

Running head: THEORY OF PLANNED BEHAVIOR AND GAMBLING

Using the theory of planned behavior to predict gambling behavior

### Abstract

Gambling is an important public health concern. To better understand gambling behavior, we conducted a classroom-based survey that assessed the role of the theory of planned behavior (TPB; i.e., intentions, subjective norms, perceived behavioral control, and attitudes) in past year gambling and gambling frequency among college students. Results from this research support the utility of the TPB to explain gambling behavior in this population. Specifically, in TPB models to predict gambling behavior, friend and family subjective norms and perceived behavioral control predicted past year gambling and friend and family subjective norms, attitudes and perceived behavioral control predicted gambling frequency. Intention to gamble mediated these relationships. These findings suggest that college responsible gambling efforts should consider targeting misperceptions of approval regarding gambling behavior (i.e., subjective norms), personal approval of gambling behavior (i.e., attitudes), and perceived behavioral control to better manage gambling behavior in various situations.

**Keywords:** gambling, gambling frequency, college students, the theory of planned behavior, gambling intention, mediation

### Using the theory of planned behavior to predict gambling behavior

As gambling behavior escalates, the negative outcomes begin to outweigh any of the potential benefits (Korn & Shaffer, 1999). For instance, individuals who increase their gambling frequency and/or intensity might begin to experience adverse personal, financial, and social problems; scientists have classified people with such gambling-related problems as problem gamblers (National Research Council, 1999). Individuals who experience numerous such consequences gamble at a diagnosable pathological level (American Psychiatric Association, 2000).

National estimates of the prevalence of individuals in the general population who experience such gambling-related consequences are well established (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004). Recent studies have found rates of < 1% for lifetime pathological gambling and between 0.9% and 2.3% for lifetime problem gambling (Kessler et al., 2008; Petry, Stinson, & Grant, 2005). Examinations of gambling among vulnerable populations and studies that investigate the determinants of problematic gambling are important (Shaffer et al., 2004). Such examinations will provide the evidence and direction needed to develop appropriate intervention efforts.

Research indicates that the college student population might be vulnerable to gambling problems. Whereas some studies (e.g., LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Slutske, Jackson, & Sher, 2003) indicate that the college student population might have a lower percentage of gamblers than the general population, others indicate the percentage is similar or higher (e.g., Wickwire et al., 2007; Winters, Bengston, Door, & Stinchfield, 1998). However, research has indicated that college students who gamble are more likely to do so at a disordered level (Blinn-Pike, Lokken Worthy, & Jonkman, 2007; Shaffer & Hall, 2001). For instance,

Shaffer and Hall's (2001) meta-analysis found that over 16% of college students experienced a gambling problem in their lifetimes; a rate higher than those observed in the general population (6.1%) and adolescent population (11.8%). These findings suggest that college students might be at greater risk for gambling-related harm than other segments of the population.

Gambling participation and gambling problems are associated with numerous negative consequences and are highly correlated with other risky behaviors evidenced by the college student population. Compared to college students without gambling problems, college students with problems are more likely to use tobacco, use alcohol, drink heavily or binge drink, get drunk, use marijuana or other illegal drugs, drive under the influence, be arrested for non-traffic offenses, binge eat and have a low GPA (Engwall, Hunter, & Steinberg, 2004; Lesieur et al., 1991; Stuhldreher, Stuhldreher, & Forrest, 2007). Concerning gambling participation, college students who had gambled in the past year had higher rates of binge drinking, marijuana use, cigarette use, illicit drug use, and unsafe sex after drinking compared to their non-gambling counterparts (LaBrie et al., 2003).

Gambling problems are associated with increased gambling frequency (Kessler et al., 2008). The reasons certain individuals might gamble more frequently than others are not completely understood. The theory of reasoned action (TRA; Fishbein, 1967) suggests that behavior is influenced by one's intention to perform that behavior and that one's intention is influenced by attitudes and perceived subjective norms regarding that behavior. More recently, an adaptation of the TRA, the theory of planned behavior (TPB; Ajzen & Fishbein, 1980) added the construct of perceived behavioral control to account for an individual's perception of control over behaviors that they might be able to control completely (Ajzen, 1991).

