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RELIGIOUS AND SPIRITUAL PREDICTORS OF GAMBLING PARTICIPATION
AND GAMBLING PROBLEMS AMONG COLLEGE STUDENTS

by

Donald J. Yorgason

A Dissertation

Submitted in Partial Fulfillment of the

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ABSTRACT

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The present study used structural equation modeling to assess spiritual and religious predictors of gambling problems and gambling participation. College students from state and religiously affiliated schools reported on their gambling participation and problems, as well as their spirituality, religious behavior and degree of religious affiliation. Additionally, participants reported their perceptions regarding peer gambling behavior, peer gambling approval, and church member gambling approval. The results indicated higher spirituality predicted fewer gambling problems, but only for women. Peer approval of gambling and church member approval of gambling predicted higher gambling frequency. Peer approval of gambling also predicted more gambling problems. Peer and church member approval of gambling completely mediated the relationships between religiosity and church affiliation and gambling frequency and problems. These same relationships were partially mediated for spirituality. Religious variables were predictive of gambling frequency and problems until peer and church member approval were included as mediators. These findings suggest that religious variables influence gambling primarily in an indirect way by influencing peer groups or perceptions of peer approval.

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Religious and Spiritual Predictors of Gambling Participation and Gambling Problems Among College Students

The relationship between religious participation and gambling among college students is not well understood. Studies on adults have consistently shown gambling to be inversely related to religious involvement (Diaz, 2000; Grichting, 1986; Hodge, Andereck, & Montoya, 2007; Hoffman, 2000; Welte, Barnes, Wieczorek, & Tidwell, 2004). In general, those who more frequently engage in religious behaviors are less likely to gamble or to have gambling problems. Religion, therefore, may serve as a protective factor for gambling problems among adults. It is not known if this same relation holds with college students. Compared to adults, college students engage in religious practices less (Astin, 1993; Bowen, 1997; Bryant, Choi, & Yasuno, 2003; Levine, 1980; Uecker, Regnerus, & Vaaler, 2007) and are more likely to gamble and gamble problematically (Shaffer, Hall, & Vander Bilt, 1999). The purpose of this study was to explore the relationship between religious involvement and gambling while also considering interpersonal variables that might influence this relationship. Following a review of the relevant literatures, this paper will return to detail the questions being considered in this exploratory project.

College Student Gambling

Gambling has been defined as betting items of value, typically money, on events with an uncertain outcome (Whelan, Steenbergh, & Meyers, 2007). Gambling is common among college students with studies finding rates of gambling between 42% and 87% (Engwall, Hunter, & Steinberg, 2004; LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Lesieur et al., 1991; Winters, Bengston, Dorr, & Stinchfield, 1998). One of these studies

showed that 23% of college students gambled at least weekly (Lesieur et al., 1991). Problem gamblers are those people who experience some significant difficulty in their life as a result of their gambling, but who may not meet all the criteria to be classified as pathological gamblers (Whelan et al., 2007). Pathological gamblers, according to the DSM-IV-TR, show persistent gambling behavior marked by a preoccupation with gambling, unsuccessful attempts to stop, having to gamble more, and experiencing social, financial, and/or occupational consequences deterioration (American Psychiatric Association, 2000).

College students report gambling problems at higher rates than adults. In a meta-analysis of prevalence rates among college students, 7% were classified as problem gamblers, meaning that they were experiencing gambling related difficulties, but not enough difficulties to classify them as pathological gamblers (Shaffer et al., 1999). An additional 5% of students met diagnostic criteria for pathological gambling (Shaffer et al., 1999). These rates show college students to experience problems related to gambling at roughly twice the rate of the typical adult population (Shaffer et al., 1999). Those who meet diagnostic criteria for pathological gambling experience a significant number of distressing consequences related to their gambling. College gamblers who can be classified as problem or pathological are more likely to use tobacco, alcohol, and other drugs, and to overeat (Ladouceur, Dube, & Bujold, 1994). These students also often report experiencing financial difficulties, as well as borrowing from friends and banks to support their gambling habits. Additionally, their gambling encroaches on the time normally given to studying and work (Engwall et al., 2004). It should be noted that these gambling related effects are more likely to be experienced by men, as gender predicts

both the likelihood of gambling (e.g., LaBrie et al., 2003; Welte et al., 2004; Winters et al., 1998) and the likelihood of experiencing gambling problems (Ladouceur et al., 1994; Shaffer, Hall, & Vander Bilt, 1997; Winters et al., 1998), with males having higher rates of both.

Research suggests that social variables, especially perceptions of peer behavior and expectations, influence gambling behavior. Social reasons are among the most commonly reported motivators for gambling among college students (Neighbors, Larimer, Lostutter, & Crouce, 2001). Perceived peer gambling behavior, or descriptive peer norms, as well as perceived gambling approval, or injunctive peer and family norms, uniquely predict gambling frequency and negative consequences related to gambling (Larimer & Neighbors, 2003; Moore & Ohtsuka, 1999), with individuals gambling more and have more gambling related problems when they perceive their peers to gamble more and to approve of gambling (Larimer & Neighbors, 2003; Moore & Ohtsuka, 1999; Weinstock, Whelan, Meyers, & Watson, 2007; Wickwire, McCausland, Whelan, Luellen, & Studaway, 2008).

Religion and Spirituality among College Students

Religion has been defined as personal beliefs and practices as they pertain to the transcendent and existential aspects of life (Richards & Bergin, 2000). Most people tend to report a specific religious group affiliation and express that their beliefs and practices are aligned with a specific institution or denomination (Richards & Bergin, 2000). Therefore, religiosity is understood to relate to practices or behaviors, beliefs, and group affiliation. However, religious participation may be driven by non-religious motives (i.e., attending church for purely social reasons). In contrast, some individuals consider

themselves to be spiritual despite their lack of participation in a formal religious group (Cherry, DeBerg, & Porterfield, 2001). Spirituality includes the individual's stated relationship with the divine or sacred, as well as their motives in regard to religious behaviors (Canda & Furman, 1999; Carroll, 1998; Koenig, McCullough, & Larson, 2001; Miller, 1998; Zinnbauer et al., 1997). In other words, a person's spirituality is made up of both their felt relationship with the divine and their reasons for engaging in religious practice.

The constructs of religiosity and spirituality are often correlated, but not synonymous, within individuals (Hout & Fischer, 2002). A person may be highly spiritual in that they consider their relationship to the divine as crucial in their life, and yet they may not engage in religious practices (e.g., prayer, scripture study, church attendance) on a frequent basis. This person could be classified as highly spiritual but not religious. Conversely, an individual may engage in very frequent religious behaviors, but not feel any connection to the divine. This person would be considered highly religious but not spiritual.

The potential disparity of religiosity and spirituality is perhaps nowhere more evident than in the population of college students. College coincides with a reduction in religious participation for many (Astin, 1993; Bowen, 1997; Bryant et al., 2003; Levine, 1980; Uecker et al., 2007). Specifically, college students report less attendance at church and less prayer (Astin, 1993). This move away from religious activity seen in college student samples has been conceptualized as a normative growth process common to young adults. However, although 69% of college students report a decline in church attendance, only 20% reported reduced religious salience, and only 17% disaffiliate

altogether (Uecker et al., 2007). Also, a substantial percentage (37.9%) of college students actually report an increase in religious convictions, while most (48%) say their religiosity remained stable, and only 13.7% report a weakening of religious convictions since entering college (Lee, 2002). Such findings suggest that the decrease in religious attendance may be temporary and may not represent a lack of religious feeling by college students. In fact, this downturn in level of religious activity has been attributed to increasing acceptance of multiple religions, beyond any single doctrine (Cherry et al., 2001; Lee, 2002). Indeed, more undergraduates identify as spiritual rather than religious (Cherry et al., 2001; Constantine, Miville, Warren, Gainor, & Lewis-Coles, 2006), leading Cherry et al. (2001) to speculate that many college students appear to be constructing their spirituality without much regard to the boundaries dividing religious denominations.

Gender is related to religiosity. Women tend to be higher in their religious participation than men (Iannaccone, 2003; Stark, 2002). This discrepancy decreases following marriage, when men tend to increase their religious behavior to be like that of their spouse (Ploch & Hastings, 1998; Thornton, Axinn, & Hill, 1992; Wilson & Sherkat, 1994), as long as both spouses are of the same denomination (Iannaccone, 1994). It has been suggested that girls are socialized to become more religious than boys, and that this socialization is the primary cause of the gender difference in religiosity (McCullough, Enders, Brion, & Jain, 2005).

Gambling and Religion

Among adults, religious involvement and gambling behavior are inversely related (Diaz, 2000; Hoffman, 2000). Frequency of attending religious services has been found

to be inversely related to the amount of money spent gambling (Diaz, 2000) and the prevalence of gambling problems even when controlling for gambling frequency and availability (Hoffman, 2000). Ratings of the importance of faith in God was also inversely correlated with gambling participation (Hoffman, 2000), although this relation has not been consistently replicated (Lam, 2006) and does not predict the likelihood of gambling problems (Hoffman, 2000). It is moderated by denomination, with individuals gambling less when they belonged to denominations that urged members not to gamble (Diaz, 2000; Grichting, 1986; Welte et al., 2004).

Religious participation may work to prevent problem gambling more than faith or belief in God. In their study of adults and various addictive behaviors, Hodge et al. (2007) collected measures of religious participation and spirituality. They found that individuals who identified as spiritual but not religious were more likely to gamble, smoke, and drink than those who were neither spiritual nor religious and those who were spiritual and religious. The authors speculated that high spirituality engenders high self-esteem, and that this self-esteem unmoored in religious norms of anti-substance use does not protect against addictive behavior. Another possible explanation for these findings is that each individual has an economy of resources, and that churches prevent excessive gambling by requiring resources (e.g., time, money) that may have otherwise been spent gambling excessively (Hoffman, 2000). If this were the case, religious behavior would influence gambling more than belief in ideas that did not lead to actual religious behavior. Another explanation is the suggestion that religious involvement may delay the onset of use and prevent problematic levels of use (Ellison & Levin, 1998; Hodge,

Cardenas, & Montoya, 2001; Hoffman, 2000; Hope & Cook, 2001; Lam, 2006; Miller, 1998; Morjaria & Orford, 2002; Vaillant, 1988).

While the relation between religion and college student gambling has not been directly explored, one study supports that these two behaviors are related. In this national survey of over 10,000 college students, a belief in the importance of religion was found to be associated with the decision not to gamble (LaBrie et al., 2003). Beyond this one study suggesting religious belief as a protective factor against gambling, the relationship between gambling and religion for college students has gone unexamined. By contrast, the relationship between religion and alcohol use for college students has been examined. As alcohol use and gambling often occur, co-occur and share many diagnostic features (Grant, Kushner, & Kim, 2002), research on religion and alcohol use in college may offer clues as to how religion might relate to gambling among college students.

