Measuring Gambling Outcomes Among College Students

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Abstract

The present research describes the proposal and validation of three gambling outcome measures, the Gambling Quantity and Perceived Norms Scale (GQPN), the Gambling Problem Index (GPI), and the Gambling Readiness to Change Questionnaire (GRTC). The study consisted of 560 undergraduate college students who completed a survey including the newly constructed measures and other measures designed to assess convergent validity. Results confirmed good reliability and convergent validity of all three measures. Implications for evaluating efficacy of treatment and prevention interventions are detailed.

Keywords

gambling; measurement; college students; gambling expenditures; readiness to change

Gambling has become increasingly popular in the United States. In 1996, gambling revenues in the United States were 47.6 billion dollars, exceeding the revenues generated from music sales, cruise ships, movie ticket sales, spectator sports, and live entertainment combined (Christian, 1998). Legalized gambling is available, in some form, in 48 of the 50 United States. The growth of gambling has also lead to increased prevalence rates of disordered gambling and represents a significant public health risk (Cunningham-Williams et al., 1998; Korn & Shaffer, 1999; Volberg, 1994). Both problem and pathological gambling are associated with a host of serious health and social consequences including suicide, work and educational disruption, criminal arrest, financial difficulties, and familial disruption. Problematic gambling has also been associated with concomitant alcohol and other drug use, eating disorders, depression and anxiety (Gupta & Derevensky, 2000; Frank, Lester, Wexler, 1991; Bland et al., 1993; Lester, 1998).

Although problematic gambling is perceived, perhaps correctly, as relatively uncommon in the general population, rates of problematic gambling among college students are alarmingly high. Approximately 1.6% of the general population have engaged in pathological gambling with an additional 3.85% having experienced gambling related problems at sub-clinical levels (Shaffer et al., 1997). These rates are more than double among college students with approximately 5% reporting pathological gambling and over 9% reporting sub-clinical gambling related problems (Lesiur et al., 1991; Shaffer et al., 1997).

While gambling problems have become more common, especially among particular populations (e.g., college students), gambling research is a relatively young field and is

struggling with the obstacles that new fields of inquiry typically encounter, among which definitional and measurement issues are paramount (Kuhn, 1962). Whether problem gambling is best treated as an addictive behavior or an impulse control disorder has important implications. If problem gambling can be effectively treated as an addiction, it follows that approaches used to address other addictive behaviors (e.g., drinking, smoking, drug use) may be readily adapted to address problem gambling. While this issue cannot be fully addressed in a single study, the purpose of this paper is to address the measurement of problem gambling by proposing and validating three additional gambling measures, two of which are closely modeled after measures used to study high-risk drinking.

Regarding the development of established methods of study, there are relatively few standardized measures in the field of gambling research. The most widely used measure of problem/pathological gambling is the South Oaks Gambling Screen or SOGS (Lesieur and Blume, 1987), which has been validated in a variety of settings within different populations, including college students (Beaudoin & Cox, 1999; Lesieur et al., 1991; Ladouceur et al., 1994). Despite it's being based on DSMIII criteria rather than DSM-IV criteria for pathological gambling (APA, 1980), and other criticisms (Dickerson & Baron, 2000), the SOGS remains the most widely used gambling instrument, having been used as both a screening measure and an outcome measure in numerous studies. The widespread reliance on a single measure has the benefit of yielding comparable results across studies but also renders the entire field susceptible to reliability and validity issues associated with its use (Ladouceur et al., 2000)

Another screening instrument, the Gamblers Anonymous 20 Questions (GA20), is widely used in public practice and compares favorably to the SOGS and DSMIV criteria for pathological gambling (Derevensky & Gupta, 2000), but is less useful than the SOGS given it's limited use in clinical and research settings. Gambling attitudes and beliefs have been reliably found to predict gambling behavior (e.g., Breen & Zuckerman, 1999), but more objective gambling outcome measures have been scarce, often constructed for specific studies examining frequency of gambling and amount spent on gambling. Frequency of gambling has typically been measured using variations of an item on the SOGS. Measures of gambling quantity or expenditure have been less standardized and have met with justifiable criticism (Blaszczynski et al., 1997). The amount of money "spent" on gambling, for example, can be interpreted in several different ways. In addition, the amount of money spent on gambling is difficult to interpret without taking income differences into account.