The central factor in the TPB is the individual's intention to perform a given behavior, which indicates how hard people are willing to try and how much effort they will exert to perform a behavior that is under their volitional control (Ajzen, 1991). The theory postulates three independent determinants of intention: attitude toward the behavior, subjective norm, and perceived behavioral control. According to the theory, as the attitude, subjective norm, and perceived behavioral control regarding a behavior become more favorable, so does the individual's intention to perform that behavior. Further, according to the TPB, behavioral intentions positively correlate with participation in the behavior of interest (Ajzen, 1991).

Researchers have examined some components of this process among college student gamblers (e.g., Larimer & Neighbors, 2003; Moore & Ohtsuka, 1997, 1999; Neighbors et al., 2007). For example, Moore and Ohtsuka (1997) found that intention to gamble correlated strongly and positively with both gambling frequency and problem gambling. Furthermore, this study also showed that intention to gamble was significantly associated with both attitudes and subjective norms. In addition, Neighbors et al. (2007) found that favorable attitudes toward gambling correlated with problematic gambling (i.e., gambling frequency, expenditure, and negative consequences). However, this study also found that perceived approval of gambling by other students (i.e., peer subjective norms) was negatively correlated with gambling behavior; a finding that was opposite in direction to what is hypothesized by the TPB.

#### *Purpose/Significance*

The literature showing the value of TPB constructs for predicting gambling behavior provides a solid foundation from which to examine the applicability of the full TPB model. Gambling research has not yet explored the construct of perceived behavioral control in conjunction with the other TPB constructs (i.e., intention, attitudes, and subjective norms).

Research concerning other health-related behaviors, such as drinking behavior, physical activity, nutrition protective behavior, and sun protective behavior has shown self-efficacy, a concept similar to perceived behavioral control, to be an important predictive variable (e.g., Collins & Carey, 2007; Frank, Heiby, & Lee, 2007; Norman, Armitage, & Quigley, 2007; Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004). Such findings support the inclusion of perceived behavioral control in examinations of gambling behavior using the TPB.

The purpose of this study was to examine the value of the theory of planned behavior (TPB) model for predicting gambling behavior. Specifically, we examined if attitudes, subjective norms, and perceived behavioral control predict past year gambling and gambling frequency and whether intention to gamble serves as a mediator in these relationships. We assessed the gambling behavior and gambling-related TPB constructs (i.e., intentions, subjective norms, perceived behavioral control, and attitudes) of a sample of undergraduate students ( $n = 785$ ) enrolled in 17 general education classes at a large, public university located in the southeastern United States via a classroom-based survey.

### *Hypotheses*

We hypothesized that past year gambling and gambling frequency would be positively correlated with favorable attitudes towards gambling, favorable perceptions of friend, family, and peer attitudes towards gambling (i.e., subjective norms) and negatively correlated with perceived behavioral control concerning gambling in various situations. Further, we hypothesized that gambling intention would mediate the relationship between past year gambling and TPB distal determinants (i.e., attitudes, subjective norms, and perceived behavioral control) and the relationship between gambling frequency and TPB distal determinants.

### Methods

### *Participants*

Students enrolled in one of 17 general education courses in fall 2007 at a large public university in the southeastern United States were eligible (i.e., they were present in class on the day the classroom-based assessment battery was distributed) to complete the classroom-based assessment battery. Of those eligible to participate, 785 completed the assessment battery. We did not track the number of students who elected not to participate in the study; however, the researcher observed that only a small number (i.e., < 20) of eligible participants made no attempt to complete the assessment battery. Of those who participated, nearly half ( $n = 377$ ; 48.0%) had gambled in the past year. One set of proceeding analyses will focus on the entire sample, whereas another will focus on the sub-sample of past year gamblers. We considered not including participants not in the typical college student age range (i.e., 18-25), but decided to keep those older than 25 ( $N=22$ ) in the analyses because univariate analyses (which are discussed subsequently) indicated that age was not associated with our outcome variables (i.e., gambling intention, past year gambling, gambling frequency).

