College Men and Alcohol Use: Positive Alcohol Expectancies as a Mediator Between Distinct Masculine Norms and Alcohol Use

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Abstract

College men are more likely to engage in health-compromising behaviors including risky drinking behavior, and experience more alcohol-related problems, including violence and arrest, as compared to women. The study of masculine norms or societal expectations, defined as beliefs and values about what it means to be a man, is one promising area of investigation that may help explain within-group differences and differential rates of alcohol use among men. Using the gender social learning model, we investigated the role of positive alcohol expectancies as an underlying mediator between masculine norms and alcohol use among college men. Data from 804 college adult men (*Mean age* = 20.43) were collected through a web-based assessment. Participants completed a self-report measure of binge drinking, frequency of drinking, quantity of drinks, conformity to masculine norms, and positive alcohol expectancies measures. Structural equation modeling was used to examine relations between masculine norms, alcohol expectancies and alcohol use. The masculine norms of "Playboy" and Risk-Taking were positively related to heavy alcohol use, while Emotional Control and Heterosexual Presentation were both negatively associated with alcohol use, after controlling for fraternity Greek status and positive expectancies. Playboy and Winning norms were positively associated with positive expectancies while Power Over Women was inversely related to positive expectancies which, in turn, were associated with heavier alcohol use. This study was a novel exploration into the multiple pathways and mediators through which positive alcohol expectancies may help explain and provide specificity to the masculinity and alcohol use relationship among college men.

Keywords

Men; masculinity; alcohol use; alcohol expectancies; mediators

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Problem drinking, including binge drinking (5 drinks in a two-hours setting for men), among college students is a significant public health concern, given that over 150,000 college students develop alcohol-related problems each year (Hingson, Heeren, Winter, & Wechsler,

2005). In particular, men between the ages of 18-25 years are twice as likely as women to suffer from alcohol abuse and dependence (Grant, Dawson, Stinson, Chou, Dugour, & Pickering, 2004). Compared to women, college men disproportionally report heavy drinking days (Seo & Li, 2009) and alcohol-related problems in the public domain, such as driving while under the influence, property damage, violence and arrest (Hingson et al., 2005; White, McMorris, Catalano, Fleming, Haggerty, & Abbott, 2006). Despite the pronounced differences in alcohol-related problems between men and women (Johnston, O'Malley, Bachman, & Schulenberg, 2007), there has been relatively little discourse and few empirical studies examining gender-relevant issues related to drinking among men (Courtenay, 2000; Locke & Mahalik, 2005; Peralta, 2007; Williams, 2003). It is thus essential to understand the gender-related predictors and mediators of heavy alcohol use among a high-risk group: men attending college. Using the gendered social learning model (Addis, Mansfield, & Syzdek, 2010; Smiler, 2004) as our overarching framework, the objective of this study was to examine relations among distinct masculine norms, positive alcohol expectancies and heavy alcohol use among college men.

College Men and Problem Alcohol Use

Problem drinking peaks during the college years at least in part because college environments often promote heavy drinking (White et al., 2006). Developmentally, individuals who attend college experience a new-found independence, and have social concerns (e.g., "fitting in" and conscientiousness with their appearance), which may compound drinking behaviors as they explore and develop their adult identities (Borsari, Murphy, & Barnett, 2007). Alcohol is readily available and common at social events and fraternities on college campuses. For instance, drinking games are often aimed at identifying the speed at which one can consume alcohol, the quantity of consumption in one setting, and one's tolerance level (Lemle & Mishkind, 1989). A recent study found that 68% of men reported that they equated the ability to consume large amounts of alcohol without vomiting or fainting as a characteristic of masculinity (Peralta, 2007). Conversely, the inability to consume large amounts of alcohol without adverse reactions is perceived as characteristic of weakness, femininity, or homosexuality (Gough & Edwards, 1998; Peralta, 2007).

Conformity to Masculine Norms and Alcohol Use

Although men attending college report the highest rates of alcohol-related problems among any group (Grucza, Noert, & Bierut, 2009), it is relatively unclear what specific gender-relevant factors, including masculinity, make men more likely than women to engage in such health-compromising behaviors (Courtenay, 2000). One factor that might help explain why certain men engage in health-compromising behaviors, including heavy alcohol use, is adherence to masculine norms (de Visser & Smith, 2007; Locke & Mahalik, 2005; McCreary, Newcomb, & Sadava, 1999; Peralta, 2007). Masculine norms reflect adherence and conformity to societal scripts, such as the expectations and beliefs about what it means to be a man (Mahalik, Locke, Ludlow, Diemer, Scott et al., 2003). These norms are formed at an early age and are believed to be relatively stable over time (Mahalik, Talmadge, Locke, & Scott, 2005). Masculine norms help to shape and guide how men interact socially through observational learning and modeling (Courtenay, 2000). Masculinity and alcohol use appear

to be intrinsically tied to each other in the cultural climate of the U.S., given that social drinking is often viewed as a "cultural symbol of manliness" (Lemle & Mishkind, 1989) or an "expectation" of male behavior (Mullen, Watson, Swift, & Black, 2007). Adherence to specific masculine norms may be positively associated with problem drinking, as quantity of drinking and drinking to intoxication is perceived as "macho" within the U.S. society (Young, Morales, McCabe, Boyd, & D'Arcy, 2005). Men therefore may feel societal pressure to follow certain standards and rules to achieve the image of manliness (i.e., ability to tolerate and consume large amounts of alcohol), where failure to adhere to these standards (e.g., the inability to drink "up") may be perceived to as less manly (Lemle & Mishkind, 1989).