Religion and alcohol use appear inversely related. Students who engage in more religious behavior drink less (Barry & Nelson, 2005; Engs, Diebold, & Hanson, 1996; Humphrey, Leslie, & Brittain, 1989; Slicker, 1997; Wechsler, Dowdall, Davenport, & Castillo, 1995). Those who attend religious services drink less often (Mason & Windle, 2002). When they do consume, they drink smaller quantities (Galen & Rogers, 2004; Mason & Windle, 2002), and experience fewer related problems (Brown, Parks, Zimmerman, & Phillips 2001; Mason & Windle, 2002). Conversely, those students who binge drink are less likely to report religion as important (Weitzman, Nelson, & Wechsler, 2003). Students with no religious affiliation by self-report drink more frequently and in larger quantities, as they hold higher perceived drinking norms (Patock-Peckham, Hutchinson, Cheong, & Nagoshi, 1998). These higher perceived norms are at

least partially due to these students affiliating with peers who drink at a similar level. It should be noted that although religious variables can predict alcohol use, among adolescents, peer use is the strongest predictor (Bucholz, 1990; Jacob & Leonard, 1994). This finding has led to the suggestion that religious variables may influence alcohol consumption at least partially through peer groups that model and reinforce abstinence or moderation.

Current Project

This study explored the relations between religious variables and gambling within a diverse college student population recruited from multiple institutions, to determine whether religious variables predicted gambling frequency and problems, as well as whether peers mediated this relationship. It was hypothesized that both religiosity and religious group affiliation, but not spirituality, would be inversely related to gambling frequency and gambling problems. Furthermore, it was predicted that social variables, specifically peer behaviors and peer norms regarding gambling would predict gambling. It was hypothesized that higher perceived approval of gambling by the individuals' fellow church members, perceived peer approval of gambling, and perceived peer gambling behaviors would predict greater gambling frequency and gambling problems. Perceived peer gambling, perceived peer approval of gambling, and perceived church member approval of gambling were also predicted to mediate the relationship between religiosity and gambling behavior. Because of the gender differences for gambling and religious behavior, men and women were tested separately for the relationships between these variables.

Method

Participants

Students were recruited from undergraduate courses at one public and two church-affiliated universities. Recruitment from diverse institutions broadens the sample to more fully represent college student experiences. To participate, students were required to be at least 18 years old and able to read English text. At the discretion of their course instructor, some received credit toward a course research requirement. The sample consisted of 728 students, which included 374 from the public university and 354 from the private church-affiliated schools. Males make up 35.7% ($n = 260$) of the sample. Ethnically, 58.8% ($n = 428$) were Caucasian, 29.4% ($n = 214$) were African American, and 11.5% ($n = 84$) were of other racial/ethnic backgrounds. Most participants were protestant (57%), with the next two largest groups being Catholic (16.4%), and belonging to no denomination (16.6%). In addition to these large groups, a smaller subset of participants identified as other religions (7.7%) and Jewish (1.3%). The mean age was 21.7 years ($SD = 4.7$), and the mean reported disposable income was within the range of \$200 to \$250 per month. See Table 1 for details.

Table 1
Demographics Detailed

		Frequency	Percent
Sex			
<i>Male</i>	<i>Female</i>	260	35.7%
		468	64.3%

Table 1 (Continued)
Demographics Detailed

<u>School Type</u>		
<i>Public</i>	374	51.4%
<i>Private/Church Affiliated</i>	354	48.6%
Age		
<i>18-19</i>	227	31.2%
<i>20-29</i>	464	63.7%
<i>30-39</i>	24	3.3%
<i>40-49</i>	10	1.4%
<i>50-59</i>	2	0.3%
<i>60+</i>	1	0.1%
Ethnicity		
<i>Caucasian</i>	428	58.8%
<i>African American</i>	214	29.4%
<i>Asian</i>	39	5.4%
<i>Hispanic</i>	11	1.5%
<i>Native American</i>	3	0.4%
<i>Islander</i>	2	0.3%
<i>Mixed</i>	19	2.6%
<i>Other</i>	11	1.5%
Disposable Income		
<i>Less than \$50</i>	71	9.8%
<i>\$50 to \$100</i>	132	18.2%
<i>\$100 to \$150</i>	107	14.8%
<i>\$150 to \$200</i>	105	14.5%
<i>\$200 to \$250</i>	70	9.7%
<i>\$250 to \$300</i>	48	6.6%
<i>\$300 to \$350</i>	35	4.8%
<i>\$350 to \$400</i>	47	6.5%
<i>\$400 to \$450</i>	28	3.9%
<i>\$450 to \$500</i>	32	4.4%
<i>\$500+</i>	50	6.9%

Table 1 (Continued)
Demographics Detailed

Denomination		
<i>Protestant</i>	425	57.0%
<i>Catholic</i>	122	16.4%
<i>Jewish</i>	10	1.3%
<i>Other</i>	57	7.7%
<i>None</i>	123	16.6%
Gambling Problems (SOGS)		
<i>0</i>	534	73.4%
<i>1-2</i>	148	20.3%
<i>3-4</i>	28	3.8%
<i>5+</i>	18	12.5%
Gambling Frequency		
<i>0</i>	302	41.5%
<i>1-2</i>	191	26.2%
<i>3-4</i>	142	19.6%
<i>5+</i>	92	12.7%

Instruments

Personal History Questionnaire (see Appendix E). Demographic information, current denomination and number of years as a member of current religion, importance of religion, importance of God, confidence in the accuracy of their rating on church stance for gambling, and degree to which they agree with the church’s teachings about gambling were assessed.

South Oaks Gambling Screen (SOGS) (see Appendix D). This 20-item self-report measure (Lesieur & Blume, 1987) converges with the current diagnostic criteria for pathological gambling (Stinchfield, 2002) as defined by the DSM-IV-TR (American Psychiatric Association, 2000). The SOGS has been reported to be internally consistent

($\alpha = .97$) and possesses adequate one-month test-retest reliability ($r = .71$) (Stinchfield, 2002). Convergent validity has also been demonstrated (Lesieur & Blume, 1987). Though the SOGS is most commonly used as a diagnostic measure, it can also be thought of as a count variable including a number of potential problems experienced by gamblers. Scores range from 0-20 with higher scores indicating a greater number of problems experienced. A score of 3 or greater has been used to identify problem gamblers, and a score of 5 or greater has been used to identify pathological gamblers (Stinchfield, 2002; Volberg & Abbott, 1997).

South Oaks Gambling Screen Frequency (SOGS-F). The SOGS contains a frequency item not included in the SOGS' score. This frequency item assesses gambling behavior in 11 typical gambling activities with responses including "Not at all," "Less than once a week," and "Once a week or more." Responses were coded from 0 to 2 respectively for each gambling activity, such that a score of 2 would indicate a person engaged in two different gambling activities less than once a week, or they engaged in one gambling activity once a week or more. Responses were summed for an estimate of gambling frequency with possible scores ranging from 0-22.

Intrinsic Spirituality Scale (ISS) (see Appendix A). This 6-item self-report scale (Hodge, 2003) measured the degree to which spirituality functioned as an individual's master motive. This scale was developed with a college sample, and based on Allport and Ross' (1967) measure of intrinsic religion. As this scale does not use the word God, it is appropriate to use with theistic and non-theistic populations (Hodge, 2003). Confirmatory factor analysis showed these items to load on a single latent factor of spirituality (Joreskog & Sorbom, 1993), and a Cronbach's Alpha of 0.96 (Hodge,

2003). Within this sample, the Cronbach's alpha was 0.97. Item responses had a possible range from 0 to 10, with higher scores indicating greater importance of spirituality.

Religiosity Scale (RS) (see Appendix E). Religiosity is measured by asking frequency of attendance at services (Musick, Koenig, Larson, & Matthews, 1998), frequency of prayer, and frequency of reading religious literature (Conners, Tonigan, & Miller, 1996; Koenig, Parkerson, & Meador, 1997). These variables represent both organizational and non-organizational aspects of religious participation, distinct albeit overlapping dimensions of religiosity (Hill, 1999). Scales that include these items have a Cronbach's alpha of 0.75, and construct validity with correlations ranging from $r = 0.4$ to $r = 0.85$ with other religious scales (Koenig et al., 1997). For this study a 6-item scale was developed. This scale included 4 items assessing frequency of various religious activities at places other than at a church, including: private prayer, watching or listening to religious programs, reading religious literature or the Bible, and saying prayers or grace at mealtime. These items were on an 8-point Likert-type scale with anchor points ranging from "Never" to "More than once a day." An additional two 9-point Likert items (ranging from Never to Several times per week) assessed attendance at religious services, as well as participation in other activities at a place of worship. The total score is the sum of these items. A reliability test and a factor analysis were completed on the current sample. The Cronbach's alpha was 0.89. The factor analysis revealed one factor with all items having factor loadings greater than .75.

Affiliation Scale (AS) (see Appendix F). Research concerned with placing individuals along a continuum of affiliation from apostate to full member found a single

rating about persistence of beliefs to be the strongest correlate of their current classification (e.g., Brinkerhoff & Mackie, 1993). This item is a Likert-type item with 6 possible responses ranging from “wholly disagree” to “wholly agree” to the question stem “What is the extent to which you still hold beliefs taught you in church when you were growing up?” To strengthen this measure, other items used by researchers of affiliation were assessed, including belief in the existence of God, level of doubt in their faith (Johnson, 1997), and a self-rating of change in whether the individual’s religious beliefs and conviction have gotten weaker or stronger since they entered college as a freshman (Lee, 2002).

Although these affiliation items have been utilized by previous surveys, their psychometric properties have not been reported. These variables, therefore, were examined for reliability. The Cronbach’s alpha for this 6-item scale was 0.78. The factor analysis showed the items loading on one factor with factor loadings ranging from .67 to .83.

Gambling Injunctive Norms Scale (GINS) (see Appendix B). This 5-item scale assessed the extent to which close friends approve of gambling. Items included such statements as “most of my friends approve of gambling” or “my friends often go out to places where gambling occurs.” Participants responded to these statements using 5-point (disagree-agree) Likert-type scales. Scores were calculated as the mean of the five items, with higher scores indicating injunctive norms favoring gambling. Cronbach alpha has been reported as 0.78 (Larimer & Neighbors, 2003) and 0.79 (Moore & Ohtsuka, 1999). Within this sample the Cronbach’s alpha was 0.80.

Gambling Injunctive Norms Scale - Religious (GINS-R) (see Appendix B). A modified version of the GINS was used to assess the individual's perception of their church community's approval toward gambling. The scale was modified so that the term "My friends" was replaced with "Members of my church." Participants were instructed to guess at their fellow church members' attitudes and behaviors if they were not certain. If they didn't currently attend worship services, participants were asked to fill out the measure in regards to a past congregation. Within this sample the Cronbach's alpha was 0.84.