In the sample ( $N = 785$ ), the majority of participants were female ( $n = 468$ ; 59.6%), and Caucasian ( $n = 619$ ; 79.2%). Nearly seventeen percent ( $n = 131$ ; 16.7%) of participants were African American, 15 (1.9%) were Hispanic or Latino, 16 (2.0%) were multiracial, five were of Asian descent (0.6%) and four (0.5%) were American Indian/Alaskan Native decent. Less than one third of participants were college sophomores ( $n = 246$ ; 31.3%), 30.3% ( $n = 238$ ) were juniors, 25.0% ( $n = 196$ ) were seniors, 13.1% ( $n = 103$ ) were freshmen and 0.3% ( $n = 2$ ) were graduate students. Participants' ages ranged from 17 to 49, and the mean ( $M$ ) age of participants was 20.51 ( $SD = 2.5$ ).

In the sub-sample of past year gamblers ( $N = 377$ ), the majority of participants were male ( $n = 205$ ; 54.5%). Concerning racial/ethnic status, the majority of participants were Caucasian ( $n = 310$ ; 82.4%), whereas 13.6% ( $n = 53$ ) were African American, seven (1.9%) were Hispanic or Latino, ten (2.7%) were multiracial, and one (0.3%) indicated American Indian/Alaskan Native descent. Over one third of participants were college juniors ( $n = 130$ ; 34.5%), 27.3% ( $n = 103$ ) were sophomores, 28.9% ( $n = 109$ ) were seniors, 9.0% ( $n = 34$ ) were freshmen and one ( $n = 0.3\%$ ) was a graduate student. Participants' ages ranged from 18 to 44, and the mean ( $M$ ) age of participants was 20.8 ( $SD = 2.5$ ).

### *Measures*

We measured gambling frequency through one question in the 16-item Gambling Quantity and Perceived Norms Scale (GQPN; Neighbors, Lostutter, Larimer, & Takushi, 2002); the question assessed how often the respondent gambles (i.e., never, once a year, 2 to 3 times a year, every other month, once a month, 2 to 3 times a month, weekly, more than once a week, every other day, and every day). We used the 32-item Gambling Attitudes and Injunctive Norms Scale (GAINS; Neighbors et al., 2007) to assess gambling attitudes and the subjective norms of peers (e.g., How do you feel about other students when they gambling instead of doing homework?). We assessed perceived behavioral control via the 16-item Gambling Self-Efficacy Questionnaire (GSEQ; May, Whelan, Steenbergh, & Meyers, 2003; e.g., I would be able to control my gambling if I were at a place where other people were gambling). We assessed subjective norms of friends and family via the 12-item Gambling Injunctive Norms Scale (GINS; Moore & Ohtsuka, 1997; e.g., My family would disapprove of me gambling on the internet) and assessed intention to gamble through the seven-item Gambling Intention Scale (GIS; Moore &

Ohtsuka, 1997; e.g., In the next 2 weeks I intend to spend \$20 or more on gambling). In addition, we collected information about participants' demographics.

#### *Procedure*

This study received approval from the institutional review board (IRB) of the university at which we conducted the research. At the beginning of each participating class, a researcher briefly explained the project to potential participants and distributed informed consent forms. After participants provided informed consent, a researcher distributed the assessment battery to all students in attendance. Those students who did not wish to participate in the study did not complete surveys. Students who completed the assessment battery did so voluntarily and received no incentives. Each survey included an assigned ID number, so that no information collected from the assessment linked to the participant's name.

#### *Data Reduction*

Participants returned 819 surveys. We analyzed the data using SPSS statistical software (SPSS Inc., 2006). Data cleaning first involved removing participants who failed to complete one or more of the demographic variable items used in this analysis (i.e., gender, race/ethnicity and class status) and/or one or more TPB subscales in the assessment battery (N=34). We considered a subscale incomplete if a participant left blank two or more responses (Little & Rubin, 1987). Once participants with missing data were eliminated, we computed past year gambling frequency rates (see Table 1). Next, we computed average scores for each TPB construct subscale to create composite TPB variables (see Table 2).

