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The Prospective Influence of Religiousness on Alcohol Use: What Role Do Perceived Norms Play?

Corey Todd Brawner
University of Southern Mississippi

THE PROSPECTIVE INFLUENCE OF RELIGIOUSNESS ON ALCOHOL USE:

WHAT ROLE DO PERCEIVED NORMS PLAY?

by

Corey Todd Brawner

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Approved by:

_____

Dr. Bradley A. Green, Committee Chair
Professor, Psychology

_____

Dr. Joye C. Anestis, Committee Member
Assistant Professor, Psychology

_____

Dr. Randolph C. Arnau, Committee Member
Professor, Psychology

_____

Dr. Michael B. Madson, Committee Member
Professor, Psychology

_____

Dr. Richard S. Mohn, Committee Member
Associate Professor, Educational Research and Administration

_____

Dr. D. Joe Olmi
Chair, Department of Psychology

_____

Dr. Karen S. Coats
Dean of the Graduate School

Published by the Graduate School

ABSTRACT

THE PROSPECTIVE INFLUENCE OF RELIGIOUSNESS ON ALCOHOL USE: WHAT ROLE DO PERCEIVED NORMS PLAY?

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Alcohol misuse is recognized as one of the most pressing health hazards for college students. Previous research has supported a protective relationship between religiousness and problematic alcohol use, but it is less clear what aspects of religiousness are protective and through what mechanisms its effect is exerted. The current study utilized a prospective design to accomplish three primary goals: (1) Delineate the protective effects of religious motivation and public participation on alcohol use and alcohol-related problems in a sample of undergraduates at a large public university in the southeastern United States, (2) determine whether effects were maintained long-term, and (3) discern whether the protective effect was mediated by indirect effects through perceived peer drinking norms. Intrinsic religious motivation demonstrated significant negative direct effects on alcohol use and related problems concurrently at baseline and prospectively approximately three months later, as well as indirectly through its impact on perceived peer norms. Effects of extrinsic religious motivation and public religious participation were inconsistent. Findings are discussed in the context of the existing literature and theories posed to explain the protective effects of religiousness. Study limitations and directions for future research are discussed.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

LIST OF ABBREVIATIONS

RS	Religiousness
RPub	Public Religious Participation
IR	Intrinsic Religious Motivation
Es	Extrinsic-Social Religious Motivation
Ep	Extrinsic-Personal Religious Motivation
DIN	Distal Injunctive Norms
PIN	Proximal Injunctive Norms
DDN	Distal Descriptive Norms
PDN	Proximal Descriptive Norms
DPM	Drinks Consumed Per Month
DPO	Drinks Consumed Per Drinking Occasion

CHAPTER I - INTRODUCTION

Alcohol Use and Consequences

Alcohol misuse is a critical health issue in the United States. The United States Department of Health and Human Services 2013 National Survey on Drug Use and Health (NSDUH) surveyed over 67,000 Americans. 86.8% of adults reported consuming alcohol in their lifetime, and over half reported drinking within the past month. More importantly, almost half of current adult drinkers also reported past month binge drinking (i.e., consumption of five or more drinks by males, or four or more drinks by females, in two hours), and 12.1% reported five or more binge episodes in the past month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014). The consequences of excessive alcohol consumption are significant and are not isolated to the drinking population. For example, excessive drinking is estimated to cost the American public $223.5 billion yearly (Bouchery, Harwood, Sacks, Simon, & Brewer, 2011) and is reportedly responsible for as many as 79,000-85,000 preventable deaths each year (Centers for Disease Control, 2004; Mokdad, Marks, Stroup, & Gerberding, 2004).

Young adults demonstrate even higher rates of alcohol misuse than the general adult population. The 2013 NSDUH survey found rates of binge drinking 15.5% higher for 18- to 25-year-old respondents (37.9%) relative to those age 26 or older (22.4%), and rates of binge drinking five or more times in the past month were nearly twice as common for the younger adults (11.3% and 6.1%, respectively; SAMHSA, 2014). Further, college students report even higher rates of alcohol consumption per month, binge drinking, and heavy drinking relative to same-aged non-students (SAMHSA, 2013, 2014; Slutske, 2005).

Within the college student population, group differences in drinking rates are also evident, particularly between males and females. Though annual prevalence rates for general alcohol consumption are virtually equal for males and females, males report more prevalent daily drinking (5.6% vs. 3.3%) and binge drinking (43% versus 30%). Greater gender differences are found for extreme binge drinking. Relative to females, males report three times greater prevalence of having 10 or more drinks on at least one occasion in the past two weeks (23% versus 7%), and an even greater divide exists for consumption of 15 or more drinks (9.4% versus 1.9%). Thus, though annual prevalence rates are generally equivalent for males and females, and gender differences in rates of binge drinking and daily drinking have narrowed in recent years, males continue to demonstrate a significantly higher prevalence of more extreme binge drinking (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014).

College alcohol use remains at the forefront of health issues facing students and school administrators due to the increased risk of serious consequences associated with student alcohol misuse and engagement in a wide range of risky behaviors while drinking. For example, each year approximately 39% of student drinkers admit driving under the influence of alcohol (Presley, Meilman, & Cashin, 1996). Over 400,000 students report unsafe/unprotected sexual intercourse, and 100,000 report drinking too much to remember if they consented to sexual activity (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Hingson, Zha, & Weitzman, 2009). College students also report high rates of alcohol-related consequences, including 599,000 unintentional injuries, 696,000 physical assaults, 97,000 sexual assaults, and 1,825 alcohol-related deaths each year (e.g., alcohol poisoning and motor vehicle accidents; Hingson et al.,

2009). Notably, the problems of college drinking are not isolated to students. Alcohol is also reportedly involved in an as much as 95% of violent campus crimes (National Center on Addiction and Substance Abuse at Columbia University [CASA], 1994), and residents in nearby communities also report higher rates of public drunkenness, noise disturbance, and vandalism resulting in lower quality of neighborhood life (Wechsler, Lee, Hall, Wagenaar, & Lee 2002).

Religiousness and Alcohol Use

Substantial research in the past several decades has focused on the identification of alcohol-related risk factors (i.e., variables associated with higher probability of problematic alcohol use) and protective factors (i.e., variables associated with lower probability of problematic alcohol use). The result has been a literature base supporting numerous associations between college drinking and various individual and environmental factors (e.g., see Baer, 2002; Borsari, Murphy, & Barnett, 2007; Linden & Lau-Barraco, 2014). Among the large group of previously identified protective factors, support for a protective influence of religiousness on hazardous alcohol use has increased markedly in recent decades. Koenig, King, and Carson (2012) identified and reviewed 278 quantitative studies conducted to examine relationships between religiousness and alcohol use, and 240 (86%) of the studies reported significant inverse relationships between religiousness and alcohol use variables. CASA (2001) examined data from three national surveys datasets (i.e., 1998 National Household Survey on Drug Abuse, 2001 National Survey of American Attitudes on Substance Abuse, and 1990-2000 General Social Surveys) and found that individuals who consider religious beliefs unimportant were one and one-half times more likely to use alcohol and over three times more likely

to binge drink, relative to those who consider their beliefs to be important. Further, individuals denied participating in religious services were seven times more likely to binge drink than individuals who attend weekly or more.

The negative relationship between religiousness and alcohol use has also been examined in longitudinal studies. Koenig and colleagues' review (2012) identified 49 prospective studies, 42 (86%) of which reported a significant inverse relationship between religiousness and alcohol use. For example, Mason & Spoth (2011) collected data from 667 adolescents at six points over seven years. Their findings indicated that religious attendance and salience (i.e., importance ascribed to religious values and experiences) were both negatively associated with substance use concurrently, and increases in attendance and salience predicted lesser substance use in late adolescence. These studies reflect a general consensus in research literature supporting a negative relationship between religiousness on alcohol use.

Though negative relationships between various measures of religiousness and problematic behaviors, including hazardous alcohol use, are reported quite consistently, reported effects sizes vary widely. Possible causes of this variability include inconsistency of operational definitions and overly simplistic measurement. Religiousness is a complex construct consisting of multiple dimensions (e.g., affiliation, motivation, beliefs, commitment, participation, coping, and well-being), and it has been defined many ways and assessed by hundreds of measures (Hill, 2005; Hill & Pargament, 2003; Koenig et al., 2012). Though some researchers have drawn conclusions about religiousness as a single generic factor, and others have assessed religiousness with only single-item measures (e.g., rating the importance of religion or reporting one's religious

affiliation), research suggests that dimensions should be assessed individually for their incremental effects to accurately examine the nuanced relationship between religiousness and alcohol use (Brown, Salsman, Brechting, & Carlson, 2007; Chitwood, Weiss, & Leukefeld, 2008).

The current study assessed three consistently defined and previously supported dimensions of religiousness, public religiousness (RPub), intrinsic religious motivation (IR), and extrinsic religious motivation (ER), with psychometrically sound measures of each construct. Each is discussed below.

Religious Participation and Motivation

Public religious participation (RPub) is one of the most commonly assessed dimensions of religiousness in previous research, and several studies have linked frequent religious participation with positive health outcomes, including lower levels of alcohol use (see Koenig et al., 2012, for a review). For example, Chitwood et al. (2008) conducted a meta-analysis of studies investigating the relationships between religiousness and substance use from 1997 through 2006. 55 articles examined the influence of RPub on substance use, and 66% of the studies reported significant negative relationships. One of the largest studies analyzed data from the National Longitudinal Study of Adolescent Health (Bearman, Jones, & Udry, 1997) to examine the distinct influences of public and private religious practices on alcohol use. Findings from the analysis of about 16,000 adolescents suggested that private and public religiousness were both negatively associated with experimental drinking, but only RPub predicted significantly lower regular and problematic alcohol use (Nonnemaker, McNeely, and Blum, 2003).

Importantly, some previous studies assessing protective effects of RPub have reported inconsistent effects or evidence for other underlying mechanisms. For example, Ellison (1991) found a significant bivariate relationship between RPub and psychological health outcomes but reported the effect was partially mediated by the strengthening of existential certainty (i.e., strength of beliefs). When existential certainty was included in the analysis, RPub effects were attenuated by 19%. Further, some studies have also reported the protective effects attributable to RPub to be weaker relative to other dimensions of religiousness (e.g., intrinsic religiousness) when assessed simultaneously in models predicting alcohol use (e.g., Jankowski, Hardy, Zamboanga, & Ham, 2013).