Gambling Perceived Norms Scale (GPN) (see Appendix C). This scale measures perceived gambling norms (Larimer & Neighbors, 2003). Larimer and Neighbors (2003) original scale includes a one item measure of participant's quantity of gambling. This study only utilized the gambling norms portion of the scale. Respondents were asked how often they thought the average college student gambled on a 10-point scale with anchors ranging from "Never" to "Every Day." Respondents were also asked how much money they thought the average college student had won and lost from gambling over the previous month and year. Expenditure responses were coded on 10-point scales with anchors ranging from less than \$5 to more than \$1,000 for wins and losses per month and \$25 to more than \$2,000 for wins and losses per year. The GPN is the mean response to these items. Higher scores mean the individual perceives their peers to be gambling more intensely. In previous research Cronbach's alpha was 0.84 (Larimer & Neighbors, 2003). Within the current sample the alpha was 0.84.

Procedure

With the approval from each University's Institutional Review Board and individual instructors, questionnaires were distributed to undergraduates. Potential participants were informed that the current study examined spirituality and gambling, and they were asked to read an informed consent statement (see Appendix F). No identifying information was collected.

Each questionnaire packet included the following measures in this order: directions, ISS, GINS, GINS-R, GPN, SOGS and the demographic questionnaire, which included the religiosity and current level of religious affiliation items. Participants were given verbal direction to complete the questionnaires as accurately as possible without discussing their responses with fellow classmates. Researchers were available to answer questions. Upon completion, participants returned the questionnaire packets to the researcher. Most participants completed and returned the questionnaire packet at the time of administration, although a small minority elected to complete it on their own time, returning it at their next scheduled class meeting.

Results

Analysis Plan

Variable means, standard deviations, distributions, and zero-order correlations were first examined to explore religiosity, gambling behaviors and their associations. Path analysis of structural equation modeling within Mplus was then utilized to determine specific predictive links from religiosity to gambling behaviors.

Variable Descriptive Statistics and Correlations

Descriptive statistics in Table 2. According to the SOGS scores, 93.7% ($n = 682$) of the sample fit into the category of non-problem gamblers, with 41.5% ($n = 302$) of the sample having not gambled at all in the past year. Of the remaining 58.5% who had gambled in the past year, most (26.2%, $n = 191$) scored between 1-2 indicating they had engaged in one or two gambling activities less than once a week, or in one gambling activity weekly. Another 19.6% ($n = 142$) scored between 3-4 indicating they had engaged in 3 to 4 gambling activities less than weekly or in 2 gambling activities weekly. Only 12.7% ($n = 92$) scored a 5 or greater on gambling frequency, which corresponds with engaging in five or more gambling activities less than weekly or engaging in 3 or more gambling activities weekly.

Problem gamblers made up 3.8% ($n = 28$) of the sample, and 2.5% ($n = 18$) of the sample were pathological gamblers. As would be expected, men were significantly more likely to have gambling problems than women, $\chi^2 (df = 1) = 16.7, p < .001$.

Participant scores for spirituality, religious behavior, and affiliation on average were in the middle range of possible responses. The average spirituality score was 6.1 ($SD = 2.66$) on a scale of 0 to 10. Similarly, participants on average reported a religious behavior score of 17.8 ($SD = 11.5$) on a scale ranging from 0 to 44. A score of 22 would represent monthly engagement in each of the religious behaviors measured. On average, students engaged in private prayer once a week ($M = 4.1, SD = 2.5$) and read religious literature somewhat more than once a month ($M = 2.4, SD = 2.2$). On average, they attended religious services once a month ($M = 3.8, SD = 2.6$). Religious affiliation scores averaged 13.2 ($SD = 4.9$) on a scale ranging from 0 to 20.

Table 2. Descriptive Statistics and Zero-Order Correlations among Demographic Variables, Predictor Variables and Outcome Measures

Measures	1	2	3	4	5	6	7	8	9	10	11	12	13
Demographic Factors													
1. Gender	-												
2. Age	.02	-											
3. Race	-.03	.08*	-										
4. School Type	.18**	-.28**	-.07	-									
5. Disposable Income	.1**	.16**	.01	-.04	-								
Religious Factors													
6. Religiosity	-.09*	.12**	.34**	.02	-.04	-							
7. Spirituality	-.09*	.11**	.31**	-.04	-.04	.76**	-						
8. Religious Affiliation	-.07*	.08*	.28**	.001	-.05	.71**	.8**	-					
Peer Factors													
9. Perceived Peer Gambling Behavior	-.1**	.04	.26**	-.05	.03	.15**	.18**	.19**	-				
10. Perceived Peer Approval of Gamb.	.07	.06	-.2**	-.05	.06	-.25**	-.17**	-.13**	.00	-			
11. Perceived Church Approval of Gamb.	-.04	-.04	-.25**	.04	.07	-.28**	-.23**	-.22**	-.07	.34**	-		
Gambling Factors													
12. Gambling Problems (SOGS)	.18**	.19**	.1*	-.13**	.04	.03	.04	.01	.07*	.15**	.03	-	
13. Gambling Frequency (SOGS-F)	.29**	.16**	-.01	-.16**	.12**	-.1*	-.07	-.1*	.04	.34**	.13**	.5**	-

Mean	.36	21.67	.41	.49	4.77	17.78	6.13	13.2	3.69	3.42	2.69	.59	1.93
SD	.48	4.69	.49	.5	3.0	11.5	2.66	4.88	1.49	.76	.78	1.45	2.45
Skew	.6	3.77	.36	.06	.71	.27	-.61	-.63	.65	-.51	-.32	4.44	1.87
Kurtosis	-1.65	19.45	-1.88	-2.0	-.62	-.93	-.44	-.52	-.05	.14	-.27	26.3	5.32
Range	0-1	18-64	0-1	0-1	1-11	0-44	0-10	0-20	1-8	1-5	1-5	0-14	0-19

Note. (N = 728). Gender Female = 0 and Male = 1. Race White = 0 and Non White = 1. School Type State = 0 and Religious = 1.
*p < .05. **p < .01.

As shown in Table 2, zero-order correlations between demographic variables and the main study variables were statistically significant and in expected directions. Being a woman (average $r = -.083$) and older (average $r = .103$) were significantly related to more religious behavior, spirituality, and stronger affiliation with a religious organization. To a moderate degree (average $r = .31$), whites reported lower spirituality, religiosity, and church affiliation than respondents from other ethnic backgrounds. The religious/spiritual variables were all strongly correlated with each other (average $r = .76$). All of these variables were also weakly correlated with perceptions regarding gambling, such that people who were more religious, spiritual, and church affiliated perceived others to gamble more frequently (average $r = .17$), and perceived that their friends and coreligionists would have greater disapproval towards gambling (average $r = -.21$). Religiosity and church affiliation were equally correlated weakly ($r = -.10$) with gambling behavior such that individuals high in these variables gambled less frequently. Spirituality did not correlate significantly with gambling frequency.

Demographic variables were moderately correlated with beliefs regarding gambling such that women ($r = .10$) and non-whites ($r = .26$) perceived that others gambled more, and non-whites perceived a lower approval towards gambling from their friends ($r = -.20$) and fellow church members ($r = -.25$). Finally, demographic variables were correlated weakly with gambling behavior, such that men, older participants, and those from the public university gambled more frequently (average $r = .20$) and had more gambling problems (average $r = .17$). Additionally, non-whites had more gambling problems ($r = .10$), and individuals with more disposable income gambled more frequently ($r = .12$).

Perceived gambling norms ($r = .07$) and perceived peer approval of gambling behavior ($r = .15$) were both weakly positively correlated with gambling problems. Perceived peer approval towards gambling was moderately correlated with perceived church member approval towards gambling ($r = .34$), and with gambling frequency ($r = .34$). Perceived church member approval towards gambling was weakly correlated ($r = .13$) with gambling frequency such that people who thought their coreligionists were more approving of gambling, gambled more. Finally, gambling frequency and gambling problems were strongly positively correlated ($r = .50$).

Outcome Variable Distribution

Data screening procedures outlined by Tabachnick and Fidell (2007) revealed that no outliers occurred in the outcome variables. Also, both outcome variables were positively skewed such that their distribution was better approximated by a Poisson distribution than a normal distribution. This is often the case with count variables that measure unusual occurrences (Long, 1997). For example, the current study measured the unusual occurrence of experiencing problems related to gambling and the unusual occurrence of gambling at progressively higher frequencies. These distributions showed the high majority of students to not have any problems related to gambling in the past year. Specifically, 73.4% of the sample received a zero on the SOGS, and a total of only 2.5% scored in the pathological range. The distribution of gambling frequency was similar, 41.5% not gambling in the past year. The Vuong test (Vuong, 1989) confirmed that these Poisson distributions were zero-inflated (SOGS $\nu = 6.87$, $Pr > z = .00$, Gambling Frequency $\nu = 17.69$, $Pr > z = .00$), indicating that the number of zero scores on these measures was disproportionately large. To properly analyze such data it is

necessary to estimate models which account for both the Poisson distribution and the zero-inflation in the outcomes. A zero-inflated Poisson (ZIP) model was used to test hypotheses. To handle missing data, the full information maximum likelihood (FIML) capabilities of Mplus were used.

Modeling Gambling Frequency and Problems

Structural equation modeling (SEM) was used to examine a path model with predictors of gambling frequency (SOGS-F) and gambling problems (SOGS) (see Figure 1). The predictors of gambling frequency and problems included religiosity, spirituality, affiliation with religion, perceived approval by church members toward gambling, perceived peer approval toward gambling, and perceived peer gambling, with perceived approval by church members toward gambling, perceived peer approval toward gambling, and perceived peer gambling as intervening variables between the predictors and the outcomes. Due to possible collinearity of religiosity, spirituality, and affiliation (average correlation $r = .76$) three separate models were run for each of these predictors. In all models run, both outcome variables (gambling frequency, gambling problems) were included. Models were estimated using Mplus (Muthen & Muthen, 1998-2010).