The use of existing screening measures may provide relative accuracy of prevalence estimates, but these measures are less informative in terms of developing effective treatment and prevention interventions (Dickerson et al., 1987; Dickerson & Baron, 2000; Shaffer et al., 1997). Instruments for developing intervention strategies must include outcome measures that can reliably evaluate behavior change (e.g., frequency and quantity of gambling and specific consequences associated with gambling). The similarity of behavioral and emotional characteristics of problem gambling to other addictive behaviors suggests that already validated instruments might be readily adapted to problem gambling. Adapting existing measures in the field of addictive behaviors to specifically address gambling is rare but not unprecedented. Lesieur and Blume (1991), for example, modified the Addiction Severity Index (McLellan et al., 1980) to include a gambling component for use as an outcome measure to evaluate the effectiveness of inpatient treatment.

In addition to assessing specific gambling related outcomes, researchers have noted that efforts to change gambling behavior, as in other high-risk behaviors, must also take motivational factors into account (Sharpe & Tarrier; 1992; DiClemente et al., 2000). DiClemente et al. (2000) specifically discussed the merits of applying the Stages of Change model (Prochaska & DiClemente, 1986) in understanding the initiation and cessation of gambling behavior. The

Stages of Change Model has become a paradigm for understanding motivation to change and has been examined in several contexts (e.g., smoking, drinking, drug use, high-risk sexual behavior). This model suggests that individuals progress, not necessarily linearly, through a series of stages in the process of changing health related behaviors. Stages include precontemplation, contemplation, preparation, action, maintenance, and termination, although the specific number of stages has varied (Joseph et al., 1999). This approach has great utility in providing therapists, counselors, and researchers the ability to assess where a client is within the Stages of Change model and tailor a client's treatment appropriately. To date, however, no measures have been published which assess stages of change specifically related to gambling.

In sum, while there are a number of gambling measures available, relatively few of them have been standardized and used in multiple studies, underlying a clear need for further measure development and validation, particularly measures which can facilitate development of effective gambling interventions. The purpose of the present study was to propose three such measures: a measure of gambling quantity (expenditure) that avoids previous problems measuring this construct (i.e., ambiguity of "money spent" and failure to account for income disparity), a measure of gambling related consequences, and a measure of motivation to change gambling behavior.

METHOD

Participants

Participants included 560 (204 men and 347 women) college students enrolled in undergraduate psychology courses at a large northwestern university in the U.S. (nine participants did not indicate gender). Participants were recruited via sign up sheets inviting the participation of all students "who had ever gambled at least once in their life, even if just bingo or lottery." Students received extra course credit for participation. The average age of participants was 19.24 years ($SD = 1.77$). Ethnicity was 58.7% Caucasian, 34.1% Asian/Asian American, 1.7% Hispanic/ Latino, 1.3% Black/African American and 4.2% other. The sample included 26.0% fraternity ($n = 51$) and sorority ($n = 92$) members. Participants were freshman (55.3%), sophomores (28.1%), juniors (11.3%), and seniors (4.9%). Participants included individuals who gambled non-problematically (83.9%; SOGS = 3), sub-clinical problem gamblers (9.8%; SOGS = 3 or 4) and probable pathological gamblers (6.3%; SOGS = 5 or higher). The university is located in a community in which there is ample access to gambling venues for college students, including six Tribal/Indian casinos and 1,842 active operator licenses in the three county area surrounding the university.

