

Religiousness and Alcohol Use in College Students: Examining Descriptive Drinking Norms as Mediators

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Religiousness has consistently emerged in the literature as a protective factor for alcohol use. Relatively few studies have empirically explored possible mechanisms for this robust effect. The present study examines descriptive drinking norms as a potential mediator of the religiousness–alcohol consumption association. Consistent with the literature, religiousness was inversely related to alcohol use and alcohol-related problems. Religiousness was also inversely related to descriptive drinking norms for close friends but not for more distal targets. Descriptive drinking norms for one's close friends mediated the relationships between religiousness and alcohol use outcomes. These results suggest that religiousness may influence alcohol use outcomes through perceptions of close friends' alcohol use. Implications of these findings and recommendations for future directions are discussed in the context of developing theory-based interventions to address problems associated with alcohol use.

Keywords: alcohol use, college drinking, drinking norms, religiousness

INTRODUCTION

Alcohol use in young adults requires continued attention due to the significant number of problems related to alcohol consumption. These negative outcomes include academic failure, accidental death, delinquency, mental health issues, motor vehicle accidents, injury, increased risk of sexually transmitted disease, suicide, and unwanted sexual contact (Arria, Dohey, Mezzich, Bukstein, & Van Thiel, 1995; Hingson, Heeren, Winter, & Wechsler, 2005; Kann et al., 1996; Windle, 1999). According to data from the National Institute on Drug Abuse (NIDA)-sponsored Monitoring the Future study, 83% of college students and 77% of counterparts not attending college endorsed alcohol use in the past year (Johnston, O'Malley, Bachman, & Schulenberg, 2006). When more recent alcohol consumption was explored, 68% of college students and 59% of same-age peers endorsed alcohol use in the past 30 days. When heavy consumption of alcohol or binge

drinking (drinking five or more drinks on one occasion) is examined, 40% of college students and 35% of peers not attending college reported binge drinking in the two weeks prior to the assessment. Clearly, alcohol use in young adults is widespread and, given the myriad of alcohol-related consequences, alcohol consumption in this population requires continued investigation.

A broad range of constructs related to alcohol use in young adults has been explored including ethnic background, socioeconomic status, athletic participation, membership in Greek organizations, peer consumption, and attitudes about alcohol use (Martens, Dams-O'Connor, Duffy-Paiement, & Gibson, 2006; Talbott et al., 2008; Windle, 1999). Recently, the role of religiousness in alcohol use has gained increasing attention (Hood, Spilka, Hunsberger, & Gorsuch, 1996; Johnson, Sheets, & Kristeller, 2008). Religiousness refers to “a personal or group search for the sacred that unfolds within a traditional sacred context” (Zinnbauer & Pargament, 2005, p. 35).

The majority of studies investigating the link between religiousness and alcohol use found a significant inverse relationship (Baer, Stacey, & Larimer,

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1991; Donahue & Benson, 1995; Koenig, McCullough, & Larson, 2001; Lorch & Hughes, 1985). For example, Hays, Stacy, Widaman, DiMatteo, and Downey (1986) found religiousness inversely related to alcohol use; in addition, religiousness exerted the strongest and most consistent effects on alcohol use when compared to other variables such as self-esteem and parental support. Amoateng and Bahr (1986) demonstrated that involvement with a religious group, regardless of the specific denomination, was associated with less frequent alcohol use and lower consumption quantities. Furthermore, even when the authors controlled for a variety of factors (e.g., number of parents in the home), the relationship between religiousness and alcohol use remained significant. The association between religiousness and alcohol use has also been demonstrated longitudinally. Mason and Windle (2001) reported that religiousness predicted alcohol consumption concurrently and at one-year follow-up. Interestingly, religiousness emerged as the strongest alcohol use predictor, surpassing both peer and family influences. These studies represent a substantial literature supporting a connection between religiousness and alcohol use.

Interestingly, this relationship emerged between multiple indicators of religiousness (e.g., membership, commitment, participation in religious activities) and several alcohol use outcomes (e.g., frequency of drinking, quantity consumed, and alcohol-related attitudes). Closer review of the literature suggests that the specific nature of the relationship may depend on the dimension of religiousness and specific aspect of alcohol use under evaluation (Amoateng & Bahr, 1986; Cochran, 1993). For example, Nonnemaker, McNeely, and Blum (2003) compared public and private religiousness as predictors of alcohol use in a sample of more than 16,000 adolescents from the National Longitudinal Study of Adolescent Health. While private and public religiousness were inversely related to alcohol outcomes, private religiousness (a combination of frequency of prayer and importance of religion) was more influential on initiating and experimenting with alcohol use whereas public religiousness (a combination of frequency of service attendance and frequency of participation in youth group activities) played a greater role in regular and problematic use. Given these findings, the present study investigated several aspects of religiousness and multiple alcohol use outcomes with the intention of clarifying the relationship.