The outcome variables followed a zero-inflated Poisson distribution, so each model analyzed two dimensions of the outcome. First, a logistic regression estimated whether respondents reported having no gambling problems on the SOGS or having not gambled in the past year as recorded by the SOGS-F. Second, the count prediction examined higher versus lower scores of SOGS and frequency according to the SOGS-F for individuals scoring 1 or greater on these scales. Mediation was tested using direct and indirect paths to the outcome variables as indicated by Kline (2011). To estimate

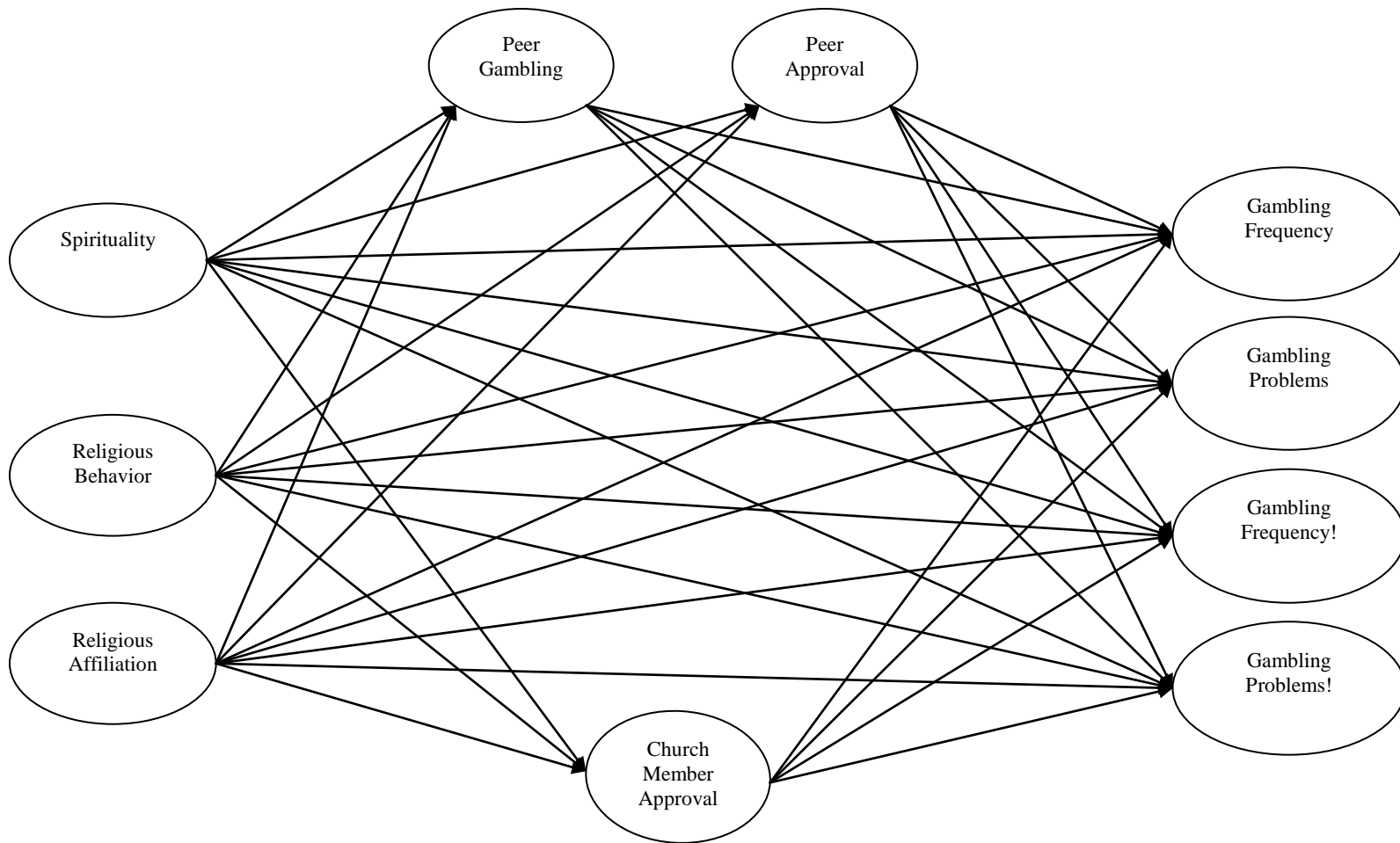


Figure 1. Full Model with all possible paths represented.

mediation effects, a direct effect between the religious predictors and the outcomes was estimated, as well as indirect effects through perceived church member approval of gambling, perceived peer approval of gambling, and perceived peer gambling. Sobel's test (Sobel, 1982) was used to determine significance in mediation. Multiple groups were examined using gender as the grouping variable. Structural invariance was examined by constraining regression paths to be equal across male and female groups (Vandenberg & Lance, 2000). Maximum likelihood deviance tests were used to determine invariance across gender.

Primary Analyses

Gambling frequency. As seen in Table 3 and Figure 2, the logistic portion of the model, having not gambled in the past year was predicted by GINS, such that each additional point of perceived peer approval of gambling decreased the odds of reporting no gambling behavior by 57% (Odds Ratio (*O.R.*) = .43, $p < .001$). Having not gambled was also predicted by GINS-R, such that each additional point of perceived church member approval of gambling decreased the odds of reporting no gambling behavior by 36% (*O.R.* = .64, $p = .001$). Finally those who attended a religious school predicted lower gambling frequency, such that being in a religious school increased the odds of reporting no gambling behavior by 1.6 times (*O.R.* = 1.57, $p = .03$).

The count portion of the model estimated predictions for those individuals who had gambled in the past year. Scoring a higher gambling frequency was predicted by a higher peer approval of gambling, such that for each unit increase in GINS the model predicts a 35% increase in the expected SOGS-F ($b = .299$, $p < .001$; see Appendix H for transformation equation and procedures). Disposable income also predicted greater

gambling frequency with more disposable income predicting a higher rate of gambling, such that for each unit increase in disposable income the model predicts a 2% increase in expected SOGS-F ($b = .024, p = .034$).

Gambling problems. As shown in Table 3 and Figure 2, the logistic portion of the model, which gives path predictions for those participants who never had any gambling related problems showed that scoring a zero on the SOGS was predicted by the GINS, such that each additional point of perceived peer approval of gambling decreased the odds of reporting no gambling problems by 57% ($O.R. = .43, p < .001$).

Table 3
Model Predictions of Gambling Frequencies and Gambling Problems with Indirect Pathways Through Peer Variables

Gambling Frequency (SOGS-F)	Estimate	Std. Error	z-value	p-value	odds ratio
Logistic Portion					
Intercept	4.211	0.817	5.154	< 0.001	
<i>GINS</i>	-0.837	0.151	-5.553	< 0.001	0.43
<i>GINS-R</i>	-0.450	0.141	-3.182	0.001	0.64
<i>School Type</i>	0.454	0.208	2.185	0.029	1.57
<i>Age</i>	-0.044	0.023	-1.946	0.052	0.96
Count Portion					
<i>Intercept</i>	-0.510	0.322	-1.585	0.113	
<i>GINS</i>	0.299	0.082	3.668	< 0.001	
<i>Disposable Income</i>	0.024	0.011	2.118	0.034	
Gambling Problems (SOGS)					
Logistic Portion					
Intercept	4.584	1.058	4.334	< 0.001	
<i>GINS</i>	-0.855	0.201	-4.248	< 0.001	0.43

Table 3 (Continued)
Model Predictions of Gambling Frequencies and Gambling Problems with Indirect Pathways Through Peer Variables

	Estimate	Std. Error	z-value	p-value
Count Portion				
Intercept	-1.356	0.954	-1.422	0.155
<i>ISS</i>	-0.132	0.049	-2.688	0.007
<i>Age</i>	0.070	0.020	3.577	< 0.001
<i>GINS-R</i>	0.220	0.118	1.86	0.063
Peer Variables				
Perceived Peer Gambling (GPN)				
<i>Intercept</i>	3.176	0.327	9.718	< 0.001
<i>ISS</i>	0.061	0.021	2.869	0.004
<i>Rel</i>	0.009	0.005	1.702	0.089
<i>Affil</i>	0.035	0.011	3.317	0.001
Perceived Peer Approval of Gambling (GINS)				
<i>Intercept</i>	3.478	0.153	22.794	< 0.001
<i>ISS</i>	-0.035	0.012	-2.971	0.003
<i>Rel</i>	-0.014	0.003	-5.191	< 0.001
<i>Affil</i>	-0.012	0.006	-1.933	0.053
Perceived Church Member Approval of Gambling (GINS-R)				
<i>Intercept</i>	3.101	0.143	21.669	< 0.001
<i>ISS</i>	-0.045	0.011	-4.111	< 0.001
<i>Rel</i>	-0.014	0.003	-5.356	< 0.001
<i>Affil</i>	-0.025	0.006	-4.153	< 0.001

Note. $N = 728$. *SOGS* = South Oaks Gambling Screen; *SOGS-F* = Gambling Frequency; *GINS* = Gambling Injunctive Norms Scale; *GINS-R* = Gambling Injunctive Norms Scale - Religious; *ISS* = Spirituality Scale. Women and school coded as 0.

The count portion of the model estimated predictions for those individuals who had experienced some gambling related problems. For this portion of the model, scoring lower on the SOGS was predicted by higher spirituality (ISS) for females, such that for each unit increase in spirituality the model predicts a 12% decrease in expected SOGS score ($b = -.132, p = .007$). Age also predicted scoring higher on the SOGS for women, with higher age predicting a higher count on the SOGS, such that for each year older a woman was, she could expect a 7% increase in her SOGS score ($b = .07, p < .001$). It is important to note that both of these relationships were not found with the men. Having a higher perception of church member approval of gambling (GINS-R) was related to scoring a higher count on the SOGS for both men and women, albeit only at a trend level ($b = .22, p = .06$).

Mediators between Religiosity and Gambling. Mediating effects of perceived gambling norms, perceived peer approval of gambling, and perceived church member approval of gambling were evaluated using the approach laid out by Baron & Kenny (1986) and also the Sobel test (Sobel, 1982). First, direct links between religious variables and gambling were estimated without potential mediators in the model. As seen in Figure 3 and Table 4, the logistic portion of gambling frequency was predicted by spirituality ($b = .08, p = .07$), religiosity ($b = .03, p = .001$), and affiliation ($b = .05, p = .03$), although the path between spirituality and gambling frequency was just short of statistical significance.

When potential mediators were added to the model, the direct links from spirituality, religiosity, and affiliation to the logistic portion of gambling frequency were no longer statistically significant. Furthermore, each of these variables significantly