Procedure

Participants completed all measures, which were presented in the same order, 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

The Gambling Problem Index (GPI; Appendix A) consisted of 20-items and was constructed for this research. The GPI was closely modeled after the *Rutgers Alcohol Problem Index (RAPI;* White & Labouvie, 1989), an established measure designed to assess alcohol related problems. For each item respondents were asked to indicate, on a five-point scale (never, one to two, three to five, six to ten, and more than ten times), how many times during the previous six months they experienced a negative consequence while gambling or as a result of 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 six months.

The Gambling Readiness to Change Scale (GRTC; Appendix B) was constructed for this research and was modeled after the alcohol *Readiness To Change* questionnaire (Rollnick et al., 1992), which is based on Prochaska and DiClemente's (1986) stages-of change model. The GRTC is a 9-item scale with three items measuring each of three stages: precontemplation, contemplation, and action. Respondents indicate the extent to which they agree with the statement presented in each item, from 1 (strongly disagree) to 5 (strongly agree). The GRTC may be scored in three ways according to the specific aims of the research in which it is used. An overall composite of readiness to change consists of weighting the precontemplation items (−2), contemplation items (1), and action items (2), and taking the mean of all weighted items. Alternatively, separate scores for precontemplation, contemplation, and action can be derived by taking the mean of the items corresponding to each subscale. A third alternative is to categorize individuals as precontemplators, contemplators, or in the action stage according to their highest subscale score. Results described herein are geared toward the first two alternatives.

The Gambling Quantity and Perceived Norms Scale (GQPN, Appendix C) includes six items (items 4–9) assessing money spent gambling and was designed as a gambling quantity measure. Respondents are asked how much money they have won and lost from gambling over the previous month and year. Responses are coded on 10-point scales with anchors ranging from less than $5 to more than $1000 for wins and losses per month and $25 to more than $2000 for wins and losses per year. One item (item 1) measures disposable income and allows for statistical control of relevant income. The quantity scale is scored as the mean of the six expenditure items residualized on the disposable income item. The GQPN includes a single frequency item (item 2) with responses coded on a 10-point scale from "never" to "every day." The GQPN also includes a perceived norms scale (items 10–13), which was included for other purposes and is not discussed further.

The South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) is a widely used 20-item self-administered screening questionnaire designed to identify probable pathological gamblers. The SOGS correlates highly with the DSM-III-R and DSM-IV with demonstrated validity and reliability among university students (Beaudoin & Cox, 1999; Lesieur et al., 1991; Ladouceur et al., 1994). 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?" A score of five or more on the SOGS has been used to identify probable pathological gamblers. Previous researchers have identified individuals scoring three or four on the SOGS as sub-clinical problem gamblers (Dube et al., 1996; Lesiur et al., 1991; Volberg & Steadman, 1988). The SOGS also includes an item related to frequency of various types of gambling, from 0 (never) to once a week or more (2). 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.

The 20 Questions of Gamblers Anonymous (GA20) 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?" The GA20 was scored as the sum of endorsed items.

The Gambling Attitudes and Beliefs Scale (GABS; Breen & Zuckerman, 1999) assesses general attitudes toward gambling. The GABS focuses on cognitive factors related to gambling and

includes 35 items to which respondents report the extent to which they agree, from 1 (strongly disagree) to 4 (strongly agree). Sample items include "Some people can bring bad luck to other people," and "If I have lost my bets recently, my luck is bound to change." The GABS was scored as the mean of all items. Higher scores indicate pro-gambling attitudes and beliefs.

RESULTS

Gambling Prevalence

Table 1 presents overall, and by gender, means and standard deviations of gambling outcome measures. Problem gambling was consistently more evident among men than women. Using the SOGS to categorize gamblers as non-problem (SOGS < 3), sub-clinical problem (SOGS = 3 or 4), and probable pathological (SOGS = 5 or higher) revealed that men were more likely than women to be classified as probable pathological gamblers (10.78% vs. 3.75%; $\chi^2 = 10.70$, $p < 01$) but men and women did not differ in likelihood of being classified as sub-clinical problem gamblers (10.78% vs. 9.22%, $\chi^2 < 1$, $p = .55$).

