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## **SELF-DETERMINATION AND PROBLEM GAMBLING AMONG COLLEGE STUDENTS**

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The present research examined the relationship between self-determination and problem gambling among college students in two studies exploring associations between controlled and autonomy orientations and various indices of problem gambling. Consistent results for controlled orientation within and across studies revealed that students who feel less freedom of choice and base behaviors on contingencies, pressures, and characteristics of the environment (as indicated by higher scores on controlled orientation) gamble more frequently, spend more money gambling, have more negative gambling consequences, and are more likely to meet clinical or subclinical criteria for disordered gambling, even after accounting for other risk factors. Results for autonomy orientation were less consistent. In Study 1, autonomy was not reliably related to gambling, whereas findings from Study 2 consistently supported the predicted negative relationship between autonomy and problem gambling. Mediation analyses revealed that associations between controlled and autonomy orientations and negative gambling consequences were largely mediated by gambling behavior. As a whole, results strongly support the utility of examining problem gambling from a self-determination perspective.

Although most people who gamble do so as a recreational activity and experience no adverse consequences, for some individuals gambling is associated with serious negative consequences. These consequences include increased rates of suicide and attempted suicide (Bland, Newman,

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Orn, & Stebelsky, 1993; Frank, Lester, & Wexler, 1991), work or educational disruption, criminal arrests and other legal difficulties (Bland et al., 1993; Rosenthal & Lorenz, 1992), financial difficulties, and familial disruption (Lesieur, 1979; Lorenz & Shuttlesworth, 1983). In addition, positive correlations exist between gambling and alcohol use, other drug use, smoking, eating disorders, depression, and anxiety (Buchta, 1995; Griffiths & Sutherland, 1998; Lesieur et al., 1991; Miller & Westermeyer, 1996; Phillips, Welty, & Smith, 1997; Specker, Carlson, Edmonson, Johnson, & Marcotte, 1996). Approximately 5½% of adults in the general population have experienced adverse consequences associated with gambling (Shaffer, Hall, & Vander Bilt, 1997). This figure, however, is closer to 15% among college students (Lesieur et al., 1991; Shaffer et al., 1997; Winters, Bengston, Dorr, & Stinchfield, 1998). Other important risk factors include being young, male, having a parental history of problem gambling, and psychiatric comorbidity (Shaffer et al., 1997).

As with other problem behaviors, knowledge regarding motivational determinants of gambling has the potential to yield important information about the etiology, prevention, and treatment of problem gambling. Unfortunately, little empirical research has been published examining gambling etiology from a motivational perspective. Previous theories of gambling have assumed problem gambling to be motivated by desires to acquire wealth (Ladouceur & Walker, 1998), as a means of escaping aversive emotions or cognitions (Jacobs, 1986), and/or as a means of enhancing arousal or affect (Dickerson & Adcock, 1987). Although the identification of specific motivational antecedents of problem gambling is pragmatic, exploring gambling from established motivation theories may be more useful in directing research concerning gambling motivation. Self-determination theory (Deci & Ryan, 1985b) provides one such approach.

### SELF-DETERMINATION THEORY

Self-determination theory focuses on motivations underlying human behavior and assumes that individuals have fundamental psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 1985b, 2000). Self-determination has previously been examined in relation to substance use, treatment, and risky sexual behavior (Knee & Neighbors, 2002; Ryan, Plant, & O'Malley, 1995; Williams, Cox, Hedberg, & Deci, 2000). No research has yet examined the relationship between self-determination and problem gambling, although a few studies have explored self-determination and recreational gambling (Chantal & Vallerand, 1996; Chantal, Vallerand, & Vallieries, 1994, 1995).

Self-determination can be examined at varying levels of generality (Vallerand, 1997). For example, self-determination has been measured by assessing general orientations (Deci & Ryan, 1985a, 1985b) and life aspirations (e.g., Kasser & Ryan, 1996) as well as more specifically by asking individuals why they engage in particular behaviors, such as going to college (Vallerand et al., 1992), seeking treatment (Ryan et al., 1995), drinking (Knee & Neighbors, 2002), and gambling (Chantal et al., 1994).

