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College Student Beliefs About Wagering: An Evaluation of the Adolescent Gambling Expectancies Survey

Meredith K. Ginley[a], **James P. Whelan**[a], **George E. Relyea**[b], **Jessica L. Simmons**[a], **Andrew W. Meyers**[a], and **Godfrey D. Pearlson**[c,d]

James P. Whelan: jwhelan@memphis.edu; George E. Relyea: grelyea@memphis.edu; Jessica L. Simmons: jsimmns1@memphis.edu; Andrew W. Meyers: ameyers@memphis.edu; Godfrey D. Pearlson: godfrey.pearlson@yale.edu

[a]Department of Psychology, University of Memphis, Memphis, TN, 38152

[b]School of Public Health, University of Memphis, Memphis, TN 38152

[c]Olin Neuropsychiatry Research Center, Hartford Hospital, 200 Retreat Ave, Hartford, CT, 06106

[d]Departments of Psychiatry and Neurobiology, Yale University School of Medicine, New Haven, CT, 06511

Abstract

Expectancy theory posits that decisions to engage in a given behavior are closely tied to expectations of the outcome of that behavior. Gambling outcome expectancies have predicted adolescent gambling and gambling problems. When high school students' outcome expectancies were measured by Wickwire, Whelan and Meyers (2010), the Adolescent Gambling Expectancy Survey (AGES) revealed five categories of expectancies that were each predictive of gambling frequency and pathology. The present study aimed to explore if the AGES could be successfully replicated with college students. When administered to a diverse college student population, factor analyses identified five factors similar to those found in the high school sample. Several factors of the AGES were also found to predict gambling frequency and gambling problems for college students. Gambling frequency and gambling activity preference were also addressed.

Keywords

college student gambling; outcome expectancies

Expectancy theory proposes that the decision to behave is related to the expected result or outcome of that behavior (e.g., Jones, Corbin, & Fromme, 2001). Consistent with this theory, high school students' gambling and problematic gambling have been predicted by the gambling outcome expectancies held by these students (Gillespie, Derevensky, & Gupta, 2007a, 2007b; Wickwire, Whelan, & Meyers, 2010). This same finding has received preliminary support in college students (Fischer & Smith, 2012). To better understand this relation in college students, a comprehensive measure of outcome expectancies is needed. Wickwire, Whelan, and Meyers (2010) developed a measure of gambling outcome

Correspondence concerning this article should be addressed to: Meredith K. Ginley, mkginley@memphis.edu, Department of Psychology, University of Memphis, Memphis, TN, 38152, Phone: 508-241-2862, Fax: 901-678-4518.

expectancies with high school students that revealed five categories. The current study explored the applicability of this measure with college students.

In the broader field of addictions, outcome expectancies have been robust predictors of adolescent risk taking, including alcohol (e.g., Fromme & D'Amico, 2000), tobacco (e.g., Schleicher, Harris, Catley, & Golbeck, 2008), and illicit drug use (e.g. Aarons, Brown, Stice & Coe, 2001). Moreover, modifying expectancies has been shown to reduce such behaviors (e.g., Botvin, Baker, Dusenbury, Tortu & Botvin, 1990; Darkes & Goldman, 1993, 1998; Dunn, Lau, & Cruz, 2000). For a given target behavior, outcome expectancies include positive and negative general expectancies (e.g., increased sociability) as well as expectancies specific to a target behavior. These patterns are found when measuring outcome expectancies for both high school and college students (e.g. Bohne, 2010; Businelle et al., 2009; Neighbors, Geisner, & Lee, 2008).

Wickwire and colleagues (2010) developed the Adolescent Gambling Expectancies Survey (AGES) using a large sample of urban high school students. Using two standard methodologies from the expectancy literature, a sample of high school students were asked to report what they thought would happen if they gambled. Next, 50 outcome expectancy items that used a bipolar endpoint and a neutral midpoint were developed. An exploratory factor analysis was completed that supported retaining 24 items, each significantly associated with one of five categories of outcome expectancies. A subsequent confirmatory factor analysis supported the five expectancy factors. These factors were material gain/loss, self-evaluation, affect, social consequences, and parental disapproval. A structural model evaluated how these factors related to gambling frequency and level of symptomatic gambling. Affect, social consequences and parental disapproval were found to be negatively related to both frequency and symptomology. Material gain/loss and self-evaluation displayed positive relations to these dependent variables. The combined expectancies predicted the majority of the variance in gambling frequency and about half the variance in gambling problems.

