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FACTORS INFLUENCING THE ASSOCIATION BETWEEN RELIGIOSITY AND DRINKING BEHAVIOR IN UNDERAGE COLLEGE STUDENTS

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THESIS

A thesis submitted in partial fulfillment of
the requirements for the degree of Master of
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By

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ABSTRACT OF THESIS

FACTORS INFLUENCING THE ASSOCIATION BETWEEN RELIGIOSITY AND DRINKING BEHAVIOR IN UNDERAGE COLLEGE STUDENTS

Research has consistently demonstrated a negative association between religiosity and college students' alcohol consumption. However, few studies have explored the unique roles religious beliefs and behaviors might play in this relationship. Using 283 underage college students, we investigated the influence of internal and external factors on drinking behaviors for students with differing combinations of religious beliefs and religious behaviors. Tests of mediation and mediated-moderation were used to help explain the unique influences beliefs and behaviors have on alcohol consumption. Results indicated that religious beliefs only functioned as a protective-factor against underage drinking when accompanied by religious behaviors; students with high religious beliefs but low religious behaviors exhibited the highest rates of alcohol consumption. Positive affect experienced during alcohol consumption mediated the relationship between religious beliefs and alcohol consumption. Drinking norms and social availability of alcohol mediated the association between religious behaviors and alcohol consumption. Both positive affect and negative affect were found to partially mediate the interaction between religious beliefs and behaviors on student alcohol consumption. Findings from this study may aid in the formulation of a more comprehensive model for the relationship between religiosity and alcohol consumption in young college students.

KEYWORDS: *religious beliefs; religious behaviors; underage drinking; alcohol; risk-taking*

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CHAPTER ONE: INTRODUCTION

Background on Underage Drinking

Researchers are becoming ever more concerned with college students' involvement in underage drinking. Underage drinking has been linked to a number of consequences including increased risks for academic failure, mental health difficulties, deleterious brain effects, legal repercussions, contraction of sexually transmitted infections, unwanted sexual contact, development of alcohol use disorders later in life, and unintentional injury or death (Brown, Salsman, Brechting, & Carlson, 2007; Hingson, Heeren, Winter, & Weschler, 2005). The detrimental outcomes of underage drinking are far reaching and extend beyond the drinking individuals themselves to families, communities, and innocent bystanders. Reports show that in 2001 nearly 3 million college students reported driving under the influence of alcohol, while an additional 600,000 students were assaulted by another intoxicated student, and 70,000 students were date raped by a student who had been drinking (Hingson et al., 2005). Since 80% of U.S. college students consume alcohol at least occasionally, the risk for alcohol-related negative consequences is high (Johnston et al., 2012; Douglas et al., 1997; Slicker, 1997). Research intended to reduce underage drinking and its associated consequences is of utmost importance.

Religiosity as a Protective Factor

While a number of risk and protective factors have been posited to explain young adults' engagement in underage drinking (e.g. alcohol expectancies, gender, impulsive nature, Greek membership, peer influences, social norms, assertiveness, drinking motives, etc.), one of the most promising protective factors appears to be religiosity (a

belief in divine existence with an emphasis on group affiliation and prescribed actions) (Burris, Sauer, & Carlson, 2011; Chen, Dufour, & Yi, 2004/2005; Ham & Hope, 2003). Numerous studies have shown that high levels of religiosity are predictive of young adults' abstention from high risk activities (Brechting & Carlson, in press; Brown et al., 2007; Douglas et al., 1997; Haber, Grant, Jacob, Koenig, & Heath, 2011; Koenig, Haber, & Jacob, 2011; Langer, Warheit, & McDonald, 2001; Patock-Peckham, Hutchinson, Cheong, & Nagoshi. 1997; Sauer, Burris, & Carlson, 2012). In a review of 278 studies examining the relationship between religiousness and alcohol, Koenig et al (2011) found that 86% of studies demonstrated a negative association between alcohol use and religiousness. Furthermore, college students who choose not to drink or to drink infrequently commonly cite religious beliefs as a reason for their abstention (Slicker, 1997). Religiosity's protective properties for alcohol use have been particularly robust and demonstrated across age, gender, and socioeconomic status (Wills et al., 2003).

Religious Beliefs vs. Behaviors

While the majority of studies attest to the protective properties of religiosity, Brechting, Brown, Salsman, & Sauer (2010) demonstrated that individuals must exhibit highly religious behaviors in addition to highly religious beliefs in order to benefit from religiosity's protective effect. In fact, individuals with strong religious beliefs unsupported by religious behaviors demonstrated among the highest rates of alcohol consumption, equal to those with low religious beliefs. This finding that religiosity may not maintain its protective properties (or perhaps even act as a risk factor) for individuals with discordant religious beliefs and behaviors suggests that religiosity may not have the broad protective properties researchers have previously attributed to it.

Mediators of the Association between Religiosity and Alcohol Use

Although the relationship between religiosity and underage alcohol consumption is well defined, the underlying mechanism for this association remains unclear. Few studies have attempted to identify factors that mediate the association between religiosity and alcohol use. Perceived descriptive drinking norms (perceptions of other students' drinking behavior) have been shown to partially mediate the relationship between religiosity and underage alcohol use (Brechting & Carlson, in press; Chawla, Neighbors, Lewis, Lee, & Larimer, 2006; Neighbors, Brown, Dibello, Rodriguez, & Foster, 2012). Sauer et al., (2012) demonstrated that less positive alcohol expectancies could also be used to partially explain the relationship between religiosity and alcohol use. Alcohol expectancies likely influence both the likelihood students will drink as well as the affective experience students have during alcohol consumption. Lastly, researchers have also proposed that the number of religious peer influences a young adult has can be used to partially explain the religiosity/alcohol consumption link (Chawla, Neighbors, Lewis, Lee, & Larimer, 2006; Neighbors, Brown, Dibello, Rodriguez, & Foster, 2012). Social networks' composed of religious peers may reduce young adults' exposure to alcohol in social settings Further research is needed to confirm these factors, identify additional mediators, and determine if these mediational relationships function through religious beliefs or behaviors.