Research exploring self-determination and recreational gambling has shown that individuals vary in the extent to which they gamble for more or less self-determined reasons (Chantal et al., 1994), with more self-determined reasons for gambling (e.g., interest and enjoyment) being associated with greater gambling involvement and less self-determined reasons (e.g., monetary gain) being associated with less gambling involvement. In addition, gambling activities that require some degree of knowledge and skill (horse racing) have been associated with more self-determined reasons for gambling, whereas games that are completely dependent on chance (lottery) have been associated with less self-determined reasons for gambling (Chantal & Vallerand, 1996). Although these studies showed important relationships between reasons for gambling and gambling involvement, they focused primarily on specific gambling games and did not address potentially aversive consequences associated with heavy gambling involvement. The present research presents an alternative approach by examining general gambling behavior and negative gambling consequences as a function of general motivational orientations, versus the assessment of specific reasons for gambling.

In describing individual differences in self-determination, Deci and Ryan (1985a) identified three general motivational orientations: a controlled<sup>1</sup> orientation, an autonomy orientation, and an impersonal orientation. Each of these orientations measures is a conceptually distinct facet of self-determination. The impersonal orientation is associated with amotivation and learned helplessness but was not of interest in the present research. Controlled and autonomy orientations measure independent aspects of self-determination. The controlled orientation involves basing behaviors on contingencies, pressures, and characteristics of the environment and is a negative indicator of self-determination whereas the autonomy orientation is a positive indicator of

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1. This orientation was originally termed *control orientation* (Deci & Ryan, 1985). We use the term *controlled orientation* to help reduce confusion of this orientation with the numerous other "control" constructs (see Skinner, 1996 for a review of this issue).

self-determination, and is associated with experiencing choice and basing behaviors on personal interests and integrated values. The controlled orientation is associated with basing self-worth on external determinants such as wealth (McHoskey, 1999) and responding to challenges and negative feedback from the environment in an ego-defensive manner (Koestner & Zuckerman, 1994; Neighbors, Vietor, & Knee, 2002). In addition, controlled orientation has been associated with escalated commitment to failing propositions (Schaubroeck & Williams, 1993), higher levels of stress (Deci & Ryan, 1985a), hostility (Deci & Ryan, 1985b), less healthy forms of coping (Knee & Zuckerman, 1998), and drinking for extrinsic reasons (Knee & Neighbors, 2002). In contrast, the autonomy orientation is a positive indicator of self-determination and is associated with experiencing choice and basing behaviors on personal interests and integrated values. Autonomous individuals tend to view feedback as useful information and are thus less likely to become ego-involved based on outcomes (Deci & Ryan, 1987, 1991; Koestner & Zuckerman, 1994).

We believe that motivational orientations are important determinants of problem gambling. We expected that controlled orientation would be associated with more problematic gambling whereas autonomy orientation would be associated with less problematic gambling. Although gambling may be engaged in for more or less self-determined reasons (e.g., interest versus to win money), it is by definition an outcome-focused activity. By its nature, gambling is an extrinsically oriented activity with salient outcomes (i.e., wins and losses) that are contingent upon factors that are to varying degrees beyond the control of the gambler. Thus, the nature of the activity complements the controlled orientation and is discordant with an autonomy orientation. In addition, controlled and autonomy orientations are associated with differential emotional responses to outcomes. Controlled individuals tend to become more defensive and emotionally involved in the outcomes of their activities. This suggests that controlled individuals are likely to experience gambling wins as self-aggrandizing and ego bolstering and losses as ego threats to be vindicated, and are thus likely to gamble more excessively. In contrast, autonomy orientation is associated with viewing environmental feedback as informational rather than potentially ego bolstering or threatening. Thus, more autonomous individuals are less likely to become emotionally invested in gambling outcomes. Perceived characteristics of the prototypical "successful gambler," such as wealth, glamour, and status, may be especially alluring to individuals higher in controlled orientation, who base their self-worth on these characteristics. In addition, higher levels of stress combined with unhealthy coping

strategies may make controlled individuals particularly susceptible to gambling pathology.

## STUDY 1

Study 1 was designed to examine associations between autonomy and controlled orientations and problem gambling using an established and widely used measure of problem gambling, the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987). The SOGS has been used in numerous studies of problem gambling and has been used to identify nonproblem, problem, and pathological gamblers (Dube, Freeston, & Ladouceur, 1996; Lesieur et al., 1991). We were specifically interested in examining the relationship between autonomy and controlled orientations and (a) gambling frequency, (b) peak amount gambled, and (c) SOGS scores.