It is not yet known if the AGES factors are predictive of college student gambling. There are several reasons why the measure might not replicate with college samples. First, the demographics of college students and high school students are different (US Census, 2008). Second, the parental and peer factors that influence high school students change in college. Parental influence on risk taking behaviors appears to wane once the adolescent enters college (e.g., Arria et al., 2008; Wetherill, Neal, & Fromme, 2007). Peer influence predicts alcohol consumption in college, while parental influence is no longer a direct predictor (Abar & Turrisi, 2008). A third reason why the AGES may not replicate in a college sample is that, for this population, some forms of gambling become legally accessible. For these reasons the AGES factors and their ability to predict high school students' gambling behavior needs to be replicated with college students.

The purpose of this study was to explore whether the AGES factor structure would be replicated in a diverse sample of college students. The project also evaluated if the AGES factors were related to the gambling frequency and gambling symptomology of college students.

Methods

Participants

Recruitment was completed at two public universities and one private college (*n* = 421). Participants were included in the study if they were between 18 and 25 years of age (M_{age} = 19.4, *SD* = 1.68). The sample was 55.2% female (*n* = 227). These individuals placed themselves in the following ethnic and racial categories: 57.7% Caucasian, 30.4% African American, 3.4% Hispanic, 2.7% Asian, 0.5% American Indian, 5.3% other.

Measures

Demographic Questionnaire—Participants completed a demographics questionnaire that asked about age, gender, race, ethnicity, and family history of gambling problems.

National Opinion Research Center Diagnosis Screen (NODS)—The NODS (Toce-Gerstein, Gerstein, & Volberg, 2003) assesses the diagnostic criteria for Pathological Gambling and was found to be sensitive for identifying pathological gambling in individuals older than 17 years (Toce-Gerstein, Gerstein & Volberg, 2003). The total score places respondents into the following categories: 0 to 2, no gambling problems; 3 to 4, at-risk pathological gambling; 5 or greater, pathological gambling. Given the low base rate for pathological gambling on this scale, a continuous gambling symptomology variable was created from the NODS total score. Non-gamblers and gamblers experiencing no adverse symptoms of gambling score a zero, while symptomatic gamblers were scored from 1 to 10 based on their endorsement of specific problems related to gambling. Among individuals seeking gambling problem treatment, the NODS' internal reliability was 0.79 and test-retest reliability was 0.98. The NODS detects problem gambling in 95% of individuals receiving treatment for problem gambling (Hodgins, 2004).

Gambling Frequency Measure—The South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) is the most widely used measure of gambling involvement (Volberg & Banks, 1990). The SOGS begins with a table of items to assess involvement in nine gambling activities. We expanded the original SOGS frequency table to indicate for each activity whether the participant gambled: not at all, a few times a year, about once a month, about once a week, a few times per week, or almost daily. Gambling frequencies for each activity and total gambling frequency scores were calculated. Participants not responding to any gambling frequency item were scored a “Not at all” for that item.

Adolescent Gambling Expectancy Survey (AGES)—The AGES (Wickwire et al., 2010) was developed to assess adolescents' expectancies for the outcome of gambling. Item responses are in a bipolar format with two negative response options, a neutral response option, and two positive response options. Factor analyses show the outcome expectancies fall into five measureable domains: material gain/loss, self-evaluation, affect, social consequences, and parental disapproval. In a sample of adolescents, the AGES factors have had an internal consistency from .70 to .80 and a two-week test-retest reliability from .54 to .76 (Wickwire et al., 2010).

Procedure

The Institutional Review Boards of each university reviewed and approved the protocol. All participants were provided with informed consent materials that emphasized the voluntary nature of participation and steps that would be taken to ensure confidentiality of responses. Those providing consent were then administered the assessment packet.