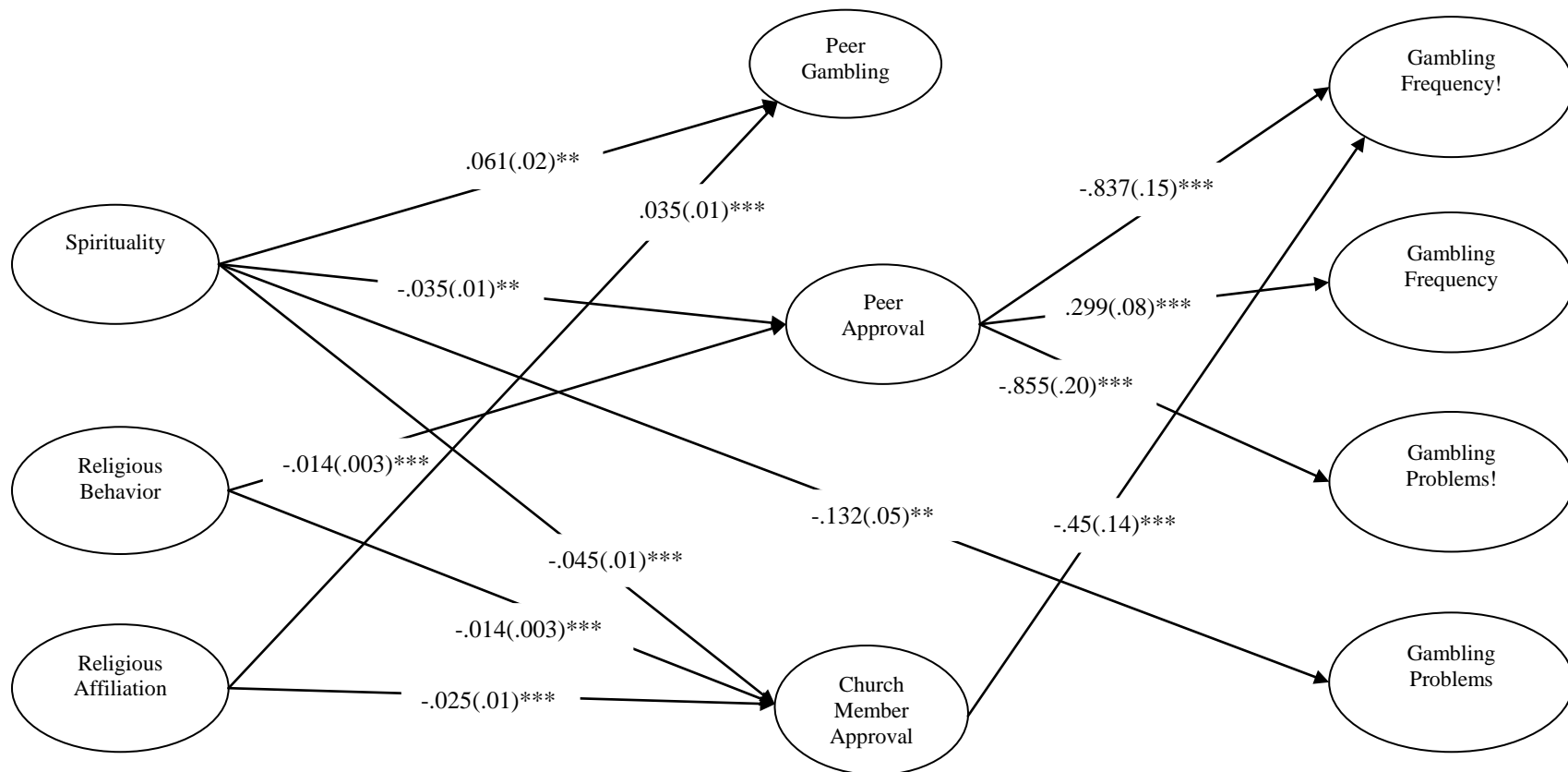


Figure 2. Structural equation model for gambling behavior and problems predicted by spirituality, religiosity, disaffiliation, perceived peer approval of gambling, perceived church member approval of gambling, and perceived peer gambling behavior, with unstandardized regression coefficients (standard errors in parentheses).

Note: ** $p \leq .01$. *** $p \leq .001$. Coefficients reported in the figure are the same for both the male and female groups, as all but one regression path was constrained to be equal across groups (the path from spirituality to gambling problems was not constrained to be equal across groups, and was significant only for females).

Table 4
Model Predictions of Gambling Frequency and Gambling Problems With Mediating Variables Removed

Gambling Frequency (SOGS-F)	Estimate	Std. Error	z-value	p-value	odds ratio
Logistic Portion					
<i>Spirituality (ISS)</i>	0.076	0.041	1.847	0.065	1.08
<i>Religious Behavior (Rel)</i>	0.029	0.009	3.286	0.001	1.03
<i>Affiliation (Affil)</i>	0.045	0.021	2.176	0.03	1.05
<i>School Type</i>	0.413	0.189	2.190	0.03	1.51
<i>Age</i>	-0.051	0.025	-2.081	0.04	0.95
Count Portion					
<i>Disposable Income</i>	0.026	0.012	2.219	0.03	
Gambling Problems (SOGS)					
Logistic Portion					
<i>Age</i>	-0.051	0.027	-1.895	0.058	0.95
Count Portion					
<i>ISS (women only)</i>	-0.115	0.053	-2.191	0.03	
<i>Age (women only)</i>	0.060	0.024	2.437	0.02	

predicted perceived church member approval of gambling, and spirituality and religious behavior predicted perceived peer approval of gambling. Additionally, perceived church member approval of gambling, and perceived peer approval of gambling significantly predicted the logistic portion of gambling frequency (see Table 3). Sobel's test (1982) also confirmed that each of these mediating pathways from religious variables to the logistic portion of gambling frequency, through peer approval and church member approval of gambling, except the path from affiliation through peer approval of gambling,

were significant (avg Sobel = 2.77, all $p \leq .01$) (See Table 5 for all Sobel test statistics). These paths meet criteria for full mediation (Baron & Kenny, 1986). There were no significant indirect effects through perceived gambling norms (GPN).

The count of portion of gambling problems was predicted by spirituality ($b = -.12$, $p = .03$) for women, but not men. When potential mediators were added to the model, the direct link from spirituality to the count portion of gambling problems for women was unchanged, suggesting no mediation for this association. Although without mediators in the model, there were not direct paths from the religious variables to the count portion of gambling frequency or to the zero portion of gambling problems, some indirect links through peer approval were found in the model. Specifically, spirituality and religious behavior predicted peer approval of gambling significantly, and peer approval of gambling was significantly related to the count portion of gambling frequency and the zero portion of gambling problems. Again Sobel's test confirmed that these indirect pathways were significant (avg Sobel = 2.82, all $p \leq .02$).

Discussion

This study examined how college students' religious engagement, affiliation, and spirituality are related to gambling and gambling problems. In addition to considering possible gender differences, this study explored the perceptions of peer gambling, peer approval of gambling and church member approval of gambling as mediators. Engagement in more religious behavior and stronger religious affiliation were predictive of having not gambled in the past year. Additionally, women with higher spirituality had fewer gambling problems. Higher perceived church member approval of gambling predicted higher gambling frequency and higher peer approval of gambling predicted

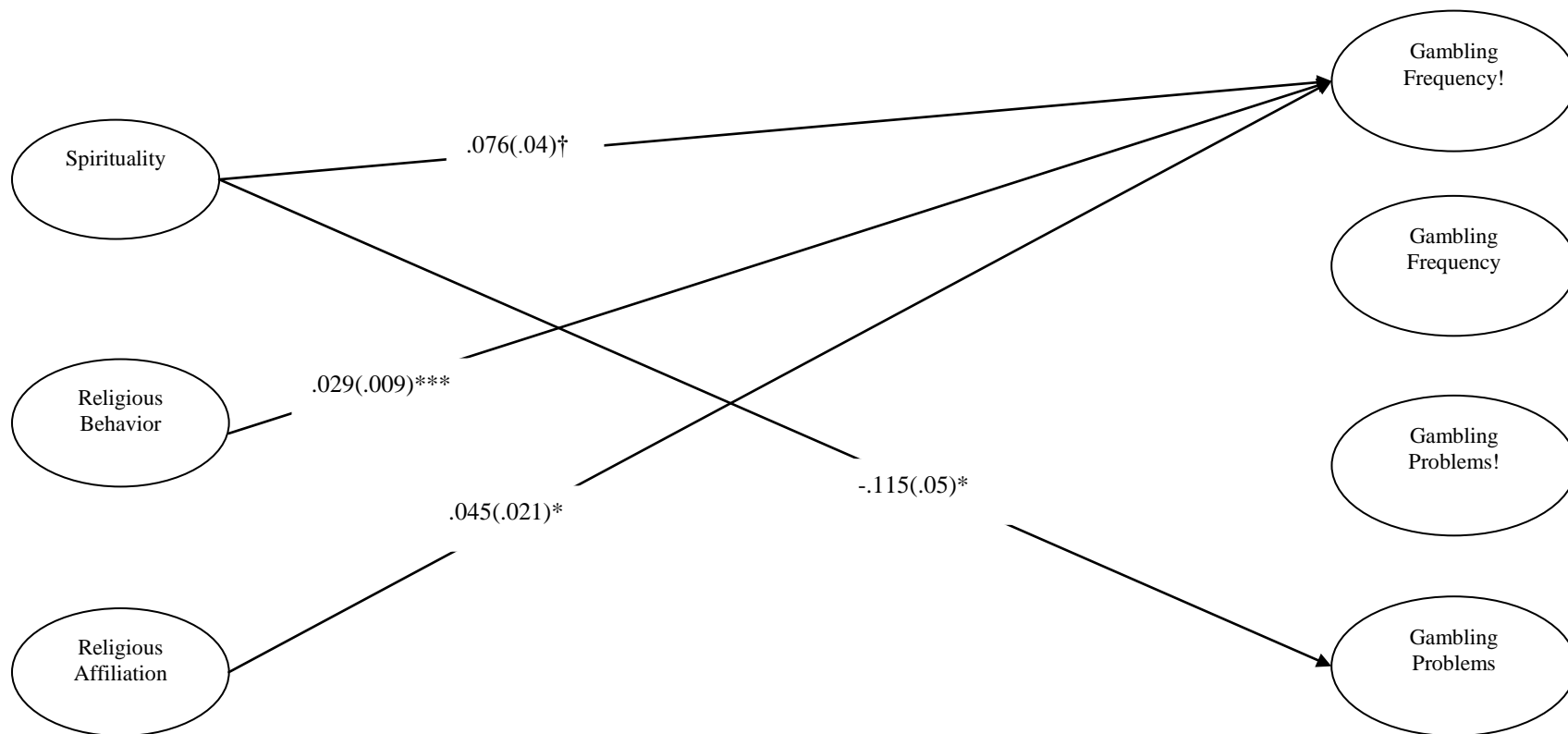


Figure 3. Structural equation model for gambling behavior and problems with mediating peer variables removed. Predictions by spirituality, religiosity, and disaffiliation with unstandardized regression coefficients (standard errors in parentheses).

Note: † $p \leq .10$. * $p \leq .05$. *** $p \leq .001$. Coefficients reported in the figure are the same for both the male and female groups, as all but one regression path was constrained to be equal across groups (the path from spirituality to gambling problems was not constrained to be equal across groups, and was significant only for females). Covariates not shown include respondent age, school, and disposable income.

Table 5
Sobel Tests for Mediation

Perceived Peer Approval of Gambling (GINS)			
Gambling Frequency	Test Statistic	Std. Error	<i>p</i>
Logistic Portion			
<i>ISS</i>	2.58	0.011	0.01
<i>Rel</i>	3.57	0.003	< .001
<i>Affil</i>	1.88	0.005	0.06
Count Portion			
<i>ISS</i>	-2.28	0.005	0.023
<i>Rel</i>	-2.87	0.001	0.004
<i>Affil</i>	-1.75	0.002	0.08
Gambling Problem			
Gambling Frequency	Test Statistic	Std. Error	<i>p</i>
Logistic Portion			
<i>ISS</i>	2.41	0.012	0.02
<i>Rel</i>	3.14	0.004	0.002
<i>Affil</i>	1.81	0.006	0.07
Count Portion			
<i>ISS</i>	0.06	0.006	0.96
<i>Rel</i>	0.06	0.003	0.96
<i>Affil</i>	0.06	0.002	0.97
Perceived Church Member Approval of Gambling (GINS_R)			
Gambling Frequency	Test Statistic	Std. Error	<i>p</i>
Logistic Portion			
<i>ISS</i>	2.52	0.008	0.01
<i>Rel</i>	2.63	0.002	0.01
<i>Affil</i>	2.53	0.004	0.01
Count Portion			
<i>ISS</i>	0.59	0.003	0.55
<i>Rel</i>	0.60	0.0008	0.55
<i>Affil</i>	0.59	0.002	0.55

Table 5 (Continued)
Sobel Tests for Mediation

Gambling Problem	Test Statistic	Std. Error	<i>p</i>
Logistic Portion			
<i>ISS</i>	-1.10	0.009	0.27
<i>Rel</i>	-1.11	0.003	0.27
<i>Affil</i>	-1.10	0.005	0.27
Count Portion			
<i>ISS</i>	-1.69	0.006	0.09
<i>Rel</i>	-1.73	0.002	0.08
<i>Affil</i>	-1.70	0.003	0.09

both higher gambling frequency and more gambling problems. Peer approval and church member approval of gambling fully mediated the relationships between affiliation and religious behavior and gambling frequency.