## METHOD

### Participants

Respondents participated as part of a larger study examining motivational determinants of college student drinking. Participants included 204 (102 men and 102 women) undergraduates from a large West Coast university. Participants received extra credit in psychology courses for participation. The average age of participants was 19.0 years ( $SD = 1.82$ ). Ethnicity was 51.7% Caucasian, 40.8% Asian/Asian American, and 7.5% other. Participants were freshman (66.7%), sophomores (18.9%), juniors (9.0%), and seniors (5.5%).

### Procedure

Participants completed measures in small groups with no communication between participants. Participants were urged to answer all items honestly and were reminded that all answers would remain anonymous. Following the assessment, participants were debriefed and thanked for their participation. All procedures were reviewed and approved by the departmental human subjects review committee.

### Measures

*Autonomy and Controlled Orientations.* We used the autonomy and controlled orientation subscales from the General Causality Orientations Scale (GCOS; Deci & Ryan, 1985a; revised: Hodgins, Koestner, & Duncan, 1996). The revised GCOS contains 17 scenarios, each of which is followed by autonomous and controlled responses. The GCOS also includes an impersonal orientation, which was not of interest in the pres-

ent research.<sup>2</sup> For example, one of the scenarios states, "You have been offered a new position in a company where you have worked for some time. The first question that is likely to come to mind is:" The autonomy orientation is then measured by the response, "I wonder if the new work will be interesting?" The controlled orientation is measured by the response, "Will I make more at this position?" Another scenario states: "You have just received the results of a test you took, and discovered that you did very poorly. Your initial reaction is likely to be:" The autonomy orientation is measured by the response, "I wonder how it is I did so poorly," and feel disappointed." The controlled oriented response is, "'That stupid test doesn't show anything,' and feel angry." Participants rate each response on a scale from 1 (*very unlikely*) to 7 (*very likely*), regarding the extent to which each response would be self-characteristic. Z-scores were computed for autonomy and controlled orientations by standardizing respondents' average ratings across all 17 scenarios. Alphas were .78 and .72 for the autonomy and controlled orientations, respectively.

*The South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987)*. The SOGS is a widely used self-administered screening instrument initially designed to identify pathological gamblers, but which has also been used to identify subclinical or Level 2 gamblers (Schaffer et al., 1997), or individuals who have experienced some problems related to gambling but do not meet clinical thresholds. The SOGS contains 20 scored items that correlate highly with the DSM-III-R and DSM-IV with demonstrated validity and reliability among university students (Ladouceur, Dube, & Bujold, 1994; Beaudoin & Cox, 1999; Lesieur et al., 1991). Sample scored items include "Have you ever felt like you would like to stop gambling but didn't think you could?" and "Have you ever lost time from work (or school) due to gambling?" Typical cutoff scores are 5 for probable pathological gambling (Level 3) and 3 for problem (Level 2) gambling (Dube et al., 1996; Lesieur et al., 1991). The SOGS also includes nonscored items assessing peak amount gambled, "What is the largest amount of money you have ever gambled with on any one day?" and

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2. The impersonal orientation is a measure of amotivation. Because gambling is an outcome-oriented activity for which people must presumably have some interest, we did not see this orientation as conceptually relevant in this domain. However, for completeness and as a courtesy to readers familiar with causality orientations, in Study 1, the impersonal orientation was not correlated with any of the gambling indices and none of the results changed when controlling for it. In Study 2, impersonal orientation was weakly (and negatively) correlated with gambling expenditure but unrelated to gambling frequency, gambling problems, SOGS scores, or Gamblers Anonymous 20 questions. None of the results of Study 2 changed when controlling for impersonal orientation.

frequency of gambling where respondents indicate how frequently they have engaged in various gambling activities (e.g., bet on horses, went to a casino, played cards for money) from 0 (*never*) to 2 (*once a week or more*). Consistent with previous research (e.g., Moore & Ohtsuka, 1999), we created a gambling frequency index based on this item by taking the mean of reported frequency for each type of gambling activity. In addition, the SOGS contains a nonscored item assessing family history of gambling problems, which has been shown to be an important risk factor in predicting problem gambling.

## RESULTS

### Frequency and Peak Amount Bet

Using a general linear modeling approach, we tested a multivariate multiple regression equation specifying both the gambling frequency index and peak amount gambled as criteria and standardized autonomy and controlled orientations as predictors. This approach evaluates the unique effects of autonomy and controlled orientations (i.e., each predictor controls for the other). Results revealed a multivariate effect for controlled orientation,  $F(2, 197) = 7.17, p = .001$ , but not for autonomy,  $F(2, 197) = 1.31, p = ns$ .