\*\*\*Table 1 and 2 (i.e., gambling frequency and composite TPB variables) about here\*\*\*

#### *Scale Reliability*

We conducted reliability analyses for each TPB subscale. We measured peer norms and attitudes from the GAINS (Neighbors et al., 2007) and reliability analyses indicated high internal consistency for both constructs (Cronbach's alpha=.93 and .92 respectively). Perceived behavioral control was measured from the GSEQ (May et al., 2003) and reliability analysis indicated high internal consistency (Cronbach's alpha=.96). We measured intention to gamble scores from the GIS (Moore & Ohtsuka, 1997) and reliability analysis indicated high internal consistency (Cronbach's alpha=.89). Friend and family subjective norm scores were summed from the GINS (Moore & Ohtsuka, 1997). Though we considered separating family and friend subjective norms into two categories, a reliability analysis indicated that leaving it as one variable was more appropriate. Specifically, the Cronbach's alpha for a reliability analysis with a combined family and friend subjective norm variable was .84, whereas the Cronbach's alphas for reliability analyses separating seven family subjective norm items and five friend subjective norm items were .80 and .79 respectively.

### *Analyses*

To test our hypotheses, the following analyses examined the association between TPB constructs and past year gambling among a sample of college students ( $n = 785$ ) and the association between TPB constructs and gambling frequency among a sub-sample of those students who gambled in the past year ( $n = 377$ ). First, crosstabulations with chi-square statistics were performed to determine significant associations between demographic variables (i.e., gender, race/ethnicity, class status and Greek-affiliation) and past year gambling and one-way ANOVAs were performed to examine associations between demographic variables and gambling frequency. Significantly associated demographic variables were included in subsequent regression analyses. Next, Pearson correlations were performed among TPB variables and past

year gambling and TPB variables and gambling frequency to examine univariate relationships. Finally, consistent with the approach suggested for mediation analyses (Barron & Kenny, 1986), we used a set of multiple regressions to test the ability of the TPB model to predict past year gambling and gambling frequency. The first regression model predicted gambling behavior (i.e., past year gambling or gambling frequency) from the three distal determinants in the TPB model: attitudes, subjective norms (peer and friend/family), and perceived behavioral control. The second regression model predicted gambling behavior from gambling intentions. The third regression model predicted gambling intention from the distal determinants in the TPB model. The fourth and final regression model included both the distal determinants and intention as predictors of gambling behavior to examine whether intention mediated the distal determinants' relation to gambling behavior.

## Results

### *Demographics and Gambling Behavior*

We conducted crosstabulations and computed a chi-square statistic to examine relationships between potential confounding variables (i.e., gender, race/ethnicity, class status and Greek-affiliation) and past year gambling and conducted one-way ANOVAs to examine relationships between potential confounding variables and gambling frequency. Analyses indicated that males were significantly more likely to gamble in the past year and to gamble more frequently than females in this sample. In addition, Caucasians students and upperclassmen students (i.e., junior, seniors and grad students) were significantly more likely to have gambled in the past year compared to students of other races and underclassmen students. Greek-affiliation (i.e., fraternity or sorority membership) was not associated to either outcome variable.

### *The TPB Model and Construct Relationships*

Prior to testing the TPB model, we conducted Pearson correlations to examine univariate correlations among the TPB constructs and gambling frequency (see Table 3). All TPB constructs were significantly correlated ( $p < .001$ ) with gambling frequency, although peer norms were correlated in the direction opposite that hypothesized by the TPB.

\*\*\*Table 3 (i.e., Pearson Correlations) about here\*\*\*

### *Testing the TPB model*

The first set of regression analyses (see Table 4 and Figure 1) were conducted using the entire sample of college student participants ( $N = 785$ ) and the second set of regression analyses (see Table 5 and Figure 2) were conducted using a sub-sample of participants who gambled in the past year ( $N = 377$ ). As mentioned previously, gender, race and class status were significantly correlated confounding demographic variables to past year gambling and/or gambling frequency and thus included in all the proceeding models.