Implications/Proposed Study

In order to develop effective interventions for underage drinkers, further research is needed to identify the mechanisms through which religiosity's protective properties operate. The proposed study sought to confirm that religiosity's protective factors are

limited to individuals high in both religious beliefs and behaviors. The present study also explored how individuals who demonstrate high religious beliefs but low religious behaviors differ from other groups in terms of involvement in underage alcohol consumption.

Lastly, the study sought to identify internal and external factors related to college students' underage drinking and determine if said-factors mediated the relationship between religiosity and drinking behaviors in the sample under investigation. More specifically, the study explored: 1) Drinking experience and competencies (How long has the student been drinking? Where did the student receive drinking training/learn to drink? What was the extent of this training?), 2) Drinking context (Where does the student normally drink and who are they with when they drink? How available does the young adult perceive alcohol to be? What emotions occur while drinking?), 3) Goals/motives for drinking, 4) Cost/benefits of drinking (What "pros" and "cons" does the student associate with drinking?), 5) Beliefs regarding alcohol (What social drinking norms does the student hold? What expectancies do they have for alcohol? How central do they perceive alcohol to be to the college experience?), 6) Drinking Behaviors (During the last year, how much did the student drink and how frequently did they drink?), 7) Religious beliefs (How strong of religious values does the student hold?), 8) Religious behaviors (How frequently does the student pray? How frequently do they attend religious services?), 9) Social assertiveness, 10) Social desirability (How likely is the student to engage in impression management?), 11) Social Support, 12) Self-esteem, and 13) High-risk sexual and drug use behavior.

Hypotheses

Based on the review of the recent literature it was expected that:

1. Religious behaviors would moderate the association between religious beliefs and student alcohol use. Individuals with high religious beliefs and high religious behaviors would have the lowest rates of alcohol consumption among the underage sample (Brechting et al., 2010).
2. Negative affect during alcohol consumption would mediate the association between religious beliefs and total alcohol consumption. Students with high religious beliefs would experience greater amounts of negative affect during alcohol consumption; in turn, they would consume less alcohol (Sauer et al., 2012).
3. Drinking norms would mediate the association between religious behaviors and alcohol consumption. Students with high religious behaviors would report lower drinking norms than students with low religious behaviors (Brechting & Carlson, 2013; Neighbors et al., 2012).
4. The social availability of alcohol would mediate the association between religious behaviors and alcohol consumption. Students with low religious behaviors would perceive alcohol to be more socially available than students with high religious behaviors; this would lead to greater alcohol consumption for low beliefs students (Treno, Ponicki, Remer, & Gruenewald, 2008).

CHAPTER TWO: METHODS

Participants

Due to the study's focus on underage drinking, eligibility was limited to college students between the ages of 18 and 20 years old. Participants were recruited through entry-level undergraduate psychology courses. Faculty announced the study in class and participants were granted extra credit towards their course work for study completion. In order to guard against coercion, students were provided an alternative assignment if they declined to participate. 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. Participants were given a link to complete the survey online. Due to the minimal risks associated with this online study, the Institutional Review Board waived the official process of informed consent. Prior to starting the survey, participants indicated their consent to the terms provided in a cover letter. Students' names were separated from all data so that responses were effectively anonymous.

Previous research (Brechting et al., 2010) found a large effect of moderation for religious behaviors on the association between religious beliefs and alcohol consumption (r^2=.319). A priori power analyses conducted with G*Power 3.17 (Erdfelder, Faul, & Buchner, 1996) indicate that a sample size of 91 participants would be sufficient to detect a similar effect in data with an alpha of .05 at .80 power. Because of interest in using study data to conduct future exploratory analyses at a later date, 283 participants were recruited. This larger sample size ensured that alternative predictive models could be explored.

One hundred ninety-five female (68.9%) and eighty-eight male participants completed the survey. Nineteen-year-olds composed nearly half of the sample (45%, n = 129). The sample was 73% white, 14% African American, 4% Asian, and 5% other or unknown. Fifty-nine percent of participants were freshman, 32% were sophomores, and the remaining 8% were upper-classmen. Twenty-eight percent of participants reported involvement in athletic organizations, 38% were involved in Greek life, and 17% participated in campus religious organizations.

Measures:

Demographics

Participants reported their age, sex, ethnic background, current year in school, marital status, and involvement in extracurricular activities during the last year. Participants also indicated whether or not they had ever received mental health treatment.

Alcohol Scales

Experience with Alcohol

The Drinking Styles Questionnaire was used to assess students' experience and history with alcohol (including age of first drink and students' primary source of knowledge regarding alcohol consumption) as well as the typical context of students' current drinking (e.g. "Who do you usually drink with?" and "Where do you normally drink alcohol?") (DSQ, Smith, McCarthy, & Goldman, 1995). The 15 item questionnaire also contained a 10 item dichotomous measure assessing negative outcomes from alcohol consumption. This negative outcome composite was found to have good reliability (α = 0.886).

Drinking Context

Students reported the physical, social, and subjective availability of alcohol using the 28-item Alcohol Availability Measure (Abbey, Scott, & Smith, 1993). Responses were given for 28 Likert-type questions. Physical (α =0.923), social (α =0.887), and subjective scales (α = 0.889) all demonstrated good internal consistencies. The measure of social availability of alcohol examined both implicit norms regarding alcohol consumption (obligation to drink, drinking to be social, and availability of alcohol in social settings) as well as individuals' perceptions of their friends', families', and romantic partners' alcohol consumption. Social networks' alcohol consumption was found to have low reliability (α =0.455) as compared to implicit alcohol norms (α =0.903). As a result, social networks' alcohol consumption was not examined independently but was included in calculations for the social availability of alcohol composite score. The measure of physical availability was scored so that low scores indicated the nearby presence of alcohol. To aid in comprehension, this scale will henceforth be referred to as "physical unavailability of alcohol."

Individuals self-reported the emotions they typically experience while drinking using the Positive and Negative Affect Scale (PANAS, Watson, Clark, & Tellegan, 1988). The PANAS is composed of two 10-item affect scales. Using a 5 point scale, students indicated to what extent they generally experience each emotion while consuming alcohol. When used to indicate how often participants experience these moods "in general", the PANAS has been shown to have a Cronbach's alpha = 0.87. Our study demonstrated an overall Cronbach's alpha =0.905.