Examination of univariate effects revealed that controlled orientation was positively associated with gambling frequency,  $t(198) = 3.45, p < .001, \beta = .24$ , and uniquely accounted for approximately 6% of the variance in gambling frequency. More specifically, controlled orientation was associated with frequency of playing cards for money, betting on horses, dogs, or other animals, betting on sports, going to casinos, and playing games of skill for money (see Table 1). Autonomy was not uniquely associated with gambling frequency. Univariate results for peak amount gambled were similar. Controlled orientation was positively associated with higher peak amount bet,  $t(198) = 3.32, p < .001, \beta = .24$  and uniquely accounted for 6% of the variance, whereas autonomy was not uniquely associated with peak amount bet.

### SOGS Scores

In this sample, 119 participants (59%) scored 0 on the SOGS, 44 (22%) scored 1 or 2, 22 (11%) scored 3 or 4, and 16 (8%) scored 5 or more. Complementary approaches were used to examine SOGS scores. First, continuous raw SOGS scores were predicted from autonomy and controlled orientations in a multiple regression equation. These results revealed that higher controlled orientation was associated with higher SOGS scores,  $t(198) = 4.03, p < .001, \beta = .28$ , and uniquely accounted for approx-

TABLE 1. Study 1 Correlations of Controlled and Autonomy Orientations with Gambling Indices

Type of Gambling	Controlled Orientation	Autonomy Orientation
Overall frequency	0.24***	-.003
Frequency of specific gambling activities		
Cards	0.26***	-0.08
Games of skill	0.19**	-0.03
Betting on sports	0.18*	-0.06
Betting on horses, dogs, or other animals	0.15*	-0.02
Casino	0.15*	0.11
Lotteries	0.11	-0.05
Stocks	0.07	0.01
Gambling machines	0.07	-0.003
Dice games	0.06	-0.13
Bingo	0.00	0.03
Peak amount bet	0.23**	-0.09
SOGS scores	0.27***	-0.03

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

imately 8% of the variance in SOGS scores. Autonomy was not significantly associated with SOGS scores.

Because SOGS cutoff scores are frequently used to identify problem and pathological gamblers (Shaffer et al., 1997), we were interested in determining the predictive utility of autonomy and controlled orientations in identifying individuals who met at least subclinical (Level 2) criteria. Accordingly, we created a dichotomous variable distinguishing individuals scoring 3 or higher on the SOGS from those scoring less than 3. Multiple logistic regression was then used to distinguish individuals meeting at least Level 2 problem gambling classification (38 participants) from those who did not (163 participants) as a function of autonomy and controlled orientations. Results revealed a medium effect size for controlled orientation,  $w = .29$  (Cohen, 1992; Rosenthal & Rosnow, 1991),  $\chi^2 = 16.71$ ,  $p < .001$ , Odds ratio = 2.38, but no effect for autonomy orientation. Thus, although autonomy orientation was unrelated to gambling classification, individuals scoring 1 standard deviation above the mean on controlled orientation were more than twice as likely to meet criteria for problem or pathological gambling. Figure 1 presents controlled and autonomy orientation means by SOGS classification.

Finally, we were interested in examining whether autonomy and controlled orientations held unique predictive utility beyond gender and family history, which have been established as important risk factors of