Religious Predictors of Gambling

The finding that higher religious behavior and stronger religious affiliation were predictive of not gambled in the past year is consistent with what has previously been observed in adult samples where religious involvement and gambling are inversely related (Diaz, 2000; Hoffman, 2000; Welte et al., 2004). These findings also follow the pattern of religion and alcohol for college students where greater engagement in religion is associated with less alcohol use (Barry & Nelson, 2005; Engs et al., 1996; Humphrey et al., 1989; Slicker, 1997; Wechsler et al., 1995). This similarity between gambling and alcohol for college students is not surprising. As was earlier noted in this paper gambling and alcohol use are linked (Grant et al., 2002), and research has suggested that these two

are particularly linked in college students (Weinstock, Whelan, & Meyers, 2004). Prior to this study, the connection between gambling and religion for college students had not been empirically confirmed. This finding bolsters the previous finding that among college students believing religion to be important was associated with the decision not to gamble (LaBrie et al., 2003), with the understanding that the same can be said of religious behavior, spirituality, and religious affiliation.

The finding that higher spirituality for women was predictive of fewer gambling problems was unexpected. Additionally, higher spirituality approached significance for predicting less gambling among men and women. Previous research has suggested that spirituality as a construct was very different from religious behavior and as such the two might be expected to relate to gambling differently. Adding to this expectation was the finding that college students as a group might be particularly apt to rate themselves as spiritual irrespective of their religious activity (Cherry et al., 2001; Constantine et al., 2006), and by logical extension irrespective of other activities. Hodge et al. (2007) found high spirituality, at least when unaccompanied by high religiosity to actually predict a greater likelihood of gambling and alcohol use, but when individuals were high in both spirituality and religiosity they were less likely to gamble and drink. This study's near prediction of gambling frequency by spirituality may then be best explained by the unanticipated strong correlation between spirituality and religiosity in this sample. In contrast, this study found some support for the idea that spirituality and religiosity are distinct factors worth considering separately as it was still the case that religious behavior and church affiliation were more predictive of gambling behavior than spirituality was.

The finding that women differed from men in how their spirituality predicted gambling may be attributable to larger role of religion and spirituality in women's lives than in men's (Iannaccone, 2003; Stark, 2002). Women's greater tendency towards religion and spirituality has been attributed to socialization (McCullough et al., 2005; Prentice & Carranza, 2002), as well as gender inequalities in family, work, and social relations (Atchley, 1997; Burke, 1999). It has also been attributed to women's greater daily contact with existential anxiety via their traditional caregiver role (Walter & Davie, 1998). While this may explain women's greater tendency towards religion and spirituality it does not explain why this variable predicts gambling problems differently for women.

Spirituality's prediction of fewer gambling problems only for women suggests spirituality as a protective factor for women developing a gambling problem. One reason for this gender disparity might be the difference in male and female motivations to gamble. Some research suggests that female problem gamblers are more likely to endorse gambling as a strategy to escape dysphoric feelings (Brown & Coventry, 1997; Johnson & McLure, 1997). And while women may gamble problematically to cope with anxiety or worry, men often endorse doing so primarily to win or improve self worth (Loughnan, Pierce, & Sagris, 1996; Pierce, Wentzel, & Loughnan, 1997). Women high in spirituality could have less need to utilize problem gambling as a distraction from dysphoric moods because they already have an effective method for coping with distress in their spirituality.

Unlike the other religious predictors of gambling, female spirituality's prediction of gambling problems was reduced by peer or church member approval towards

gambling. This suggests that women's spirituality may have a more individual and personal component, and that it is less influenced by peer expectations. This interpretation is supported by research showing that the dimension of religious life where men and women differ most is private devotion (Beit-Hallahmi & Argyle, 1996; Campiche, 1993), leading some to speculate that men engage in religious practices most when they are publicly acceptable or required and that they are less likely to participate in private devotion when there is no social pressure (Walter & Davie, 1998).

In addition to differing in their religious and spiritual lives, previous research has found that when compared to men, women tend to gamble less frequently (LaBrie et al., 2003; Welte et al., 2004; Winters et al., 1998) and are less likely to develop gambling related problems (Ladouceur et al., 1994; Lesieur et al., 1991; Shaffer et al., 1997; Winters et al., 1998). This study found that in addition to differing in their religiosity and gambling, women and men also differ in how these variables interact. One implication of these findings is that future preventative efforts for problem gambling based in a religious paradigm would likely need to differ based on the gender of the target audience.

Peer Related Predictors of Gambling

Perceived peer gambling behavior failed to predict gambling. However, participants did gamble more when they perceived their friends and church members to approve of gambling. Higher perceived church member approval of gambling predicted higher gambling frequency. Higher perceived peer approval of gambling also predicted higher gambling frequency as well as a greater likelihood of experiencing gambling problems. The predictive power these variables can be explained by primary socialization theory that states that cultural norms for addictive behavior are transmitted

through the primary socialization sources of family, school, and peers, and to a lesser degree by secondary sources such as religious groups (Oetting, Donnermeyer, & Deffenbacher, 1998). Perceived peer approval's prediction of gambling was anticipated as it has previously been observed (Larimer & Neighbors, 2003; Moore & Ohtsuka, 1999), although in these previous studies it did not predict gambling problems as it has here. It is worth noting that peer approval of gambling was more predictive than church member approval, both in the strength of its predictions and in the number of outcomes predicted.

The significance of church member approval in predicting gambling frequency was unexpected, as it was anticipated that a college student sample would have less frequent contact with fellow church members given the already discussed tendency for college students to be less religiously engaged (Astin, 1993; Bryant et al., 2003; Levine, 1980; Uecker et al., 2007). In fact, to assess this variable despite this anticipated disconnection we asked participants to base this scale on a previous congregation if they were not currently attached to a religious group. The apparent continued influence of church member approval may indicate that this variable reflected a more powerful influence such as family member or parent approval. This seems possible since college students are likely to have grown up attending a church chosen by their parents, and thus one that reflects their parents' values regarding gambling. This possibility is supported by primary socialization theory as secondary influences, such as religious groups, are expected to be mediated by the direct and more powerful influence of primary sources, the family (Oetting et al., 1998). Research on gambling has confirmed that perceptions regarding proximal influences are more influencing than those of distal influences

(Wickwire et al., 2008). An overshadowing influence of family may be especially likely in regards to gambling as children who gamble are likely to do so with family and friends, and they are more likely to have first gambled with their parents (Raylu & Oei, 2004).

Interestingly, lower church member approval of gambling was significant only in predicting the likelihood of no past year gambling. This finding mirrors those of religious behavior and church affiliation, which were also predictive of no past year gambling, but were not predictive of those who had gambled in the past year, and were not predictive of gambling problems. This overall pattern suggests that religious variables may be most effective in preventing initial engagement in gambling, and that once a person has engaged in gambling other factors become more important.

In a departure from previous research (Larimer & Neighbors, 2003; Wickwire et al., 2008), perceived peer gambling behavior did not predict gambling frequency or gambling problems. Although peer approval has been observed to be a stronger predictor of gambling frequency than peer behavior, it remains unclear why perceived behavior would not predict gambling frequency or problems in this study as it has previously. One possible explanation lies in a subtle wording difference between the approval and behavior scales. Neighbors et al. (2007) found that norms of friends and family were positively associated with gambling, while norms of the more general “other students” were negatively associated with gambling. This difference is attributed by these authors to a biased estimation resulting from less direct knowledge of the group being estimated (Neighbors et al., 2007). Within the present study, the peer gambling behavior variables asks specifically about “the average college student”, certainly a more general wording

than “my friends” and “my fellow church members” assessing perceived gambling approval. Still, these wording differences existed in the previous studies mentioned where the behavior of “the average college” student predicted gambling, so they are not sufficient to explain the difference between this study’s findings and previous research.

Several studies have found college students to consistently overestimate how much other college students gamble (Larimer & Neighbors, 2003; Neighbors et al., 2007). It may also be that priming students with questions about religion and spirituality further increases the tendency to overestimate other student’s gambling behavior. There is some support for this possibility with students scoring higher on both spirituality and affiliation rating the average college student as gambling more. Regardless of the reason for perceived behavior being unassociated with gambling frequency and problems, within this sample the findings suggest that college students are more influenced in their gambling by what they thought important others would approve of, than what they believed the averaged college student actually did in regards to gambling.

Mediators of Religious Predictors of Gambling

Religious behavior and church affiliation’s predictions of gambling were fully mediated by peer approval and church member approval of gambling. The previous literature on adults has consistently found religious behavior to be negatively related to gambling frequency and problems (Diaz, 2000; Hodge et al., 2007; Hoffman, 2000; Welte et al., 2004). These full mediations offer a possible mechanism through which religiosity influences gambling. Namely, these results support that religiosity influences gambling by influencing peer networks and perceptions of peer’s approval. Peer cluster theory states that adolescents engage in problematic behavior largely as a function of

their peer group, and that this group of similarly behaving individuals simultaneously encourages and normalizes the problem behavior (Oetting & Beauvais, 1990).

Participation in religious activities may have its protective influence against general addictive behavior by creating a peer group which encourages and normalizes non-engagement in problematic behavior (Kutter & McDermott, 1997), an interpretation supported by findings that peer use is a stronger predictor of adolescent drinking than religious influences (Perkins, 1985). Researchers have suggested that religious participation may be most important before addictive behavior is engaged in, and less so once it has already occurred (Hodge et al., 2001). This suggestion is consistent with peer cluster theory because once a person has engaged in gambling they are likely to do so in the company of other gamblers, and so will have already begun to create a new peer cluster that is supportive of the behavior while simultaneously breaking rank with their previous peer cluster.

Strengths and Limitations

One strength of this study is its sample. It is a large sample and includes participants from both religiously affiliated and public universities. In addition, this sample included a large number of ethnic minorities as well as students outside the traditional age range for college. Finally, this sample included students from varying faith backgrounds, a significant portion of which strongly affiliated with a religious group, regularly participated in religious behavior, and considered spirituality a major motivation in their life. These more religious students are less likely to be included in research which samples only at public universities. This broad sampling makes the findings more likely to generalize. Still, this sample is geographically bound to the area

of the country commonly referred to as the “Bible belt” as an indication of a cultural norm supporting religiosity. As such, this sample may differ religiously from other parts of the country.

