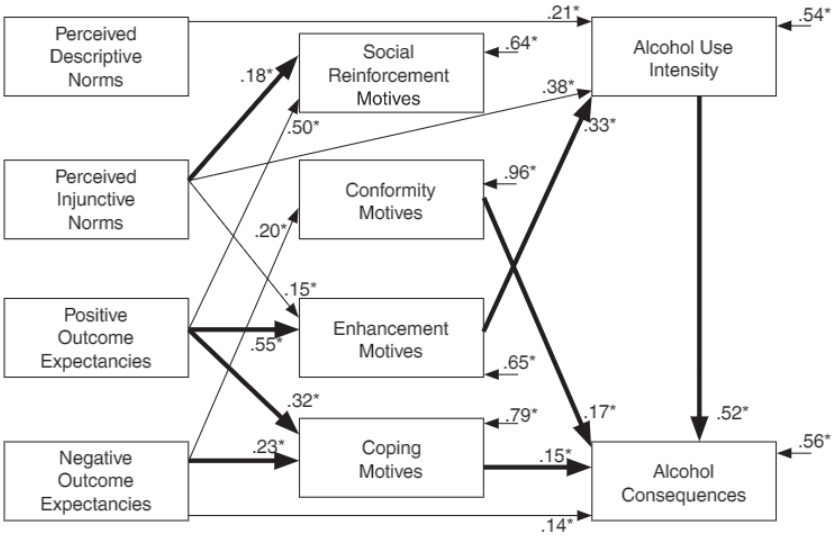

FIGURE 2

Standardized Solutions of Revised Model

Note. N = 445. Thicker lines indicate hypothesized paths that were significant, and regular lines indicate nonhypothesized paths that were significant. For visual ease, nonsignificant parameters (p > .05) are omitted from the path diagram. Alcohol consequences = alcohol-related negative consequences.
*p < .01, two-tailed.

Several key differences exist between the hypothesized model and revised model. In the revised model, direct paths were found between perceived norms (descriptive and injunctive) and alcohol use intensity, as well as between negative outcome expectancies and alcohol-related negative consequences. A statistically significant ($p < .05$) association was not found between social reinforcement motives and alcohol use intensity in the revised model. Furthermore, in the revised model, positive outcome expectancies were related to social reinforcement motives, and perceived injunctive norms were associated with enhancement motives.

Research Question 2: Invariance Testing

The fully constrained model (i.e., paths were forced to be equal between groups) for gender fit the data well, $\chi^2(59) = 96.74$, $p < .01$, RMSEA = .05, CFI = .99. The fully unconstrained model, in which paths were free to vary between groups, provided a slightly less acceptable fit for the data, $\chi^2(34) = 67.26$, $p < .01$, RMSEA = .07, CFI = .99, given that the RMSEA exceeded the desired value of .05 or less. A chi-square difference test between the constrained and unconstrained models showed that the fully constrained model fit the data better than the fully unconstrained model, $\Delta\chi^2(25) = 29.48$, $p< .25$, indicating invariance between groups.

Research Question 3: Mediation Analyses

The point estimates, standard errors, and 95% CIs derived from the bootstrap distribution are presented in Table 2. Examination of the 95% CIs revealed that social reinforcement motives did not mediate the relationship between perceived norms (descriptive and injunctive) and alcohol use intensity. Furthermore, enhancement motives did not mediate the relationship between negative outcome expectancies and alcohol use intensity. An indirect effect was observed between positive outcome expectancies and alcohol use intensity through enhancement motives. Confirming our predictions, an indirect effect was found between enhancement motives and alcohol-related negative consequences through alcohol use intensity; however, alcohol use intensity did not mediate the relationship between social reinforcement motives and alcohol-related negative consequences. Coping motives were found to mediate the relationship between outcome expectancies (positive and negative) and alcohol-related negative consequences. Conformity motives, contrary to our hypothesis, did not mediate the relationship between the perceived norms variables and alcohol-related negative consequences.