Reliability and Validity

Gambling Quantity and Frequency—The gambling quantity subscale of the GQPN demonstrated good reliability (alpha = .89). The six quantity items (amount won and lost) loaded highly on a single factor (factor loadings ranged from .77 to .85) and accounted for 65.3% of the variance among these items. In order to control for differences in disposable income we residualized the mean of the six quantity items on the disposable income item. References to the gambling quantity measure refer to this residualized variable. Correlations with other gambling outcome measures ranged from .39 to .61 providing convergent validity for the gambling quantity measure. The gambling frequency item also demonstrated good convergent validity. Correlations with other gambling outcomes ranged from .30 to .54. The GQPN frequency item was moderately correlated with the SOGS frequency index and was similarly associated with other gambling outcome measures (see Table 2).

The Gambling Problem Index—The GPI was internally consistent (alpha = .84) and demonstrated good convergent validity. The GPI, like the RAPI upon which it was modeled, was conceptualized as a general index of problems manifested as a result of gambling behavior, hence we were primarily interested in testing the internal consistency of the instrument and less concerned with its specific factor structure. The GPI, however, displayed similar factor structure to the RAPI, with 6 factors having Eigenvalues above one, whereas the RAPI produced 5 factors with Eigenvalues above one. Convergent validity of the gambling problem index was established through correlations with other gambling outcome measures, which ranged from .39 to .61 (see Table 2).

The Gambling Readiness to Change Scale—Because the GRTC scale is only appropriate for measuring readiness to change among individuals who gamble at least moderately, and thus might have reason to change their gambling behavior, only individuals scoring three or higher on the SOGS were included in analyses of readiness to change.[1] In evaluating the reliability and validity of the GRTC, we began by testing the assumption that the three stages (precontemplation, contemplation, and action) were evident and distinguishable. Principal components analysis revealed strong support for a three-factor solution, with three factors having Eigenvalues above 1, accounting for 67.5% of the total

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[1]Individuals who do not gamble or who gamble nonproblematically would otherwise be incorrectly classified as precontemplators. Preliminary analyses revealed this to be true for 88.9% of the nonproblem gamblers in our sample. A cutoff of 3 has been previously used to identify subclinical or Level 2 gamblers (Shaffer et al., 1997), or individuals who have experienced some problems related to gambling but do not meet clinical thresholds (Dube et al., 1996; Lesieur et al., 1991; Volberg & Steadman, 1988).

variance (see Table 3). Rotated factor loadings (Varimax rotation) revealed that the contemplation items loaded strongly on Factor 1, the action items loaded on Factor 2, and the precontemplation items loaded on Factor 3 (see Table 4). None of the items exhibited cross-loadings greater than .35.

The GRTC scale demonstrated satisfactory reliability for the composite scale (alpha = .81), and each of the three subscales, with alphas of .64, .80, and .74 for precontemplation, contemplation, and action respectively. Convergent validity was established by examining correlations of the readiness to change composite, and each of its sub-scales with gambling outcome measures. Alpha levels were adjusted for multiple comparisons using Bonferroni correction. As expected, results suggested a simplex structure with more problematic gambling associated with greater readiness to change one's gambling behavior (see Table 5).

DISCUSSION

The present study was designed to introduce and validate three gambling outcome measures the Gambling Quantity and Perceived Norms (GQPN), the Gambling Problem Index (GPI), and the Gambling Readiness To Change Questionnaire (GRTC). In pursuit of this objective we examined the psychometric properties of the GPI, the GRTC, and the quantity subscale of the GQPN. Each of these measures demonstrated good reliability and convergent validity.

The GPI, like the RAPI in alcohol research, measures the incidence of specific consequences related to gambling. In addition to its potential service as a gambling outcome measure, we believe that it can be used, as the RAPI has been, as a source of information in brief interventions. Among the components typically included in successful brief alcohol interventions (Marlatt et al., 1998; Dimeff et al., 1999) is personalized feedback delivered in a non-threatening way consistent with motivational interviewing (Miller & Rollnick, 1991). This feedback is used, in part, to bring awareness to the individual, of the consequences of his/her behavior. We feel that the GPI can be used as one excellent source for generating such feedback for gambling interventions.