Studies examining aspects of masculine ideology, including gender role conflict (O'Neil, Helms, Gable, David, & Wrightsman, 1986), or strain and stress related to trying to fulfill dominant gender role expectations, have found that adherence to these norms is associated with heavier alcohol use and more alcohol-related problems (Blazina & Watkins, 1996; Korcuska & Thombs, 2003; McCreary, Newcomb, & Sadava, 1999; Monk & Ricciardelli, 2002). Although stronger adherence to masculine norms overall is related to heavier drinking, theoretical models of masculinity describe masculine norms as multidimensional (Levant, 1996; Mahalik et al., 2003), where distinct norms may influence alcohol use patterns differentially (Levant & Richmond, 2007). Consistent with contemporary theoretical models of masculinity, Mahalik and colleagues (2003) identified 11 salient masculine norms in the United States including: being in control of one's emotions (*Emotional Control*); taking risks regardless of potential consequences (*Risk Taking*); the drive to win at all costs (*Winning*); ability to solve one's own problems (*Self-Reliance*); being a womanizer or having many sexual partners (*Playboy*); importance placed on upward mobilization and elevation of socioeconomic status (*Pursuit of Status*); exhibiting aggressive or violent behavior (*Violence*); demonstrating physical dominance and toughness (*Dominance*); prioritizing work above everything else (*Primacy of work*); perceived control over women (*Power Over Women*); and importance of appearing heterosexual to others (*Heterosexual Presentation*). These multidimensional norms vary across and within individuals as they are based on the extent to which an individual experiences, as well as adheres to and internalizes, any specific norm.

Recent investigations among college men have demonstrated the link between distinct masculine norms and problem alcohol use (Iwamoto, Cheng, Lee, Takamatsu, & Gordon, 2011; Liu & Iwamoto, 2007; Locke & Mahalik, 2005). Across these studies, distinct masculine norms including Playboy, Power Over Women, and Risk Taking have been significantly positively associated with heavy alcohol use and alcohol-related problems while higher endorsement of Self-Reliance, Heterosexual Presentation and Emotional Control have been found to be inversely related to problem drinking (Iwamoto et al., 2011; Liu & Iwamoto, 2007). These findings highlight the fact that masculine norms can both promote and protect against heavy alcohol use and related problems. Although the link between masculinity and alcohol use has the potential to improve our understanding of higher levels of engagement in risk behaviors among men, this area of research would be enhanced considerably by efforts to identify potential mediating variables which may

provide greater specificity regarding relations between masculine norms and alcohol use. One possible mediator through which masculine norms may influence alcohol use is positive alcohol expectancies.

Positive Alcohol Expectancies and Alcohol Use

Positive alcohol expectancies are normative beliefs about the positive cognitive, behavioral, and affective effects of alcohol (Darkes & Goldman, 1993; Fromme et al., 1993). Positive expectancies have been identified in the literature as beliefs that drinking alcohol makes one do things that they would not normally do (i.e., liquid courage); the belief that alcohol "loosens" one up and increases sociability (i.e., sociability); the belief that drinking helps one to "unwind" (i.e., tension reduction), and enhancement of sexual performance (i.e., sexuality) (Fromme et al., 1993). Although findings are mixed (Carey, 1995), men generally report stronger positive alcohol expectancies compared to women (Cooper, Russell, Skinner, Fone, & Mudar, 1992; Sher, Wood, Wood, & Raskin, 1996). Understanding the role of positive expectancies and alcohol use among men is essential given that alcohol expectancies have been found to differentiate light from heavy drinkers (Sher et al., 1996; Stacy, Widaman, & Marlatt, 1990), and are a well-established determinant of future problem drinking and alcohol-related problems (Cooper et al., 1992; Jones, Corbin, & Fromme, 2001; Settles, Cyders, & Smith, 2010).

According to social-learning theory (Bandura, 1977), alcohol expectancies play an instrumental role in mediating the association between psychosocial factors and alcohol-related problems (Borsari et al., 2007; Corbin, Iwamoto, & Fromme, 2011; Dal Cin, Worth, Gerrard, Gibbons, Stoolmiller, Wills, & Sargent, 2009; Darkes, & Goldman, 1998; LaBrie, Grant, & Hummer, 2011). That is, individuals who observe their peers being positively reinforced for their drinking behavior may develop strong beliefs about positive alcohol effects which, in turn, contribute to heavier drinking. Accordingly, it is important to elucidate the factors that influence and reinforce positive alcohol expectancies when researching men's drinking behaviors (La Brie et al., 2011).

Theoretical Model: The Gendered Social Learning Model

The gendered social learning model (Addis et al., 2010; Smiler, 2004) offers a theoretical framework to understand the possible temporal relationships among masculine norms, alcohol expectancies and alcohol-related problems. Gendered social learning theory posits that traditional masculine norms influence an individual's perception of their environment, thereby impacting learning processes (Addis & Cohane, 2005; Courtenay, 2000; Levant, 1996; Mahalik et al., 2003) such as positive alcohol expectancies. Men are socialized to ascribe to masculine norms and characteristics and may be penalized or punished socially for failing to conform (e.g., be perceived as a "sissy" or feminine) (Addis et al., 2010). For example, men are positively reinforced within their social environment for adhering to certain masculine norms including "winning at all cost" and are often punished for expressing their emotions, which is perceived as a feminine characteristic (Addis & Mahalik, 2003). As a result, men who endorse particular dimensions of masculine norms including Playboy and Winning norms may be more likely to learn and develop positive

alcohol expectancies whereby they fail to consider the negative effects of alcohol (i.e., alcohol impairs cognitive and behavioral functioning). Men are more likely than women to use alcohol as a social lubricant (Landrine, Bardwell, & Dean, 1988) and to drink to relieve stress (Cooper et al., 1992). The perceived need to conform to certain masculine norms may explain within-group differences or why some men tend to engage in risky behaviors in order to "display" their manhood (Addis et al., 2010). To our knowledge, no empirical research to date has investigated the relationship between masculine norms and alcohol expectancies.

The Present Study

The current study addresses this gap in the literature by investigating the positive alcohol expectancies as a potential mediator by which masculine norms contribute to, alcohol use in a sample of college men. Based upon previous research and in line with gendered social learning model, we hypothesize that distinct masculine norms will be associated with positive alcohol expectancies and greater alcohol use. Alcohol expectancies are hypothesized to mediate or partially mediate the relationship between masculine norms and alcohol use. Additionally, we included fraternity status as a covariate given that this factor has been found to be a strong determinant of heavy drinking among men (Borsari, Murphy, & Barnett, 2007; Capone, Wood, Borsari, & Laird, 2007).

Method

Participants and Procedures

Participants consisted of 804 men attending a large public university located in southern California. The average age of the men was 20.43 years ($SD = 2.51$), and 79.6 % of the sample indicated that they did not belong to a Greek/fraternity group. In terms of academic standing, 21.2% of the participants identified as freshmen, 20.4% as sophomores, 26.6% as juniors and 31.8% as seniors. The ethnic distribution of the sample included 64.8% Asian American, 20.0% Caucasian American, 9.1% Latino, and 6.0% categorized as "Other," paralleling the population demographics of the university.