TABLE 2

Mediation of the Effect of Perceived Norms and Alcohol Outcome Expectancies on Alcohol Use Intensity (AUI) and Alcohol-Related Negative Consequences Through Drinking Motives

	Bootstrapping Product of Coefficients		Bootstrapping BC 95% CI	
Mediation	**Point Estimate**	**SE**	**LL**	**UL**
Descriptive → conform → consequences	–0.01	0.02	–0.05	0.02
Injunctive → conform → consequences	0.05	0.04	–0.01	0.17
Positive → coping → consequences	0.32	0.14	0.08	0.64
Negative → coping → consequences	0.43	0.14	0.18	0.74
Enhancement → AUI → consequences	0.82	0.16	0.55	1.17
Social → AUI → consequences	0.03	0.11	–0.19	0.22
Positive → enhancement → AUI	0.36	0.08	0.22	0.54
Negative → enhancement → AUI	–0.04	0.07	–0.18	0.08
Descriptive → social → AUI	0.01	0.00	–0.01	0.02
Injunctive → social → AUI	0.01	0.02	–0.03	0.04
Injunctive → enhancement → AUI	0.07	0.04	0.01	0.15
Positive → social → AUI	0.05	0.04	–0.04	0.14
Negative → conform → consequences	0.11	0.08	0.01	0.34

Note. Confidence intervals (CIs) that do not include zero indicate significance. BC = bias-corrected; LL = lower limit; UL = upper limit; descriptive = perceived descriptive norms; conform = conformity motives; consequences = alcohol-related negative consequences; injunctive = perceived injunctive norms; positive = positive outcome expectancies; coping = coping motives; negative = negative outcome expectancies; enhancement = enhancement motives; social = social reinforcemenet motives.

Indirect effects of the perceived norms variables and the outcomes expectancies variables on alcohol use intensity and alcohol-related negative consequences were also assessed for motivational pathways that were added to the revised model. Unexpectedly, enhancement motives mediated the relationship between perceived injunctive norms and alcohol use intensity. Furthermore, an indirect effect was observed between negative outcome expectancies and alcohol-related negative consequences via conformity motives. Social reinforcement drinking motives did not mediate the association between positive outcome expectancies and alcohol use intensity.

DISCUSSION

We explored the ability of the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1988 2004) to clarify the roles that perceived norms, outcome expectancies, and drinking motives play in alcohol use intensity and alcohol-related negative consequences in a collegiate sample. Our findings build upon previous research (Read et al., 2003) by delineating associations among psychosocial antecedents and drinking motives. Furthermore, the revised model was gender invariant (i.e., associations were consistent across gender group), thus supporting previous findings that drinking motives, outcome expectancies, and perceived norms are key determinants of drinking behaviors for both male and female college students (Baer, 2002; Ham & Hope, 2003).

In the revised model, several mediational pathways were observed between outcome expectancies, drinking motives, alcohol use intensity, and alcohol-related negative consequences. These findings confirm what previous researchers have found in that drinking motives mediated the association between outcome expectancies and drinking behavior (Kuntsche et al., 2007, 20102010). Unexpectedly, the inclusion of a path between negative outcome expectancies and alcohol-related negative consequences improved the model fit. The presence of both direct and indirect relationships between negative outcome expectancies and alcohol-related negative consequences underscores the role that beliefs about the negative effects of alcohol consumption play in explaining drinking problems. Specifically, stronger beliefs that alcohol use will result in negative outcomes, such as cognitive or behavioral impairment and aggression, were positively associated with higher rates of coping and conformity drinking motives as well as alcohol-related negative consequences. These results support past findings in which negative outcome expectancies emerged as a significant predictor of alcohol-related negative consequences after controlling for alcohol use intensity (Neighbors et al., 2007).