Given the consistent protective effect of religiousness on alcohol use, the next step is to explore mechanisms to explain this relationship. Several recent studies have expanded our understanding by elucidating mediators (e.g., social support, attitudes about alcohol, spiritual well-being, peer influences) of the relationship between religiousness and alcohol use (Chawla, Neighbors, Lewis, Lee, & Larimer, 2007; Galen & Rogers, 2004;

Johnson et al., 2008; Menagi, Harrell, & June, 2008). Chawla and colleagues (2007) examined prescriptive drinking norms as mediators and found that perceived approval of peers partially accounted for the relationship between religiousness and alcohol consumption. The current study further complements this study and addresses a gap in the literature by investigating the potential mediating role of descriptive drinking norms on the religiousness–alcohol use relationship.

Research addressing drinking norms distinguishes between descriptive and prescriptive (also called injunctive) drinking norms. According to Borsari and Carey (2001), prescriptive norms refer to perceptions of other peoples' *attitudes about drinking* and act as perceived guidelines for acceptable behaviors. Prescriptive norms have been associated with alcohol use such that higher levels of perceived approval by peers are related to greater levels of personal alcohol consumption (Larimer, Turner, Mallet, & Geisner, 2004). Descriptive norms refer to perceptions of people's *alcohol use*, most often the quantity of alcohol consumed and the frequency of consumption. Higher levels of perceived peer alcohol use have been linked with higher personal alcohol use (Neighbors, Lewis, Bergstrom, & Larimer, 2006; Perkins, Haines, & Rice, 2005). Because descriptive norms focus on perceptions of behavior while prescriptive norms focus on perceived attitudes, these constructs are theoretically distinct. In the present study we investigated perceptions of drinking behavior and examined young adults' descriptive drinking norms.

Studies investigating descriptive drinking norms have demonstrated that adolescents and young adults consistently overestimate the quantity and frequency of alcohol consumption by their peers (Perkins & Berkowitz, 1986). That is, perceptions of others' typical drinking behavior exceeded actual levels of drinking quantity and frequency (Baer et al., 1991). These misperceptions of peers' drinking behaviors extend across extracurricular activities (e.g., Greek membership, athletic participation), housing situation (e.g., dormitory, off-campus housing), and sex (Perkins, Meilman, Leichliter, Cashin, & Presley, 1999). It should be noted that overestimating peers' drinking appears to vary as a function of age and sex such that male and older students reported higher drinking norms than female and younger students (Adams & Nagoshi, 1999). Furthermore, the discrepancy between perceived and actual drinking behavior increases as the reference group becomes more distal (Baer & Carney, 1993). For instance, Baer and Carney found that students estimated their alcohol consumption as less than their best friend's consumption and considerably less than that of a typical student. This pattern of overestimation is concerning because several studies have demonstrated links between drinking norms and alcohol consumption and alcohol-related

problems (Adams & Nagoshi, 1999; Wood, Read, Mitchell, & Brand, 2004).

No studies could be located that specifically assessed the relationship between religiousness and descriptive drinking norms. Findings from the literature suggest, however, that religiousness may influence drinking norms through its association with peer group. Specifically, higher levels of religiousness have been associated with less peer alcohol use (Bahr, Maughan, Marcos, & Li, 1998). Adolescents who attend services more frequently and/or ascribe greater importance to religion were less likely to associate with alcohol-using peers. Religious adolescents may seek out friends with similar beliefs and non-using peers (Burkett & Warren, 1987; Sutherland & Shepherd, 2001). Interactions with peers provide information for the development and refinement of drinking norms. Religious individuals with fewer alcohol-using friends likely possess more conservative descriptive drinking norms. That is, due to fewer opportunities to interact with friends and peers consuming at greater levels, these individuals perceive lower levels of consumption by others. Given the paucity of research investigating the role of religiousness in drinking norms, this study examines the associations between several measures of religiousness and descriptive drinking norms so as to increase understanding of both constructs.

Beyond establishing the pattern of overestimating others' alcohol consumption, it is important to understand the overall effects of descriptive drinking norms. Several studies have demonstrated that perceived drinking norms predict alcohol use and alcohol-related problems for the individual (Lewis & Neighbors, 2004; Martin & Hoffman, 1993; Thombs, Wolcott, & Farkash, 1997). For example, in a longitudinal study of more than 180 young adults, perceptions of one's best friend's drinking behavior significantly predicted personal alcohol consumption at baseline and at follow-up 32 months later (Werner, Walker, & Greene, 1996). Taken together, these studies suggest a significant link between descriptive drinking norms and individual drinking behavior.

The drinking norms literature has significantly expanded our understanding of adolescent and young adult alcohol consumption and their alcohol-related behaviors. This knowledge has been a foundation for the development of prevention and intervention efforts. Within the framework of this growing body of scientific literature concerning young adults' drinking behavior the following hypotheses emerge.

Study Hypotheses

- *Hypothesis 1:* In congruence with the literature (e.g., Koenig et al., 2001), religiousness will be inversely associated with alcohol consumption.

- *Hypothesis 2:* Religiousness will be inversely related to descriptive drinking norms. Specifically, individuals reporting higher levels of religiousness will endorse lower quantity and frequency descriptive norms (Bahr et al., 1998; Francis, 1997).
- *Hypothesis 3:* Descriptive drinking norms will be positively associated with alcohol outcomes (Borsari & Carey, 2001). Individuals perceiving higher descriptive norms will report higher levels of alcohol consumption than counterparts reporting lower descriptive norms.
- *Hypothesis 4:* The relationship between religiousness and alcohol use (*Hypothesis 1*) will be partially mediated by descriptive drinking norms.