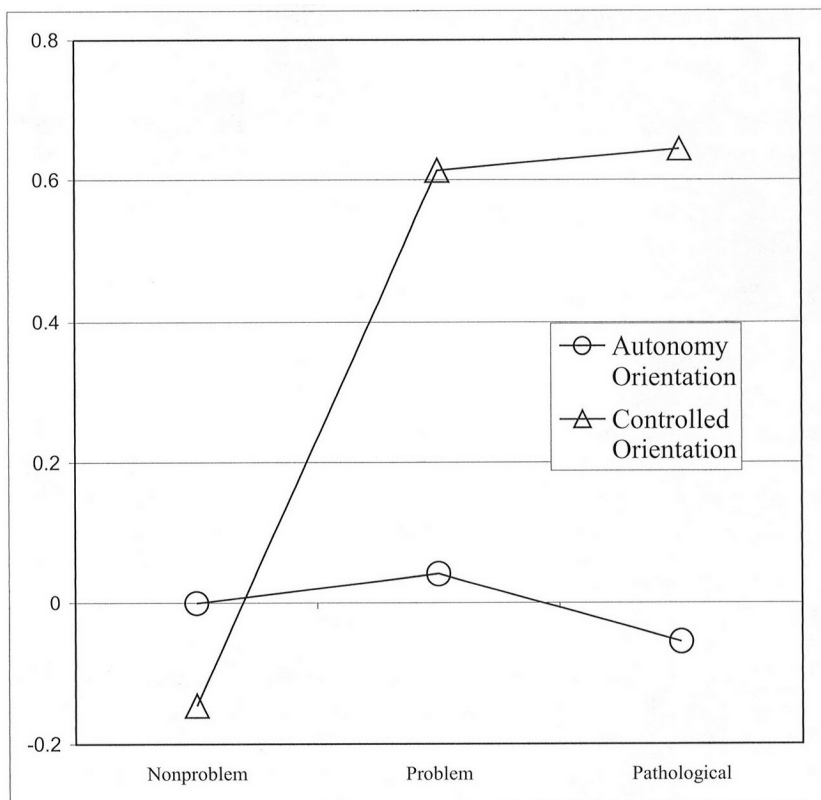


FIGURE 1. Autonomy and controlled orientation scores by SOGS classification.

problem gambling. Multiple logistic regression confirmed that controlled orientation remained significant after accounting for both gender and family history (See Table 2).

DISCUSSION

Study 1 provided an initial examination of the relationship between individual differences in self-determination and problem gambling among college students. Results provided preliminary support for the hypothesis that individuals who are generally less self-determined gamble more and are more likely to have problems with gambling. Specifically, although autonomy orientation was not associated with gambling indices, controlled orientation was positively related to gambling

TABLE 2. Study 1 Multiple Logistic Regression Analyzing Likelihood of Classification as Problem or Pathological Gambler

Predictor	<i>B</i>	<i>SE</i>	<i>p</i>	Odds Ratio	Lower	Upper
Parental Gambling History <sup>a</sup>	2.59	.46	.001	13.27	5.37	32.82
Sex <sup>b</sup>	1.34	.50	.01	3.82	1.43	10.24
Controlled Orientation	.59	.24	.02	1.80	1.12	2.91
Autonomy Orientation	.13	.24	.58	1.14	.72	1.82

Note. *B* = Parameter estimate; Lower = lower 95% confidence interval; Upper = upper 95% confidence interval. <sup>a</sup>No parental history = 0, parental history = 1. <sup>b</sup>Women = 0, Men = 1.

frequency, peak amount gambled, and SOGS scores. In addition, individuals who were higher in controlled orientation were more likely to meet criteria for classification as problem or pathological gamblers, even after accounting for gender and family history of problem gambling.

## STUDY 2

Study 2 was designed to provide a more detailed examination of the relationship between autonomy and controlled orientations and problem gambling among college students. We were interested in replicating Study 1 results, using a larger sample, and including only students with at least minimal gambling experience. Study 2 incorporated additional gambling indices and was geared toward exploring the relationships between autonomy and controlled orientations and specific consequences related to gambling.

## METHOD

### Participants

Participants included 560 college students enrolled in undergraduate psychology courses at a large West Coast university. Incomplete data from 16 participants resulted in a final sample of 544 (201 men and 343 women). Participants were recruited via sign-up sheets inviting all students "who had ever gambled at least once in their life, even if just bingo or lottery." Participants received extra credit in psychology courses for participation. The average age of participants was 19.23 years ( $SD = 1.78$ ). Ethnicity was 59.4% Caucasian, 33.8% Asian/Asian American, and 6.8% other. Participants were freshman (55.3%), sophomores (28.1%), juniors (11.2%), and seniors (5.4%).

### Procedure

Participants completed measures in small groups with no communication between participants. Participants were urged to answer all items honestly and were reminded that all answers would remain anonymous. All measures and procedures were reviewed and approved by the departmental human subjects committee. Following the assessment, participants were debriefed and thanked for their participation.

### Measures

Autonomy Orientation, Controlled Orientation, and the SOGS were again employed and were described in Study 1.