Drinking Motives

To assess students' motives for drinking, The Drinking Motives Questionnaire-Revised (DMQR; Cooper, 1994), a 20-item questionnaire that assessed people's reasons for drinking alcoholic beverages was administered. Participants were asked how frequently they are motivated to drink by 20 common provided reasons; responses ranged from 1 (Almost never/Never) to 5 (Almost always/Always). The measure produced four scales indicating different motives for drinking (social, coping, enhancement, and performance). The DMQR demonstrated excellent reliability in our sample ($\alpha = 0.953$).

Costs and Benefits of Drinking

Items from two validated scales were combined to assess individuals' "pros" and "cons" of consuming alcohol. Ten items concerning the benefits of drinking alcohol were taken from the Decisional Balance for Immoderate Drinking (DBID, Migneault, Velicer, Prochaska, & Stevenson, 1999). To assess potential consequences of drinking, 14 consequences were taken from the DSQ + Kahler (Smith et al., 1995). Both the "pros" and "cons" scales exhibited excellent reliability ($\alpha = 0.933$ and $\alpha = 0.939$, respectively).

Beliefs about Alcohol

Drinking norms were assessed using the 10 item Drinking Norms Rating Form (DNRF; Baer et al., 1991). Participants estimated the frequency and quantity of alcohol consumption for various peers (such as close friends, average student on campus, average member of a sorority/fraternity, etc.). Responses ranged from 1 (less than once a month) to 7 (once a day) for frequency questions and from 1 (0 drinks) to 6 (more than 8 drinks) for quantity. Both scales were found to have good to excellent reliabilities ($\alpha = 0.874$ and $\alpha = 0.909$, respectively).

Drinking Behavior

Alcohol use was determined from two single-item measures addressing frequency of alcohol use ("In the last year, how often did you drink alcohol on average?") and alcohol consumption ("In the last year, when you drank alcohol, how many drinks did you consume on average on one occasion?"). Frequency responses ranged from 0 (no alcohol use) to 17 (4 or more times a day) while consumption responses ranged from 0 (no alcohol use) to 13 (more than 25 drinks). These single-item measures have been shown to have strong test-retest reliability (0.84-0.85 across 11 weeks) and to correlate moderately with two week logs of alcohol consumption (r=0.72 and 0.56, respectively) (Dollinger & Malmquist, 2009). In our sample, frequency of alcohol use and alcohol consumption demonstrated a strong significant correlation ($r=.733$, $p < .01$). In order to simplify further analyses, a drinking behavior composite score (indicating the average amount of alcohol consumed over a given week) was computed by multiplying the z-scores of these measures ($\alpha = 0.842$). While the alcohol composite variable was found to violate the regression assumptions of homoscedasticity and normality, the variable was found to meet assumptions after undergoing a square root transformation. As a result, the square root transformed variable was used for all subsequent analyses.

Religious Scales

Religious beliefs were measured with the 12-item short form of the faith maturity scale (Piedmont & Nelson, 2001) developed from the original faith maturity scale by Benson, Donahue, and Erickson (1993). The measure emphasizes values and behavioral manifestations of faith. Responses ranged from 1 (never true) to 7 (always true) and reliability was found to be excellent ($\alpha = 0.938$).

Students' religious behaviors were assessed using single-item measures previously found to have strong test-retest reliability (0.85-0.86 across 11 weeks) (Dollinger & Malmquist, 2009). The question, "how often do you pray?" was used to assess frequency of prayer. Participants were asked to select from Likert-type responses ranging from 0 ("never") to 5 ("several time a day"). Frequency of religious service attendance was gauged with the question, "how often do you attend religious services?" Responses ranged from 0 ("never") to 3 ("about once a week or more"). In our sample, frequency of religious service attendance and frequency of prayer demonstrated a strong significant correlation ($r=0.674$, $p<.01$) so a religious behavior composite score was computed by summing z scores of these measures ($\alpha = 0.681$).

Additional Scales

Social Skills/Assertiveness

Social assertiveness was assessed using the Rathus Assertiveness Schedule (RAS, Rathus, 1973). The measure contains 30 Likert-type items ($\alpha=0.789$). Responses ranged from +3 (very characteristic of me, extremely descriptive) to -3 (very uncharacteristic of me, extremely non-descriptive).

Social Desirability

Students' tendency to engage in impression management and self-deceptive enhancement were measured using the Paulhus Balanced Inventory of Desirable Responding (BIDR, Paulhus, 1991). The inventory consists of 40 items measured with a 7-point Likert-type scale. Responses raged from 1 (not true) to 7 (very true). The 40 items demonstrated adequate reliability in our study as a measure of socially desirable responding ($\alpha=0.743$).

Social Support

Participants' perceptions of the amount and type of personal social support they received were measured using the DUKE-UNC Functional Social Support Questionnaire (Broadhead, Gehlbach, DeGruy, & Kaplan, 1988). The measure includes eight items that participants responded to using a 5-point scale ranging from 1 (much less than I would like) to 5 (as much as I would like). The measure breaks down into two scales- confidant support and affective support. Due to a technical error, the data for this variable were not viable. As a result, social support was excluded from further analyses.

Self-Esteem

Participants' self-esteem was assessed using the Rosenberg Self-Esteem Scale (RSES, Rosenberg, 1965). The scale consists of 10 items. Responses ranged from strongly agree to strongly disagree. Internal consistency was excellent (α=0.915).

High-Risk Sexual and Drug Use Behavior

Participants reported their lifetime number of sexual partners, current number of male and female sexual partners, number of vaginal and oral sex partners (male and female) in the past three months, as well as the number of unprotected sex acts and instances of condom use in the past three months. A three month time frame has been shown to elicit reliable recall of sexual behavior (Kauth, St. Lawrence, & Kelly, 1991). Item responses ranged from 0 (none) to 6 (13+) with the exception of current number of sexual partners which ranged from 0 to 5+. Findings for these measures will be reported at a later date.