#### *Step 1: Distal Determinants and Gambling Behavior*

Analysis 1 (Past year gambling): In the proposed TPB model to predict past year gambling, the first step was conducting a logistic regression procedure to examine the association between past year gambling and TPB distal determinants (i.e., peer norms, friend/family norms, attitudes, and perceived behavioral control). Friend/family norms and perceived behavioral control were significantly associated ( $p < .05$ ) with past year gambling. With the exception of peer norms, all variables had a relationship to past year gambling in the direction that is consistent with what is postulated by the TPB. The model was statistically significant ( $p < .001$ ) and explained approximately 25-30% (Cox and Snell  $R^2 = .254$ ; Nagelkerke  $R^2 = .339$ ) of the variability in past year gambling.

Analysis 2 (Gambling frequency): The first step to testing the proposed TPB model to predict gambling frequency was conducting a multiple regression procedure to examine the association between gambling frequency and TPB distal determinants. All TPB distal determinants were significantly associated ( $p < .05$ ) with gambling frequency. With the exception of peer norms, they all had a relationship to frequent gambling in the direction that is consistent with what is postulated by the TPB. The model was statistically significant ( $p < .001$ ) and explained 28.1% ( $R^2 = .281$ ) of the variability in gambling frequency.

*Step 2: Gambling Intention and Gambling Behavior*

Analysis 1: Next, we conducted a logistic regression analysis to examine the association between intention to gamble and past year gambling. The analysis indicated that intention had a positive significant ( $p < .05$ ) relationship to past year gambling. The model explained approximately 19-26% (Cox and Snell  $R^2 = .194$ ; Nagelkerke  $R^2 = .259$ ) of the variance in past year gambling.

Analysis 2: We conducted a regression analysis to examine the association between intention to gamble and gambling frequency. The analysis indicated that intention to gamble had a positive significant ( $p < .05$ ) relationship to gambling frequency. The model explained 34.7% ( $R^2 = .347$ ) of the variance in gambling frequency.

*Step 3: Distal Determinants and Gambling Intention*

Analysis 1: Next, we conducted a multiple regression procedure to examine the association between intention to gamble and TPB distal determinants. All TPB distal determinants, except for peer norms, were significantly associated ( $p < .05$ ) with intention to gamble. The model was statistically significant ( $p < .001$ ) and explained 28.6% ( $R^2 = .286$ ) of the variance in intention to gamble scores.

Analysis 2: As in analysis 1, the third step was conducting a multiple regression procedure to examine the association between intention to gamble and TPB distal determinants. Except for peer norms, all TPB distal determinants were significantly associated ( $p < .05$ ) in the direction hypothesized by the TPB with intention to gamble. The model was statistically significant ( $p < .001$ ) and explained 28.4% ( $R^2 = .284$ ) of the variance in intention to gamble scores among participants in this sample.

*Step 4: Distal Determinants, Gambling Intention and Gambling Behavior*

Analysis 1: Finally, we conducted a logistic regression model to predict past year gambling using all TPB construct variables, including intention. This series of analyses indicated that intention to gamble served as a mediator in the relationship between past year gambling and perceived behavioral control. As mentioned previously, the first model indicated that friend and family norms ( $B = 1.510$ ;  $p < .001$ ) and perceived behavioral control ( $B = -.013$ ;  $p = .017$ ) were significantly associated with past year gambling. When intention was added to the model, perceived behavioral control ( $B = -.008$ ;  $p = .151$ ) was no longer significantly associated with past year gambling and the beta value was substantially lowered. Intention to gamble did not mediate the relationship between past year gambling and the other TPB distal determinants.

Analysis 2: Lastly, we conducted a regression analysis to predict frequent gambling using all TPB construct variables, including intention. Results indicated that intention to gamble served as a mediator in the model, especially concerning the relationship between frequent gambling and perceived behavioral control and frequent gambling and friend/family norms. As mentioned previously, the first model indicated that all four TPB distal determinants, peer norms ( $B = -.596$ ;  $p \leq .001$ ), friend and family norms ( $B = .349$ ;  $p = .007$ ), attitudes ( $B = .629$ ;  $p \leq .001$ ) and perceived behavioral control ( $B = -.011$ ;  $p = .010$ ), were significantly associated with gambling

frequency. When intention was included in the model, the distal determinants perceived behavioral control ( $B = .000$ ;  $p = .850$ ) and friend/family norms ( $B = .041$ ;  $p = .746$ ) were no longer significantly associated with frequent gambling and their beta values were substantially lowered. Further, the results indicated that intention served as a partial mediator in the relationship between attitudes and frequent gambling and peer norms and frequent gambling. When intention was added to the model, the attitudes ( $B = .467$ ;  $p = .004$ ) and peer norms ( $B = -.517$ ;  $p \leq .001$ ) remained significantly associated with frequent gambling but had lower beta values.