Another factor to consider in applying these findings is that the peer gambling behavior and gambling approval variables are based on perceptions. While perceptions about gambling are known to predict behavior (Larimer & Neighbors, 2003; Moore & Ohtsuka, 1999; Wickwire et al., 2008), they are still a proxy for actual gambling approval. Additionally, these measures don’t consider distinctions such as active versus passive forms of approval. Future research that integrates observed gambling behavior in individuals, families, and perhaps even communities, could address this limitation.

Finally, it should be noted that this sample included a large number of students who had not gambled in the past year and who had never experienced any gambling related problems. This sampling issue has been previously discussed in detail and was the impetus for a statistical analysis which accounted for the zero-inflated Poisson distribution of the outcome variables. This type of distribution is often seen when measuring infrequent outcomes, such as gambling very frequently or having gambling problems. There is little reason to believe that this study’s sample distribution is not representative of college students generally. Still caution should be exercised in applying these findings to samples with much higher rates of gambling and gambling related problems as such samples are likely to differ in other significant ways. Examining the current research questions among a sample of college students with greater gambling frequency and more gambling problems would likely be informative.

Conclusion

This study found partial support for each of the hypotheses examined. More religious behavior and stronger church affiliation predicted lower gambling frequency for college students. This finding further strengthens the conclusion that religious participation acts as a protective mechanism against addictive behavior in general and gambling behavior specifically. Unexpectedly, higher spirituality predicted fewer gambling problems for women, suggesting that spirituality can act as a protective mechanism against gambling problem development, at least for women. This gender difference highlights that men and women differ not only in their gambling and religious lives, but also in how these two areas interact. A final implication of this difference is that prevention and treatment efforts for gambling that incorporate spirituality would likely benefit by being tailored differently to men and women. Additionally, it is worth noting that other than female spirituality predicting gambling problems, all of the religious variables were predictive only of the likelihood of not gambling, suggesting that religious variables may have the most impact on preventing initial participation in gambling, and that once gambling is engaged in their effect is diminished.

In addition to these direct religious effects, perceptions of peer and church member approval of gambling significantly predicted gambling frequency and gambling problems. These variables also fully mediated most of the relationships between religious variables and gambling outcomes. This finding strongly suggests that religious variables work in large part by influencing peer groups and perceptions regarding peer approval of gambling. One implication of this finding is that prevention efforts aimed at college students would likely benefit from a focus on changing perceptions of approval regarding

gambling. Interestingly, perceived peer behavior regarding gambling did not predict gambling frequency or problems suggesting that college students are more influenced in their gambling by what they think their friends approve of than by what they think the average college student is doing. Still, it remains unclear why peer behavior was not predictive of gambling in this study as it has been in previous studies. This discrepancy suggests that peer behaviors and attitudes are not fully understood in how they influence gambling behavior, and that future research efforts would do well to focus on this area. Additionally, the difference between men and women in regards to spirituality predicting gambling problems suggests that additional research into the differences in spirituality between the sexes could yield important information for future prevention efforts towards problem gambling development.

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Appendix A

Intrinsic Spirituality Scale

For the following six questions, *spirituality* is defined as one's relationship to God, or whatever you perceive to be Ultimate Transcendence. The 0 to 10 range provides you with a continuum on which to reply, with 0 corresponding to an absence or zero amount of the attribute, while 10 corresponds to the maximum amount of the attribute. In other words, the end points represent extreme values, while five corresponds to a medium, or moderate, amount of the attribute. Please circle the number along the continuum that best reflects your initial feeling.

1. In terms of the questions I have about life, my spirituality answers

No questions											Absolutely all my questions
<u>0</u>	1	2	3	4	5	6	7	8	9	<u>10</u>	

2. Growing spirituality is

More important than anything else in my life											Of no importance to me
<u>10</u>	9	8	7	6	5	4	3	2	1	<u>0</u>	

3. When I am faced with an important decision, my spirituality

Plays Absolutely No role											Is always the overriding consideration
<u>0</u>	1	2	3	4	5	6	7	8	9	<u>10</u>	

4. Spirituality is

The master motive of my life, directing every other aspect of my life											Not part of my life
<u>10</u>	9	8	7	6	5	4	3	2	1	<u>0</u>	

5. When I think of the things that help me to grow and mature as a person, my spirituality

Has no effect on my personal growth											Is absolutely the most important factor in my personal growth
<u>0</u>	1	2	3	4	5	6	7	8	9	<u>10</u>	

6. My spiritual beliefs affect

**Absolutely every
Aspect of my life**

10

9

8

7

6

5

4

3

2

1

**No aspect
of my life**

0

Appendix B

The Gambling Injunctive Norms Scale

1. Most of my friends approve of gambling
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

2. Most of my friends gamble sometimes
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

3. My friends often go out to places where gambling occurs
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

4. My friends would disapprove of me playing poker machines
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

5. My friends would disapprove of me buying a lottery ticket
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

The Gambling Injunctive Norms Scale - Modified

Please answer the following statements about your current congregation. Or if you do not currently attend church but used to, please answer the statements about your past congregation. If you are not certain, make your best guess.

1. Most of my fellow church members approve of gambling
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

2. Most of my fellow church members gamble sometimes
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

3. My fellow church members often go out to places where gambling occurs
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

4. My fellow church members would disapprove of me playing poker machines
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

5. My fellow church members would disapprove of me buying a lottery ticket
 - (1) Strongly Disagree
 - (2) Disagree
 - (3) Neither Disagree or Agree
 - (4) Agree
 - (5) Strongly Agree

Appendix C

The Gambling Quantity and Perceived Norms Scale

Please read each question carefully and circle your answer.

1. Approximately how much spending money (not devoted to bills) do you have each month?*

Less than \$50 \$50 to \$100 \$100 to \$150 \$150 to \$200 \$200 to \$250
\$250 to \$300 \$300 to \$350 \$350 to \$400 \$400 to \$450 \$450 to \$500
More than \$500

2. Approximately how often do you gamble?

Never Once a year 2-3 timer per year Every other month
Once a month 2-3 times per month Weekly More than once per week
Every other day Every day

3. How often do you think the average college student gambles?

Never Once a year 2-3 timer per year Every other month
Once a month 2-3 times per month Weekly More than once per week
Every other day Every day

4. Approximately how much money have you spent (lost) gambling in the PAST YEAR?

Less than \$25 \$25 to \$50 \$50 to \$100 \$100 to \$200 \$200 to \$300
\$300 to \$500 \$500 to \$700 \$700 to \$1000 \$1000 to \$2000 More than \$2000

5. Approximately how much money have you spent (lost) gambling in the PAST MONTH?

Less than \$5 \$5 to \$10 \$10 to \$20 \$20 to \$40 \$40 to \$60
\$60 to \$100 \$100 to \$200 \$200 to \$500 \$500 to \$1000 More

6. On average how much money do you spend (lose) gambling PER MONTH?

Less than \$5 \$5 to \$10 \$10 to \$20 \$20 to \$40 \$40 to \$60

\$60 to \$100 \$100 to \$200 \$200 to \$500 \$500 to \$1000 More

7. Approximately how much money have you won gambling in the PAST YEAR?

Less than \$25 \$25 to \$50 \$50 to \$100 \$100 to \$200 \$200 to \$300

\$300 to \$500 \$500 to \$700 \$700 to \$1000 \$1000 to \$2000 More than \$2000

8. Approximately how much money have you won gambling in the PAST MONTH?

Less than \$5 \$5 to \$10 \$10 to \$20 \$20 to \$40 \$40 to \$60

\$60 to \$100 \$100 to \$200 \$200 to \$500 \$500 to \$1000 More

9. On average how much money do you win gambling PER MONTH?

Less than \$5 \$5 to \$10 \$10 to \$20 \$20 to \$40 \$40 to \$60

\$60 to \$100 \$100 to \$200 \$200 to \$500 \$500 to \$1000 More

10. How much money do you think the average college student spends (loses) gambling PER YEAR?

Less than \$25 \$25 to \$50 \$50 to \$100 \$100 to \$200 \$200 to \$300

\$300 to \$500 \$500 to \$700 \$700 to \$1000 \$1000 to \$2000 More than \$2000

11. How much money do you think the average college student spends (loses) gambling PER MONTH?

Less than \$5 \$5 to \$10 \$10 to \$20 \$20 to \$40 \$40 to \$60

\$60 to \$100 \$100 to \$200 \$200 to \$500 \$500 to \$1000 More

12. How much money do you think the average college student wins gambling PER YEAR?

Less than \$25 \$25 to \$50 \$50 to \$100 \$100 to \$200 \$200 to \$300

\$300 to \$500 \$500 to \$700 \$700 to \$1000 \$1000 to \$2000 More than \$2000

13. How much money do you think the average college student wins gambling PER MONTH?

Less than \$5 \$5 to \$10 \$10 to \$20 \$20 to \$40 \$40 to \$60

\$60 to \$100 \$100 to \$200 \$200 to \$500 \$500 to \$1000 More

* Item 1 is coded from 1 to 11, all other items are coded on 10-point scales corresponding to their anchors.

Appendix D

South Oaks Gambling Screen

DIRECTIONS: For the following questions please mark the selection that best describes *your* gambling behavior over the course of the *past year*.

1. In the table below, please mark with an "X" which of the following types of gambling you have done. For each type, check one answer: "not at all," "less than once a week," or "once a week or more."

Types of Gambling	Not At All	Less than Once a Week	Once a Week or More
A. Played cards for money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Bet on horse, dogs or other animals (includes off-track betting, or with a bookie)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Bet on sports (parlay cards, with a bookie)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Played dice games for money (including craps, over and under, or other dice games)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Went to a casino	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Played the numbers or bet on lotteries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Played bingo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Played the stock and/or commodities market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Played slot machines, poker machines, or gambling machines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Bowled, shot pool, played golf, or played some other game of skill for money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Placed a bet through the Internet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. What is the largest amount of money you have ever gambled with on any one day?