Similarly, the GRTC is modeled after the RTC measure, which has been used successfully in alcohol studies. The stages of change model (Prochaska & DiClemente; 1986) describes several stages which individuals typically go through in changing addictive behaviors such as smoking and alcohol use. Among the benefits of applying this perspective to gambling is that it incorporates an individuals motivation in understanding his/her behavior. Moving from a precontemplative stage to a contemplative stage can be seen as progress, even in the absence of behavior change. Further, in both secondary prevention and treatment, disregarding an individual's readiness to change can undermine intervention efficacy and perhaps even reduce likelihood of behavior change. For example, offering suggestions for changing one's behavior is not appropriate if the individual is in the precontemplative stage and has not acknowledged a need for behavior change (Miller & Rollnick, 1991). The GRTC can be used as both an outcome measure, with movement from precontemplation to contemplation and from contemplation to action being seen as improvement, and as a means of evaluating readiness to change one's gambling behavior.

The GQPN also shows great potential. The single frequency item was generally comparable to the SOGS frequency index. The quantity subscale appears especially promising. As noted by other researchers, (e.g., Blaszczynski et al., 1997) previous measures of gambling outcomes have suffered from at least two problems. First, many of these measures simply ask individuals how much money they have spent on gambling in a given amount of time, leaving ambiguous whether this expenditure includes only money lost that was intended to be spent or whether gambling wins that are subsequently lost are counted as expenditure. Our measure, rather than

simply asking respondents how much they spent, asks more specifically the amount of money lost and won gambling. That these items loaded on a single factor suggests that the amount of money with which one gambles, regardless of the outcome, is a unitary construct that can be reliably measured. A second criticism of existing gambling quantity/expenditure measures is that they do not account for income differences. Clearly, a loss of $100 dollars to a person with a six-figure income is less consequential than to a person struggling to remain above the poverty level. We have gone a step further and suggest that overall income is less relevant than disposable income in determining the impact of wins and losses. We suggest, for example, that the same income, which provides a pleasurable lifestyle for a single individual, may be inadequate to support a family of six, and that disposable income is the more relevant figure. Our measure allows for statistical control of this important difference by including an item measuring disposable income.

In sum, our results support the reliability and validity of all three of these measures and we believe that subsequent research on gambling etiology, prevention, and treatment can benefit by their use. Care should be exercised, however, as a number of limitations to this research are evident. First, our results were based on self-report measures rather than observations of actual behavior. Correlations among measures are likely to be inflated by shared method variance and a cognitive bias to appear consistent when filling out questionnaires. In addition, as with all self-report measures, there is the risk of under-reporting problem behaviors, which we attempted to address by emphasizing to participants that all responses were completely anonymous and that no one would ever know how they personally responded to any of the items included. Another limitation relates to our sample, which was comprised entirely of undergraduate college students. While we were specifically interested in college students, given that individuals in the college age range have shown the highest levels of problem gambling versus any other cohort, it must be noted that our findings may not generalize to other populations. Also, in this study we recruited only students who reported having gambled at least once in their lives, which likely resulted in greater prevalence of problem gambling than would have otherwise been indicated. An additional limitation concerns the cross-sectional nature of our data, which, as with any cross-sectional design, leaves ambiguities in any causal inferences based on the data.

We foresee a number of potentially fruitful avenues for future research based on our results. First, examination of reliability and validity of the proposed measures in this study among other populations would provide additional confidence in their use. In addition, while these measures were shown to be internally consistent, future research examining consistency over time would lend additional credibility to these measures. Second, the high prevalence of at-risk and probable pathological gamblers in our sample, which is generally consistent with previous prevalence estimates in college populations (e.g., Lesieur et al., 1991), suggests the need for increased attention concerning gambling behavior in this population. It is unfortunate that there has yet to be published, to our knowledge, a single empirical study aimed at indicated prevention of problematic gambling, despite the fact such interventions addressing diagnostically similar behaviors are relatively common in this population and could likely be readily adapted to address problem gambling. Longitudinal research of gambling behavior, among all populations, including college students, is apropos and would help in establishing a developmental understanding of problematic gambling behavior. In addition, while several risk factors for problem gambling have been identified (e.g., parental history, early onset, problem drinking), most research has been cross-sectional, leaving open many plausible rival hypotheses including third variable explanations. Gambling research remains a relatively new frontier. The research presented herein reflects an effort to further the development of valid measures of this understudied behavior.