METHOD

Participants

Participants were 333 undergraduate students (62.2% female) with a mean age of 19.7 years ($SD = 1.1$). With regard to ethnicity, 89.2% were Caucasian, 7.2% were African-American, 1.2% were Asian-American, 2.1% reported other ethnic backgrounds, and <1% did not respond to this item. Fifty-five percent of participants reported Protestantism, 30.9% Catholicism, 5.7% reported other religious affiliations (e.g., Hinduism, Judaism, Islam), and 8.4% reported no religious affiliation.

Procedures

Participants were recruited through undergraduate psychology courses (e.g., general psychology, developmental psychology) to participate in a study examining lifestyle factors and health. Faculty announced this study in their courses and offered course credit to prospective participants. Students who elected not to participate in this study were given an alternative course credit activity. After providing informed consent, participants completed a questionnaire packet. The Institutional Review Board of the University of Kentucky approved the study protocol and the treatment of participants was in accordance with the ethical standards of the American Psychological Association.

Measures

Demographics

Participants reported their age, sex, ethnic background, highest level of education attained, and whether or not they were a member in a Greek organization.

Social Desirability

To assess and control for social desirability, we administered the Marlowe-Crowne Form C (MC-C; Reynolds, 1982), a 13-item measure that assesses a person's tendency to engage in impression management. Participants responded to each item by indicating either "true" or "false." Sample items include "I sometimes feel resentful when I don't get my way" and "No matter who I'm talking to, I'm always a good listener." Higher scores on the MC-C are indicative of greater impression management. Cronbach's alpha in this study was .63.

Religiousness

To assess religiousness, we administered the Religious Commitment Inventory-10 (RCI-10; Worthington et al., 2003). The RCI-10 assesses adherence to one's religious beliefs and values as well as the application of religiousness in daily living. Responses ranged from 1 (not at all true) to 5 (totally true). Sample items include "Religious beliefs influence all my dealings in life" and "Religiousness is especially important to me because it answers many questions about the meaning of life." The total score, obtained by summing responses to all 10 items, was used in this study. Cronbach's alpha for this study was .95.

We also administered the Religious Comfort and Strain Scale (Exline, Yali, & Sanderson, 2000), a 20-item questionnaire assessing positive and negative religious experiences. Responses were given using a 4-point scale ranging from 0 (not at all) to 3 (extremely). The religious comfort subscale comprises seven items. Examples of religious comfort items include "Trusting God to protect and care for you" and "Feeling comforted by your faith." The religious strain subscale is comprised of 13 items and includes items such as "Bad memories of past experiences with religion or religious people" and "Difficulty trusting God." Cronbach's alphas for the study were .95 for religious comfort and .82 for religious strain.

Alcohol Use

Alcohol consumption is commonly assessed through items addressing the frequency of use and quantity of consumption (Presley, Meilman, & Leichliter, 2002). These single items have been shown to be reliable and valid (Dollinger & Malmquist, 2009). Participants' frequency of alcohol use was assessed by the following question: "In the past year, how often did you drink alcohol on the average?" Response options ranged from 0, indicating no alcohol use, to 14, indicating daily use. Quantity of alcohol use was assessed using the following question: "In the past year, when you drank alcohol, how many drinks did you consume, on the average, on

one occasion?" Response options ranged from 0, indicating no alcohol use, to 13, indicating more than 25 drinks.

Alcohol-Related Problems

To assess alcohol-related problems, we administered the Drinker Inventory of Consequences (DrInC; Miller, Tonigan, & Longabaugh, 1995), a 45-item questionnaire assessing negative consequences of alcohol use. Participants indicated whether they had experienced each consequence and rated the frequency of the consequence. Responses were given using a 4-point scale ranging from 0 (never) to 3 (daily or almost daily). A total scale score, obtained by summing responses to all 45 items, was used in this study to provide an index of overall severity of alcohol-related problems. Cronbach's alpha in this study was .92 for the total scale.

Perceived Drinking Norms

To assess drinking norms, we administered a version of the Drinking Norms Rating Form (DNRf; Baer et al., 1991). Participants estimated how often (frequency) and how much (quantity) different people drink. Participants estimated drinking consumption for their close friends, an average student on their campus, an average member of a fraternity, an average member of a sorority, and an average person their age. Responses ranged from 1 (less than once a month) to 7 (once a day) for frequency and 1 (0 drinks) to 6 (more than 8 drinks) for quantity.