Students were also be asked to indicate if they have ever used a number of substances (e.g. tobacco, amphetamine stimulants, hallucinogens, etc.) as well as their

frequency of use of said substances during the last three months (responses ranged from 0- never to 4- daily or almost daily). These items are a subset of questions from the World Health Organization's Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST V. 3.0) which has been found to have a coefficient alpha greater than 0.80 (Humeniuk, 2006). Findings for this measure will be discussed in subsequent articles.

CHAPTER THREE: RESULTS

Validity Checks and Covariates

Given concerns regarding the validity of online data collections, a number of data checks were employed to ensure the highest quality of data. First, as the study was only interested in underage alcohol use, responses from all participants over the age of 20 were excluded (10 responses removed). Responses from 11 participants who failed to complete at least 50% of the survey were also removed. Next, survey completion time was examined. Survey completion time ranged from 8.10 to 722.13 minutes. Fourteen extreme, high outliers were removed as it was considered unreasonable to assume that participants' response sets remained constant across a 12-hour duration. As the survey was estimated to take 40 minutes to complete, researchers were also concerned about the quality of data from participants with extremely low survey completion times. As a result, 31 participants with survey completion times less than 15 minutes were excluded from further analysis. Data of participants with completion times between 15 and 20 minutes were carefully examined for blatant response patterns (e.g. completing four or more scales in a row with the same response). Nine participants were found to have invalid data and were removed. As one final check of the data, descriptives were run for participants' alcohol consumption over the course of a week. As alcohol consumption involved the survey's first questions and the focus of the study, any extreme outliers on these questions were excluded. This procedure resulted in the exclusion of two participants. Two hundred eleven responses passed these rigorous data checks and were retained for further analyses.

Analyses were also conducted to determine if significant differences existed between the 211 retained participants and the 77 participants who were excluded. As Table 1 shows, no significant differences were found between the two groups for religious beliefs, religious behaviors, alcohol consumption (nearly significant, p=.051), social availability of alcohol, frequency drinking norms, consumption drinking norms, or completion time (nearly significant, p =.030). Significant differences were only found for negative affect. An alpha level = .01 was used to control for family-wise error rate for these analyses.

Finally, we examined whether any demographic characteristics served as covariates to our variables of interest. Gender, ethnicity, and year in school were all found to not share significant relationships with students' religious beliefs, religious behaviors, or alcohol use. Participation in Greek life ($r(211) = .289$, $p < .001$) and impression management ($r(211) = -.180$, $p < .01$) were found to share small correlations with alcohol consumption while self-deception ($r(206) = .163$, $p < .05$) and impression management ($r(206) = .145$, $p < .05$) demonstrated small correlations with religious behavior. The inclusion of these variables as covariates did not affect the significance of any reported results so no variables were controlled for throughout further analyses.

Table 1

Results comparing participants excluded due to response problems with the remaining sample of participants.

Outcome	Group						95% CI for Mean Difference	T	Df	p
	Excluded			Included						
	M	SD	N	M	SD	N				
Religious Beliefs	47.44	15.18	54	50.22	17.76	206	-7.55, 2.01	-1.15	95	.252
Religious Behaviors	5.63	2.95	57	6.41	2.92	211	-1.65, .09	-1.78	88	.079
Alcohol Consumption	52.77	43.41	57	40.47	33.25	211	-.03, 24.63	1.99	75	.051
Negative Affect	21.21	9.01	53	15.29	5.97	203	3.31, 8.53	4.53	64	.000*
Social Availability of Alcohol	40.16	11.39	56	40.91	10.42	207	-4.10, 2.60	-.45	82	.656
Frequency Drinking Norms	26.69	7.13	56	30.34	6.23	209	-2.74, 1.42	-.63	79	.529
Consumption Drinking Norms	28.06	8.61	54	29.16	7.36	203	-3.66, 1.44	-.87	75	.390
Completion Time	76.34	152.52	57	31.24	11.97	211	4.60, 85.60	2.23	56	.030

* $p < .01$.

Interaction of Religious Beliefs and Religious Behaviors

In accordance with the moderation analytic strategies proposed by Aiken and West (1991), a two-step hierarchical regression with an alpha level = .05 was used to investigate whether religious behaviors moderated the relationship between religious beliefs and alcohol use. For step one of the regression, religious beliefs and behaviors were entered simultaneously. Variables were centered to avoid potential issues of high multicollinearity with the interaction term. Religious beliefs and behaviors accounted for a significant amount of variance in students' alcohol consumption, $R^2 = .162$, $F(2,203) = 19.659$, $p < .001$. The interaction term for these variables was entered as the second step. The significance of the interaction term was tested, $\Delta R^2 = .037$, $\Delta F(1, 202) = 9.232$, $p < .01$, $\beta = -.192$, $t(202) = -3.039$, $p < .01$. In accordance with Hypothesis 1, religious behaviors were found to moderate the relationship between religious beliefs and students' alcohol consumption (discussed below). The moderation term was plotted and the simple slopes of its regression lines were tested to determine if they were significantly different from zero.

Examination of the interaction plot (Figure 1) revealed that religious beliefs acted as a significant inverse predictor of alcohol consumption for students who demonstrated high levels of religious behavior (1 SD above the mean), $B=-.0361$, $p < .01$. However, at low levels of religious behavior (1 SD below the mean), religious beliefs were positively associated with student's alcohol consumption, $B= 0.0341$, $p<.01$. Students with high religious beliefs and discordant religious behaviors demonstrated significantly higher alcohol consumption rates than any other group of students ($p < .01$). Students with low religious beliefs and low religious behaviors did not significantly differ from students

with low religious beliefs and discordant religious behaviors, *B*=- 0.214, p>.05; however, both groups were found to have significantly higher alcohol consumption rates than students with both high religious beliefs and behaviors (p<.01).