Although coping and enhancement drinking motives served as a partial conduit for outcome expectancies to influence alcohol use intensity and alcohol-related negative consequences, neither social reinforcement nor conformity drinking motives acted as a pathway between perceived norms and drinking behaviors. Indeed, the model fit was improved by adding direct paths between both perceived norms variables (descriptive and injunctive) and alcohol use intensity. These results extend findings by Read et al. (2003), who examined the mediating role of drinking motives using only three drinking motives (conformity motives were not included) and found that including a direct path between perceived norms and alcohol use resulted in a significant improvement in the model fit. Furthermore, the robust path ($\beta = .38$) between perceived peer approval of drinking behaviors and alcohol use intensity confirmed past research determining that the injunctive norms of proximal groups, such as friends and family, play a critical role in accounting for the variance in college student drinking (Borsari & Carey, 2003).

Unlike the perceived norms variables, social reinforcement motives were not associated with alcohol use intensity in the revised model. This finding suggests that the descriptive and injunctive perceived norms variables were better indicators of alcohol use intensity in the sample. Although this finding was unexpected, it is consistent with research in the United Kingdom, where perceived descriptive norms explained hazardous drinking above and beyond that of social reinforcement motives in a sample of undergraduates (Atwell et al., 2011). It is possible that perceived norms better explain increased intensity of alcohol consumption, whereas social reinforcement motives are more likely to be associated with light and nonproblematic alcohol use, a hypothesis proposed by Cooper (1994). Future research to identify the style of drinking by college students who endorse specific drinking motives for alcohol use is warranted.

An assumption of the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1988 2004)—that social reinforcement and conformity motives act as the final pathway for factors associated with the instrumental effects of drinking behaviors, whereas coping and enhancement motives serve as the conduit for factors related to the chemical effects of alcohol use—was not supported in the final model. Model fit was significantly improved by adding paths between perceived injunctive norms and enhancement motives, between positive outcome expectancies and social

reinforcement motives, and between negative outcome expectancies and conformity motives. Furthermore, indirect effects were observed for negative outcome expectancies on alcohol-related negative consequences via conformity motives and for perceived injunctive norms on alcohol use intensity via enhancement motives. Read et al. (2003) obtained a similar result when they included specific types of outcome expectancy beliefs (social lubrication and tension reduction) in their model; specifically, they found that these outcome expectancies were associated with social reinforcement drinking motives and that perceived norms had an indirect effect on alcohol use via enhancement motives. These findings may indicate a limitation of the DMM-R as an assessment of drinking motives. Indeed, Cox and Klinger (2004) argued that the DMM-R does not fully represent the four drinking motive categories; moreover, some researchers have combined the Social Reinforcement and Enhancement subscales because of their statistical and conceptual similarities (LaBrie et al., 2012).

A key finding of this study was that drinking motives related to alleviating negative affect were among the strongest correlates of alcohol-related negative consequences in the model. The association between these negative drinking motives extends previous research, which had omitted conformity motives (Read et al., 2003), did not assess perceived norms or outcome expectancies (Merrill & Read, 2010), or did not regress alcohol-related negative consequences onto all four drinking motives simultaneously (Martens et al., 2008). Whereas negative drinking motives were associated with alcohol-related negative consequences, enhancement drinking motives were related to alcohol use intensity and indirectly associated (via alcohol use intensity) with alcohol-related negative consequences. These findings hold implications for how counselors design and implement collegiate drinking intervention efforts.

Implications for Addictions Counselors

Addictions counselors should consider incorporating the assessment of drinking motives into their assessment procedures. On the basis of our findings, collegiate clients who endorse drinking to alleviate negative affect may be at an increased risk for alcohol-related negative consequences and may require a more intensive level of care. An advantage of assessing drinking motives in addition to asking direct questions about alcohol use and consequences is that examining results from these measures together can provide a more nuanced conceptualization of a client's drinking behavior. For example, higher levels of alcohol-related negative consequences may be the direct result of drinking to reduce negative affect or an indirect effect of drinking to enhance positive mood. Counselors can use the Modified Drinking Motives Questionnaire (Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007), which is an expanded version of the DMM-R that differentiates between drinking to cope with depression and drinking to cope with anxiety, to confirm diagnostic impressions and provide additional clinical information that can be used to form a comprehensive treatment plan.