\*\*\*\*\*Tables 4 & 5 and Figures 1 & 2 (i.e., regression models) about here\*\*\*\*\*

### Discussion

In general, the results from this research support the utility of TPB in explaining gambling behavior. However, the model was a better predictor of gambling frequency than past year gambling in this sample of college students. Friend and family norms, attitudes, and perceived behavioral control were significantly associated with gambling frequency and intention to gamble mediated the relationship, whereas only friend and family norms and perceived behavior control were associated with past year gambling and intention to gamble mediated only the relationship between perceived behavioral control and past year gambling. In general, the findings of this study were consistent with results reported in other research (Larimer & Neighbors, 2003; Moore & Ohtsuka, 1997, 1999; Neighbors et al., 2007) that has examined gambling behavior using various TPB constructs.

Concerning demographic characteristics, only gender was associated with past year gambling and frequent gambling among this sample. Males in this sample were significantly more likely to gamble in the past year and significantly more likely to gamble frequently than

their female counterparts. This finding is consistent with other research (e.g., Blinn-Pike et al., 2007; Engwall et al., 2004; Rockey, Beason, Howington, Rockey, & Gilbert, 2005; Stuhldreher et al., 2007; Weinstock, Whelan, Meyers, & Watson, 2007; Winters et al., 1998) that has reported that male college students gamble more frequently and experience disordered gambling at higher rates than their female counterparts.

### *Significance*

This study is unique in that it fully tested a TPB model to predict gambling behavior. It is the first research study to examine the relationship of perceived behavioral control in conjunction with other TPB constructs. This research extends the previous work by demonstrating that such models should include perceived behavioral control.

In addition, this study is the first of its kind to examine the role of intention to gamble as a mediator in predicting gambling behavior. Although we cannot definitively conclude that intention is a mediator because of our use of cross-sectional data, this study provides evidence of a mediating relationship that is consistent with what the TPB hypothesizes.

### *Implications*

Findings from this research have several implications for researchers and other college health professionals with an interest in promoting responsible gambling. Of the two gambling outcome variables examined, frequent gambling is more of a concern than past year gambling, as gambling frequency is positively correlated with disordered gambling (Kessler et al., 2008). Results indicate that the TPB distal determinants friend/family norms, attitudes and perceived behavioral control predict gambling frequency and intention mediates the relationship. Though it may prove difficult to alter perceptions of friend and family approval of gambling, efforts to decrease gambling frequency among college students should consider decreasing students'

personal approval of gambling and increasing students' perception of their ability to control gambling in various situations.

Another interesting finding was that peer norms was associated with gambling intention, past year gambling and gambling frequency negatively; a relationship that is opposite to that hypothesized by the TPB but that was also observed in other research (i.e., Neighbors et al., 2007). This finding indicates that social norms campaigns concerning the gambling of peers and the perceptions of gambling of peers may not be an advisable strategy to decreasing gambling behavior on college campuses.

Additional research might want to further explore the predictive value of the TPB concerning gambling behavior. Because gambling among college students is not necessarily generalizable to the other population segments, future research should consider exploring whether the model predicts gambling behavior among other population groups (e.g., elderly, adolescents). Another avenue for future research is examining whether disordered gambling is a moderating variable (i.e., whether the model works differently for disordered and non-disordered gamblers).