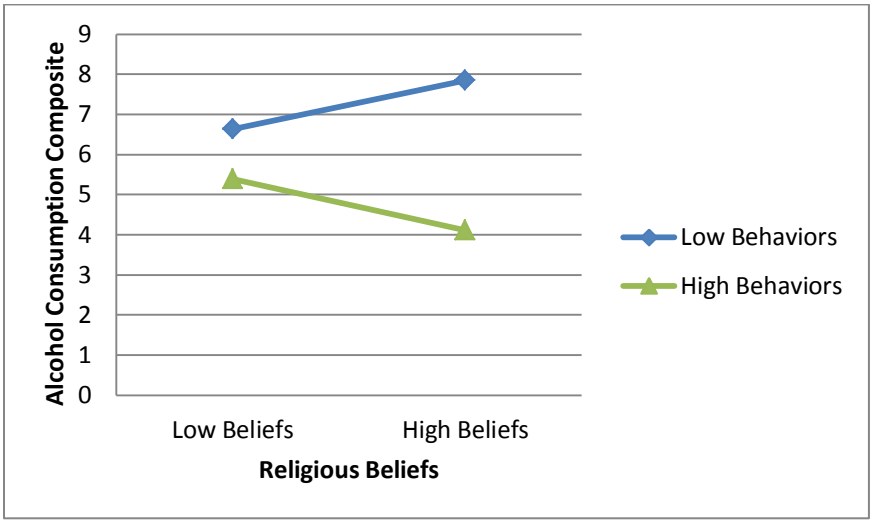

Figure 1. Relationship between religious beliefs and alcohol consumption under conditions of low and high frequency of religious behaviors.

Affect as a Mediator of Religious Beliefs and Alcohol Use

Hypothesis 2 proposed testing affective experience during alcohol consumption as a mediator of the association between religious beliefs and alcohol consumption. However, after tests of Hypothesis 1 found evidence for a significant interaction between religious beliefs and behaviors, it was decided that it would be more informative to conduct tests of mediated moderation The Preacher & Hayes SPSS macro for indirect effects was used to determine whether negative affect mediated the relationship found between the interaction of religious beliefs and religious behaviors and alcohol. Religious beliefs and religious behaviors were entered in the first step, followed by the

interaction term of religious beliefs and behaviors in the second step. The proposed mediator (negative affect) was then added as a final step.

Figure 2 shows that negative affect (indirect effect 95% CI = [-.005, -.001]) was found to mediate significantly the moderating effect of religious behaviors on the association between religious beliefs and alcohol consumption. In other words, different combinations of religious beliefs and religious behaviors experienced different levels of negative affect while drinking; these differences in negative affect were associated with differences in alcohol consumption. More specifically, religious beliefs significantly predicted lower experiences of negative affect when accompanied by high religious behaviors (1SD above the mean) (B=-.0825, t(192)=-2.0859, p <.05). The association was non-significant for students with low religious behaviors (B=.0360, t(196)=.9106, p >.05). Lower levels of negative affect during alcohol consumption were in turn predictive of lower total alcohol consumption for students with high religious behaviors (B=.1121, t (192) = 3.3223, p < .01). Students with high religious beliefs and high religious behaviors were found to experience significantly lower negative affect while drinking than students with low religious beliefs and high religious behaviors (p<.05).

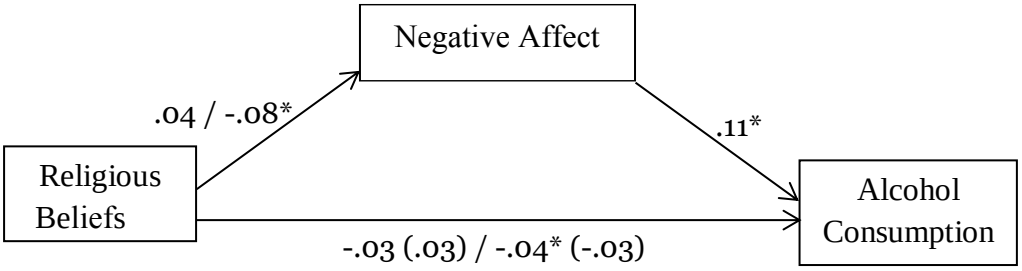

Figure 2 Tests of negative affect mediated moderation model. The relationship between the interaction of religious beliefs and religious behaviors and alcohol consumption is mediated by negative affect. All values are beta coefficients. Values before the slash indicate conditions of low religious behaviors while values after the slash represent conditions of high religious behaviors. The value in parentheses shows the relationship between the independent variable and alcohol consumption when the mediator is included in the model.
Note. * p <.05

Due to the strong support for negative affect as an important factor in the association between religious beliefs, religious behaviors, and alcohol consumption, we decided to also explore positive affect as a moderation mediator. The Preacher & Hayes SPSS macro for indirect effects was again used to test for mediated moderation. Figure 3 shows that positive affect (indirect effect 95% CI = [-.011, -.001]) was also found to be a significant mediator for the association between the interaction of religious behaviors and beliefs and alcohol consumption. Religious behaviors were found to only significantly predict positive affect as a mediator when religious beliefs were high (i.e. students with high religious behaviors and high religious beliefs experienced lower positive affect while drinking than students with low religious behaviors and high religious beliefs), (B=-1.4064, t(195)=-3.5131, p <.001). For these students, lower levels of positive affect were predictive of lower levels of alcohol consumption, (B=.1739, t(195)=10.1553, p < .0001).

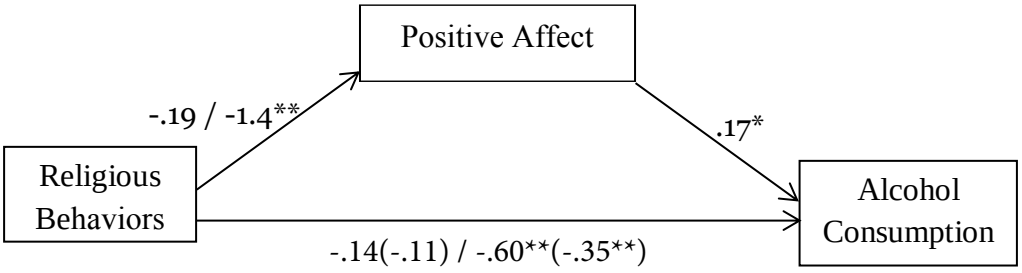

Figure 3 Tests of positive affect mediated moderation model. The relationship between the interaction of religious beliefs and religious behaviors and alcohol consumption is mediated by positive affect. All values are beta coefficients. Values before the slash indicate conditions of low religious beliefs while values after the slash indicate conditions of high religious beliefs. The value in parentheses shows the relationship between the independent variable and alcohol consumption when the mediator is included in the model.
Note. * p <.01; ** p < .001