Prior to data collection, IRB approval was obtained. Two data collection methods were used to obtain the sample. The first method involved the use of the university-wide subject pool ($n= 504$), an online forum in which students from all majors can participate in experiments for extra credit. The other method included recruitment of participants ($n = 300$) through classrooms, in which the instructor sent a recruitment email written by the lead researcher with the survey link inviting students to voluntarily participate in the study. Participants recruited through classrooms were given the opportunity to enter a raffle to win one of five $50 gift cards. An ANOVA was performed to examine whether there was a difference in alcohol consumption between participants from the subject pool and students recruited through classrooms. The results revealed no differences in drinking quantity, $F(1, 801) = .08$, $p = .78$, frequency, $F(1, 801) = .013$, $p = .91$, or binge drinking, $F(1, 801) = .96$, $p = .33$, between the two data collection methods. Thus, the samples were combined for all further analyses.

Measures

Conformity to Masculine Norms Inventory (CMNI-46)—The CMNI-46 is an abbreviated version of the original 94-item CMNI, based upon the results of a confirmatory factors analysis (Mahalik et al., 2003; Parent & Moradi, 2009). The CMNI-46 assesses conformity to dominant masculine norms (Mahalik et al., 2003) set out by the United States standard of masculinity. The CMNI-46 assesses 11 traditional and non-traditional masculine norms including: *Winning, Emotional Control, Risk-taking, Violence, Power Over Women, Playboy, Self-Reliance, Primacy of Work, Dominance, Pursuit of Status* and *Heterosexual Self-Presentation*. Sample items include, "My work is the most important part of my life" (subscale: Primacy of Work) and "I would feel good if I had many sexual partners" (subscale: Playboy). Items on this measure were scored on a four point Likert type scale, from 0 (strongly disagree) to 3 (strongly agree), where higher scores indicate stronger adherence to the specific masculine norm. The internal consistency estimates for the CMNI-46 subscales in the current study ranged from α = .75 to .87.

Brief Comprehensive Effects of Alcohol (B-CEOA)—Positive alcohol expectancies were measured using Ham and colleagues' (2005) revision of the Comprehensive Effects of Alcohol Questionnaire (Fromme, Stroot, & Kaplan, 1993). The B-CEOA is based on the full-scale CEOA developed by Fromme et al. (1993) which includes the subscales: Sociability, Liquid Courage and Sexuality. Given that items comprising the B-CEOA subscale of liquid courage were drawn from two separate subscales of the CEOA (liquid courage and risk and aggression) that differ in valence, we elected to retain the distinction between these two subscales. We utilized the four B-CEOA subscales in our analyses (Sociability, Liquid Courage, Sexuality, and Risk and Aggression). The reliability estimates for the positive expectancy subscales ranged from α =.70 to .94.

Daily Drinking Questionnaire—The revised version of the Daily Drinking Questionnaire, DDQ (Collins, Parks, & Marlatt, 1985) is a self-report measure used to estimate alcohol use over the past three months. The DDQ provides more accurate measurements of drinking patterns by differentiating frequency and quantity of use (Kruse, Corbin, & Fromme, 2005). Participants were asked to estimate and report the number of days each week within the past three months that they engaged in alcohol use; and for each day alcohol use was reported, estimate how many drinks they consumed. Frequency of alcohol use was calculated by summing the number of days they consumed alcohol (see Table 1; range 0-7 days). Quantity of alcohol consumption was determined by summing the number of drinks consumed on an average week in the past three months (range 0-100). Previous studies have documented strong construct validity evidence (Collins, Parks, & Marlatt, 1985) and high internal consistency estimates for the DDQ (Corbin, Iwamoto, & Fromme, 2011).

Binge drinking—To assess binge drinking, participants were asked, "During the last three months, how many times did you have 5 or more drinking in a two-hour sitting." This definition is consistent with National Institute on Alcohol Abuse and Alcoholism (NIAAA) and national studies measurement of binge drinking (Wechsler & Isaac, 1992).

Data Management and Data Analytic Plan

The variables binge drinking, quantity, and frequency were count variables and were specified as such in the analyses using M*plus* (Muthen & Muthen, 2008). In addition, we utilized robust maximum likelihood estimation to account for nonnormality in the drinking data. Missing data ranged from 0-4.4% which fell within acceptable limits (Tabachnick & Fidell, 2007). Little's (1988) MCAR (missing completely at random) test was performed, using the SPSS missing values program and the results suggested that the data were missing at random, χ^2 (*df* =448) =432.4, *p* = .68. Since our data appeared to be MCAR, we used full information maximum likelihood estimation to handle missing data (Enders, 2001).

To examine direct and indirect effects of masculine norms on alcohol use, taking into account the mediator of positive expectancies, structural equation modeling was performed using M*plus* (Muthen & Muthen, 2008). SEM has multiple advantages over approaches, such as multiple regression or analysis of covariance in that this method tests and models complex patterns of relationships between latent factors. SEM can simultaneously test multiple mediators and outcome variables, and accounts for correlated independent variables and correlated error terms. The use of confirmatory factor analysis within SEM also reduces measurement error by including multiple indicators to identify latent factors or constructs. The two latent factors in our models included positive alcohol expectancies and alcohol use. The latent variable of positive expectancy included the positive expectancy subscales of Sociability, Sexuality, Liquid Courage, and Risk and Aggression. The latent factor of alcohol use was composed of binge drinking, frequency of alcohol consumption, and quantity of alcohol consumption per occasion. For each estimated parameter, we report the standardized coefficient (*β*) estimate.

Although fit indices including the comparative fit index (CFI), root mean square error of approximation (RMSEA), and the chi-square/degrees of freedom ratio are commonly used to assess model fit, these indices are not estimated in count models within Mplus (Zamboanga, Schwartz, Ham, Borsari, & Van Tyne, 2010). Consistent with other researchers who have used SEM count models (Zamboanga et al., 2010), we tested the proposed theoretical model against alternative/competing models using the Bayesian Information Criterion (Raftery, 1995). The BIC provides an estimated value for each model, and the models do not have to be nested within one another to allow for model comparisons. A smaller value or an approximation closer to zero suggests a better fitting model. Raftery (1995) noted that a model that has a lower or more negative BIC value, and a BIC difference of 10 or greater is the better of two models.