*Gambling Expenditure* was measured using the quantity subscale of the Gambling Quantity and Perceived Norms Scale (GQPN; Neighbors, Lostutter, Larimer, & Takushi, 2002). Six items assess amounts won and lost over the previous month and year. For example, one item asks, "Approximately how much money have you spent (lost) gambling in the PAST MONTH?" Responses are ordered on a 10-point Likert-type scale from less than \$5 to more than \$1,000. Another item asks, "Approximately how much money have you won gambling in the PAST YEAR?" Responses for this item range from less than \$25 to more than \$2,000. In addition, one item measures disposable income and allows for statistical control of relative income. Scores reflect the mean of the six items assessing gambling wins and losses, controlling for differences in disposable income. Thus, gambling expenditure is residualized on disposable income. Internal reliability (Cronbach's alpha) in this study was .89.

*The Gambling Problem Index* (GPI; Neighbors, Lostutter, et al., 2002) consists of 20 items designed to assess negative gambling consequences. For each item, respondents were asked to indicate how many times, from 1 (*never*) to 5 (*more than 10 times*), during the previous 6 months they had experienced a negative consequence while gambling or as a result of gambling. Sample items include "Kept gambling when you promised yourself not to," "Neglected your responsibilities," and "Missed out on other things because you spent too much money on gambling." The GPI score was calculated as the sum of items in which participants reported experiencing the gambling-related consequence at least once during the previous 6 months. Internal reliability (Cronbach alpha) in this study was .84.

*The 20 Questions of Gamblers Anonymous* (GA20) has been used publicly to help individuals determine whether they may be "compulsive gamblers." This measure consists of 20 dichotomous items (yes/no) describing situations and behaviors characteristic of problem gamblers and has previously demonstrated good reliability and convergent validity (Ursua & Uribelarrea, 1998). Sample items include "Have you ever

sold anything to finance gambling?" "Were you reluctant to use "gambling money" for normal expenditures?" and "Did gambling make you careless of the welfare of yourself or your family?" Internal reliability (Cronbach's alpha) in this study was .75.

## RESULTS

### **Frequency, Gambling Expenditure, and Peak Amount Bet**

We tested a multivariate multiple regression equation specifying the gambling frequency index, gambling expenditure, and peak amount gambled as criteria with autonomy and controlled orientations as predictors. Results were consistent with Study 1, revealing a medium multivariate effect for controlled orientation,  $f = .28$ ,  $F(3, 538) = 14.20$ ,  $p < .001$ . In this study, however, there was also a relatively small ( $f = .17$ ) multivariate effect for autonomy orientation,  $F(3, 538) = 5.38$ ,  $p < .001$ .

Examination of univariate effects revealed that controlled orientation was positively associated with gambling frequency, gambling expenditure, and peak amount gambled. Conversely, autonomy was negatively associated with gambling frequency, gambling expenditure, and peak amount gambled (see Table 3).

### **SOGS and Gamblers Anonymous 20 Questions**

We examined the relations between autonomy and controlled orientations and scores on two widely used gambling screens using multivariate multiple regression. In these data, 243 participants (45%) scored 0 on the SOGS, 212 (39%) scored 1 or 2, 54 (10%) scored 3 or 4, and 35 (6%) scored 5 or more. SOGS and GA20 scores were specified as criteria and both autonomy and controlled orientations were predictors. Multivariate effects were present for both controlled,  $F(2, 540) = 13.71$ ,  $p < .001$ , and autonomy orientations,  $F(2, 540) = 8.64$ ,  $p < .001$ . Univariate results revealed positive associations between controlled orientation and both SOGS (consistent with Study 1) and GA20. Conversely, autonomy was negatively associated with both SOGS and GA20 (see Table 3).

### **Gambling Consequences**

We took a slightly different approach in examining the relations between autonomy and controlled orientations and specific gambling consequences. Gambling consequences were indicated by scores on the Gambling Problem Index. We were interested in examining both the direct relations between autonomy and controlled orientations and gambling consequences and the extent to which these relations were

TABLE 3. Study 2 Univariate Multiple Regression Results

Criterion	Predictor	B	SE	t	p	Std. Est.
Gambling Frequency Index	Controlled orientation	.07	.012	5.97	< .001	.25
	Autonomy orientation	-.03	.012	-2.89	< .01	-.12
Peak amount gambled	Controlled orientation	.13	.034	3.92	< .001	.17
	Autonomy orientation	-.12	.034	-3.57	< .001	-.15
Gambling expenditure	Controlled orientation	.20	.040	4.91	< .001	.21
	Autonomy orientation	-.11	.040	-2.74	< .01	-.12
SOGS	Controlled orientation	.31	.078	3.99	< .001	.17
	Autonomy orientation	-.23	.078	-2.92	< .01	-.13
GA20	Controlled orientation	.52	.104	4.98	< .001	.21
	Autonomy orientation	-.42	.104	-4.05	< .001	-.17
Gambling Problems Index	Controlled orientation	.51	.118	4.30	< .001	.18
	Autonomy orientation	-.44	.118	-3.77	< .001	-.16