Drinking Norms as a Mediator of Religious Behaviors and Alcohol Use

Ordinary Least Squares (OLS) regression analyses were used to test Hypothesis 3 (students with high religious behaviors will report lower drinking norms than students who lack religious behaviors). Bootstrapping analyses (as proposed by Shrout & Bolger (2002) were used to test the significance of the indirect effect and determine if drinking norms acted as a significant mediator. These procedures revealed that both frequency drinking norms and consumption drinking norms were found to significantly mediate the association between religious behaviors and alcohol use. Figure 4 (a) illustrates the association mediated by frequency drinking norms while Figure 4 (b) depicts the association with consumption drinking norms as the mediator. Bootstrapping procedures were used to test the significance of the indirect effect. The 95% confidence intervals were [-.111, -.021] for frequency drinking norms and [-.210, -.076] for consumption drinking norms. Thus it was concluded that both indirect effects were statistically significant and both frequency and consumption drinking norms partially mediated the association between students' religious behaviors and alcohol use. Tests of mediated moderation for frequency and consumption drinking norms proved non-significant (95% CI = [-.0043, .0003] and [-.0087, .0004], respectively)

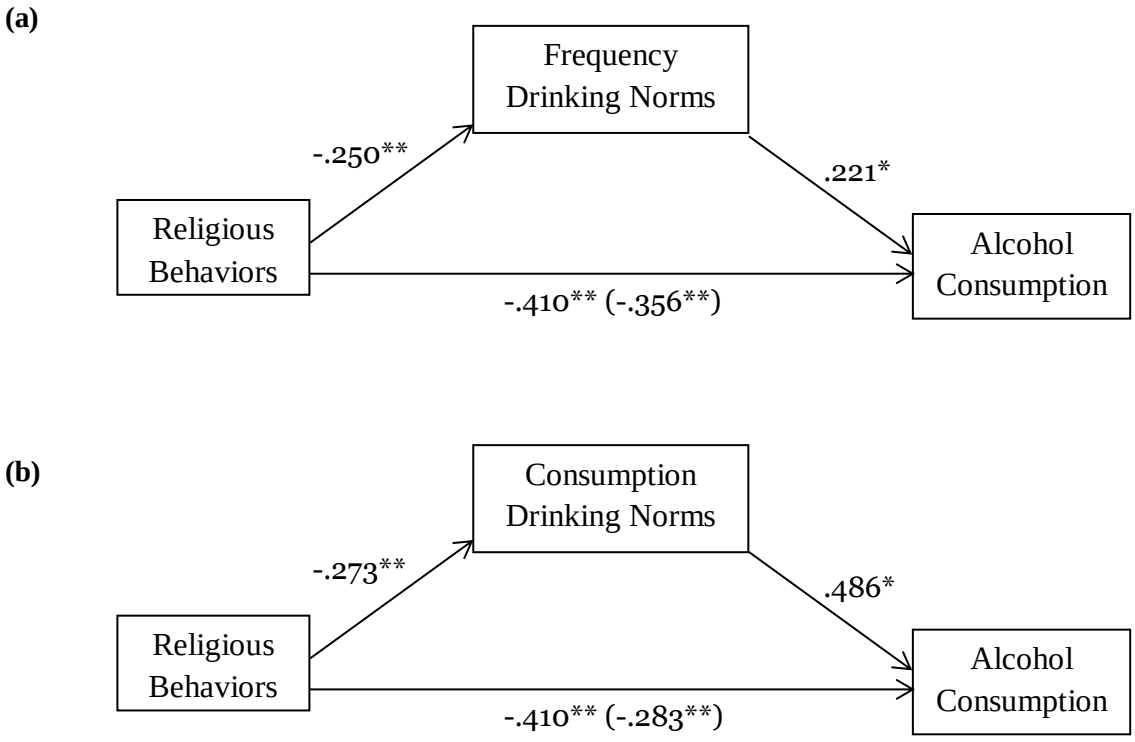

Figure 4 Test of drinking norms mediation models. Standardized regression coefficients for the relationship between religious behaviors and alcohol consumption as mediated by (**a**) consumption drinking norms and (**b**) frequency drinking norms. The value in parentheses shows the relationship between the independent variable and alcohol consumption when the mediator is included in the model.
Note. * p <.01; ** p < .001

Social Availability of Alcohol as a Mediator of Religious Behaviors and Alcohol Use

As social availability was defined by Abbey et al. (1993) to include alcohol norms that exist within an individual's social circles in addition to the drinking behavior of their social network, it was important to examine these factors both individually and as a composite variable. Correlational analyses were used to explore these associations. Table 2 shows the correlations between the components of the social availability of alcohol composite and religious beliefs, religious behaviors, and alcohol consumption. All four components of the social availability composite shared significant negative associations with religious behaviors. Obligation to drink and drinking for social motives were

negatively associated with religious beliefs at the p =.01 level while social networks' alcohol consumption was significant at the p= .05 level. All four components of the social availability composite demonstrated strong positive associations with student alcohol consumption.

Hypothesis 4 predicted that students with low religious behaviors would report higher social availability of alcohol than students with high religious behaviors. OLS regression and bootstrapping were used to test social availability of alcohol as a mediator for the relationship between religious behaviors and alcohol consumption. As predicted, social availability of alcohol was found to significantly mediate the relationship. As Figure 5 indicates, both the standardized regression coefficient between religious behaviors and social availability of alcohol and the standardized regression coefficient between social availability of alcohol and alcohol consumption were statistically significant at the p= .001 level. Bootstrapping procedures were used to test the significance of the indirect effect. This procedure produced a 95% confidence interval for the indirect effect ranging from -.273, -.112. Accordingly, the indirect effect was deemed statistically significant and social availability of alcohol was demonstrated as a partial mediator of the religious behaviors, alcohol consumption association. Tests of mediated moderation proved non-significant, 95% CI = [-.0097, .0001].