RESULTS

Means and standard deviations are presented in Table 1. Bivariate correlations among demographics, religiousness, descriptive drinking norms, and alcohol use outcomes are presented in Table 2. In order to reduce the likelihood of Type I error, a .01 significance level was adopted. Given the associations between the background variables and the mediating and dependent variables, these background variables were included as covariates in the mediation analyses. Correlations among religiousness, descriptive drinking norms, and alcohol outcomes are presented in Table 3. As predicted in Hypothesis 1, religious commitment was negatively associated with the frequency and quantity of alcohol use as well as alcohol-related problems. Contrary to predictions from Hypothesis 1, religious strain was not related to alcohol consumption. However, religious strain was positively associated with alcohol-related problems as expected, such that more negative religious

TABLE 1
Descriptive Statistics

<i>Variable</i>	<i>M</i>	<i>SD</i>
<i>Demographic</i>		
Female	202.0	62.2
Caucasian	298.0	89.2
Age (y)	19.7	1.1
<i>Religiousness</i>		
Religious commitment	25.7	10.8
Religious comfort	14.5	5.8
Religious strain	9.9	6.5
<i>Descriptive Drinking Norms</i>		
Close friends' frequency	3.4	1.3
Close friends' quantity	3.6	1.5
<i>Alcohol Outcomes</i>		
Frequency	6.0	3.4 ^a
Quantity	4.8	2.9 ^b
Alcohol-related problems	13.1	10.9

Note. Data reported for sex and ethnic background are cases and percentages.

^aCorresponds to drinking twice per month.

^bCorresponds to having 5 alcohol beverages per occasion.

experiences were related to more consequences from drinking.

As predicted in Hypothesis 2, religious commitment and comfort were inversely related to perceptions of drinking behavior for close friends. Individuals with higher religious commitment and comfort scores reported that their close friends consumed fewer alcohol beverages and drank alcohol less frequently than those with lower religiousness scores. Religious commitment and comfort were not significantly associated with the remaining drinking norm ratings. In addition, religious

strain was not significantly associated with any of the drinking norm ratings as predicted by Hypothesis 2. In summary, Hypothesis 2 received support only for perceptions of close friends' drinking behavior.

In contrast to the predictions of Hypothesis 3, the significance of the relationships between drinking norms and alcohol use outcomes in this sample depends on the drinking norm target and the alcohol outcome variable. A few general patterns are noted here. First, perceptions of close friends' drinking behaviors were positively associated with all alcohol consumption and alcohol-related consequences. Similarly, young adults' perceptions of alcohol use quantity for same-age peers were positively associated with all alcohol consumption and alcohol-related consequences. In summary, Hypothesis 3 was partially supported as many of the associations between drinking norms and alcohol use outcomes were as predicted.

Variables Meeting the Preconditions for Mediation

Each of the religiousness variables was evaluated in order to determine whether or not drinking norms mediated the relationships among the religiousness variables and alcohol outcomes. According to Baron and Kenny (1986), four conditions must be met to test for mediation. First, a significant relationship must exist between the independent variable and the dependent variable. Second, there must be a significant relationship between the independent variable and the mediating variable. Third, the mediator must be significantly associated with the dependent variable. Fourth, when the mediator is controlled, the previously significant

TABLE 2
Bivariate Correlations Among Background Variables and Study Variables

<i>Measure</i>	<i>Age</i>	<i>Gender^a</i>	<i>Greek Membership^b</i>	<i>Ethnic Background^c</i>	<i>Social Desirability</i>
Religious commitment	-.014	.200**	.004	.113*	.084
Religious comfort	-.038	.230**	-.057	.136*	.133*
Religious strain	.022	-.104	.097	.029	-.129*
Close friends' frequency	.103	-.113*	.244**	-.057	-.096
Close friends' quantity	.020	-.280**	.181**	-.082	-.086
Average student frequency	.166**	.024	-.146**	.151**	-.010
Average student quantity	.077	-.249**	-.179**	.074	-.052
Fraternity member frequency	.040	.090	-.154**	.014	.004
Fraternity member quantity	.012	-.190**	.003	-.071	.022
Sorority member frequency	.068	.065	-.136*	.035	.064
Sorority member quantity	.049	-.156**	-.156**	.015	.010
Average person frequency	.241**	.101	-.062	.097	-.023
Average person quantity	.082	-.215**	-.047	.020	-.086
Frequency of alcohol use	.084	-.139*	.272**	-.125*	-.131*
Quantity of alcohol use	-.013	-.317**	.172**	-.026	-.112*
DrInC total score	.075	-.142*	.141*	-.127*	-.203**

^aPositive correlations indicate associations with females; ^bPositive correlations indicate associations with Greek membership; ^cPositive correlations indicate associations with non-Caucasians.

* $p < .05$. ** $p < .01$.

TABLE 3
Bivariate Correlations Among Religiousness, Drinking Norms, and Alcohol Use Outcomes

<i>Measure</i>	<i>RCI Total Score</i>	<i>Religious Comfort</i>	<i>Religious Strain</i>	<i>Frequency</i>	<i>Quantity</i>	<i>DrInC Total Score</i>
Close friends' frequency	-.462**	-.234**	.101	.668**	.514**	.561**
Close friends' quantity	-.475**	-.236**	.070	.606**	.616**	.546**
Average student frequency	.036	.023	-.035	-.131*	-.147**	-.046
Average student quantity	-.068	-.020	.080	.083	.166**	.108*
Fraternity member frequency	-.023	-.061	.042	-.066	-.141*	-.032
Fraternity member quantity	-.098	-.075	.025	.183**	.272**	.202**
Sorority member frequency	-.011	.049	.014	-.103	-.125**	-.029
Sorority member quantity	-.082	-.021	.043	.060	.161**	.074
Average person frequency	.016	.033	-.014	-.088	-.123*	-.038
Average person quantity	-.135*	-.023	.038	.209**	.312**	.235**
Frequency of alcohol use	-.477**	-.262**	.086			
Quantity of alcohol use	-.363**	-.186**	.037			
DrInC total score	-.367**	-.271**	.170**			

* $p < .05$. ** $p < .01$.

relationship between the independent variable and dependent variable decreases significantly. In the event of mediation, Sobel's (1990) significance test was used to determine the significance of the indirect effect of the independent variable on the dependent variable via the mediator.