Note. Std. Est. = Standardized estimate; SOGS = South Oaks Gambling Screen; GA20 = Gamblers Anonymous 20 Questions.

mediated by gambling behavior. Accordingly, we specified gambling frequency and expenditure as indicators of latent gambling behavior and followed criteria outlined by Kenny, Kashy, and Bolger (1998) in testing mediation. Model 1 (Figure 2, top) revealed significant paths from both predictors (autonomy and controlled orientations) to the mediator (gambling behavior) and significant paths from predictors to the criterion (gambling consequences). As expected, controlled orientation was positively associated with gambling consequences, whereas autonomy was negatively associated with gambling consequences. Model 2 (Figure 2, bottom) revealed a strong relationship between the mediator and the criterion, controlling for the predictor, and revealed that the relationships between both predictors and the criterion were no longer significant when controlling for the mediator. Thus, all criteria for establishing mediation were observed. A modification of the Sobel (1982) test (Kenny et al., 1998) was employed to evaluate mediation effect size and revealed that gambling behavior mediated gambling consequences for both controlled orientation,  $z = 4.99, p < .001$ , and autonomy orientation,  $z = -3.00, p = .001$ . These results indicate that individuals who are more controlled or less autonomous experience more gambling problems *because* they engage in the behavior more frequently and spend more money doing so.

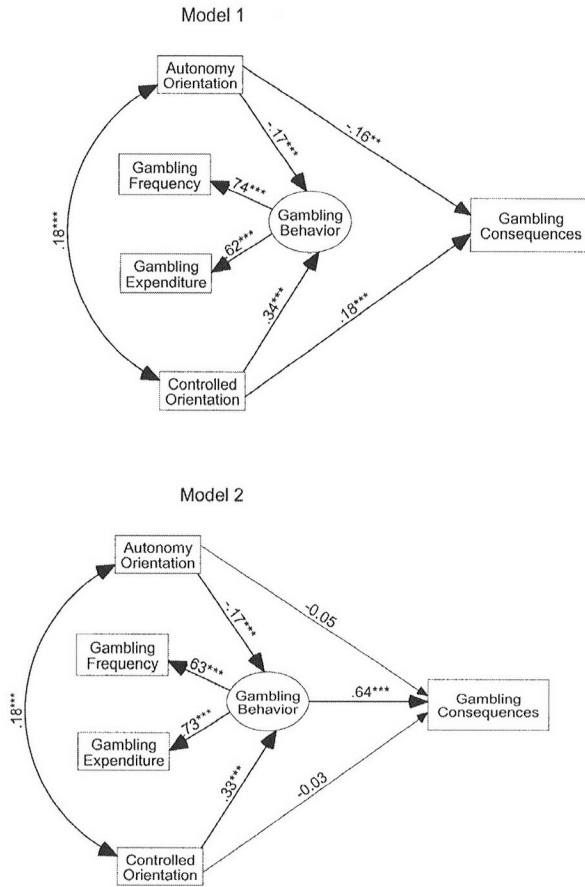


FIGURE 2. Mediation of autonomy and controlled orientations and gambling consequences by gambling behavior. \* $p < .01$ ; \*\*\* $p < .001$ .

DISCUSSION

Results from Study 2 provided additional evidence supporting the relationship between self-determination and problem gambling. Consistent with Study 1, controlled orientation was positively associated with self-reported gambling behavior and scores on gambling screening measures. Controlled orientation was also associated with more consequences related to gambling, and this relationship was mediated by gambling behavior. In contrast to Study 1 findings, results from Study 2 revealed a consistent negative relationship between autonomy and gambling behaviors, gambling screen scores, and aversive conse-

quences of gambling. The relationship between self-determination and gambling consequences was mediated by behavior.

## GENERAL DISCUSSION

The present research examined the relationship between self-determination and problem gambling among college students in two studies exploring associations between autonomy and controlled orientations and various indices of problem gambling. Consistent results within and across both studies indicated that students who feel less sense of choice and base behaviors on contingencies, pressures, and characteristics of the environment (as indicated by higher scores on controlled orientation) gamble more frequently, spend more money gambling, have more negative gambling consequences, and are more likely to meet clinical or subclinical criteria for disordered gambling. This finding persists even after accounting for other risk factors.