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Appendix A Gambling Problem Index

How many times did the following things happen to you while you were gambling or because of your gambling during the **last 6 months**? Circle the number corresponding to you answer.

	Never	*One to Two Times*	*Three to Five Times*	*Six to Ten Times*	*More Than Ten Times*
1. Not able to do your homework or study for a test?	1	2	3	4	5
2. Got into fights, acted badly, or did mean things?	1	2	3	4	5
3. Missed out on other things because you spent too much money on gambling?	1	2	3	4	5
4. Caused shame or embarrassment to someone?	1	2	3	4	5
5. Neglected your responsibilities?	1	2	3	4	5
6. A relative avoided you?	1	2	3	4	5
7. Felt that you needed to gamble more frequently or place higher wagers than you used to use in order to get the same effect?	1	2	3	4	5
8. Tried to control your gambling by trying to gamble only at certain times of the day or in certain places?	1	2	3	4	5
9. Had withdrawal symptoms, that is, felt sick or irritable because you stopped or cut down on gambling?	1	2	3	4	5
10. Noticed a change in your personality?	1	2	3	4	5

	Never	One to Two Times	Three to Five Times	Six to Ten Times	More Than Ten Times
11. Felt that you had a problem with gambling?	1	2	3	4	5
12. Missed a day (or part of a day) of school or work?	1	2	3	4	5
13. Tried to cut down or quit gambling?	1	2	3	4	5
14. Had a fight, argument, or bad feelings with a friend?	1	2	3	4	5
15. Had a fight, argument, or bad feelings with a family member?	1	2	3	4	5
16. Kept gambling when you promised yourself not to?	1	2	3	4	5
17. Felt you were going crazy?	1	2	3	4	5
18. Had a bad time?	1	2	3	4	5
19. Felt physically or psychologically dependent?	1	2	3	4	5
20. Was told by a friend or neighbor to stop or cut down gambling?	1	2	3	4	5

Appendix B Gambling Readiness to Change Questionnaire

The following questionnaire is designed to identify how you personally feel about your gambling right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements. Please mark the answer of your choice to each question according to the following scale.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree

_____1. I enjoy my gambling, but sometimes I gamble too much.
_____2. Sometimes I think I should cut down on my gambling.
_____3. It's a waste of time thinking about my gambling.
_____4. I have just recently changed my gambling habits.
_____5. Anyone can talk about wanting to do something about gambling, but I am actually doing something about it.
_____6. My gambling is a problem sometimes.
_____7. There is no need for me to think about changing my gambling.
_____8. I am actually changing my gambling habits right now.
_____9. Gambling less would be pointless for me.

Appendix C Gambling Quantity & Perceived Norms

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 times 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 times 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 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

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

Table 1

Means and Standard Deviations for Gambling Outcomes

	Overall (n = 560)	*Men (n = 204)*	*Women (n = 347)*
SOGS	1.29 (1.81)	1.67 (2.14)	1.06 (1.56)
GA20	2.53 (2.43)	3.07 (2.50)	2.23 (2.37)
SOGS Freq	0.58 (0.29)	0.67 (0.30)	0.53 (0.27)
GABS	2.27 (0.38)	2.36 (0.38)	2.22 (0.38)
Quantity	1.66 (0.95)	1.83 (1.06)	1.42 (0.84)
GQPN Freq	3.32 (1.29)	3.77 (1.38)	3.05 (1.17)
GPI	1.58 (2.77)	2.19 (2.98)	1.34 (2.61)

Note: SOGS refers to the South Oaks Gambling Screen. GA20 refers to the Gamblers Anonymous 20 Questions. SOGS Freq refers to the SOGS frequency index. GABS refers to the Gambling Attitudes and Beliefs Scale. GQPN Freq refers to the frequency item on the GQPN. GPI refers to Gambling Problems Index. Standard deviations are in parentheses. All gender differences were significant at $p < .001$.