First, the independent variable (religiousness) must be associated with the dependent variables (alcohol use and alcohol-related problems). As shown in Table 3, religious commitment and comfort were associated with all alcohol outcomes. Religious strain was not associated with alcohol use but was related to alcohol-related problems. Second, the independent variable (religiousness) must be associated with the mediating variables (drinking norms). As shown in Table 3, religious commitment and religious comfort were associated with perceptions of alcohol use frequency and quantity for close friends. Religious strain was not significantly associated with any of the drinking norms. Therefore, only close friends' frequency and close friends' quantity of alcohol use were considered further as potential mediators. Third, the mediating variables (drinking norms) must be associated with the dependent variables (alcohol use and alcohol-related problems). Perceptions of close friends' frequency and quantity of alcohol use were associated with all dependent variables (Table 3).

As a result, the mediation analyses examined whether drinking norms for close friends (quantity and frequency) mediated the relationships between religious commitment and all alcohol outcomes (frequency, quantity, and alcohol-related consequences) and between religious comfort and these same outcomes. As indicated in Hypothesis 4, we predicted that the relationships between religious commitment and alcohol outcomes and between religious comfort and alcohol outcomes would be at least partially mediated by perceptions of others' drinking behaviors.

The Mediating Role of Close Friends' Frequency of Use

Drinking norms for friends' frequency of alcohol use fully mediated the relationships between religious commitment and quantity of alcohol use (Sobel's formula $z = -4.26$, $p < .001$). That is, religious commitment no longer significantly predicted quantity of alcohol use after accounting for perceptions of friends' frequency of alcohol use ($\beta = -.11$, $p > .05$). Furthermore, drinking norms for friends' frequency of alcohol consumption partially mediated the relationships between religious commitment and frequency of alcohol use ($z = -7.01$, $p < .001$) and between religious commitment and alcohol-related consequences ($z = -4.99$, $p < .001$). These results are shown in Figure 1.

We also examined the mediating role of friends' perceived frequency of alcohol use on the relationships between religious comfort and frequency of alcohol use and between religious comfort and alcohol-related consequences. As shown in Figure 1, drinking norms for friends' frequency of alcohol consumption partially mediated the relationships between religious comfort and frequency of alcohol use ($z = -3.97$, $p < .001$) between religious comfort and alcohol-related problems ($z = -3.65$, $p < .001$). Alcohol use quantity was omitted as a dependent variable because religious comfort did not predict this outcome beyond the effects of the background variables (partial correlation = $-.105$, $p > .05$).

The Mediating Role of Close Friends' Quantity of Use

Drinking norms for friends' quantity of alcohol consumption exhibited a pattern of mediation similar to drinking norms for friends' drinking frequency. Specifically, friends' perceived quantity of alcohol use fully

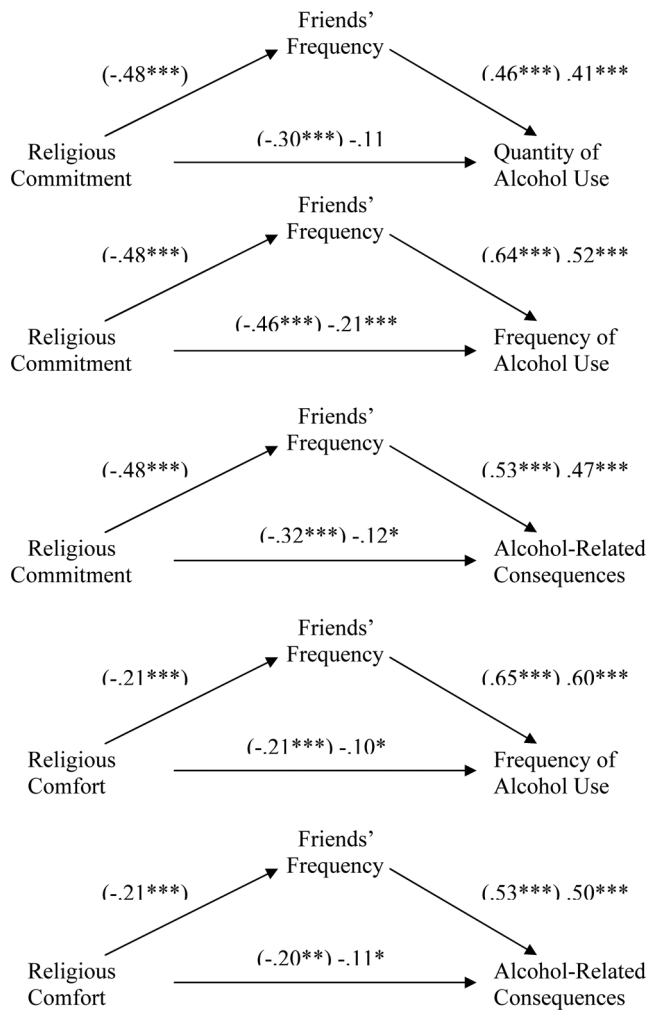


FIGURE 1 The mediating role of perceptions of close friends' frequency of consumption in the relationship between religious commitment and alcohol outcomes and religious comfort and alcohol outcomes. *Notes.* The numbers in parentheses are partial correlations indicating the unique contribution of the independent and mediator variables when the variance associated with the background variables has been removed. The numbers outside parentheses are standardized beta coefficients with alcohol outcomes as the dependent variables, perceptions of close friends' frequency of consumption as the mediating variable, and religiousness as the independent variable; * $p < .05$, ** $p < .01$, *** $p < .001$.