Results for autonomy orientation were less consistent. In Study 1, autonomy orientation was not reliably related to gambling, whereas findings from Study 2 consistently supported the predicted negative relationship between autonomy and problem gambling. As opposed to Study 1, the sample recruited in Study 2 included only participants who had at least some experience with gambling. This raised the possibility that the negative relationship between autonomy and gambling might exist only for those who have at least some experience with gambling. However, reanalysis of Study 1 excluding 34 participants who never gambled did not change the results. Meta-analytically comparing and combining the results of both studies using procedures described by Rosenthal and Rosnow (1991), we found that autonomy was significantly associated with gambling behavior and SOGS scores. Across both studies, controlled orientation was a stronger predictor of gambling behavior and SOGS scores than was autonomy. As a whole, the evidence suggests a relatively weak negative relationship between autonomy and problem gambling and a stronger, positive association between controlled orientation and problem gambling among college students.

Results from the present research are consistent with the growing body of literature associating negative health-related consequences with lower levels of self-determination (Knee & Neighbors, 2002; Knee, Neighbors, & Vietor, 2001; Neighbors, Vietor, & Knee, 2002; Neighbors et al., 2002; Williams, Grow, Freedman, Ryan, & Deci, 1996; Williams, Rodin, Ryan, Grolnick, & Deci, 1998). Although not directly comparable, these results are somewhat inconsistent with previous work examining gambling from a self-determination perspective. Chantal et al. (1994, 1995) found that gambling for more self-determined reasons (e.g., inter-

est and excitement) was associated with higher levels of gambling involvement, where involvement was defined by frequency and gambling expenditure. Chantal and colleagues did not examine more general individual differences in self-determination (i.e., autonomy and controlled orientations) nor did they address potential problems arising from heavy gambling involvement. However, the conceptual divergence between their research and the present findings suggests a need for additional research to simultaneously examine self-determination at multiple levels of specificity in relation to problem gambling. It is possible that at a domain-specific level, intrinsically motivating characteristics of gambling games (e.g., interest and challenge) result in more frequent and extended play, and at a more global level, individuals who are more self-determined perceive gambling as extrinsically motivated and are hence less likely to engage in gambling activities. In addition, although most people gamble recreationally, gambling is a potentially addictive behavior and is associated with serious negative consequences not easily reconciled with self-determined regulation (i.e., regulating one's behaviors based on personal, well-integrated values).

Although our findings present strong evidence for examining problem gambling from a self-determination perspective, it is important to identify limitations of the present research. First, both samples were made up of college students, and although college student populations have among the highest prevalence rates of problem gambling (Lesieur et al., 1991; Shaffer et al., 1997), these results may not generalize to other populations. A related limitation is the ethnic composition of the samples, which were both composed primarily of Caucasian and Asian/Asian American students. Results may not generalize to populations with larger proportions of other ethnicities. An additional limitation is that our measures were based on self-report rather than actual observations of behavior. Finally, although our data are consistent with the theoretical model presented in Study 2, the nonexperimental cross-sectional nature of the data does not allow determination of causal direction.

Despite these limitations, the present research offers important implications and numerous possibilities for future research. Self-determination offers a theoretically rich approach for examining problem gambling, a characteristic that is frequently lacking in present gambling research. The present findings suggest that controlled individuals, who feel less sense of choice and base behaviors on contingencies, pressures, and characteristics of the environment, may be particularly susceptible to developing problems with gambling. In contrast, autonomous individuals, who tend to base behaviors on personal interests and integrated values, may be less susceptible. These findings are consistent with sug-



gestions that motivational enhancement approaches for prevention and treatment of problem gambling addressing gambling issues in a nonthreatening manner may be particularly effective (Miller & Rollnick, 2002; Sharpe & Tarrier, 1994). Cognitive-behavioral and skills training interventions targeting increased sense of control and decreased cognitive distortions regarding perceived contingencies may also prove useful from this perspective. Further research is necessary to specifically address how individual differences in self-determination interact with different prevention and treatment approaches. An additional important route for future investigation is to examine the relationship between individual differences in self-determination and specific reasons that people give for gambling and/or not gambling, and how these motivational variables combine to predict gambling consequences.

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