#### *Limitations*

There are limitations in this research that warrant future discussion. First, the study relied on participants to self-report their gambling behavior. Participants may have been hesitant to share such information, especially if their behavior was problematic and/or unlawful. To minimize self-report bias, we made participants aware that they would remain confidential, as we would not link any information they gave to their identity. There was also potential for recall bias, as we asked participants to report past year and lifetime gambling behavior. Respondents may not have accurately remembered their gambling behavior from those timeframes, especially

if they gambled frequently or were under the influence of drugs or alcohol when gambling. Another limitation is the lack of generalizability and the selection bias associated with the use of convenience samples. This research attempted to minimize selection bias by using general education classes that include students from multiple departments and different majors.

This research was also limited in that it was an exploratory, cross-sectional study. Because of this study design, our results should be interpreted cautiously, especially those concerning mediation. Our analyses, particularly the mediation analyses, are limited because our data was retrospectively recalled and not temporal. Our findings support the implementation of a longitudinal study examining the variables in this study to determine if the relationships found in this study hold true over time. By conducting such a study, researchers could attain a richer, more accurate picture of gambling behavior and further validate the utility of TPB in examining gambling behavior.

### *Conclusion*

Despite these limitations, the findings of this study support the use of the TPB to explain gambling behavior, particularly gambling frequency, as the TPB model was better a predictor of the gambling frequency than past year gambling. TPB distal determinants were significantly associated with gambling frequency and intention to gamble mediated these relationships. Those interested in promoting responsible gambling (e.g., decreasing gambling frequency) might want to consider targeting TPB distal determinants, including attitudes and perceived behavioral control. Targeting such attitudes and perceptions may be advantageous in reducing gambling intentions and subsequently decreasing how frequently one gambles.

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Table 1

*Gambling Frequency in a Sample of College Students (N = 785)*

Past year Gambling Frequency	N (%)
Never	408 (52.0)
Once per year	170 (21.7)
2-3 times per year	125 (15.9)
Every other month	26 (3.3)
Once per month	17 (2.2)
2-3 times per month	18 (2.3)
Weekly	13 (1.7)
More than once per week	5 (0.6)
Every other day	1 (0.1)
Every day	2 (0.3)

Table 2

*Gambling-related TPB Variable Scores in a Sample of College Students (N=785) and a Sub-sample of College Student Gambling (N = 373)*

	All (N = 785)	Past year gamblers (N = 377)
TPB Variables	M (SD)	M (SD)
Intention to gamble (range: 1-5)	1.45 (.66)	1.71 (.73)
Peer norms (range: 1-5)	2.54 (.59)	2.50 (.57)
Friend/family norms (range: 1-5)	2.76 (.68)	3.07 (.60)
Attitudes (range: 1-5)	2.06 (.53)	2.20 (.46)
Perceived behavioral control (range: 0-100)	91.43 (15.51)	88.73 (16.96)

Table 3

*Pearson Correlation Coefficients of Gambling Frequency and TPB constructs in a Sample of College Students (N = 785)/Sub-sample of College Student Gamblers (N = 373)*

	Gambling frequency	Intention	Peer norms	Friend/family norms	Attitudes	Perceived behavioral control
Gambling frequency	-					
Intention	.542*/.510*	-				
Peer norms	-.142*/-.193*	-.045/-.037	-			
Friend/family norms	.407*/.236*	.426*/.385*	-.040/.008	-		
Attitudes	.299*/.279*	.369**/.298*	.152*/.193*	.532*/.458*	-	
Perceived behavioral control	-.207*/-.165*	-.283*/-.321*	-.007/.054	-.150*/-.071	-.134*/-.057	-
* <i>p</i> value < .001.						

Table 4

*Regression Models to Predict Intention to Gamble and Past Year Gambling of a Sample of College Students who Gambled in the Past Year (N =785)*