mediated the relationships between religious commitment and quantity of alcohol use ($z = -4.55$, $p < .001$). Furthermore, drinking norms for friends' quantity of alcohol consumption partially mediated the relationships between religious commitment and frequency of alcohol use ($z = -6.38$, $p < .001$) and between religious commitment and alcohol-related consequences ($z = -4.86$, $p < .001$). These findings are summarized in Figure 2.

In addition to these analyses, we investigated the mediating role of friends' perceived frequency of alcohol use on the relationships between religious comfort and

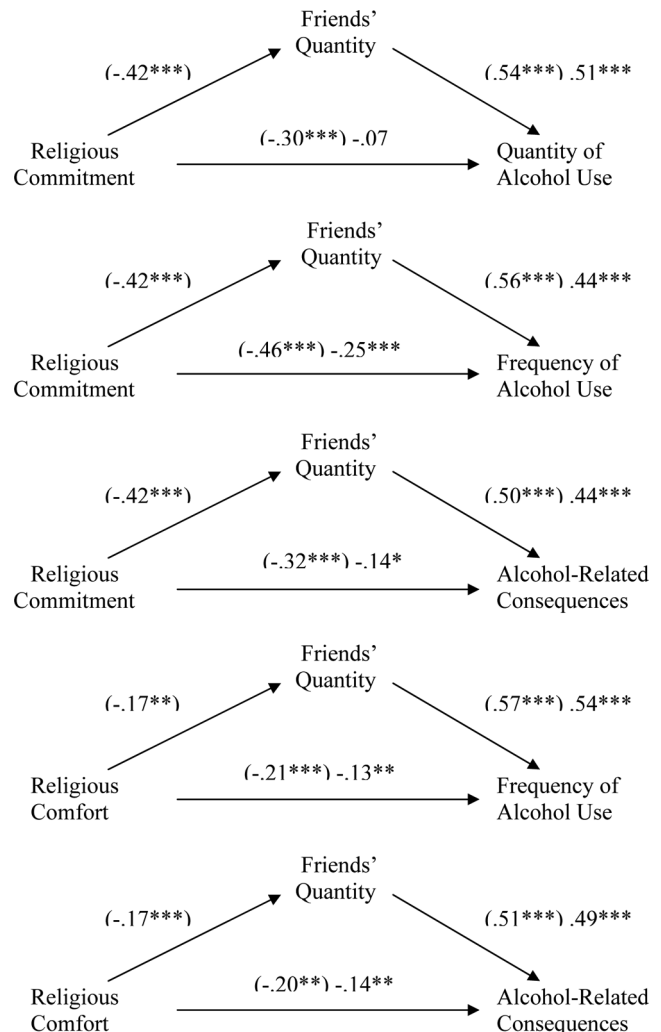


FIGURE 2 The mediating role of perceptions of close friends' quantity of consumption in the relationship between religious commitment and alcohol outcomes and religious comfort and alcohol outcomes. *Notes.* The numbers in parentheses are partial correlations indicating the unique contribution of the independent and mediator variables when the variance associated with the background variables has been removed. The numbers outside parentheses are standardized beta coefficients with alcohol outcomes as the dependent variables, perceptions of close friends' quantity of consumption as the mediating variable, and religiousness as the independent variable; ** $p < .01$, *** $p < .001$.

frequency of alcohol use and between religious comfort and alcohol-related consequences (Figure 2). Drinking norms for friends' frequency of alcohol consumption partially mediated the relationships between religious comfort and frequency of alcohol use ($z = -3.97$, $p < .001$) and between religious comfort and alcohol-related problems ($z = -3.65$, $p < .001$).

DISCUSSION

Because alcohol use in young adults involves high levels of consumption as well as significant problems,

researchers have investigated a variety of factors related to alcohol use including religiousness. Few studies, however, have included multiple measures of religiousness or investigated simultaneously several important dimensions of alcohol use and alcohol-related behaviors. In this study, we used multiple measures of religiousness and examined the role of descriptive drinking norms in the relationship between religiousness and alcohol use.

As predicted, religiousness, as measured by religious commitment and religious comfort, was inversely associated with alcohol use and alcohol-related consequences. Religiousness was related to less frequent alcohol consumption, fewer drinks consumed, and fewer problems related to alcohol consumption. That is, individuals who reported a greater sense of commitment to their religious beliefs, application of their beliefs to their daily living, or more positive religious experiences also endorsed lower levels of alcohol consumption and fewer alcohol-related problems than their less religious counterparts. These findings are consistent with other studies demonstrating an inverse relationship between religiousness and alcohol use (Bahr et al., 1998; Donahue & Benson, 1995; Koenig et al., 2001) and contribute to a growing literature linking religiousness and lower levels of alcohol use.