Data collection procedures varied by site. At one university, participants were recruited from the undergraduate subject pool. They completed the survey questionnaires in an online format for course credit. At the other two institutions, students completed the measures as part of a large, general data collection (BARCS: RO1 AA016599 and RC1 AA019036 to Dr. Godfrey Pearlson; for complete description see Dager et al., 2012). These participants completed the questionnaire in paper and pencil form and were paid $20 per hour for the data-gathering session.

Results

Missing Data

Few AGES items were left blank (<1%). Missing items were determined to be missing at random and the neutral response option (e.g. "Not good or bad") was imputed for any missing item. Nonresponses on the frequency and symptomatology items (<1%) were not added into individual sum scores or included in the frequency computations. The data imputation allowed for 411 participants to be included in the analysis.

Gambling Behavior

Past year gambling involvement was reported by 60% of the sample (n = 246). Participants reported engaging in a variety of gambling activities (see Table 1), with lottery or scratch ticket purchases being the most common (42.1 %, n = 173). Men were more likely than women to have placed a bet in the past year ($\chi^2(1, n = 411) = 6.37, p < .05$). Males also reported gambling at a significantly higher frequency than females, $t(402) = 4.18, p < .05$. Minority and non-minority participants did not report different rates of gambling abstinence, nor did they report significantly different rates of gambling frequency. Approximately 10% (n = 40) reported having a parent with a history of gambling problems.

Based on the NODS, the majority of the sample (91%; n = 374) was classified as non-problem gamblers, and 9% (n = 37) of participants were symptomatic gamblers. Approximately 15% of the male sample reported adverse symptoms from gambling (n = 27), whereas only 4% of the female sample reported adverse symptoms from gambling (n = 9). Men were significantly more likely to have experienced negative symptoms from their gambling than women, χ^2 $(3, n = 411) = 18.39, p < .05$. Ethnic minority and non-minority participants did not differ on their experiences of negative gambling symptomology.

Factor Structure of Expectancy Measures

To obtain a simple oblique factor structure a Maxplane rotation procedure (Cattell & Muerle, 1960; Eber, 1968) was conducted. Beginning with an orthogonal Varimax rotation using principal axis factoring extraction, a Maxplane rotation program was employed to maximize the number of loadings or projections in the hyperplanes so that a more simple structure was obtained. The reference vector structure produced a five-factor solution (eigenvalues > 1) that concluded the simplest Maxplane factor pattern structure yielding an 82 hyperplane count (proportion 68.33). Upon review of the factor structure, item 4 ("If I were to gamble I would ___ get caught") was removed from further analyses due to weak split loadings across all factors. See Table 2.

To verify the factor structure, the overall fit of the Maxplane model was evaluated using confirmatory factor analysis.[1] The five-factor structure was cross-validated using the standardized loadings. Factors were allowed to correlate. Although the model indicated some differences in the factor structure (χ^2 (df = 218) = 766.9, p <.001), factor loading direction and relative magnitude were confirmed for all subscales. In addition, all error variances were greater than zero, and the goodness of fit statistic indicated a good model fit, GFI = 0.861. The ratio of chi-square model fit to its degrees of freedom indicated an acceptable model fit. The Mardia based multivariate kappa (Bollen, 1982; Browne, 1982) was determined to be acceptable (kappa = 0.51).

To assess the stability of this five factor solution, nonparametric bootstrap analyses were performed (as described by Efron & Tibshirani, 1993). Four hundred full replacement bootstrap samples were produced and CFA were performed on each sample. Nonparametric bootstrap standardized loadings with bias corrected 95% confidence intervals were simulated to measure the accuracy of the confirmatory factor analysis standard scores and to determine if errors in model fit were due to sample specific error variance. The findings indicated good stability of the original standardized confirmatory factor loadings. See Table 3.

Most items from the original validation high school student sample loaded on the same factors in the college student sample. Affect retained all items from the original validation. Material gain/loss also showed good stability, but picked up several items that loaded on other factors for the high school sample, specifically AGES 5 and AGES 11 from social consequences and AGES 12 from self-evaluation. The only other item to change factors was the second AGES item. This item had strongly loaded on parental disapproval for the original sample, but split loaded on parental disapproval and self-evaluation factors for the college student sample. The confirmatory factor analysis placed item 2 on the self-evaluation factor for model fit improvement.