Religious motivation, which Allport originally referred to as religious orientation, was one of the first constructs posed to conceptualize types of religiousness (Allport, 1950). Allport and Ross (1967) described intrinsically orientated individuals as those who "find their master motive in religion" and bring other needs and beliefs into harmony with their religious beliefs, while extrinsically oriented individuals consider religion to be functional and "use religion" to meet other needs, such as status, sociability, or comfort (p. 434). Allport's original conceptualization and definitions have remained a focus of research in the psychology of religion (see Donahue, 1985; Koenig et al., 2012, for reviews) and have been critiqued and modified. Namely, findings from several studies with various populations best support a three-dimensional model consisting of extrinsic religiousness (ER) separated into two distinct factors, extrinsic-personal (Ep) and extrinsic-social (Es), and intrinsic religiousness (IR; Gorsuch & McPherson, 1989; Kirkpatrick, 1989; Darvyri et al., 2014), and this conceptualization has been supported by

subsequent analyses with religious and non-religious samples (Maltby & Lewis, 1996; Tiliopoulos, Bikker, Coxon, & Hawkin, 2006).

Previous research has reported a significant link between religious motivation and health behaviors across various populations, and IR appears to consistently exhibit a significant protective effect on alcohol use while effects of ER tend to fluctuate. For example, Templin and Martin (1999) surveyed 277 Roman Catholic college students about religion and drinking behaviors, and they found IR to be significantly negatively correlated with weekly consumption and alcohol-related problems while ER was unrelated. More recently, Masters and Knestel (2011) examined relationships between religious motivation and several health-related behaviors in a community sample of 157 adults. Findings indicated significant negative relationships for both IR and ER with daily alcohol consumption while accounting for age, ethnicity, marital status, gender, and education as covariates; however, analyses also revealed differential effects, such that high IR/low ER individuals reported significantly less alcohol consumption than those reporting either low IR/high ER or low IR/low ER.

These studies represent a literature base that largely supports a significant influence of religiousness on a number of health behaviors, including alcohol use; however, findings are clearly not unanimous and, rather, evince a complex relationship and the need for further study to improve our understanding of other influential factors. There remains a lack of consensus about possible mechanisms of action (i.e., mediators) in the relationship between religiousness and alcohol use. For example, Gottfredson and Hirschi (1990) theorized that self-control is solely responsible for problematic substance use and that any protective effect of religiousness would be rendered altogether spurious

when accounting for self-control. Others have since reported contradictory findings (Desmond, Ulmer, and Bader, 2013; Welch, Tittle, & Grasmick, 2006), and several other potential mediators have also emerged with varying levels of empirical support (e.g., thrill seeking [Mason & Spoth, 2011] delay discounting [Kim-Spoon, McCullough, Bickel, Farley, & Longo, 2015], and alcohol expectancies [Galen & Rogers, 2004]). Most relevant to the current study, two previous studies have assessed models which pose that the protective effect of religiousness acts through its inverse relationships with descriptive (Perceptions of others' alcohol use; Brechting & Carlson, 2014) and injunctive drinking norms (Perceptions of others' attitudes about drinking; Chawla, Neighbors, Lewis, Lee, & Larimer, 2007), which have been shown to be strong predictors of alcohol use and are discussed in more depth below.

Perceived Peer Drinking Norms

Decades of previous research and theory has asserted that human behaviors are guided not only by personal attitudes and beliefs but also by perceptions of others' beliefs (e.g., Ajzen & Fishbein, 1980) and behaviors (e.g., Asch, 1951; Deutsch & Gerard, 1955). Most relevant to the current study, studies conducted with various populations on a range of campuses have found student perceptions of peer drinking norms to be particularly influential on drinking behaviors (see Borsari & Carey, 2001; Borsari & Carey, 2003, for reviews). Previous literature has distinguished between two types of drinking norms. Descriptive norms refer to one's perceptions of others' alcohol use (e.g., quantity and frequency) whereas injunctive norms refer to one's perceptions of others' attitudes about drinking or approval of drinking practices (Borsari & Carey, 2001). Descriptive and injunctive norms have been shown to exhibit distinct, though related,

influences on behavior and to account for unique variance in drinking behaviors (Foster, Neighbors, & Krieger, 2015; Halim, Hasking, & Allen, 2012; Rimal & Real, 2003).

Perceived drinking norms are thought to influence alcohol use through a two-part process (Borsari, 2001). In the first part, college students misperceive actual descriptive and injunctive drinking norms by consistently overestimating the quantity and frequency of others' alcohol use (Baer, Stacey, & Larimer, 1991; Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006; Perkins, Haines, & Rice, 2005) and others' approval of heavy drinking or drunkenness (Perkins & Berkowitz, 1986; Prentice & Miller, 1993). For example, Carey, Borsari, Carey, and Maisto (2006) surveyed 1,611 college students and found that, on average, perceptions of average weekly consumption for same-gender close friends' (18.6 drinks) and same-gender students on campus (20.5 drinks) were both significantly higher than self-reported drinking in the sample (12.5 drinks), 33% and 38% discrepancies, respectively. Cox & Bates (2011) reported similar discrepancies for a sample of 585 students of which 86% self-identified as members of a religion that strictly proscribes alcohol use. Only 17% of the sample reported any alcohol consumption in the past year, and perceived drinking norms and self-reported consumption were each substantially lower than that reported by most samples; however, respondents still estimated average student alcohol consumption 52% higher than was self-reported.

In the second part, once students establish what they perceive to be normal drinking behaviors and attitudes, they then shift their personal behaviors (Neighbors, Lewis, Bergstrom, & Larimer, 2006; Perkins et al., 2005) and attitudes (Rinker & Neighbors, 2013; Wood, Read, Mitchell, & Brand, 2004) toward the exaggerated norms. Carey et al. (2006) found that greater discrepancy between students' personal use and

perceived normal use predicted greater increases in drinking over a subsequent 30-day period. Perkins (1997) asserts that this process is self-perpetuating, in that, by behaviorally matching one's exaggerated perceived norms, one then becomes another possible observation of heavy drinking for others to observe. Students are also less likely to acknowledge their personal drinking as hazardous in this type of circular system (Borsari & Carey, 2001).

Notably, several studies reporting significant associations between perceived norms and drinking behaviors have also found stronger effects when the referent group is more specific to the individual (e.g., perceived drinking norms of same ethnicity/gender students versus perceived norms of a general college population; Larimer et al., 2009; Lewis & Neighbors, 2004, 2007). Reference Group Theory (Merton & Rossi, 1968) and Social Identify Theory (Terry & Hogg, 1996, 1999) both assert that individual behavior is directed more strongly by groups with which the individual identifies or to which one refers when seeking to engage in normative behaviors. That is, the degree to which a student identifies with a specified reference group moderates the influence of perceived norms on drinking behaviors (Neighbors et al., 2010; Reed, Lange, Ketchi, & Clapp, 2007), and perceived norms of more proximal groups (e.g., close friends) better predict student drinking (Larimer et al., 2011). For example, Halim et al. (2012) surveyed 229 college students about drinking norms, motives, and behaviors. Results indicated that proximal injunctive norms were significantly negatively correlated with alcohol consumption, but distal injunctive norms were unrelated. The current study assessed student perceptions of descriptive and injunctive drinking norms for proximal and distal referent groups.

Religiousness and Perceived Norms

Religiousness and perceived drinking norms are among the most studied variables presumed to influence alcohol use and alcohol-related problems on college campuses, yet, we still lack a clear understanding of the interplay of these variables in predicting alcohol outcomes. Existing literature suggests that religiousness may influence perceived drinking norms and alcohol use in at least two ways.

First, some of religion's protective effect may be attributable to its association with peer group selection. Religious participation and the importance one ascribes to religion are both inversely associated with lower levels of peer substance use (Bahr, Maughan, Marcos, and Li, 1998). Religiousness may serve as a "criterion" for religious adolescents when "sorting through friendships" to select friends who express similar beliefs and proscriptions against alcohol use (Burkett & Warren, 1987, p.127). Then, religious students who interact less with alcohol-using peers and more closely identify with non-drinking peers likely develop more proscriptive injunctive drinking norms (Chawla et al., 2007) and more conservative descriptive norms (Brechting & Carlson, 2014), particularly for close friend groups, which then negatively influence personal alcohol use. In summary, some studies indicate that religiousness may exhibit a protective effect on alcohol use through peer selection and subsequent influence.

Second, religiousness is also associated with the internalization of personal beliefs and negative attitudes that may buffer the influence of perceived drinking norms. For example, Francis (1997) examined the effects of religiousness and personality traits (i.e., extraversion, neuroticism, and psychoticism) on adolescents' attitudes about substance use and found that greater belief in God and more frequent church attendance predicted

less permissive alcohol attitudes while accounting for personality, age, and gender. Further, Johnson, Sheets, and Kristeller (2008) found a similar significant association between religious involvement and negative beliefs about alcohol and also reported that the effect of religiousness on alcohol use and alcohol-related problems was mediated by negative attitudes about alcohol. More recently, Neighbors, Brown, Dibello, Rodriguez, and Fosters (2013) examined these variables from a different perspective and surveyed 1,124 undergraduates and found that religiousness and perceived norms were significantly and oppositely associated with alcohol consumption frequency and quantity. Religiousness also significantly buffered the relationship between perceived norms and alcohol outcomes, such that the association between perceived norms and alcohol use was weaker for individuals who reported greater religiousness. These findings indicate that religious individuals, and particularly those affiliated with denominations that value abstinence, may be somewhat protected against the influence of drinking norms in their environments. This effect may be more robust for individuals with greater intrinsic religious motivation, as they are more likely to internalize religious beliefs as behavioral guides that may buffer environmental influences, whereas extrinsic religiousness appears to exert a weaker protective effect (Brown et al., 2007; Masters and Knestel, 2011).

Current Study

Research investigating the influences of religiousness and perceived drinking norms has greatly expanded our understanding of young adult alcohol use and continues to inform prevention and intervention efforts for college students (e.g., Borsari & Carey, 2000; Lewis & Neighbors, 2007). However, our understanding remains limited by gaps

in the existing literature, and the current study aimed to contribute to this literature base by addressing the following limitations.

First, despite the identification and empirical support of perceived injunctive and descriptive drinking norms, religious motivation, and religious public participation as significant predictors of alcohol use, a gap remains in our understanding of the interplay of these factors (Brechting & Carlson, 2014; Mason & Spoth, 2011; Neighbors et al., 2013). No studies were found that systematically assessed the possible mediation roles of both descriptive and injunctive drinking norms in the relationship between religiousness and alcohol use. The current study aimed to address this gap by simultaneously assessing the direct effects of each dimension of religiousness on alcohol outcomes and the indirect effects of the religiousness-alcohol relationships through each drinking norm.

Second, while religiousness is thought to be a complex and multidimensional construct, and numerous measures of religiousness exist, previous research has often been limited by its simplistic assessment of religiousness (Hill & Hood, 1999; Koenig et al., 2012). The current study addressed operational concerns by assessing participation in religious activities and motivations for religious involvement. These dimensions were selected for their theoretical implications and because psychometrically sound measures of these constructs have been well-supported for use with undergraduate students (Fetzer Institute, 2003; Gorsuch & McPherson, 1989; Turner-Musa & Wilson, 2006). Assessing RPub, IR, and ER, enabled us to differentiate the influences of participation in a religiously defined social group versus one's personal interaction with religion and motivations for doing so.