Table 2

Bivariate Correlations among Social Availability Components, Religious Beliefs, Religious Behaviors, and Alcohol Consumption

Variable	1	2	3	4	5	6	7	8
1 Social availability of alcohol composite	1.000							
2 Alcohol's availability at social gatherings	.787**	1.000						
3 Perceived obligation to drink alcohol at social gatherings	.792**	.401**	1.000					
4 Drinking for social motives	.816**	.509**	.611**	1.000				
5 Social network's alcohol consumption	.713**	.509**	.381**	.429	1.000			
6 Religious behaviors	-.339**	-.215**	-.333**	-.297**	-.196**	1.000		
7 Religious beliefs	-.292**	-.134	-.317**	-.291**	-.165*	.703**	1.000	
8 Alcohol consumption	.613**	.457**	.445**	.591**	.437**	-.410**	-.288**	1.000

Note. ** $p < .01$. ; * $p < .05$

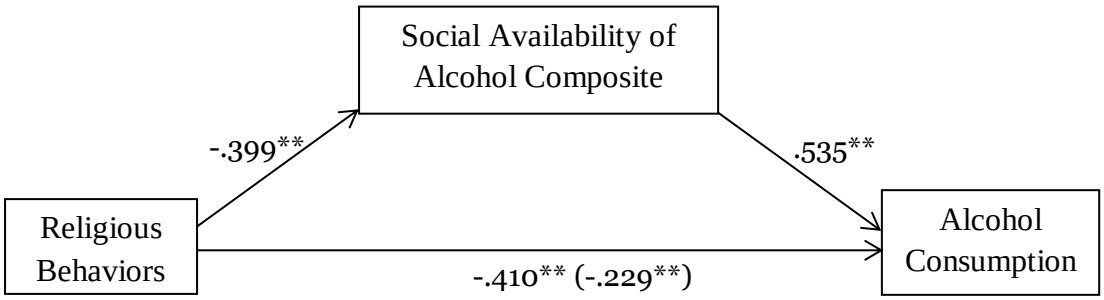

Figure 5 Tests of social availability of alcohol mediation model. Standardized regression coefficients for the relationship between religious behaviors and alcohol consumption as mediated by social availability of alcohol. The value in parentheses shows the relationship between the independent variable and alcohol consumption when the mediator is included in the model.
Note. * p <.01; ** p < .001

Relationships amongst Other Variables

In addition to the previously confirmed mediators, we were also interested in examining the associations between a number of other internal and external factors with our variables of interest. The results of these correlational analyses are presented in Table 3. The analyses revealed that religious individuals were less likely to use drinking as a coping mechanism or in order to enhance positive affect. While both religious behaviors and religious beliefs were positively associated with perceived consequences of alcohol consumption, individuals high in religious behaviors also perceived significantly less benefits of drinking alcohol. Religious behaviors were also associated with lower physical availability of alcohol. Additional internal factors (self-esteem and social assertiveness) did not appear to correlate with alcohol consumption, suggesting these are not important mechanisms in the religiosity/alcohol use relationship.

Table 3

Bivariate Correlations among Additional Internal and External Factors Related to Drinking with Religious Beliefs, Religious Behaviors, and Alcohol Consumption

Variable	Religious Behaviors	Religious Beliefs	Alcohol Consumption
Pros about drinking	-.139*	-.078	.304**
Cons about drinking	.143*	.147*	-.199**
Drinking for coping motives	-.202**	-.199**	.422**
Drinking to enhance positive mood	-.328**	-.253**	.692**
Self-esteem	-.086	-.245**	.003
Social assertiveness	-.080	-.130	-.047
Physical unavailability of alcohol	.184*	.106	-.262**

Note. ** $p < .01$. ; * $p < .05$

CHAPTER FOUR: DISCUSSION

Overall Results of the Study

While many studies have shown that high levels of religiosity are associated with lower levels of alcohol consumption, few studies have differentiated between the effects of religious beliefs and religious behaviors on drinking behavior. A major goal of this study was to determine if different combinations of these traits led to different patterns of drinking behavior for college students. Our findings suggest that there are in fact differences between these groups such that students who possess both high religious beliefs and behaviors have significantly lower alcohol consumption than students with high religious beliefs and low religious behaviors or their peers with low religious beliefs; students with high religious beliefs and discordant behaviors have significantly higher rates of alcohol consumption than all other students. Overall these results are in line with previous findings by Brechting et al (2010), suggesting that while possessing both strong religious beliefs and behaviors can help to protect students from high risk drinking, possessing only religious beliefs may actually be a significant risk factor for alcohol abuse.

Another major goal of this study was to identify factors that could help explain the different drinking behaviors for students with different combinations of religious beliefs and behaviors. Both internal and external factors appear to be important. Arguably the most influential intrinsic factor identified by the study was affect experienced during alcohol consumption. Mediated moderation analyses indicated that students with high religious beliefs but low religious behaviors experience greater amounts of positive affect

while drinking than students with both high religious beliefs and behaviors; this difference predicted higher rates of alcohol consumption for students lacking religious behaviors These findings suggest that one reason students with high religious beliefs but low behaviors drink heavily may be that they find consuming alcohol to be a more enjoyable experience than their peers do. As these students find drinking to be a highly pleasurable experience, they are more likely to continue in their actions. This pattern of behavior further suggests students with religious beliefs unsupported by behaviors represent an "at risk" group for excessive alcohol use. Mediated moderation analyses also revealed that students with high religious beliefs and behaviors experienced the lowest rates of both positive affect and negative affect while drinking. In other words, when highly religious students, in terms of both beliefs and practices, do consume alcohol, it is not a very negative experience but it is also not particularly pleasurable. One explanation for this finding is that students in this group are less likely to have had extensive experiences with alcohol. Minimal drinking experiences may make it difficult for these students to recall strong affect at the time of consumption. As these students do not have particularly positive experiences with alcohol, they are unlikely to seek out further experiences.