Table 2

Convergent Validity: Correlations Among Gambling Outcome Indices

	SOGS	*GA20*	*SOGS Freq*	*GABS*	*Quantity*	*GQPN Freq*	*GPI*
SOGS	—	.55	.30	.35	.58	.30	.42
GA20	.55	—	.43	.56	.61	.44	.52
SOGS Freq	.30	.43	—	.41	.39	.42	.46
GABS	.35	.56	.41	—	.47	.36	.35
Quantity	.58	.61	.39	.47	—	.54	.48
GQPN Freq	.30	.44	.42	.36	.54	—	.36
GPI	.42	.52	.46	.35	.48	.36	—

Note. N's ranged from 554 to 560 depending on missing data. SOGS refers to the South Oaks Gambling Screen. GA20 refers to the Gamblers Anonymous 20 Questions. SOGS Freq refers to the SOGS frequency index. GABS refers to the Gambling Attitudes and Beliefs Scale. GQPN Freq refers to the frequency item on the GQPN. GPI refers to Gambling Problems Index. All correlations are significant at $p < .0001$.

Table 3

Principal Components of Gambling Readiness to Change

Factor Number	Eigenvalue	Explained Variance	Cumulative Variance
1	3.77 (2.20)	41.9% (24.4%)	41.9% (24.4%)
2	1.29 (2.02)	14.3% (22.4%)	56.2% (46.8%)
3	1.01 (1.85)	11.2% (20.6%)	67.5% (67.5%)

Note. Varimax rotated values are in parentheses.

Table 4

Rotated Factor Loadings for Gambling Readiness to Change

Item	Factor 1	Factor 2	Factor 3
I enjoy my gambling, but sometimes I gamble too much. (1)	.90*	.13	−.12
Sometimes I think I should cut down on my gambling. (2)	.80*	.23	−.17
My gambling is a problem sometimes. (6)	.72*	.30	−.19
I am actually changing my gambling habits right now. (8)	.14	.80*	−.18
Anyone can talk about wanting to do something about gambling, but I am actually doing something about it. (5)	.25	.82*	.05
I have just recently changed my gambling habits. (4)	.26	.69*	−.33
Gambling less would be pointless for me. (9)	−.09	−.04	.84*
There is no need for me to think about changing my gambling. (7)	−.25	−.22	.76*
It's a waste of time thinking about my gambling. (3)	−.09	−.16	.59*

Note. Factor 1 = contemplation; Factor 2 = Action, Factor 3 = Precontemplation; item numbers are displayed in parentheses.

*Indicates loadings above .35.

Convergent Validity: Correlations with Readiness to Change

Measure	Readiness to Change			
	Composite	Precontemplation	Contemplation	Action
SOGS	.45	−.22	.33	.46
GA20	.54	−.18	.41	.57
SOGS Freq	.31	−.09	.22	.33
GABS	.51	−.19	.41	.52
Quantity	.49	−.30	.37	.47
GQPN Freq	.40	−.17	.11	.50
GPI	.51	−.18	.38	.54

Note. Sample included 90 participants scoring 3 or higher on the SOGS. SOGS refers to the South Oaks Gambling Screen. GA20 refers to the Gamblers Anonymous 20 Questions. SOGS Freq refers to the SOGS frequency index. GABS refers to the Gambling Attitudes and Beliefs Scale. GQPN Freq refers to the frequency item on the GQPN. GPI refers to Gambling Problems Index. Alpha levels were set at .002 based on Bonferroni correction, thus correlations above .31 can be considered statistically significant.