Third, although heavy episodic drinking is particularly prevalent in college students (Johnston et al., 2014; SAMSHA, 2014), no studies were found that systematically assessed the effects of religiousness and drinking norms on binge drinking. Thus, in addition to average number of standard alcoholic drinks consumed in the past month, the current study also assessed average drinks consumed per drinking occasion to better assess for episodic drinking.

Finally, numerous researchers have called for the use of prospective designs to assess the temporal influence of religiousness on drinking norms and behaviors (e.g., Brechting & Carlson, 2014; Chawla et al., 2015; Neighbors et al., 2013). The current study utilized a prospective design to test whether religiousness maintains a protective effect long-term against later alcohol use and alcohol-related problems.

Hypotheses

The overarching goals of the current study were threefold: to examine (1) the concurrent effects of religious motivation and participation on college student alcohol use, (2) to determine if those effects are maintained over time, and (3) to discern the extent to which that relationship is explained, or mediated, by indirect effects through perceived peer drinking norms. Four sets of hypotheses were tested to accomplish these goals.

It was hypothesized that each dimension of religiousness (i.e., RPub, IR, Es, and Ep) would exhibit a direct negative effect on monthly alcohol consumption, drinks consumed per occasion, alcohol-related problems, and hazardous alcohol use concurrently at baseline (Hypothesis One) and prospectively approximately three months

later (Hypothesis Two). It was also expected that IR and RPub would exhibit stronger effects relative to Es and Ep (Hypothesis Three).

In line with Borsari and Carey's (2001) two-part model by which peers promote alcohol use was hypothesized that participants would demonstrate significant self-other differences (SODs) such that estimates of other college students' and close friends' descriptive and injunctive drinking norms would significantly exceed the averages of self-reported alcohol consumption and approval of drinking behaviors observed in the study sample (Hypothesis Four). It was also hypothesized that perceived descriptive and injunctive norms would each be positively associated with each alcohol outcome concurrently at time two (Hypothesis Five) and that proximal (i.e., close friends) norms would exhibit a stronger effect on alcohol outcomes relative to distal (i.e., typical same-gender students) norms (Hypothesis Six).

It was hypothesized that baseline religiousness would be inversely associated with perceived descriptive and injunctive norms (Hypothesis Seven) and that the relationship would be stronger with proximal norms relative to distal norms (Hypothesis Eight).

Lastly, it was hypothesized that the prospective effects of baseline religiousness on subsequent alcohol outcomes would be mediated by descriptive and injunctive norms (Hypothesis Nine) and that indirect effects through proximal norms would be stronger relative to indirect effects through distal norms (Hypothesis Ten). It was also expected that the direct effects of IR on alcohol outcomes would be more robust and remain significant when accounting for effects of perceived norms in the prospective model (Hypothesis Eleven).

CHAPTER II – METHODS

Participants

Total participation in this study included 554 undergraduate students at a public university in the southeastern United States. Approximately 59% of participants elected to complete the second set of survey measures. Thus, the study sample consisted of 325 undergraduate students who responded to two self-report surveys separated by approximately 3 to 4 months' time (mean= 104.84 days, SD = 15.77). The average age of participants was 19.36 years (SD = 1.69). A large majority of participants were female (83.4%) and White or African American (60.5% and 31.2%, respectively). Participants reported a range of religious affiliations, but most identified as Protestant Christian (78.7%), Catholic (9.9%), or non-religious (i.e., "none," atheist, or agnostic; 7.1%). Notably, there were no apparent sociodemographic differences between responders and non-responders for the second survey.

Procedure

Permission to conduct this study was granted by the Institutional Review Board prior to participant solicitation. Students were solicited to participate in the two-part study through the university research participation system (SONA Systems), and they completed the self-report measures online via Qualtrics Research Software. An informed consent form was presented prior to each survey, and participants indicated their consent to participate by clicking to proceed to the questionnaires which included measures of religious participation and motivation, perceptions of peer norms, alcohol use, and alcohol-related problems.

Individuals who completed the first survey were emailed an invitation to complete the second survey approximately three months after their initial participation. The email included instructions for completing the survey through SONA and a direct link to the survey for individuals who wished to participate but were not enrolled in a class with research requirements. Up to two weekly reminders were also sent to individuals had not yet completed the study. Participants earned course credit for completing each survey in accordance with standard practice at the university. Individuals who completed both instruments were also offered the opportunity to participate in a drawing for one of five monetary gift cards. Following recommendations for multiple time-point data collection by Kearney, Hopkins, Mauss, and Weisheit (1984), participants also indicated their middle initial (substituting "x" for no initial), first letter of mother's first name, sex, birth month, and race/ethnicity to create a 5-digit code used for data matching purposes.

Measures

Daily Drinking Questionnaire

The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) is one of the most commonly used self-report measures of alcohol use and is designed to assess an average quantity and duration of alcohol consumption over a specified period of time (e.g., past week). Information is provided to indicate what constitutes a standard drink of beer, wine, and spirits. Using a calendar grid, students responded to two items for each day of the week: number of standard drinks and number of hours spent drinking. Two outcomes were derived from the DDQ for the current study. (1) Total number of standard alcohol drinks consumed per month (DPM) was calculated by summing the number of drinks per week reported on the DDQ calendar and multiplying the total by 4.3 (Walters

& Baer, 2006). (2) Average drinks per drinking occasion (DPO) were calculated by summing the number of drinks consumed per week and dividing by the number of drinking days reported.

Convergent validity for the DDQ has been demonstrated by significant associations with Cahalan's Quantity-Frequency Index (Cahalan, Cisin, & Crossley, 1969), other quantity-frequency measures (Collins Parks, & Marlatt, 1985; Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990), alcohol-related problems, and alcohol tolerance (Morean & Corbin, 2008).

Alcohol Use Disorders Identification Test

The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) is a screening tool developed by the World Health Organization to detect early-phase harmful and hazardous drinking patterns. Students responded to 10 items about frequencies of experiences in three conceptual domains (Use, problems, and dependence) using a 5-point response scale ranging from *never* to *daily*. Higher scores indicate more hazardous use and negative consequences, as well as a greater likelihood of alcohol dependence.

The AUDIT has demonstrated adequate internal consistency (median α = .80 - .90) across numerous samples and settings (see Reinert and Allen, 2002, for a review). Convergent validity for the AUDIT is evinced by significant association between high AUDIT scores and greater community problems (e.g., legal involvement and hazardous behaviors) and socio-emotional problems (e.g., decrease self-esteem and interpersonal problems) reported on the College Alcohol Problems Scale (O'Hare, 1997), indicating

that high scorers on the AUDIT are likely to experience more legal, interpersonal, or emotional problems related to their drinking (O'Hare & Sherrer, 1999).

Rutgers Alcohol Problems Index

The Rutgers Alcohol Problems Index (RAPI; White & Labouvie, 1989) is a self-report measure developed to assess problematic drinking in adolescents and young adults. The measure contains 23 items to which inquiring how many times the respondent has experienced each of the problems in the past year on a 5-point scale from *never* to *more than 10 times*. Item scores are summed, and higher scores indicate a greater negative impact of alcohol use on one's life.

The RAPI has demonstrated adequate internal consistency (α = .88-.92) across numerous samples of various age ranges (Read, Kahler, Strong, & Colder, 2006; White & Labouvie, 1989; White, Labouvie, & Papadaratsakis, 2005). Convergent validity for the RAPI is evinced by significant associations with college student drinking frequency and quantity (Neal, Corbin, & Fromme, 2006) and other measures of alcohol-related problems, such as the Young Adult Alcohol Consequences Questionnaire (Read et al., 2006).

Religious Orientation Scale-Revised

The Religious Orientation Scale-Revised (I/E-R; Gorsuch & McPherson, 1989) is 14-item self-report measure designed to assess individuals' extrinsic and intrinsic religious motivations. Students responded to items by indicating the extent to which they agree with each statement on a 5-point scale from *strongly agree* to *strongly disagree*. Higher scores on each scale (i.e., IR, Es, and Ep) indicate greater intrinsic or extrinsic motivations for practicing one's religion.

The I/E-R is the result of several decades of critiques and revisions to the measure of religious motivation. Religious orientation was first defined and measured by Allport (Allport, 1963, 1966; Allport & Ross, 1967). In their development of the 20-item Age-Universal scale, Gorsuch and Venable (1983) revised the original scales (Allport & Ross, 1967) to improve item wording and increase readability for use with individuals across education and age levels. The original two-scale structure was retained until Gorsuch and McPherson (1989) developed the I/E-R in response to Kirkpatrick's (1989) critique of the factor structure resulting from reanalysis of several previous studies. In accordance with Kirkpatrick's (1989) recommendations and supported by their own factor analysis of data from 771 students at secular and religious universities, Gorsuch and McPherson (1989) split the ER scale into two moderately correlating (r = .41) scales: Extrinsic-personal and Extrinsic-social. Thus, the I/E-R consists of three scales, IR (8 items), Es (3 items), and Ep (3 items).

Reported estimates of internal consistency for the I/E-R are generally adequate though reliability estimates for the Es (.58 - .76) and Ep (.57 - .70) scales tend to be lower relative to the IR scale (.79 - .88; Gorsuch & McPherson, 1989; Maltby, Lewis, & Day, 1999; Tiliopoulos et al., 2007).

Organizational Religiousness

The Organizational Religiousness scale of the Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS; Fetzer Institute, 2003) was developed to assess participation, experiences, and fit within a formal public religious entity. The scale was developed as a standalone measure and is included as such in the BMMRS, which is a compilation of recommended measures of religiousness intended to promote their use in

research. Three items from the Organizational Religiousness scale were utilized in the current study. Two items inquired about attendance at religious services and other activities at a place of worship, and the third item assessed respondents' self-perceived fit in their religious institution. One additional item was included in the survey to inquire about attendance at religious services or activities outside one's formal place of worship (e.g., university religious group activities). Per BMMRS instructions, participants responded to attendance-related items on a 9-point scale from never to several times a week, and responses to the fit-related item were on a 5-point scale from *do not fit at all* to *fit extremely well*.

Drinking Norms Rating Form

A calendar version of the Drinking Norms Rating Form (DNRF; Baer et al., 1991) was used to assess perceived descriptive norms. Respondents were asked to estimate the number of drinks they believe peers consumed on each day of a typical week in the past month. Participants estimated alcohol consumption for two groups, close friends and typical students on his/her campus, and provide their answers in a calendar grid format. Akin to the process for calculating respondents' personal monthly consumption, the perceived number standard alcohol drinks consumed per month were calculated by summing the number of drinks per week recorded on the DNRF calendar and multiplying the total by 4.3.