In addition to evaluating the BIC values between the theoretical and alternative models, we conducted parallel structural equation models using log transformed alcohol variables (rather than treating these variables as count data). We conducted this analysis so we could obtain the standardized factor loadings of the latent factors and the traditional model fit indices for the measurement model and multigroup analysis. The results revealed that the relations among the variables in the log transformed variable models were quite similar to the models specifying count data. The CFI is a goodness of fit index that adjusts for model complexity and parsimony. CFI compares a hypothesized model to a simpler model, such as

a model where no paths are calculated (Iacobucci, 2009). RMSEA is the estimate of the discrepancy between two nested models and it compensates and is sensitive to models with greater complexity (MacCallum, Browne, & Sugawara, 1996). Standards for good model fit included a CFI greater than .95 (.90-.95 suggest fair fit), and RMSEA values less than .05, (. 05-.08 suggests a fair fit) (MacCallum et al., 1996; Quintana & Maxwell, 1999). The inferential statistic χ^2/df ratio of less than 2 indicates an excellent fit, and a ratio up to 5 indicates reasonable model fit (Marsh & Hocevar, 1985).

The program RMediation package (Tofighi & MacKinnon, 2011) was used to examine indirect effects of masculinity on alcohol use through positive alcohol expectancies. The RMediation program builds on the widely cited and used PRODCLIN program (MacKinnon et al., 2007b) by producing more accurate confidence intervals using three methods: distribution of products, Monte Carlo simulation, and asymptotic normal distribution. Simulation studies suggest that the distribution of products yields more accurate confidence intervals and more optimal coverage (i.e., more power) than resampling methods including the percentile and bias-corrected bootstrap methods (MacKinnon et al., 2007b; Tofighi & MacKinnon, 2011). If the confidence interval does not include zero then the indirect effect is considered significant.

Results

Descriptive Statistics—Men in our sample reported that they engaged in binge drinking an average of three times in the past three months ($SD = 6.11$); average drinking days per week was 1.07 ($SD = 1.57$), and the average amount of alcohol consumed during a typical week in the past three months was 4.254 ($SD = 8.61$). Correlations, means, standard deviations, and ranges for all study variables are presented in Table 1.

Structural Equation Modeling

Measurement Model—In order to obtain standardized factor loadings of the latent factors and the traditional model fit indices for the measurement model, we conducted parallel structural equation models using log transformed alcohol variables. In the measurement model, the latent variables of positive alcohol expectancies and alcohol use were allowed to co-vary. This model provided adequate fit to the data χ^2 (13) = 85.9, $p < .001$, χ^2/df ratio = 6.6, CFI = .98, RMSEA =.08. Important to note, even though the χ^2/df ratio was higher than the recommended cut-off criteria, χ^2 is sensitive to sample sizes and, as the number of participants increase, so does the χ^2 (Quintana & Maxwell, 1999). The latent correlation between positive expectancies and alcohol use was .36, $p <.001$. All the factor loadings were significant, and the factor loading estimates on the latent factor of positive expectancies ranged from .64-.96, with the standardized factor loadings for alcohol use ranging from .84 to .88, and 1.00-1.56 for the unstandardized loading (Figure 1).

Structural Model—First, we tested a model investigating the total effect of masculine norms on alcohol use, without the mediator positive expectancies and the covariate fraternity/Greek status. The masculine norms Winning ($\beta = .14$, $p < .001$), Risk Taking ($\beta = .21$, $p < .001$), and Playboy ($\beta = .27$, $p < .001$) were positively associated with alcohol use,

while Emotional Control (β = .13, p < .001), and Heterosexual Presentation (β = .13, p < .001) were significantly negatively related with alcohol use (Figure 1).

Next, we tested the structural model with all of the observed variables (masculine norms, the covariate fraternity Greek status) and the latent positive expectancies variable included in the model. The BIC value for this model was 55,729. The significant pathways between factors and the R-square values for the alcohol expectancies and alcohol use latent factors are displayed in Figure 2. The masculine norms of Winning (β = .10, p <.001), Self-Reliance (β = .07, p <.001), and Playboy (β = .22, p <.001) were significantly and positively associated with the latent factor of positive alcohol expectancies, whereas Power over Women was significantly inversely related to positive alcohol expectancies. Upon controlling for alcohol expectancies (β =.40, p <.001) and fraternity/Greek status (β =.21, p <.001), Risk-Taking (β = .19, p <.001), and Playboy (β = .17, p <.001) remained significant predictors of alcohol use, whereas the direct effect of Winning on alcohol use was no longer statistically significant, β = .06, p > .05. Heterosexual Presentation (β = -.11, p <.05) and Emotional Control (β = -.09, p <.05) remained significant inverse predictors of alcohol use when controlling for the effects of positive alcohol expectancies. Endorsement of masculine norms, membership in a fraternity, and positive alcohol expectancies explained 36% of the variance in self-reported alcohol use.

The RMediation program was used to test for indirect effects of masculine norms operating through positive expectancies. These analyses indicated that the masculine norms of Playboy (indirect effect β = .08, SE = .01, p <. 05, 95% CI [.05, .12]) and Winning (indirect effect β = .04, SE = .01, p <. 05, 95% CI [.007, .07]) had a positive indirect effect on alcohol use through positive expectancies, whereas Power Over Women (indirect effect β = -.04, SE = .01, p <.05, 95% CI [-.08, -.009]) had an indirect negative association with alcohol use (Table 2). No significant indirect effect was detected for Self-Reliance (indirect effect β = . 03, SE = .01, p >. 05, 95% CI [0, .06]). In addition to the indirect effect, the direct effect of Playboy norms remained when controlling for the effects of alcohol expectancies. In contrast, only the indirect effect was significant for Winning when controlling for alcohol expectancies. Interestingly, although there was no direct effect of Power Over Women in either model (not controlling or controlling for alcohol expectancies), there was an indirect inverse relation with alcohol use operating through positive alcohol expectancies. Men who more strongly endorsed the norm of Power Over Women reported weaker positive alcohol expectancies.