Incorporating drinking motives into treatment addresses the call within the literature to move away from a one-size-fits-all approach to using tailored interventions that address the specific factors meaningful to the individual client (Carey et al., 2007; Cleveland, Lanza, Ray, Turrisi, & Mallett, 2012). Our findings indicate that certain psychosocial factors may be more salient to individuals who endorse specific drinking motives. For example, clients who strongly endorse coping drinking motives may benefit from a cognitive behavior approach that teaches them to

identify how negative outcome expectancies contribute to the cycle of alcohol abuse. Alternatively, a focus on altering positive outcome expectancies may be more appropriate for clients who strongly endorse enhancement drinking motives. Wenzel, Liese, Beck, and Friedman-Wheeler (2012) presented a conceptual model that describes how outcome expectancies influence drinking-related thinking and beliefs. These authors also outlined several strategies, such as the use of behavioral monitoring, that addictions counselors can use during counseling to help clients alter drinking-related thoughts and behaviors.

Assessing for perceived peer acceptance of high-risk drinking may also be advantageous on the basis of our results. More specifically, assessing these perceptions may assist addictions counselors in designing an individualized treatment plan. Clients who perceive their friends as approving of high-risk behaviors, such as daily drinking and driving while impaired, may struggle with identifying or forming relationships that support reduced drinking or abstinence. This may hinder treatment progress, given that establishing helping relationships is an important process of behavior change (DiClemente, 2003). Therefore, if a client reports higher levels of peer endorsement of hazardous drinking, a referral to a group program may be necessary. Groups provide a venue for social support (Walters & Baer, 2006) and the learning of new behaviors, such as drinking refusal skills (LaChance, Feldstein Ewing, Bryan, & Hutchison, 2009). Alternatively, counselors may consider encouraging the client to invite a close peer to counseling. Tevyaw, Borsari, Colby, and Monti (2007) conducted a pilot study to evaluate a peer-enhanced intervention and found that students who participated in a brief motivational intervention with a peer reported greater reductions in alcohol use and problems compared with students in a traditional, individual brief motivational intervention. Furthermore, these authors found that both participants and peers reported that they felt comfortable during the intervention and found it helpful.

Limitations

Our findings must be interpreted within the context of several limitations. The sample was recruited using convenience sampling from the same university; therefore, the study findings may not be generalizable among undergraduates in other colleges and geographic regions. In addition, 1st-year students (17.3%) and male students (32.1%) were underrepresented in the sample, thereby affecting the application of our findings to these student populations. Because only 143 men participated in the study—less than the 200 participants per group minimum recommended in the literature to achieve acceptable statistical power (Kline, 2011)—measurement invariance results should be interpreted with caution. Another limitation is that data were collected using self-report measures. Therefore, it is possible that some participants responded in a socially desirable manner. However, we used a waiver of signed informed consent, a strategy that has increased the likelihood that self-report data provide reliable and valid results with collegiate populations (Del Boca & Darkes, 2003). Finally, two scales, the Injunctive Norms Rating Questionnaire and the perceived descriptive norms measure (i.e., three items from the Alcohol and Other Drug Survey), possessed low levels of internal consistency, which must be considered when interpreting the study findings.

CONCLUSION

Our purpose was to test a mediational model of collegiate drinking based on the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1988 2004). Although our hypothesized model was not an acceptable fit for the sample, our analysis revealed distinct differences in drinking behavior based on specific drinking motive, regardless of gender. Enhancement drinking motives were associated with alcohol use intensity, whereas coping and conformity drinking motives were related to alcohol-related negative consequences. Several psychosocial factors, such as perceived norms and negative outcome expectancies, emerged as significant direct correlates of collegiate drinking behaviors in our final model. These findings indicate the importance of assessing for drinking motives and other psychosocial factors associated with alcohol use behavior among college student drinkers to enhance prevention and intervention success.

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