The DNRF has demonstrated adequate test-retest reliability for non-treatment groups and convergent validity with various measures of drinking (Baer et al., 1991; Borsari & Carey, 2000; Neighbors, Larimer, & Lewis, 2004).

Injunctive Drinking Norms

Perceived and personal injunctive norms were assessed by an extended form of Baer's (1994) measure. Students responded to eight items using a 7-point scale (e.g., strongly agree, wouldn't care, strongly disagree) to assess the degree to which students believe their close friends and typical students at their university approve of drinking and drinking-related behaviors. Students answered items in reference to their own attitudes.

The original form inquires about four behaviors (drinking alcohol every weekend, drinking alcohol daily, driving after drinking, and drinking enough alcohol to pass out). The current study inquired about four additional behaviors with the aim of more accurately representing the possibly wide variability of approval/disapproval of drinking practices. Similar to behaviors assessed by Halim et al. (2012), two items were added to represent more hazardous drinking behaviors (drinking enough alcohol to vomit and drinking enough alcohol to forget what happened the night before). Two items were also be added to assess approval of lower level drinking (drinking alcohol at all [non-abstinence] and drinking socially without becoming intoxicated). These items are intended to expand the floor and ceiling of possible scores, such that the lowest scores may better reflect perceptions of very low approval (i.e., proscriptive norms) and the highest scores better reflect very high approval (i.e., permissive norms).

Two studies implementing similar modifications reported adequate internal consistency for their amended measures when inquiring about friends (α = .76 - .94; Halim et al., 2012; Rinker & Neighbors, 2013) and typical students (α = .80; Halim et al., 2012), which are similar to those typically reported for the original measure (α = .72 - .80; Chawla et al., 2007; Foster et al., 2015; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Neighbors et al., 2008; Reed et al., 2007).

Additional Items

Six items were included in the questionnaire instructing participants to respond with a specified answer choice. Incorrect responses served as indication of careless responding or inattention to item content. Participants were also asked to indicate their age, sex, ethnicity, year in school, and religious affiliation.

Statistical Plan

Preliminary Analyses

Data were first screened for attention to item content and missing data. Careless responding, or inattention to item content, was operationally defined as providing incorrect responses to three or more quality assurance items, and cases meeting this criterion were excluded from subsequent analyses. Cases with missing data for entire sections of the survey were also removed listwise. The online survey instrument required participants to respond to all items of each measure before continuing to the next measure. Thus, all remaining cases were complete (i.e., contained no missing values for variables of interest).

Descriptive statistics were computed for all variables, and statistical assumptions for manifest variable path analysis were assessed. Data were assessed for univariate normality using measures of central tendency, frequency histograms, and kurtosis and skewness values following Kline's (2011) suggestion that levels of kurtosis less than ten and skewness less than three are unlikely to be problematic in statistical analyses with relatively large samples. Per recommendations by Muthén & Muthén (2016), data were assessed for multivariate normality and potential outliers by examining loglikelihood distance influence values, scatterplots of loglikelihood contribution values (x-axis) by

each endogenous variable (y-axis), Mahalanobis Distance, and Cook's distance. For cases that were identified as potential outliers, raw data were examined to determine the validity of responses. Cases that were determined to be grossly invalid were excluded from subsequent analyses. Once the dataset was finalized, Pearson product-moment correlation coefficients were calculated to assess relationships between all variables of interest at the zero-order level.

Model Specification

Mplus 6.12 (Muthén & Muthén, 2010) was used to conduct manifest variable path analysis to assess the concurrent direct effect of religiousness on alcohol use, as well as indirect effects through perceived peer norms. All variables were entered into the model as manifest (i.e., observed) variables. Each religiousness variable was entered as an exogenous variable. Each drinking norms variable was regressed on each religiousness variable, and each alcohol-related measure was regressed on each drinking norm variable and each religiousness variable. Correlations were drawn amongst the four religiousness variables, as well as the four drinking norms variables and the four alcohol outcomes. The hypothesized model consisted of 12 observed variables, resulting in 90 data points (i.e., 12 means and 78 variances and covariances in the covariance matrix) and 90 free elements (i.e., 48 regression coefficients, 12 intercepts, 12 residual variances, and 18 correlations). The model was just identified (i.e., zero degrees of freedom) model, which is often the case when path analysis is used for the purpose of analyzing multivariate models with multiple outcome variables. To allow for assessment of model fit, the correlation between IR and Es was fixed to 0 for all subsequent analyses. This path was chosen based on statistical reasoning (i.e., variables were unrelated at the zero-order

level; r < .01) and theory (i.e., the scales are intended to assess motivations that are essentially unrelated, except in cases of indiscriminately pro-religious responding; e.g., see Masters and Knestel, 2011). A Wald chi-square test of equality confirmed the lack of impact on the model ($\chi 2 = 0.01$, $p = 0.91$). A similar path model was specified to test the prospective effects of religiousness measured at baseline on perceived drinking norms and alcohol outcomes assessed at time two. The hypothesized concurrent effects model and prospective effects model are depicted in Appendices 1 and 2.

Assessment of Model Fit, Direct Effects, Indirect Effects, and Mediation

Path analysis was utilized to simultaneously assess a complex network of direct effects of religiousness on alcohol use and related problems, as well as indirect effects through perceived peer drinking norms. Though the scope of this study did not include establishing or supporting the validity of a theoretical model or engaging in significant model respecification (e.g., to improve parsimony or fit), absolute fit indices were calculated and reported as a point of reference and as evidence against gross misfit between the model and data. The comparative fit index (CFI), Tucker-Lewis Index (TLI), and root mean squared error of approximation (RMSEA) were computed to assess model fit. A CFI between .80 and .95 indicates adequate fit, and values above .95 indicate good fit. A TLI greater than .90 indicates adequate fit, and values above .95 indicate good fit. RMSEA values below .10 are generally considered acceptable while values below .06 indicate good fit (Hu & Bentler, 1999). The Satorra-Bentler (Bryant & Satorra, 2012; Satorra & Bentler, 2010) adjusted chi-square ($\chi 2$) statistic was also reported. RMSEA, TLI, and CFI were selected for the evaluation of models in this study because they have

demonstrated less sensitivity to sample size in some cases (Marsh, Balla, & McDonald, 1988; Fan, Thompson, & Wang, 1999).

Due to the non-normal distribution of most endogenous variables in the model and high probability of multivariate non-normality, models were estimated using robust maximum likelihood estimation which computes parameter estimates equal to those produced by standard maximum likelihood estimation but with standard errors and mean-adjusted chi-square model tests that have no assumption of univariate or multivariate normality (Bryant & Satorra, 2012; Satorra & Bentler, 2010). Given that distributions of indirect effects in mediation models also tend to be asymmetric, 95% bias-corrected bootstrap confidence intervals were calculated for all direct and indirect effects. Both models were analyzed using 1,000 bootstrap samples (Hayes, 2009).

Parameter estimates were examined to test hypotheses one through three and five through eight. As recommended by MacKinnon (2008) and Hayes (2009), path coefficients and 95% bias-corrected bootstrap confidence intervals were examined to determine the impact of each variable while accounting for effects attributable to all other variables in the model. Path effects with confidence intervals that did not contain zero were identified as statistically significant. Standardized path coefficients were reported to compare the magnitude of effects across variables, given that scales of measurement vary.

Hypotheses nine and eleven were tested by assessing the significance of indirect effects of religiousness on alcohol outcomes through perceived norms and the extent to which the total effect was explained by indirect versus direct effects. Hypotheses ten was

tested by comparing the specific indirect effects of religiousness on alcohol outcomes through proximal versus distal perceived norms.

CHAPTER III - ANALYSES AND RESULTS

Data Preparation and Preliminary Analyses

325 students participated in data collection at both time points; however, 53 individuals failed to complete the second survey and were removed listwise from further analysis. None of the remaining cases contained missing data, as the survey instrument required that all items be answered for each measure before moving on to the next measure. 19 cases were removed due to recording incorrect responses to three or more items included to detect careless or otherwise invalid responding. Thus, the following analyses were conducted with data collected from 253 participants.

Descriptive statistics for primary variables are recorded in Table 1. All variables related to alcohol use were somewhat positively skewed and leptokurtic, and baseline DPM was significantly leptokurtic ($z = 11.054$) due to the large proportion of participants denying any recent alcohol use.

Table 1

Descriptive Statistics for Study Variables

Variable (Possible Range)	Mean	Standard Deviation	Skewness	Kurtosis
RPub (0 to 28)	13.24	6.51	0.07	-0.59
Int (8-40)	29.59	6.17	-0.63	0.17
Es (3-15)	6.67	2.85	0.61	-0.17
Ep (3-15)	11.23	3.10	-0.96	0.55
DDN1 (0-∞)	67.92	48.91	1.18	1.64
DDN2 (0-∞)	58.94	40.08	1.13	2.06
PDN1 (0-∞)	34.09	34.60	1.84	6.67
PDN2 (0-∞)	31.31	32.68	1.34	2.05

Table 1 (continued)

DIN1 (8-63)	48.74	12.95	-0.37	0.79
DIN2 (8-63)	41.59	9.37	-0.13	1.00
PIN1 (8-63)	38.05	12.33	0.28	0.14
PIN2 (8-63)	40.42	12.48	0.19	0.41
DPM1 (0-∞)	21.13	27.70	2.57	11.05
DPM2 (0-∞)	18.80	27.54	2.31	6.15
DPO1 (0-∞)	3.05	2.13	2.16	7.51
DPO2 (0-∞)	1.86	2.23	1.89	5.88
RAPI1 (0-92)	6.36	10.52	2.78	9.11
RAPI2 (0-92)	6.79	12.12	2.36	4.83
AUDIT1 (0-46)	4.30	4.63	1.84	4.04
AUDIT2 (0-46)	4.34	4.90	2.02	4.78

Data were then assessed for multivariate outliers. Loglikelihood distance influence values and scatterplots of loglikelihood contribution values for each alcohol outcome were examined, and 13 cases were identified as possible outliers. The 11 most extreme cases also had a significant Mahalanobis distance ($p < .05$) and exceeded the commonly accepted cutoff for Cook's distance ($D > 1.0$). Examination of raw data revealed that the 11 most extreme cases seemed to result from haphazard responding to item content (e.g., Recording "never" responses to all items on multiple measures that included reverse-scored items; Recording "30" in response to an item requesting drinking days in the past month but recording "0" drinks for all days on the DDQ) that was not detected by the quality assurance items. These cases were excluded from further analyses. The two remaining potential outliers reported unusually high, but valid, responses to alcohol-related measures. Primary statistical analyses were run with the two cases

included and excluded, and results did not differ significantly. Differences in RMSEA, CFI, and TLI were minimal (00-.01). Standardized path coefficients varied by only 0.0 – 0.02, and none changed status relative to p-value significance. Thus, the two cases were retained, and the final dataset used for analyses consisted of data from 242 participants.