Alternative Models—Given the cross-sectional nature of the data, alternative models were assessed to allow for model comparisons in an effort to provide support for our theory-driven hypothetical model (i.e., Model 1). Testing alternative models in cross-sectional studies is crucial given that the temporal sequence of the relations among variables cannot be determined using these types of designs (Kraemer et al., 2000; Zamboanga et al., 2010). Further, it is theoretically plausible for different temporal relations among the variables in the model. La Brie et al. (2011) noted that alcohol expectancies change in response to episodes of alcohol consumption occurring in a college setting. From a conceptual and measurement perspective, previous behaviors including alcohol use could possibly influence positive alcohol expectancies, and positive expectancies could contribute to strengthening of

masculine norms. To address these possibilities, Model 2 examined alcohol expectancies as a mediator between alcohol use and masculine norms. The BIC value for model 2 was 55,764 (Table 3), which was higher than the BIC for model 1 (55,729). This provides evidence of the conceptual validity for the temporal ordering of the variables in the theory driven cross sectional model (model 1), and is consistent with longitudinal research that supports the temporal relationship between positive expectancies and alcohol use (Corbin et al., 2011).

We investigated a third model to determine if specific alcohol expectancies were critical in mediating relations between masculine norms and alcohol use. In this model, we examined the four positive alcohol expectancy subscales Sociability, Risk and Aggression, Liquid Courage, and Sexuality individually as observed mediators of relations between the dimensions of masculine norms and alcohol use. In this model, the positive expectancies subscale scores were allowed to freely covary given the strong relationships among these variables. The BIC for this model was 55,826 which, based on Raftery's (1995) criteria, provided worse fit to the data than either model 1 or model 2. Playboy norms were positively associated with all of the expectancy subscales, and Power Over Women was negatively associated with Liquid Courage, Risk and Aggression, and Sociability. Winning was positively related to Liquid Courage and Risk and Aggression expectancies. Finally Self-Reliance was positively associated with Liquid Courage, and Heterosexual Presentation was positively associated with Sexuality expectancies.

Testing for Invariance by Ethnicity: Finally, given the ethnic diversity of the sample, we performed a multigroup SEM in which we explored the extent to which our hypothesized model (model 1) operated similarly for Asian Americans compared to Whites and other racial/ethnic groups. In these nested models, the log transformed alcohol variables were used to test for structural invariance between Asian Americans and non-Asians. Accordingly, the structural weights or pathways were constrained to equality across groups. Since we used the log transformed variables, we were able to compare chi-square model fit between the unconstrained and constrained models. There was no evidence for a decrement in model fit, χ^2 ($df = 21$) = 22.02, $p = .40$ when imposing these constraints, suggesting that the model operated similarly across ethnic groups.

Discussion

Alcohol misuse among young adult college men is a national problem, yet there has been a dearth of research examining how alcohol expectancies may mediate the relationship between masculine norms and alcohol use. This study was unique in its efforts to identify the multiple pathways through which positive alcohol expectancies influence alcohol use within the context of masculine norms among college men. Moreover, the present study presents data wherein the structural model of masculine norms, positive alcohol expectancies, and alcohol use provides strong preliminary evidence for the gendered social learning model of alcohol use. It is important to note that, while the gendered social learning model describes a causal theory, the current study is not a test of the causal aspects of the theory, but rather an initial, cross-sectional test to determine if this causal theory is plausible.

This study is a critical step forward in men's health research given that we were able to elucidate the distinct relationship between masculine norms, alcohol expectancies, and alcohol use. Before entering fraternity status and positive alcohol expectancies into the structural equation model, the norms of Playboy, Risk-Taking and Winning were positively associated with alcohol use, whereas the norms of Emotional Control and Heterosexual Presentation were negatively related to alcohol use. These findings suggest that men attending college who exhibit the norms of desiring many sexual partners at the same time (Playboy), enjoying risk-taking activities regardless of potential consequences (Risk-Taking), and focusing on the important of winning are at heightened risk for heavy drinking. These results are consistent with contemporary models of masculinity (Courtenay, 2000; Levant, 1996; Liu & Iwamoto, 2007; Locke & Mahalik, 2005) and highlight the importance of considering the expression of masculinity in relation to drinking behavior. Because Playboy and Risk-Taking norms are reflective of a "heightened" sense of self-presentation (Mahalik et al., 2003) men who endorse these norms might view the ability to drink larger quantities of alcohol as a sign of "manliness" (Peralta, 2007), contributing to their risk for heavy drinking.

Although a number of masculine norms were positively associated with heavy alcohol use, Heterosexual Presentation (HP) and Emotional Control were inversely related to drinking behavior within the present sample. College men who reported a greater need to appear heterosexual and greater control over their emotions tended to engage in lower levels of alcohol use. One previous study also found that HP was negatively associated with drinking to intoxication and alcohol-related problems (Iwamoto et al., 2011). It may be that men who strongly adhere to HP are more conscious about how others perceive of them and therefore drink less in an effort to retain a sense of control over their behavior. With respect to Emotional Control, men who are unable to control their emotions may be more reactive to stress or may become further emotionally disregulated with the disinhibiting effects of alcohol, thereby increasing their risk for over consumption of alcohol (Lemke, Schutte, Brenna, & Moos, 2008; Nolen-Hoeksema, 2004). With the exception of norms for Winning, the remaining direct effects remained statistically significant when controlling for fraternity status and positive alcohol expectancies. These findings highlight the robust links between masculine norms and alcohol use as alcohol expectancies have consistently been found to be a strong determinant of alcohol use (Borsari et al., 2007; Dal Cin et al., 2009; Jones et al., 2001), and have been shown to mediate the effects of more distal predictors including personality characteristics related to impulsivity (Corbin, Iwamoto, & Fromme, 2011). Endorsement of positive alcohol expectancies was significantly related to drinking, and Playboy, Winning, and Power Over Women norms were indirectly related to alcohol use through positive alcohol expectancies. Individual who adhered to the norm of Playboy and Winning reported higher positive alcohol expectancies whereas individuals who endorsed Power Over Women reported weaker positive alcohol expectancies. Because there is evidence that masculine norms guide how one interacts socially (Courtenay, 2000), these norms may shape and influence learning processes that contribute to the development of alcohol expectancies. For instance, men who adhere to Playboy norms may be more likely to form expectancies regarding the sexual and social benefits of alcohol use, which consequently contribute to heavier alcohol use. In a related vein, Winning norms may

promote competition with other men, in that men who are unable to keep "up" with their peers are considered impotent or less of a man (Lemle & Mishkind, 1989). The bivariate analysis and test of alternative models (model 3) supports this notion as Winning norms were positively related to Liquid Courage and Risk and Aggression expectancies. Based on gendered learning theory men who endorse Winning norms might be positively reinforced for their drinking behavior and may be more likely to attend to the positive messages and beliefs about alcohol (expectancies) in their environment.