It should be noted that many studies have investigated associations between “positive” aspects of religiousness (e.g., religious commitment, importance of religion) and alcohol use (Bahr et al., 1998; Mason & Windle, 2001). In order to expand understanding of the role of religiousness in alcohol consumption, however, the present study also included a measure of “negative” religiousness. Specifically, we explored the associations between negative religious experiences or religious strain and alcohol outcomes. While religious strain was not significantly associated with alcohol consumption, religious strain was linked to alcohol-related problems. Specifically, individuals who endorsed negative religious experiences (e.g., disagreement with friends or family about religious issues, feeling lonely or different because of one’s beliefs) reported more consequences related to their drinking. These drinking consequences cannot be attributed to greater levels of alcohol consumption because religious strain was not associated with alcohol use outcomes. Given the cross-sectional nature of the present study, however, we cannot infer a causal direction between religious strain and alcohol-related problems. Future studies using longitudinal methodologies are needed to replicate this finding and determine the temporal direction of the association. It is possible, for example, that religious strain is tapping a general sense of discord or dissatisfaction with life. In this case, the association between religious strain and alcohol-related consequences may represent a relationship between two indicators of distress rather than the specific influence of religiousness.

The present study also examined the associations between religiousness and descriptive drinking norms. While a recent study linked religiousness with prescriptive drinking norms (Chawla et al., 2007), the relationship between religiousness and perceptions of alcohol use by others remained unexplored until now. The present study found that religiousness was associated with descriptive drinking norms for one’s close friends. Specifically, religious commitment and comfort were significantly associated with perceptions of close friends’ drinking frequency and quantity. Young adults higher in religiousness perceived their close friends to drink less frequently and in lower quantities than less religious counterparts. These significant associations between religiousness and descriptive drinking norms require replication in future studies.

It may be that religiousness, as indexed by measures of religious commitment and comfort, influences drinking norms through selection of friends. Religious young adults may establish friendships with peers possessing similar beliefs and exhibiting similar alcohol use patterns (Bahr et al., 1998). If religious young adults are more likely to associate with friends with similar religious beliefs (Sutherland & Shepherd, 2001), then the association between religiousness and perceptions of friends’ drinking behavior is likely due to actual differences in alcohol consumption rather than the influence of religiousness on perceptions about drinking. It is also possible that religiousness is associated with drinking norms for close friends because of misperceptions and not due to lower levels of alcohol use in friends of religious young adults. That is, personal beliefs about alcohol use (e.g., approval of moderate use, disapproval of binge drinking) and perceptions of others’ approval of use (prescriptive drinking norms) may influence perceptions of close friends’ drinking behavior (Chawla et al., 2007). As such, additional studies are needed to investigate religiousness, personal alcohol attitudes, prescriptive drinking norms, and descriptive drinking norms so that we can better understand the relationship between religiousness and descriptive drinking norms.

Religiousness may influence personal choices about drinking, as evidenced by the association between religiousness and alcohol consumption discussed here, as well as perceptions of close friends’ behavior, but does not alter perceptions of drinking behaviors in the more general population. Perhaps alcohol consumption is so common that even religious young adults who typically consume less alcohol and associate with peers possessing similar beliefs (Burkett & Warren, 1987; Sutherland & Shepherd, 2001) are sufficiently exposed to alcohol consumption to report descriptive drinking norms similar to less religious counterparts. Future studies should investigate the association between religiousness and descriptive drinking norms on religious campuses and other

campuses where alcohol use is likely to be less common to explore this issue.

In addition to investigating the relationships between religiousness and alcohol use and between religiousness and descriptive drinking norms, the present study also examined the associations between descriptive drinking norms and alcohol use outcomes. Previous research has demonstrated that descriptive drinking norms for close friends were more strongly associated with consumption by the individual than perceptions of the more general population (e.g., typical student) (Baer et al., 1991). Based on social comparison and social impact theories, researchers have argued that more proximal groups such as close friends exert a stronger influence on behavior than more distal groups (Lewis & Neighbors, 2004; Martens et al., 2006). We found that the strength and significance of the association between descriptive drinking norms and alcohol use depends on the drinking norms target. Perceptions of friends' drinking frequency and quantity were associated with frequency of use, quantity of consumption, and alcohol-related consequences. Similarly, perceptions of same-age peers' quantity of alcohol use were related to alcohol consumption variables and alcohol-related problems. However, these relationships were not as strong as those for perceptions of close friends' drinking behavior. This is not surprising, as young adults likely spend more time with close friends and these friends likely exert greater influence than the general population.

Many of the prior studies demonstrating a relationship between drinking norms and alcohol used cross-sectional designs. As such, we cannot determine the direction of the relationship. As interest in the role of drinking norms in alcohol use has increased, more researchers have implemented longitudinal designs to develop and evaluate intervention programs focused on drinking norms (Marks, Graham, & Hansen, 1992; Werner et al., 1996). From these studies, we know that drinking norms influence subsequent drinking behavior. In the present study, we focused on the influence of drinking norms on alcohol consumption within a mediational model. However, this relationship may be better understood as alcohol consumption influencing one's perceptions of others' drinking behavior. In reality, this is likely a bidirectional relationship where perceptions of others' drinking influence one's alcohol consumption and vice versa as posited by Marks and colleagues (1992). Additional longitudinal studies are required to elucidate the relative influences these constructs have on each other.