Finally, one assumption of manifest variable path analysis is that variables are measured without error. Though this assumption is not typically viable in social science research, high levels of measure reliability ($\alpha > .70$) have been commonly considered a proxy to satisfy the assumption (Kelloway, 2015). All measures met this criterion (Cronbach's $\alpha = .76$-$.87$).

Zero-Order Correlations

Pearson correlation coefficients were calculated to assess relationships amongst all variables of interest at the zero-order level (Appendix 1). Due to the relatively large sample, weak correlations (i.e., as small as $r = .09$) met the criterion for statistical significance ($p = .05$). A cutoff of $r > |.2|$ was used as a guideline to demarcate potentially meaningful relationships (Ferguson, 2009).

Consistent with previous literature, IR was positively correlated with Ep and RPub but not with Es. RPub had a small but significant positive association with Ep and Es. IR correlated negatively with PIN, DPM, AUDIT, and RAPI. Es was significantly negatively correlated with DDN. Rpub and Ep demonstrated no significant zero-order relationships with perceived norms or alcohol-related variables.

All alcohol-related measures (i.e., DPM, DPO, RAPI, and AUDIT) were positively correlated, with RAPI and AUDIT exhibiting the strongest relationships. Most measures of proximal perceived norms were also significantly positively correlated with

each alcohol outcome, but no relationships between distal norms and alcohol outcomes were of practical significance.

Model Estimation and Fit

Two manifest variable path models were specified and tested with robust maximum likelihood estimation using Mplus 6.12 (Muthén & Muthén, 2010). Appendix B depicts the hypothesized concurrent effects model in which religious participation and motivation are proposed to have direct effects on alcohol use and related problems as well as indirect effects through perceived descriptive and injunctive drinking norms, all measured at baseline. Appendix C depicts the hypothesized prospective effects model in which religious participation and motivation are proposed to exhibit similar direct effects on alcohol outcomes and indirect effects through perceived peer norms, after a gap of approximately three to four months.

Fit indices, including the CFI, TLI, RMSEA, and SRMR are recorded in Tables 2 and 3. The Satorra-Bentler adjusted chi-square statistic is also reported for reference. Fit indices appeared to indicate very good fit with the data for both hypothesized models; however, it is likely that index values overestimated actual model fit due to the combination of very large model size and relatively small sample size. Very large models (e.g., 12 variables and 89 free parameters) directly impact the computations of most fit indices and may affect the accuracy of good and poor fit determinations. Also, the current study sample (n = 242) is relatively small for assessing the fit of such complex models and likely contributed to somewhat inflated fit indices.

Table 2

Summary of Direct Effects in the Concurrent Effects Path Model

Outcome	Predictor	UC	p-value	BC Bootstrap CI 2.5%ile	BC Bootstrap CI 97.5%ile	SC
DPM1	RPub	0.537*	.042	0.045	1.102	.131
	IR	-0.766*	.019	-1.486	-0.190	-.180
	Es	-0.468	.429	-1.695	0.609	-.051
	Ep	-0.252	.699	-1.763	0.817	-.029
	DIN1	-0.464*	.001	-0.777	-0.225	-.229
	PIN1	0.367*	.014	0.085	0.669	.170
	DDN1	0.018	.606	-0.047	0.084	.031
	PDN1	0.386*	<.001	0.264	0.534	.455
DPO1	RPub	0.038	.150	-0.009	0.091	.117
	IR	-0.037	.121	-0.087	0.006	-.111
	Es	-0.026	.609	-0.125	0.066	-.035
	Ep	0.018	.672	-0.070	0.097	.027
	DIN1	-0.038*	.001	-0.062	-0.018	-.241
	PIN1	0.046*	.001	0.018	0.070	.267
	DDN1	0.001	.640	-0.004	0.007	.030
	PDN1	0.029*	<.001	0.019	0.039	.434
RAPI1	RPub	0.196	.186	-0.090	0.480	.125
	IR	-0.396*	.006	-0.691	-0.137	-.244
	Es	0.281	.245	-0.217	0.733	.080
	Ep	0.100	.657	-0.345	0.550	.030
	DIN1	-0.041	.455	-0.156	0.063	-.052
	PIN1	0.088	.224	-0.078	0.207	.106
	DDN1	-0.006	.668	-0.031	0.021	-.026
	PDN1	0.095*	<.001	0.044	0.144	.293

Table 2 (continued).

Outcome	Predictor	UC	p-value	BC Bootstrap CI 2.5%ile	BC Bootstrap CI 97.5%ile	SC
AUDIT1	RPub	0.021	.709	-0.090	0.139	.032
	IR	-0.095*	.061	-0.206	-0.004	-.138
	Es	0.115	.268	-0.076	0.339	.077
	Ep	-0.044	.647	-0.220	0.159	-.031
	DIN1	-0.026	.202	-0.067	0.012	-.080
	PIN1	0.088*	.001	0.035	0.142	.252
	DDN1	-0.002	.651	-0.013	0.008	-.026
	PDN1	0.046*	<.001	0.026	0.066	.334
DIN1	RPub	0.150	.376	-0.176	0.476	.074
	IR	-0.061	.727	-0.412	0.263	-.029
	Es	-0.75*	.024	-1.387	-0.060	-.165
	Ep	-0.187	.587	-0.913	0.423	-.044
PIN1	RPub	-0.112	.518	-0.441	0.257	-.059
	IR	-0.464*	.004	-0.787	-0.148	-.237
	Es	0.350	.310	-0.295	1.024	.082
	Ep	-0.238	.431	-0.821	0.385	-.059
DDN1	RPub	0.847	.156	-0.264	2.114	.117
	IR	0.131	.837	-1.144	1.390	.017
	Es	-4.077*	<.001	-6.068	-2.092	-.250
	Ep	-1.342	.211	-3.902	0.506	-.087
PDN1	RPub	0.298	.449	-0.473	1.068	.062
	IR	-1.203*	.003	-2.083	-0.483	-.240
	Es	-1.266	.140	-2.816	0.465	-.116
	Ep	0.536	.515	-1.318	2.029	.052

Note: $\chi 2$ (1) = 0.013, p = .908; CLI = 1.000; TLI = 1.068; RMSEA = .000 (90% CI = .000 - .071)

UC = Unstandardized Coefficient; SC = Standardized Coefficient; BC Bootstrap CI = Bias-corrected Bootstrap Confidence Interval

** indicates statistical significance at p < .05*

Table 3

Summary of Direct Effects in the Prospective Path Model

Outcome	Predictor	UC	p-values	BC Bootstrap CI 2.5%ile	BC Bootstrap CI 97.5%ile	SC
DPM2	RPub	0.758*	.005	0.244	1.349	.206
	IR	-0.781*	.004	-1.320	-.193	-.205
	Es	-1.024*	.043	-2.096	-.053	-.124
	Ep	0.545	.202	-0.246	1.488	.070
	DIN2	-0.336*	.012	-0.631	-.076	-.131
	PIN2	0.287*	.031	0.018	.551	.145
	DDN2	0.030	.185	-0.011	.079	.058
	PDN2	0.461*	< .001	0.341	.592	.565
DPO2	RPub	0.027	.288	-0.023	.077	.082
	IR	-0.040	.105	-0.086	.014	-.115
	Es	-0.044	.346	-0.143	.054	-.059
	Ep	0.042	.282	-0.043	.117	.059
	DIN2	-0.034*	.007	-0.060	-.009	-.148
	PIN2	0.033*	.005	0.009	.057	.184
	DDN2	0.005*	.020	0.001	.010	.113
	PDN2	0.034*	<.001	0.023	.045	.455
RAPI2	RPub	0.247	.053	-0.005	.494	.146
	IR	-0.532*	< .001	-0.818	-.287	-.303
	Es	0.334	.168	-0.140	.834	.088
	Ep	0.227	.216	-0.175	.625	.063
	DIN2	-0.095	.165	-0.233	.047	-.080
	PIN2	0.236*	.002	0.090	.388	.259
	DDN2	0.000	.980	-0.027	.025	-.001
	PDN2	0.004	.878	-0.052	.061	.012

Table 3 (continued).

Outcome	Predictor	UC	p-values	BC Bootstrap CI 2.5%ile	BC Bootstrap CI 97.5%ile	SC
AUDIT2	RPub	0.132*	0.009	0.039	0.242	.202
	IR	-0.204*	< .001	-0.306	-0.114	-.300
	Es	-0.084	0.367	-0.293	0.087	-.057
	Ep	0.082	0.345	-0.093	0.263	.059
	DIN2	-0.046	0.115	-0.102	0.017	-.101
	PIN2	0.077*	0.002	0.027	0.127	.220
	DDN2	0.003	0.431	-0.005	0.012	.036
	PDN2	0.045*	< .001	0.025	0.064	.307
DIN2	RPub	0.104	0.317	-0.088	0.307	.073
	IR	-0.098	0.461	-0.362	0.140	-.066
	Es	-0.351	0.155	-0.826	0.117	-.109
	Ep	-0.117	0.652	-0.608	0.423	-.038
PIN2	RPub	-0.110	0.485	-0.429	0.179	-.059
	IR	-0.324*	0.053	-0.657	-0.025	-.168
	Es	0.438	0.485	-0.212	1.087	.105
	Ep	-0.078	0.053	-0.708	0.551	-.020
DDN2	RPub	0.847	0.165	-0.264	2.114	.117
	IR	0.131	0.806	-1.144	1.390	.017
	Es	-4.077*	0.165	-6.068	-2.115	-.250
	Ep	-1.342	0.806	-3.902	0.506	-.087
PDN2	RPub	-0.324	0.150	-1.072	0.452	-.072
	IR	-0.627	0.833	-1.350	0.126	-.134
	Es	0.285	< .001	-1.290	1.896	.028
	Ep	-0.268	0.211	-1.837	1.085	-.028

Note: $\chi 2$ (1) = 0.012, p = .912; CLI = 1.000; TLI = 1.075; RMSEA = .000 (90% CI = .000 - .068)

UC = Unstandardized Coefficient; SC = Standardized Coefficient; BC Bootstrap CI = Bias-corrected Bootstrap Confidence Interval

** indicates statistical significance at p < .05*

Importantly, these potential limitations do not impede the primary aims of this study or the testing of a priori hypotheses, as the sample size was deemed sufficient to achieve enough power for stable parameter estimation and detection of significant direct and indirect effects based on recommendations from several sources (Fritz & MacKinnon, 2007; Loehlin, 1992; Meyers, Gamst, & Guarino, 2013; Stevens, 2009).