The more perplexing finding was the negative association between Power Over Women and expectancies, and the consequent inverse indirect effect of these norms on alcohol use. It is important to note that Power Over Women norms were positively and significantly correlated with alcohol use in the bivariate correlations, but inversely (though not significantly) related to alcohol use in the first regression model (not controlling for alcohol expectancies). This type of statistical relationship has been referred to as cross-over suppression (Paulhus, Robins, Trzesniewski, & Tracy, 2004), which describes a change or reverse in direction of relationships among variables when controlling for additional predictor variables. This pattern of findings suggests that it was residual variability in Power Over Women norms (controlling for the effects of other masculine norms) that was associated with lower levels of alcohol use. Thus, the positive and significant bivariate relation between Power Over Women and alcohol use may be a product of the significant positive correlations between Power over Women norms and both Playboy and Winning norms (See Table 1), which were related to heavier alcohol use. It is important to note that the inverse relation between Power Over Women norms and positive alcohol expectancies in the structural equation models was not driven by a single expectancy domain. In the alternative model 3, Power Over Women norms were inversely related with Sociability, Risk and Aggression, and Liquid Courage expectancies.

It may be that Power Over Women norms capture aspects of conventionality (e.g., conservative values, greater religiosity) that are protective against the development of positive alcohol expectancies and heavy drinking. These relationships may also reflect gender stereotypic personality traits of agency-instrumentality or internalized stereotypical masculinity (McCreary, Newcomb & Sadava, 1999; McCreary, Saucier, & Courtenay, 2005). McCreary, Newcomb and Sadava (1999) found the agentic personality traits as measured by the Personal Attributes Questionnaire (Spence & Helmerich, 1978) were negatively associated with alcohol-related problems among Canadian college men. They postulated that men who endorse internalized stereotypical masculinity might use more active coping strategies and have higher self-esteem. It may be that men in the current study who endorse Power Over Women may believe that they do not need alcohol to facilitate social interactions (i.e., Sociability) or give them courage (i.e., Liquid Courage). However, these possibilities are speculative and future studies are needed to understand the potential protective role of Power Over Women norms in the context of other masculine norms.

In addition to the theoretical importance of the results, there is potential clinical value in identifying determinants and mediators of heavy alcohol use among college men. Identifying modifiable factors including alcohol expectancies are important as this particular factor has been targeted in many interventions to reduce hazardous drinking (Darkes &

Goldman, 1993; Darkes & Goldman, 1998; Jones et al., 2001). The present findings suggest that provision of information about masculine norms and their relation to drinking behavior may serve an important function in the context of gender-specific programming designed to screen, identify, and treat men who are at risk of abusing alcohol. Clinicians working with men in college settings in individual and group counseling may explore how these individuals negotiate masculinity and how it may contribute to their health risk behaviors. Clinicians could assess for the level of adherence to masculine norms; for example using Mahalik and colleagues' (2005) instrument to explore what these scripts mean subjectively; this may be coupled with reflections upon how these messages may have positively and negatively impacted their drinking (Iwamoto, 2010), as well as other behaviors (e.g., dating, pursuit of friendships, membership in organizations, adjustment to university life.).

Although the current study had several strengths and the results have potentially important theoretical and practical implications, several limitations need to be considered when interpreting the findings. First, the design was cross-sectional, so causal inference cannot be made. Although we tested and found strong empirical support for a causal theoretical model, the gendered social learning model, given the cross-sectional nature of the study design, we were unable to provide strong empirical support for the temporal ordering of the variables in the model. Although cross-sectional data is a limitation of any study attempting to determine the direction of influence among variables, there are specific issues in applying SEM and meditational analyses with cross-sectional data. Cole and Maxwell (2007) report that testing mediation using cross-sectional data can substantially bias (over or underestimate) direct, indirect, and overall effects. Cross-sectional analyses are unable to test whether the association between variables captures the influence of one variable on another over time or distinguish whether there is a stable relationship between variables (Cole & Maxwell, 2007). It is also important to note that we conceptualized current attitudes about adhering to distinct masculine norms as predictors of retrospective alcohol use. This approach can be justly critiqued given that "something afterwards can't cause something that happened before it" (Davis, 1985, p.8). A longitudinal design would have allowed us to make stronger inferences about the temporal relations among the observed and latent variables in our theoretical model, thus the reader should use caution when interpreting our findings.

Future studies on relations between masculine norms and drinking behavior would also benefit from inclusion of additional trait characteristics associated with drinking behavior. Prior research suggests that masculine norms, such as Risk Taking might be associated with the personality factor of sensation-seeking, which is associated with increased risk of problematic drinking and other risky behaviors (Borsari et al., 2007). It will be important in future studies to determine whether the masculine norm of risk-taking and the personality characteristic of sensation-seeking measure are distinct constructs that are independently associated with alcohol use. Future studies should include non-college students or community samples, to investigate how masculine norms may influence the development of alcohol use in these groups. Finally, the current study did not collect data regarding sexual identity, as previous studies have indicated that gay men endorse different masculine norms (Hatzenbuehler, 2009). Future studies testing relations among masculine norms, expectancies, and drinking behavior among gay men would provide an important contribution to the literature.