Correlational analyses revealed a number of other internal factors that can be used to understand the relationship between religious beliefs, religious behaviors, and alcohol consumption. Religious beliefs and behaviors both exhibited negative associations with drinking as a coping mechanism and drinking to enhance positive mood. Religious students tended to perceive their peers as drinking less and less frequently than their non-religious counterparts; holding lower drinking norms was in turn associated with a

decreased pressure to drink to conform. Religious beliefs and behaviors were both found to be positively associated with perceived consequences of drinking while religious behaviors were also negatively associated with perceived benefits of drinking. These findings suggest that while religious beliefs may help students associate drinking with more negative outcomes, religious behaviors are needed to fully detract from the appeal of drinking.

In addition to internal factors, a number of environmental factors are important for understanding the complex relationship between religiousness and alcohol use. Religious behaviors were negatively associated with social and physical availability of alcohol; yet the same could not be said for religious beliefs. While both high religious beliefs and behaviors corresponded to social networks comprised of individuals who consume less alcohol, students' religious behaviors were also predictive of perceiving one's entire peer group to be drinking less frequently. These findings support the hypothesis that the relationship between religiosity and alcohol might largely be influenced by the difference in social environments for students who engage in religious behaviors and those who do not. Students who frequently participate in religious services or extracurricular religious organizations are more likely to develop a peer group of similarly-minded religious friends. Students who participate in these religious social circles are exposed to less alcohol in social settings making them less likely to drink. This protective environment shifts students' perceptions of normal college drinking so that they believe their peers are also drinking less. This mindset likely fosters less of an obligation to drink and ultimately results in lower rates of alcohol consumption.

Our findings clearly suggest that students with religious beliefs but no corresponding religious behaviors are more at risk for heavy alcohol consumption than students who also possess religious behaviors to complement their religious beliefs. However, less evidence is available to explain why they are at more risk than their non-religious peers. One possible explanation is that individuals with religious beliefs were likely raised by religious families who imparted the message that alcohol use is neither good nor healthy. As a result, these students likely were not taught how to drink responsibly. As our sample consisted mainly of college freshman, it is possible that our high risk group consists of first time college students who are branching out from their parents' influence and beginning to test boundaries. In addition to ceasing to attend religious services, these students are also likely experimenting with alcohol. Since they might not have received training at home about how to drink responsibly, they may be more likely than their peers to drink in a dangerous fashion. Mediated moderation analyses suggest that they also enjoy the experience of drinking more than their peers, further contributing to high risk drinking. Religious students who maintain both their beliefs and practices upon arriving at college are less susceptible to this pattern as their religious social circles likely protect them from exposure to alcohol.

Limitations

Several limitations of this study should be noted. First, generalizability of the findings may be limited due to unique characteristics of the sample. Females were over-represented in the study sample. As the scientific literature consistently shows that females demonstrate greater religious beliefs and behaviors than males (Donahue & Benson, 1995), this unequal distribution likely does not compromise the study's external

validity. Future studies should seek to replicate these findings in samples consisting of a greater proportion of males. Additionally, limited diversity in participants' race and ethnicity make it difficult to extrapolate findings to young adults with minority status. Restriction in range of participants' educational status and location may also limit findings to students who attend public universities. Future studies should examine whether these results replicate in adults of a similar age who are not attending college or who attend different types of colleges (e.g. community colleges or small liberal arts schools). A second limitation of the present study is its cross-sectional design. Longitudinal studies are needed to deduce the temporal relationship between religiosity and alcohol consumption. A third limitation is the study's reliance on self-report. While much research has attested to the reliable and valid nature of self-report data for young adults (Winters, Stinchfield, Henly, & Schwartz, 1990), the fact that study participants were asked to report their participation in illegal activities (drinking underage) could minimize reporting high risk behaviors. Another possible study limitation is the use of the PANAS to retroactively report affect experienced during alcohol consumption. As a Likert-type scale that does not provide users with a "not applicable" option, students who had never consumed alcohol may have used different strategies for answering this question. This sub-group of non-drinkers was very small (comprising only 15% of our sample). Analyses that were rerun excluding these participants, however, did not produce any changes in findings already mentioned. Lastly, as participants were not required to report their specific religious affiliation, it is possible that different religious denominations' views on alcohol could skew results. The influence of religious affiliation is thus a topic for future study.

Conclusions and Future Directions

As one of the few studies to differentiate religious beliefs from religious behaviors, the present study contributes to a more thorough understanding of the ways in which religiosity influences drinking behavior in young college students. Religious behaviors appear to moderate the relationship between religious beliefs and alcohol consumption such that individuals high in both religious beliefs and behaviors have the lowest rates of alcohol consumption whereas individuals who possess religious beliefs but no religious behaviors are most at risk for heavy alcohol consumption. Significantly different drinking behaviors for these groups emphasize the need for investigators to adopt the practice of differentiating between religious beliefs and behaviors. This approach also identifies a clear target for intervention (students with strong religious beliefs but no behaviors) to reduce high risk alcohol use in campus communities. The present study aids in the development of future models that use both internal (affect experienced while drinking and drinking norms) and external factors (social availability of alcohol) to explain the complex relationship between religiosity and drinking behaviors in young college students. In conclusion, the presence of concordant or discordant religious behaviors influences whether religious beliefs serve as a risk or protective factor for alcohol consumption in young college students.

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PRESENTATIONS

Cole, H., Wheaton, J., & Giesler, R. B. (2013, January). *Differentiating Between Spirituality and Religiosity: Implications for Self-Regulation and Health.* Poster presented at the Annual Meeting of the Society for Personality and Social Psychology, New Orleans, LA.

Adams, K., Moss, N., **Cole, H.**, & Giesler, R. B. (2013, January). *Affective State During Goal Adoption: Does it Matter?.* Poster presented at the Annual Meeting of the Society for Personality and Social Psychology, New Orleans, LA.

Cole, H., Wheaton, J., & Giesler, R. B. (2012, April). *High Faith and No Faith Predict Physical Well- Being: More Evidence for a Curvilinear Relationship between Religiosity and Health in Young Adults.* Presented at The Annual Undergraduate Research Conference, Butler University, Indianapolis, IN.

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Adams, K., Kaiser, E., Moss, N., **Cole, H.,** & Giesler, R. B. (2012, April). *Using Non-Conscious Priming to Alter Snack Choice.* Poster presented at the Annual Meeting of the Society of Behavioral Medicine, New Orleans, LA.