- I've never gambled \$1 or less
- more than \$1 but less than \$10 more than \$10 but less than \$100
- more than \$100 but less than \$1,000 more than \$1,000 but less than \$10,000
- more than \$10,000

3. Do (did) your parents have a gambling problem?

- both my father and mother gamble (or gambled) too much
- my father gambles (or gambled) too much
- my mother gambles (or gambled) too much
- neither gamble (or gambled) too much

4. When you gamble, how often do you go back another day to win back the money you lost?

- never
- some of the time I lost
- most of the time
- every time I lost

5. Have you ever claimed to be winning money gambling, but weren't really? In fact, you lost?

- never (or never gamble)
- yes, less than half of the time I lost
- yes, most of the time

6. Do you feel you have ever had a problem with gambling?

- no
- yes, in the past, but not now
- yes

	YES	NO
7. Did you ever gamble more than you intended to?	<input type="checkbox"/>	<input type="checkbox"/>
8. Have people criticized your gambling?	<input type="checkbox"/>	<input type="checkbox"/>
9. Have you ever felt guilt about the way you gamble or what happens when you gamble?	<input type="checkbox"/>	<input type="checkbox"/>
10. Have you ever felt like you would like to stop gambling, but didn't think you could?	<input type="checkbox"/>	<input type="checkbox"/>
11. Have you ever hidden betting slips, lottery tickets, gambling money, or other signs of gambling from your spouse, children, or other important people in your life?	<input type="checkbox"/>	<input type="checkbox"/>
12. Have you ever argued with people you live with over how to handle money?	<input type="checkbox"/>	<input type="checkbox"/>

If you answered "No" to Question 12, do not answer Question 13, & skip to Question 14

13. Have money arguments ever centered on your gambling?	<input type="checkbox"/>	<input type="checkbox"/>
14. Have you ever borrowed from someone and not paid them back as a result of your gambling?	<input type="checkbox"/>	<input type="checkbox"/>
15. Have you ever lost time from work or school due to gambling?	<input type="checkbox"/>	<input type="checkbox"/>

16. If you borrowed money to gamble, or to pay gambling debts, who or where did you borrow from?

YES	NO
<input type="checkbox"/>	<input type="checkbox"/>

(check YES or NO for each)

A. From household money	<input type="checkbox"/>	<input type="checkbox"/>
B. From your spouse	<input type="checkbox"/>	<input type="checkbox"/>
C. From other relatives or in-laws	<input type="checkbox"/>	<input type="checkbox"/>
D. From banks, loan companies, or credit unions	<input type="checkbox"/>	<input type="checkbox"/>
E. From credit cards	<input type="checkbox"/>	<input type="checkbox"/>
F. From loan sharks	<input type="checkbox"/>	<input type="checkbox"/>
G. You cashed in stocks, bonds, or other securities	<input type="checkbox"/>	<input type="checkbox"/>
H. You sold personal or family property	<input type="checkbox"/>	<input type="checkbox"/>
I. You borrowed from your checking account (passed bad checks)	<input type="checkbox"/>	<input type="checkbox"/>
J. You have (had) a credit line with a bookie	<input type="checkbox"/>	<input type="checkbox"/>
K. You have (had) a credit line with a casino	<input type="checkbox"/>	<input type="checkbox"/>
17. Do you have any gambling related debts?	<input type="checkbox"/>	<input type="checkbox"/>
18. If yes, how much debt? (Please specify a dollar amount.)	\$ _____ _____	

Appendix E

Personal History Questionnaire

DIRECTIONS: Please answer all of the following questions. Check the appropriate box or fill in the blank for the answer that best describes you.

1. Gender:

- female
- male

2. Age (years): _____

3. What term(s) below best describe your race/ethnicity?

{Choose all that apply}

- White or Caucasian
- Hispanic or Latino
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- Native American or American Indian or Alaska Native
- Other: _____
(please specify)

4. Year in school:

- 1) Freshman
- 2) Sophomore
- 3) Junior
- 4) Senior
- 5) Other _____

5. Where are you living?

- 1) Residence hall or other university housing
- 2) Fraternity or sorority
- 3) House or apartment

6. With whom are you living?

- 1) With roommates
- 2) Alone
- 3) With one or both parents, or other adult relatives
- 4) Other

7. Do you belong to a fraternity or sorority?

- 1) No
- 2) Yes

8. What best describes your marital status?

- 1) Single
- 2) Married
- 3) Separated
- 4) Divorced

9. How many children do you have?

- 1) No children
- 2) 1 child
- 3) 2 or more children

10. What is your yearly income (money you earn from a job, not including gifts/scholarships)?_____

11. How much money did you have available to spend for non-essential items (e.g., clothing, CDs, entertainment, alcohol, eating in restaurants, going to the movies, etc.) during the past month?_____

(Do not include money budgeted for essentials: rent, school books, gasoline, utility bills, groceries)

12. At the present time, what is your religious preference?

- 1) Catholic
- 2) Jewish
- 3) Protestant
If Protestant: What specific denomination?_____
- 4) Other
If Other: Please Specify_____
- 5) None

13. If you currently belong to a religious group, how long have you been a member of your current religious group or church?

- 1) Less than 1 year
- 2) 1 to 5 years
- 3) 6 to 15 years
- 4) more than 15 years

14. If you currently belong to a religious group, how important is your religion to you?

- (0) Not Very Important
- (1) Somewhat Important
- (2) Important
- (3) Very Important
- (4) Extremely Important

15. Where you raised in a religious tradition?

- 1) No
- 2) Yes

16. If you were raised in a religious tradition, do you currently practice the same religion in which you were raised?

- 1) No, no longer practice any religion
- 2) No, I've changed religious affiliations
- 3) Yes

17. Which of the following best describes you at the present time?

- 1) Atheist - I do not believe in God.
- 2) Agnostic - I believe we can't really know about God.
- 3) Unsure - I don't know what to believe about God.
- 4) Spiritual - I believe in God, but I'm not religious.
- 5) Religious - I believe in God and practice religion.

18. In the past year, how often have you... (Circle one number for each line.)

Once a **Twice a** **Once a** **Twice a** **Almost** **More than**
Never Rarely month month week week daily once a day

a) Prayed privately in places other than at church or synagogue?

1 2 3 4 5 6 7 8

b) Watch or listen to religious programs on TV or radio?

1 2 3 4 5 6 7 8

c) Read the Bible or other religious literature?

1 2 3 4 5 6 7 8

d) Say prayers or grace before or after meals in your home?

1 2 3 4 5 6 7 8

19. Have you ever in your life:

	<u>Never</u>	<u>Yes, in the past but not now</u>	<u>Yes, and I still do</u>
a) Believed in God?	1	2	3
b) Prayed?	1	2	3
c) Meditated	1	2	3
d) Attended worship services regularly?	1	2	3
e) Read scriptures or holy writings regularly?	1	2	3
f) Had direct experiences of God?	1	2	3

20. How often do you attend religious services?

- 1) Never
- 2) Less than once a year
- 3) About once or twice a year
- 4) Several times a year
- 5) About once a month
- 6) 2-3 times a month
- 7) Nearly every week
- 8) Every week
- 9) Several times a week

21. Besides religious services, how often do you take part in other activities at a place of worship?

- 1) Never
- 2) Less than once a year
- 3) About once or twice a year
- 4) Several times a year
- 5) About once a month
- 6) 2-3 times a month
- 7) Nearly every week
- 8) Every week
- 9) Several times a week

22. How important is God in your life?

- (0) Not Very Important
- (1) Somewhat Important
- (2) Important
- (3) Very Important
- (4) Extremely Important

23. How true are the following statements in describing you?

I always seek God's guidance for every decision I make.

- (0) Not at all true
- (1) Slightly true
- (2) Moderately true
- (3) Substantially true
- (4) Very true

I am always in the mood to give service to other people.

- (0) Not at all true
- (1) Slightly true
- (2) Moderately true
- (3) Substantially true
- (4) Very true

24. What are your personal views regarding gambling?

- (0) People should never gamble
- (1) Gambling should be avoided
- (2) Some gambling is OK
- (3) Gambling is a normal and fun type of recreation
- (4) People should seek out opportunities to gamble

25. If you belong to a church, what do you think your church says about gambling?

- (0) People should never gamble
- (1) Gambling should be avoided
- (2) Some gambling is OK
- (3) Gambling is a normal and fun type of recreation
- (4) People should seek out opportunities to gamble

26. If you know what your church teaches about gambling, how strongly do you agree with those teachings?

- (0) Strongly Disagree
- (1) Disagree
- (2) Neither Disagree or Agree
- (3) Agree
- (4) Strongly Agree

Appendix F

Affiliation Scale

1. What best describes your current level of belief in the existence of God?

- (0) I don't believe
- (1) There is no way to find out
- (2) There is some higher power
- (3) I believe sometimes
- (4) I believe but have doubts
- (5) I know God exists

2. Compared with when you entered college as a freshman, how would you describe your religious beliefs and convictions?

- (0) Much Weaker
- (1) Weaker
- (2) No Change
- (3) Stronger
- (4) Much Stronger

3. What is the extent to which you still hold beliefs taught you in church when you were growing up?

- (0) Wholly Disagree
- (1) Substantially Disagree
- (2) Partially Disagree
- (3) Partially Agree
- (4) Substantially Agree
- (5) Wholly Agree

4. Circle which number best represents the level of doubt you have in your faith.

**Faith free
of doubt**

1

2

3

4

5

6

**Faith mixed
with doubts**

7

Appendix G

CONSENT FORM

Investigators: Don Yorgason, M.S., James P. Whelan, Ph.D.
The Institute for Gambling Education and Research
Department of Psychology
The University of Memphis, Memphis, TN 38152
(901) 678-3491

Title: Religion and Gambling in a College Student Sample

Purpose of study: Investigate how spiritual and religious variables relate to gambling.

By completing and returning the enclosed packet of information you agree to participate as a volunteer in the above named research study.

The research project involves filling out a survey on gambling and spirituality/religion which will take no more than 15 minutes.

Participation in the study is anonymous and no identifying information will be collected. None of your individual answers will be shared with your professor. There is no compensation for participation in this study.

You are free to refuse to participate or answer any question at any time. You are free to withdraw from the research study at any time, without consequence.

You can contact Don Yorgason at 678-3491 with any questions you have about this research study. If you have questions about your rights as a research participant, the Chair of the Institutional Review Board for the Protection of Human Subjects can be contacted at 678-2533.

By agreeing to participate in this research you do not waive your legal rights.

Appendix H

Statistical Procedures

To estimate a two-group model within Mplus, when the outcomes follow a zero-inflated Poisson distribution, the Mixture approach was used specifying male and female as known classes (see Muthen & Muthen, 1998-2010). Although this approach does not provide absolute model fit indices, it is the only way to analyze a zero-inflated Poisson model comparing direct and indirect effects across gender.

Comparisons were made between the -2 log likelihood values for the constrained and non-constrained models. The difference in parameters of the two models was then used as degrees of freedom for a Chi sq difference test. If constraining the path to be equal across gender worsened model fit significantly (based on a Chi sq test) this path was allowed to be estimated freely for males and females. In order to detect nuanced differences by gender, the invariance of each regression path was examined individually.

Because the predictors in Poisson distributions are exponentiated, the raw generated output by Mplus is impossible to interpret, beyond simply knowing which paths are statistically significant.

The logistic portion of the model can be best interpreted by exponentiating the coefficients, creating an odds-ratio. This odds-ratio is equal to 1 when the coefficient is not predictive of the outcome. Odds-ratios are probabilities that show the change in the outcome for each point increase in the predictor. This change is interpreted as a percent change from 1.

For the count portion of the model the following transformation allows the regression coefficients to be interpreted as the percentage change in expected count.

$$100(e^{\beta \times \delta} - 1)$$

Where β is the regression coefficient and δ is the units of change in the predictor. So, for one unit of change in the predictor, $\delta = 1$. For more information on these transformations see Atkins & Gallop (2007).