Despite the aforementioned limitations, the current study provides an important contribution to the extant literature. Using a multidimensional measure of masculinity within a large sample of college men, these findings illustrate the complex relations between masculine norms and drinking behavior. Although several masculine norms are positively associated with heavy alcohol use, we found that Emotional Control and Heterosexual Presentation were inversely related to alcohol use. The current findings also provide novel information about potential mechanisms through which masculine norms may impact drinking behavior. Three masculine norms (Playboy, Winning, and Power Over Women) were found to have indirect relations with alcohol use operating through positive alcohol expectancies. As with the direct effects, some masculine norms were indirectly associated with increased risk (Playboy and Winning), while others were associated with decreased risk (Power Over Women). The results provide support for the need to further explore and address how individual adherence to distinct masculine norms contribute to complex patterns of drinking among college men.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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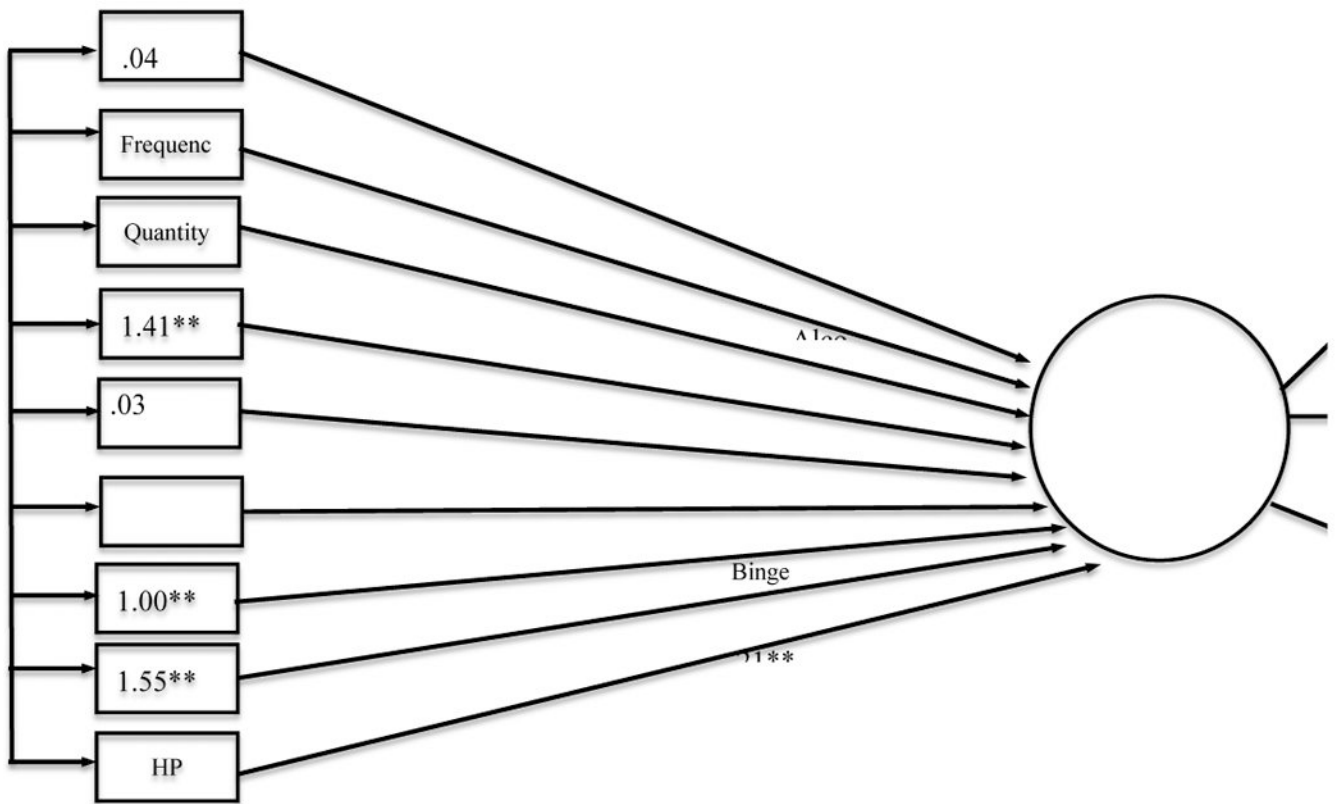
Figure 1.
SEM illustrating the relationship between dimensions of masculine norms and alcohol use.
Note. *p* <.05, **p* <.01. *N* = 804. The alcohol use factor loadings are unstandardized. HP =
Heterosexual Presentation. Power = Power Over Women. Primacy = Primacy of Work.

Figure 2.
SEM illustrating the relationship between dimensions of masculine norms, covariate fraternity status, alcohol expectancies and alcohol use.