Tests of Hypotheses

Hypothesis One

Path coefficients and bootstrap confidence intervals within the concurrent effects model were examined to test the hypothesis that each religiousness measure (RPub, IR, Es, and Ep) would exhibit a negative direct effect on each alcohol outcome (DPM1, DPO1, RAPI1, and AUDIT1) assessed at baseline. A summary of direct effects in the concurrent effects model is recorded in Table 2. IR exhibited a significant negative effect on DPM1, RAPI1, and AUDIT1 but not DPO1. RPub was positively associated with DPM1 only, and neither Es nor Ep exhibited any significant direct effects on alcohol outcomes.

Hypothesis Two

Path coefficients and bootstrap confidence intervals within the prospective effects model were examined to test the hypothesis that baseline religiousness would maintain a long-term negative direct effect on each alcohol outcome after approximately three to four months. A summary of direct effects in the prospective effects model is recorded in Table 3. IR and Es were both negatively associated with DPM2, and IR also again exhibited a significant negative effect on RAPI2 and AUDIT2. RPub was again

positively associated with DPM2 and also with AUDIT2. Ep did not exhibit any significant direct effects on alcohol outcomes.

Hypothesis Three

Path coefficients from both path models were examined to determine whether IR and RPub exhibited stronger negative effects on alcohol outcomes relative to Es and Ep. Overall, IR exhibited stronger concurrent and prospective effects than any other RS variable on all alcohol outcomes, except DPO which was not significantly associated with any RS variable. Counter to the hypothesis, RPub was actually positively associated with DPM in both models and not significantly associated with any other alcohol outcome.

Hypothesis Four

Self-other difference scores (SODs) were calculated to test the hypothesis that participants would estimate that others consume more alcohol per month and hold more permissive attitudes about drinking behaviors relative to participants' self-reported alcohol consumption and drinking attitudes. Self-other differences (SODs) for injunctive norms were calculated by subtracting self-reported attitudes toward drinking from the perceived norms of others (i.e., typical students [distal] and close friends [proximal]). A negative SOD indicates the belief that others hold more permissive attitudes while a positive SOD indicates more permissive attitudes held by the participant. Likewise, SODs were calculated for descriptive norms by subtracting respondents' self-reported monthly alcohol consumption from the perceived norms of others. Negative SODs indicate perceptions that the referent group consumes more per month than the participant. Paired sample t-tests were used to determine the statistical significance of

SOD magnitude for each comparison, and results indicated significant differences for every pair. For example, at baseline participants' estimates of monthly alcohol consumption for other college students were 46.78 higher than their own self-reported monthly consumption. Participants also self-reported consuming about 13 drinks per month fewer than they estimate for their close friends consume (Table 4).

Table 4

Results of Paired Sample T-Tests of Self-Other Differences

Comparison Group	Mean	Std. Deviation	Std. Error Mean	t	p-value
DDN1	-46.78	50.63	3.18	-14.70	< .001
DDN2	-40.14	40.23	2.53	-15.87	< .001
PDN1	-12.96	32.38	2.04	-6.37	< .001
PDN2	-12.51	27.94	1.76	-7.12	< .001
DIN1	-12.32	14.18	0.89	-13.83	< .001
DIN2	-4.36	11.32	0.71	-6.12	< .001
PIN1	-1.63	9.29	0.58	-2.79	.006
PIN2	-3.19	10.17	0.64	-4.98	< .001

Hypotheses Five and Six

Path coefficients and bootstrap confidence intervals within the prospective effects model were examined to test the hypothesis that each measure of perceived peer norms would exhibit a positive direct effect on each alcohol outcome concurrently at time two (hypothesis five) and that effects of proximal norms would be stronger than those of distal norms (hypothesis six). A summary of direct effects in the model is recorded in Table 3. PIN2 and PDN2 both exhibited significant positive effects on DPM2, DPO2, and AUDIT2, but PIN2 was significantly associated with RAPI2. DDN2 had a small but statistically significant effect on DPO2 but was not significantly associated with any

other alcohol outcome. Counter to hypothesis five, DIN2 actually had a significant inverse association with DPM2 and DPO2.

Hypotheses Seven and Eight

Path coefficients and bootstrap confidence intervals within the prospective effects models were examined to test the hypothesis that each religiousness variable exhibits a long-term negative direct effect on perceived peer norms (hypothesis seven) and that the effect will be stronger on proximal versus distal norms (hypothesis eight). Counter to hypothesis seven, results suggested a weak relationship between religiousness and perceived peer norms overall. The four RS variables accounted for less than 10% of the variance in each perceived norm variable, and only two direct effects were statistically significant. IR exhibited a negative effect on PIN2, and Es exhibited a negative effect on DDN2. Further, counter to hypothesis eight, there were no notable differences between the associations of RS with distal versus proximal norms.

Hypotheses Nine, Ten, and Eleven

Path coefficients and bias-corrected bootstrap confidence intervals of direct, indirect, and total effects were to examine to test the hypothesis that long-term effects of religiousness on alcohol outcomes would be attributable to indirect effects through perceived peer norms (hypothesis nine) and that indirect effects through proximal norms would be strong than those through distal norms (hypothesis ten). Hypothesis nine was generally unsupported. The prospective path model included 64 indirect effect pathways between the RS variables and alcohol outcomes through measures of perceived norms; however, only five specific indirect effects were determined to be statistically significant, and four of those effects were by IR through PIN2 on each alcohol outcome. Es had a

small but statistically significant effect on DPO2 through DDN2. A summary of significant indirect effects is recorded in Table 5. A formal test of hypothesis ten was not conducted due to the lack of significant indirect effects in the model to make a meaningful comparison between paths through proximal versus distal norms.

Table 5

Summary of Significant Indirect Effect Paths in the Prospective Path Model

Model Path	Unstandardized Direct Effect	Unstandardized Indirect Effect	BC Bootstrap 2.5%ile	BC Bootstrap 97.5%ile	Standardized Indirect Effect
Int-PIN2-DPM2	-.781*	-.093*	-.287	-.003	-.024
Int-PIN2-DPO2	-.040	-.011*	-.032	-.001	-.031
Int-PIN2-RAPI2	-.532*	-.076*	-.212	-.009	-.043
Int-PIN2-AUDIT2	-.204*	-.025*	-.068	-.002	-.037
Es-DDN2-DPO2	-.044	-.012*	-.047	-.005	-.028

Note: * indicates statistical significant at $p < .05$

Path coefficients and bias-corrected bootstrap confidence intervals of direct, indirect, and total effects were compared to test Hypothesis 11 and determine whether the direct effects of IR would remain robust when accounting for perceived norms in the prospective model. IR exhibited significant indirect effects on all four alcohol outcomes through PIN2 and also maintained a significant direct effect on each outcome, indicating robustness of the direct effect in those cases. There was one exception: IR exhibited a small but statistically significant total effect of IR on DPO2 (b = -.067, BC 95% CI [-.124, -.009]), and the direct effect of IR on DPO2 was no longer significant (b = -.040, BC 95% CI [-.086, .014]) after accounting for variance in DPO2 attributable to the total indirect effect (b = -.028, BC 95% CI [-.065, .0003]). Thus, though some of the negative

effect of IR on alcohol outcomes was explained by indirect effects through perceived peer norms, direct effects were generally salient.

CHAPTER IV – DISCUSSION

Summary

Heavy alcohol consumption is one of the most prevalent health hazards for college students. Alcohol use behaviors are multiply determined, and research in recent decades has resulted in an expansive literature of risk and protective factors. Previous research has generally supported an inverse relationship between religiousness and alcohol consumption and other substance use across many populations, but the protective aspects of religiousness and pathways through which they exercise an effect remain less understood. The current study sought to extend upon previous literature by examining two pathways by which religiousness may exhibit a protective effect on alcohol use.

The primary goals of this study were to (1) examine the concurrent effects of religiousness on college student alcohol use and related problems, (2) determine whether those effects are maintained over time, and (3) delineate whether the effect is explained, or mediated, by indirect effects through perceived peer norms.

Hypotheses one, two, and three proposed that (1) each dimension of religiousness would exhibit a direct negative effect on each alcohol outcome, (2) the effect of religiousness on alcohol would be maintained long-term, and (3) IR and RPub would exhibit stronger effects relative to Es and Ep. Support was mixed for these hypotheses. At the zero-order level, IR was negatively correlated with most alcohol outcomes, but no other RS variables demonstrated a significant zero-order relationship with alcohol-related variables. Path estimates in the concurrent effects model indicated a significant negative direct effect of IR on DPM1, RAPI1, and AUDIT1 at baseline, and results of the prospective effects model indicated that baseline IR also negatively impacted subsequent

DPM2, RAPI2, and AUDIT2 at time two. Counter to the hypotheses, RPub actually exhibited a positive effect on DPM at both time points and on AUDIT2 prospectively. So, overall the impact of religiousness was weaker than expected, though IR did exhibit a concurrent and long-term direct negative effect on each outcome except DPO.

Hypothesis four proposed that participants would estimate the descriptive and injunctive norms of other college students and their close friends to be significantly greater than their own self-reported drinking and approval of drinking behaviors. The hypothesis was supported, and results for the current sample were generally commensurate with those reported in previous literature. Participants estimated that average college students and their close friends drank significantly more and approved of more dangerous drinking behaviors. Self-other differences for the distal referent group were more extreme in all cases.

Hypotheses five and six proposed that (5) perceived peer norms would exhibit a positive effect on alcohol outcomes concurrently at time two and that (6) effects of proximal norms would be stronger than those of distal norms. Support for this hypothesis was mixed. PIN2 and PDN2 both exhibited significant positive effects on DPM2, DPO2, and AUDIT2, but PIN2 was the only norm variable significantly associated with RAPI2. Counter to hypothesis five, DIN2 was negatively associated with alcohol consumption.

Hypotheses Seven and Eight proposed that (7) religiousness would have a long-term negative effect on measures of perceived peer norms, and (8) the effect would be stronger for proximal norms. Hypothesis seven was largely unsupported. RS variables accounted for less than 10% of the variance in each perceived norm variable, and the only significant associations were negative effects of IR on PIN2 and Es on DDN2.

Hypothesis eight was also unsupported, as there were no discernable differences between effects of RS on distal versus proximal norms.