Another major finding of the present study was that the associations between religiousness and alcohol use outcomes appear to be mediated by drinking norms for one's close friends. That is, religiousness impacts

alcohol consumption and alcohol-related problems *through* the influence of perceptions of close friends' drinking frequency and quantity of consumption. Our data suggest that higher levels of religious commitment and comfort are associated with lower levels of friends' perceived drinking which, in turn, are associated with alcohol consumption and alcohol-related consequences.

It is beyond the scope of the present study to determine precisely how religiousness influences descriptive drinking norms. It appears clear, however, that perceptions of close friends' drinking explain, at least in part, why religiousness is associated with lower alcohol use. Young adults who are high in religiousness tend to perceive lower levels of drinking by their close friends and these perceptions are then associated with less alcohol use and fewer alcohol-related problems. While this finding is important, it also raises other questions warranting further investigation. First, it is not clear that the influence of religiousness can be explained entirely by descriptive norms for one's close friends. For example, religious commitment accounted for a small but significant increase in variance in predicting frequency of alcohol use beyond the variance accounted for by perceptions of close friends' drinking frequency and background variables. This finding aligns with previous work by Burkett (1993) but also suggests that the influence of religiousness on alcohol use outcomes is not solely due to perceptions of friends' drinking behavior. Second, it is unclear whether more religious young adults actually associate with peers who consume alcohol less frequently and in lesser quantities or whether these religious young adults misperceive lower levels of consumption in their friends. Additional studies—including those obtaining actual drinking reports from friends—are needed to determine the mechanisms by which religiousness influences perceptions of friends' alcohol consumption. We do know, however, that religious commitment and comfort were consistently related to alcohol use outcomes and that these relationships were at least partially explained by descriptive drinking norms for close friends.

Prior to integrating the present findings into prevention and intervention programs, these results must be replicated in subsequent studies. This is particularly important for the associations demonstrated between religiousness and descriptive drinking norms as these relationships have not been explored previously in the literature. Future research must also examine the mechanisms of the association between religiousness and descriptive drinking norms for one's close friends. Specifically, investigators should evaluate whether friends of religious young adults actually consume alcohol less frequently and in lesser quantities or religious young adults simply perceive lower levels of alcohol use. In addition, future research must address the

relationship between religious strain and alcohol-related consequences. Again, the temporal nature of the relationship must be explored. Perhaps young adults experiencing religious strain consume alcohol to deal with these negative experiences. While they may not consume alcohol at higher levels than counterparts, they may be more likely to experience negative consequences as a result of their drinking (Brechting, Salsman, Collier, & Carlson, 2006). It could also be that young adults may be drinking alcohol and experiencing alcohol-related problems, which in turn, lead to feelings of religious discord for some individuals.

The present findings should also be considered in light of several limitations of the study. First, the cross-sectional nature of the study design precludes conclusions regarding causality. Longitudinal studies are needed in order to elucidate the temporal manner in which religiousness, drinking norms, and alcohol use relate to one another. Second, the distribution of males and females in the sample is also a potential concern. Given that one of the most persistent findings in the scientific study of religion is that females exhibit greater religiousness and religious participation than males (Brown, Parks, Zimmerman, & Phillips, 2001; Donahue & Benson, 1995; Gallup & Bezilla, 1992), this overrepresentation of females likely does not compromise the external validity of the present findings. However, if future studies examining these constructs included an increased proportion of males, it would instill greater confidence in the present findings. Third, the ethnic diversity of the sample was limited. Replicating this study with larger numbers of ethnic minority participants would enable exploration of whether the present findings are invariant across ethnic groups. Fourth, the participants were recruited through their enrollment in undergraduate psychology classes. Although many of these classes are general courses and do not represent advanced students pursuing degrees only in psychology, it is possible that these participants do not represent undergraduate students at the university or undergraduate students in general. Fifth, the educational status of the participants may limit the findings to this particular cohort of young adults. It would be important to evaluate whether these findings hold for young adults not participating in higher education. Finally, this study relied on responses to self-report questionnaires. Much research, however, has demonstrated that using self-report study designs yields reliable and valid substance use data in young adults (Harrison & Hughes, 1997).

This study makes important contributions to our understanding of how religiousness may exert its influence on the drinking behavior of young adults. First, the previously demonstrated relationship between religiousness and alcohol use received additional empirical support in young adults from the present sample.

Second, this study expanded the current literature by exploring the associations between several aspects of religiousness and descriptive drinking norms. Fourth, the present findings highlighted the importance of examining the role of specific descriptive drinking norms and refraining from general conclusions about drinking norms when considering their impact on alcohol use. Finally, descriptive drinking norms for close friends emerged as mediators of the relationships between religiousness and alcohol use outcomes. In sum, the relationship between religiousness (i.e., religious commitment and comfort) and alcohol use can be at least partially understood through the influence of drinking norms for close friends.

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