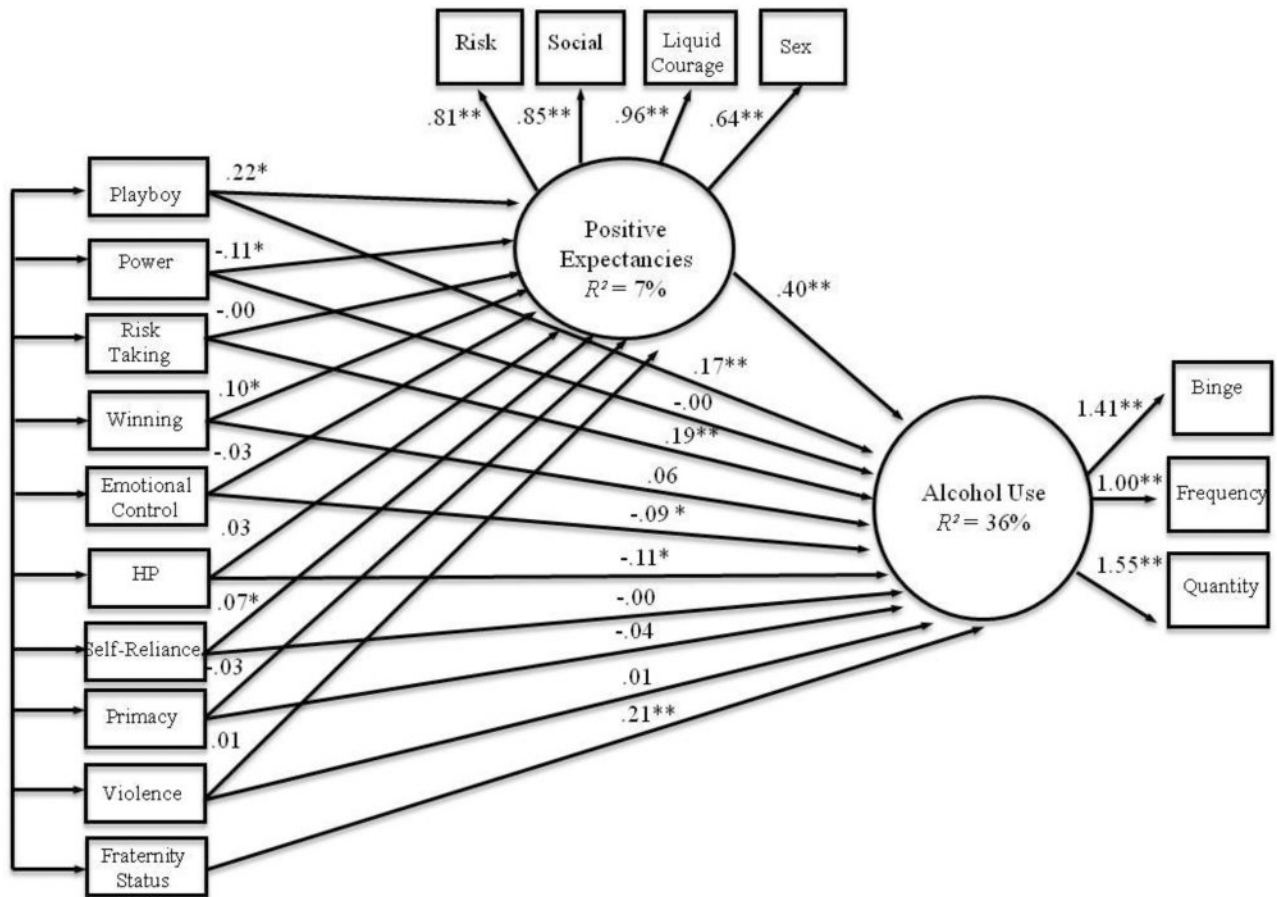Note. *p <.05, **p <.01. N = 804. The alcohol use factor loadings are unstandardized. HP = Heterosexual Presentation. Power = Power Over Women. Primacy = Primacy of Work. Sex= sexuality expectancies. LC = Liquid courage. Social = sociability. Risk = risk and aggression expectancies.

Table 1

Correlations, means, standard deviations, and ranges for the scale of the alcohol variables, fraternity status, and masculine norms among college men

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Playboy	---																
2. Risk Taking	.27**	---															
3. Primacy of Work	.09*	0.06	---														
4. Winning	.17**	.12**	.14**	---													
5. Emotional Control	0.07	-0.03	0.07	.12**	---												
6. Self-Reliance	.13**	0.02	0	.09*	.41**	---											
7. HP	0.02	0	0.06	.27**	.15**	.10**	---										
8. Violence	.13**	.16**	-.14**	.17**	-0.05	-0.05	.11**	---									
9. Power Over Women	.33**	.24**	.19**	.21**	.09*	.14**	.38**	0.05	---								
10. Binge	.26**	.20**	-0.06	.13**	-0.06	-0.02	-0.05	.10**	.10*	---							
11. Quantity	.26**	.23**	-0.03	.13**	-0.04	0.04	-0.02	0.06	.13**	.64**	---						
12. Frequency	.26**	.23*	0.06	0.07	-0.07	0.03	-.13**	0.05	.10**	.58**	.72**	---					
13. Fraternity Status	.13**	.12**	-0.04	.14**	-0.02	.08*	-0.06	0.05	.09*	.25**	.22**	.23**	---				
14. CEO-Sexual	.26**	0.04	-0.02	.12**	0.07	.11**	.12**	0.02	.15**	.16**	.22**	.24**	0.03	---			
15. CEO-Risk	.15**	0.05	0.06	.10**	0.02	0.06	0.01	0.03	-0.03	.18**	.16**	.20**	0.04	.50**	---		
16. CEO-LC	.19**	0.04	0.04	.13**	0	.08*	0.02	0.06	0	.23**	.23**	.29**	0.04	.62**	.78**	---	
17. CEO-Social	.17**	0	-0.02	0.07	0	0.06	-0.05	.10*	-.09*	.18**	.20**	.25**	0	.54**	.70**	.81**	---
M	4.45	6.9	5.52	9.64	8.23	6.28	9.56	10.07	4.09	3.01	4.55	1.14	1.2	6.85	8.85	8.97	9.57
SD	5.03	9.27	0.4	19.33	2.86	3.1	2.24	3.11	2.32	6.11	8.61	1.6	0.39	5.03	9.27	0.4	19.33
Range	0-12	15-Jan	0-12	0-18	0-18	0-15	18-Jan	0-18	0-12	0-75	0-100	0-7	2-Jan	14-Feb	14-Feb	2-14	14-Feb

Note:

*
p < .05,

**
p < .01.

N = 804. HP = Heterosexual Presentation. CEO = fComprehensive effects of alcohol. Sexual = sexuality. LC = Liquid courage. Social = sociability. Risk = risk and aggression.

Table 2

Indirect Effects of each Dimension of Masculine Norms on Alcohol Use through the Mediator Positive Alcohol Expectancies

Dimension of Masculine Norm	Total Effect	Indirect Effect	SE	95% Confidence Interval for mean indirect effect (lower and upper)
Winning	.10	.04	.01	.007, .07
Emotional Control	-.14	-.05	.01	-.046, .015
Risk Taking	.18	-.00	.01	-.034, .029
Violence	.01	-.00	.01	-.021, .037
Power Over Women	-.04	-.04	.01	-.084, -.009
Playboy	.25	.08	.01	.055, .127
Self Reliance	.03	.03	.01	0, .061
Primacy of Work	-.05	-.01	.01	-.043, .017
Heterosexual Presentation	-.10	.01	.01	-.016, .048

Note. $N = 804$. Total Effect = Approximately the sum of the direct effect (c′) and the indirect effect (ab).

Table 3

Proposed Theoretical Model Compared to Alternative Models

Independent variable	Mediator variable	Dependent variable	Bayesian Information Criterion (BIC)
Model 1) Masculine Norms→	Expectancies→	Alcohol Use	55,729.86
Model 2) Alcohol use→	Expectancies→	Masculine Norms	55,764.64
Model 3) Masculine Norms→	Expectancies Subscales→	Alcohol Use	56,301.82

Note. N = 804. Lower BIC suggested better fitting model