Hypotheses nine and ten proposed that (9) the prospective effects of religiousness on alcohol outcomes would be accounted for by indirect effects through perceived peer norms and that (10) indirect effects through proximal norms would be stronger than those through distal norms. Only 5 of 64 specific indirect pathways between each RS variable and alcohol outcomes were statistically significant. IR exhibited significant indirect effects through PIN2 on DPM2, DPO2, RAPI2, and AUDIT2, and Es made a small but statistically significant effect on DPO2 through DDN2. These findings are counter to hypothesis nine but are not surprising given the largely nonsignificant direct effects of religiousness on perceived peer norms. Hypothesis ten was not formally tested due having too few significant indirect effects in the model to make a meaningful comparison of paths through proximal versus distal norms. That is, little to no information is gained by analyzing two or more nonsignificant small effects to determine if one is weaker by a statistically significant margin. In terms of raw numbers, the significant indirect effects of IR on alcohol outcomes all went through proximal injunctive norms while the only other significant indirect effect was by ES on DPO2 through DDN2.

Hypothesis 11 proposed that the direct effects of IR would remain robust when perceived norms were accounted for in the prospective model. IR exhibited significant indirect effects on all four alcohol outcomes through PIN2, but it also maintained significant direct effects on all outcomes except DPO2. In the one exception, the direct effect of IR on DPO2 was nonsignificant when accounting for the total indirect effect

through all four perceived peer norms, but the total indirect effect was also nonsignificant.

Results of the current study evinced a protective effect of intrinsic religious motivation on college student alcohol use, as well as two potential pathways through which the effect may occur. IR exhibited significant negative direct effects on monthly alcohol consumption, RAPI scores, and AUDIT scores concurrently at baseline and prospectively approximately three months later. Baseline IR demonstrated a negative effect on all alcohol outcomes, including average number of drinks consumed per drinking occasion, indirectly through its negative association proximal injunctive norms. These protective effects may be conceptualized through two processes. The direct negative effect of IR on alcohol outcomes found in this study aligns with previous findings suggesting that religiousness exerts a protective effect through the internalization of religious beliefs and attitudes as behavioral guides that buffer outside influences such as perceived drinking norms (Francis, 1997; Neighbors et al., 2013). Thus, religious individuals with high IR, and particularly those affiliated with religions that value abstinence from alcohol, may be somewhat protected against the influence of drinking norms in their environments.

The indirect negative effect of IR on alcohol outcomes through proximal injunctive norms found in this study supports previous findings that suggest religiousness exerts a protective effect through its impact on exposure to alcohol and indirectly through peer selection and subsequent peer influence. Individuals with high IR are more likely to associate with religious non-drinking peers and less likely to associate with alcohol-using peers (Bahr et al., 1998) which may directly decrease exposure to alcohol use

opportunities and pressures to drink. These individuals are also then more likely to closely identify with their non-drinking peers and to develop proscriptive injunctive drinking norms (Chawla et al., 2007) which, in turn, negatively influence personal alcohol use.

Proposed effects of extrinsic religious motivation on alcohol outcomes were unsupported with one exception, which is generally commensurate with previous research findings demonstrating inconsistent effects of extrinsic religious motivation relative to that of intrinsic motivation. Ep did not demonstrate significant associations with alcohol use at any level of measurement concurrently at baseline or prospectively. Es was not significantly associated with alcohol outcomes at baseline but exhibited a negative direct effect on monthly alcohol consumption assessed at time two, as well as an indirect effect through its negative impact on distal descriptive norms. These effects reflect a process similar to that of IR but with distinct underlying motivations. High Es is associated with greater motivation to seek out religious social activities and interactions with same-religion friends which may impact alcohol use directly by decreasing exposure to peers who drink alcohol and activities that involve alcohol (Bahr et al., 1998). More time spent with non-drinking friends then influences the development of more conservative descriptive norms (Brechting & Carlson, 2014) which exhibit a protective influence on alcohol use.

Most associations between RPub and alcohol outcomes were nonsignificant. Though these results were counter to hypotheses one, two, and three, the finding is not necessarily out of line with previous literature. Previous studies have assessed RPub more than any other measure of religiousness, and while many studies have supported a

protective effect on alcohol use, others have reported inconsistent effects or attributed protective effects to alternative mechanisms (e.g., other dimensions of religiousness). More interesting was the significant positive association between RPub and monthly alcohol consumption at baseline and the positive prospective effects on monthly consumption and AUDIT scores assessed at time two. These associations may reflect the nature of public religious participation as a relatively generic construct that is simple to define but may be more difficult to measure effectively. Individuals who report attending religious events may range widely in their motivations for doing so. Thus, a measure of religious participation without assessment of motive or self-perceived purpose may most accurately reflect one's inclination to engage with others socially. College students' inclination to engage socially may be equally likely to promote exposure to alcohol, religious events, or any other activities that are believed to involve positive social interactions. The extent to which religious participation has a positive, negative, or neutral effect may depend on other personal factors (e.g., religious motivation).

Limitations & Future Directions

Findings from this study should be considered in light of several limitations. All data analyzed for this study were gathered by self-report measures, which cannot control for biased or otherwise inaccurate (e.g., aloof and inattentive) responding or inaccurate recall of alcohol-related events. However, research has suggested that alcohol-related research with self-report data provides acceptably accurate aggregate data with large samples (e.g., see Osberg & Shrauger, 1986) like that used in the current study.

Another limitation of this study was its relatively small sample size. The sample was of sufficient size to achieve enough power for model estimation and detection of

significant direct and indirect effects, but the study may have been somewhat limited in its ability to identify indirect paths, which are almost always of relatively small magnitude due to the methods of their calculation. Power limitations may have also precluded accurate assessment of the absolute and relative fit of large hypothesized models.

The results and conclusions drawn from this study may also be somewhat limited in their generalizability. The study sample consisted entirely of college students, and though this population was the intended focus of the study, it is important to note that findings may not translate to other populations, including younger adolescents, older adults, and possibly same-aged non-students. The public university from which participants were sampled is located in the southeastern United States, often informally termed the Bible Belt, and the sample may not be representative of groups in other regions where religiousness may exhibit greater, lesser, or altogether different influences.

Some sample characteristics may also have implications for generalizability of findings and needs for further study: (1) Though the sample consisted of a fairly even mix of white and African American respondents, only 8.3% of the sample represented other ethnic groups; (2) 83.4% of the sample was female; (3) a significant majority of participants identified as 78.7% Protestant Christian; and (4) a large proportion identified as non-drinkers. Previous research has shown that men tend to drink more than women, engage in heavier episodic drinking, and report more alcohol-related consequences. The effects of religious participation and motivation on alcohol-related behavior may also differ across sexes, and collection of data from a larger sample of male participants would allow for a comparison of these effects. Similarly, the current study was limited in

its ability to examine differences across ethnic groups, and potential differences in religious practices and drinking behaviors for certain groups may be particularly pertinent to understanding the effect of religiousness on alcohol use. Given these limitations, future studies would benefit from investigating these findings in regions outside of the southeastern United States and especially within non-Protestant Christian religious groups and ethnic minority groups for whom cultural norms may differ significantly as they relate to religious beliefs and customs, social modeling, and alcohol-related norms.

One of the most salient effects in this study was the direct negative effect of intrinsic religious motivation on alcohol outcomes concurrently at baseline and maintained over the three- to fourth-month gap. Given this protective effect and previous research that has shown religiousness motivation to be malleable over time, it may be beneficial to further explore the ways in which intrinsic religious motivation can be fostered, as has been studied in other areas (e.g., smoking cessation and long-term weight control).

The current study found that effects of perceived group norms on alcohol outcomes varied substantially based on referent group proximity (i.e., proximal versus distal). Future studies should consider directly assessing participants' awareness, insights, and beliefs about current social influences on their behavior and their historical influences (e.g., parents or others who modeled norms).

The prospective design of this study allowed for the assessment of concurrent and long-term effects of religiousness on alcohol outcomes, and the maintenance or deterioration of those effects. Future studies should consider a multi-point data collection design (e.g., diary/journal design studies) to allow for more complex models to be

analyzed (e.g., non-linear curve modeling) and provide information about variable change over time and the effect of one variable's change on another.

APPENDIX A – Correlation Table

Table A1.

Zero-Order Correlations among Study Variables

Variable	1	2	3	4	5	6	7	8
1. RPub	1	.606**	.239**	.325**	-.097	-.169**	.048	.042
2. IR	.606**	1	.010	.438**	-.180**	-.189**	.062	.048
3. Es	.239**	.010	1	.382**	-.087	-.018	-.260**	-.252**
4. Ep	.325**	.438**	.382**	1	-.078	-.110	-.149*	-.134*
5. PDN1	-.097	-.180**	-.087	-.078	1	.498**	.373**	.378**
6. PDN2	-.169**	-.189**	-.018	-.110	.498**	1	.179**	.174**
7. DDN1	.048	.062	-.260**	-.149*	.373**	.179**	1	.993**
8. DDN2	.042	.048	-.252**	-.134*	.378**	.174**	.993**	1
9. PIN1	-.202**	-.298**	.044	-.151*	.323**	.372**	.013	.029
10. PIN2	-.147*	-.211**	.077	-.080	.273**	.362**	-.015	-.010
11. DIN1	.011	-.005	-.155*	-.086	.049	.001	.191**	.196**
12. DIN2	-.017	-.039	-.115	-.099	.089	.091	.181**	.185**
13. DPM1	-.086	-.243**	-.043	-.138*	.534**	.488**	.168**	.175**
14. DPM2	-.059	-.177**	-.072	-.090	.381**	.610**	.144*	.150*
15. DPO1	-.061	-.182**	-.008	-.068	.524**	.472**	.148*	.158*
16. DPO2	-.092	-.152*	-.035	-.066	.343**	.529**	.157*	.164*
17. AUDIT1	-.145*	-.266**	.053	-.122	.415**	.387**	.058	.071
18. AUDIT2	-.072	-.246**	.008	-.093	.410**	.400**	.057	.066
19. RAPI1	-.056	-.235**	.102	-.053	.329**	.184**	.030	.041
20. RAPI2	-.050	-.233**	.156*	-.023	.213**	.133*	-.067	-.059

Table A1 (continued).