	X <sup>2</sup>	p value	R <sup>2*</sup>	β	p value
Regression 1: Predicting past year gambling via TPB distal determinants	230.207	<.001	.254-.339		
Gender				-.998	<.001
Race				-.485	.018
Class status				.515	.002
Peer norms				-.242	.107
Friend/family norms				1.510	<.001
Attitudes				.025	.899
Perceived behavioral control				-.013	.017
	X <sup>2</sup>	p value	R <sup>2*</sup>	β	p value
Regression 2: Predicting past year gambling via gambling intention	169.228	<.001	.194-.259		
Gender				-.852	<.001
Race				-.335	.086
Class status				.557	.001
Intention				1.286	<.001
	F	p value	R <sup>2</sup>	β	p value
Regression 3: Predicting gambling intention via TPB distal determinants	44.545	<.001	.286		
Gender				-.208	<.001
Race				-.106	.033
Class status				.025	.424
Peer norms				-.059	.096
Friend/family norms				.272	<.001
Attitudes				.216	<.001
Perceived behavioral control				-.008	<.001
	X <sup>2</sup>	p value	R <sup>2*</sup>	β	p value
Regression 4: Predicting past year via gambling intention and TPB distal determinants	255.223	<.001	.278-.370		
Gender				-.871	<.001
Race				-.436	.037
Class status				.517	.003
Peer norms				-.196	.199

Friend/family norms				1.343	<.001
Attitudes				-.155	.441
Perceived behavioral control				-.008	.151
Intention				-3.806	<.001

\*Cox & Snell  $R^2$  and Nagelkerke  $R^2$ , respectively

Table 5

*Regression Models to Predict Intention to Gamble and Gambling Frequency of a Sample of College Students who Gambled in the Past Year (N = 377)*

	F	p value	$R^2$	$\beta$	p value
Regression 1: Predicting gambling frequency via TPB distal determinants	20.602	<.001	.281		
Gender				-.991	<.001
Race				-.203	.256
Class status				.238	.097
Peer norms				-.596	<.001
Friend/family norms				.349	.007
Attitudes				.629	<.001
Perceived behavioral control				-.011	.010
Regression 2: Predicting gambling frequency via gambling intention	49.442	<.001	.347		
Gender				-.908	<.001
Race				-.109	.518
Class status				.159	.237
Intention				.942	<.001
Regression 3: Predicting gambling intention via TPB distal determinants	20.929	<.001	.284		
Gender				-.201	.003
Race				-.113	.180
Class status				.088	.194
Peer norms				-.095	.104
Friend/family norms				.371	<.001
Attitudes				.195	.018
Perceived behavioral control				-.012	<.001
Regression 4: Predicting gambling frequency via gambling intention and TPB distal determinants	29.538	<.001	.391		
Gender				-.825	<.001
Race				-.109	.508
Class status				.165	.213
Peer norms				-.517	<.001
Friend/family norms				.041	.746
Attitudes				.467	.004
Perceived behavioral control				<.001	.850

Intention				.831	<.001
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Figure 1. TPB Model: Past year gambling (N=785).

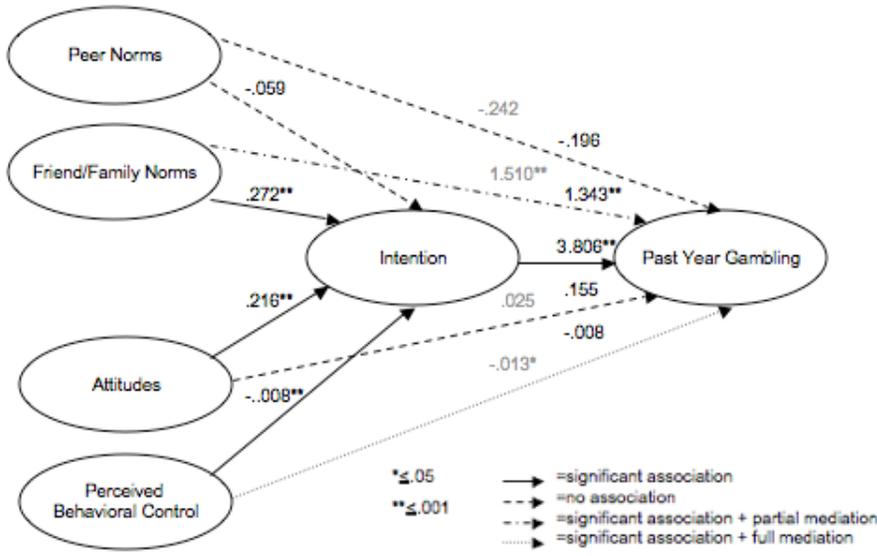


Figure 2. TPB model: Gambling frequency among past year gamblers (N=377).