Variable	9	10	11	12	13	14	15	16
1. RPub	-.**202****	-.147*	.011	-.017	-.086	-.059	-.061	-.092
2. IR	-.**298****	-.**211****	-.005	-.039	-.**243****	-.177**	-.182**	-.152*
3. Es	.044	.077	-.155*	-.115	-.043	-.072	-.008	-.035
4. Ep	-.151*	-.080	-.086	-.099	-.138*	-.090	-.068	-.066
5. PDN1	.**323****	.**273****	.049	.089	**.534****	**.381****	**.524****	**.343****
6. PDN2	.**372****	.**362****	.001	.091	**.488****	**.610****	**.472****	**.529****
7. DDN1	.013	-.015	.191**	.181**	.168**	.144*	.148*	.157*
8. DDN2	.029	-.010	.196**	.185**	.175**	.150*	.158*	.164*
9. PIN1	1	.**554****	.**504****	**.296****	.**232****	**.261****	**.291****	**.297****
10. PIN2	.**554****	1	.**253****	**.538****	.**251****	**.291****	**.255****	**.280****
11. DIN1	.**504****	.**253****	1	**.449****	-.107	-.048	-.082	.005
12. DIN2	.**296****	.**538****	.**449****	1	.034	.050	.079	.038
13. DPM1	.**232****	.**251****	-.107	.034	1	.**731****	**.820****	**.604****
14. DPM2	.**261****	.**291****	-.048	.050	**.731****	1	**.635****	**.870****
15. DPO1	.**291****	.**255****	-.082	.079	**.820****	**.635****	1	**.670****
16. DPO2	.**297****	.**280****	.005	.038	**.604****	**.870****	**.670****	1
17. AUDIT1	.**364****	.**291****	.044	.065	**.660****	**.563****	**.609****	**.502****
18. AUDIT2	.**284****	.**313****	-.075	.090	**.629****	**.641****	**.539****	**.547****
19. RAPI1	.**219****	.197**	-.017	.064	**.373****	**.337****	**.362****	**.271****
20. RAPI2	.109	.**278****	-.070	.090	**.300****	**.294****	.**238****	**.234****

Table A1 (continued).

Variable	17	18	19	20
1. RPub	-.145*	-.072	-.056	-.050
2. IR	**-.266****	**-.246****	**-.235****	**-.233****
3. Es	.053	.008	.102	.156*
4. Ep	-.122	-.093	-.053	-.023
5. PDN1	**.415****	**.410****	**.329****	**.213****
6. PDN2	**.387****	**.400****	**.184****	**.133***
7. DDN1	.058	.057	.030	-.067
8. DDN2	.071	.066	.041	-.059
9. PIN1	**.364****	**.284****	**.219****	.109
10. PIN2	**.291****	**.313****	.197**	.**278****
11. DIN1	.044	-.075	-.017	-.070
12. DIN2	.065	.090	.064	.090
13. DPM1	**.660****	**.629****	**.373****	**.300****
14. DPM2	**.563****	**.641****	**.337****	**.294****
15. DPO1	**.609****	**.539****	**.362****	**.238****
16. DPO2	**.502****	**.547****	**.271****	**.234****
17. AUDIT1	1	**.724****	**.638****	**.481****
18. AUDIT2	.**724****	1	.590**	.**692****
19. RAPI1	.**638****	.**590****	1	.**583****
20. RAPI2	.**481****	.**692****	.**583****	1

Note. * p < .05; **p < .01;***p <.001

Correlations bolded if r > |.2| and p < .05.

APPENDIX B – Concurrent Effects Model Diagram

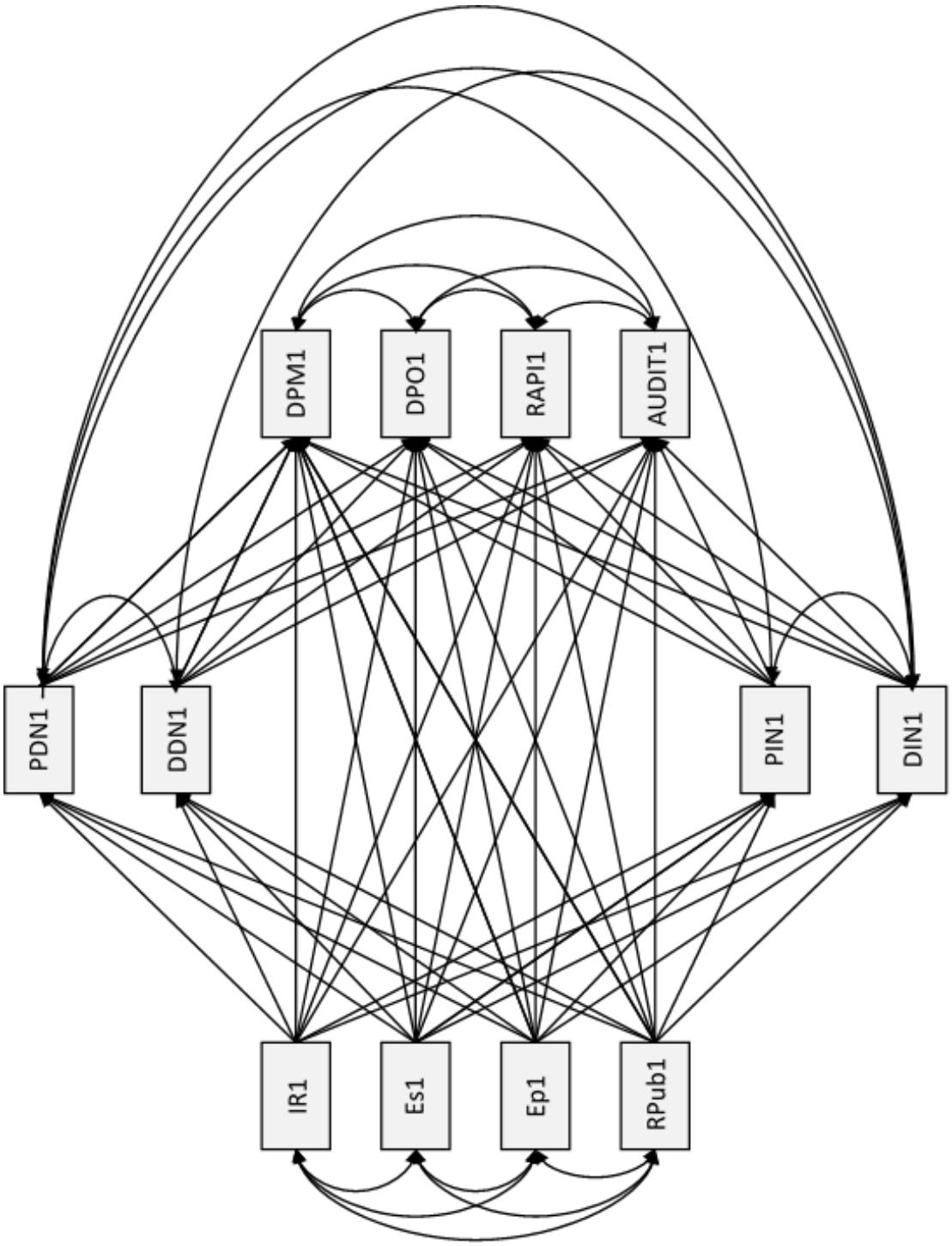

Figure A1. Hypothesized Concurrent Effects Path Model.

APPENDIX C – Prospective Effects Model Diagram

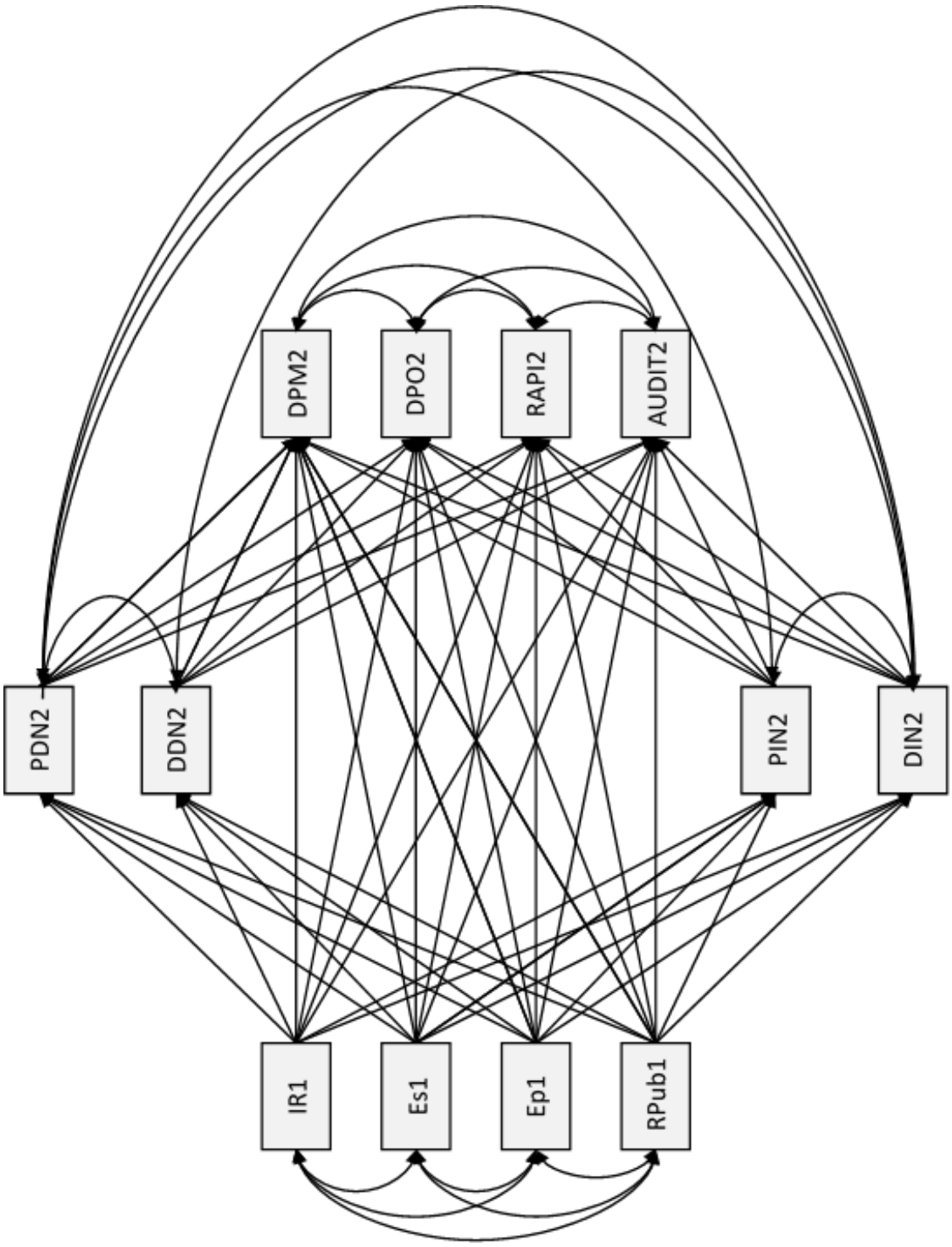

Figure A2. Hypothesized Prospective Effects Path Model.

APPENDIX D – IRB Approval Letter

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 16021201
PROJECT TITLE: The Prospective Influence of Religiousness on Alcohol Use: What Role do Perceived Norms Play?
PROJECT TYPE: New Project
RESEARCHER(S): Corey Brawner
COLLEGE/DIVISION: College of Education and Psychology
DEPARTMENT: Psychology
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 02/16/2016 to 02/15/2017
Lawrence A. Hosman, Ph.D.
Institutional Review Board

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