Outcome Expectancy and Gambling

To examine the relation between the expectancy factors and gambling behavior, factors scores were calculated by summing the scores of the items loading on each factor. A positive correlation was found between gambling frequency and affect, r = 0.18, p < .05, self-evaluation, r = 0.23, p < .05, material gain, r = 0.26, p < .05, and parental disapproval, r = 0.15 p < .05. Positive correlations were also found between the NODS symptomatology score and the factor of parental disapproval, r = .10 p < .05.

[1]Proc TCALIS in SAS/STAT (SAS Institute, 2008) was used to conduct this analysis.

The overall model of the five expectancy factors was then entered into a regression model that was found to significantly predict gambling frequency, $R^2 = 0.10$, $F(5, 405) = 8.56$, $p < .05$. A closer examination of how the individual factors contributed to the model indicated that self-evaluation, $b = 0.31$, $t(410) = 3.37$, $p < .05$, social consequences, $b = -0.11$, $t(410) = -2.11$, $p < .05$, and material gain/loss, $b = 0.18$, $t(410) = 2.66$ were significantly loading in the model.

Similarly, the overall model of the five expectancy factors was entered into a regression model that significantly predicted gambling symptomology $R^2 = 0.05$, $F(5, 405) = 4.26$, $p < .05$. A closer examination of the individual factors revealed that self-evaluation, $b = 0.35$, $t(410) = 3.72$, $p < .05$ and social consequences $b = -0.12$, $t(410) = -2.20$, $p < .05$ both significantly contributed to the model.

Discussion

The present study sought to investigate if a gambling outcome expectancies measure that had been developed with an urban adolescent sample (Wickwire et al., 2010) could be used with college students. The results showed that the five factors identified by Wickwire and colleagues (2010) were largely replicated in a college student sample, however, the relation between these factors and both gambling frequency and symptomatology was not as strong as they had been shown for the adolescent sample.

To evaluate if AGES would replicate in a college student sample, the present study intentionally collected data from a very different population than the initial validation sample. The Wickwire study sample were predominately African Americans (78.9%) attending urban public high schools that have a graduation rate of approximately 51% (Burgette, King, Lee & Park, 2011) while the current study's participants were college students. Remarkably, the factor structure for gambling outcome expectancies was found to be similar across populations. Only one high school expectancy item failed to load significantly for the college student sample, and three additional items switched factors. Statistical procedures to confirm the stability of the five-factor model in this population indicated the factor model of adolescent gambling outcome expectancies was nearly identical for college students.

These findings suggest that the categories of expectancies for gambling among high school students may still be pertinent and meaningful in a similar clustering pattern for college students. The literature has repeatedly shown that college students' positive and negative expectancies influence alcohol consumption (Demmel & Hagen, 2003, Westmaas, Moeller & Woicik, 2007), drug use (Boys et al., 1999, Businelle, Kendzor, Rash, Patterson & Copeland, 2009), and smoking (Businelle et al., 2009). Positive and negative expectancies of gambling involvement may also predict gambling behavior.

The two factors contributing to the largest amount of variance for the college student sample were affect and self-evaluation. Both factors retained all of the items from the initial high school sample validation, with the self-evaluation factor gaining an additional item. In both samples, positive and negative affective expectations correlated with increased gambling frequency. However, only expectations of positive affective experiences correlated with increased gambling symptomatology in the college sample. Wickwire and colleagues (2010) hypothesized that both positive and negative affective expectancies may correspond to increased gambling frequency because there is a general emotional affective experience that attracts adolescents to engage in gambling (Gillespie et al., 2007b; Stewart, Zack, Collins & Klien, 2008). This general affect changing experience of gambling seems to have a similar, albeit statistically weaker correlation in college students. The finding that only positive affective expectancies are significantly correlated with gambling symptomatology has been consistently shown in the alcohol expectancy literature in this population (Westmaas et al., 2007).

In both samples, expectancies of social consequences displayed a negative relation to both gambling frequency and gambling symptomatology. Specifically, expecting negative social consequences was related to more frequent gambling and reports of greater symptoms. These findings are in contrast to results in the alcohol expectancy literature where perceived negative social consequences limit drinking involvement (Bohne, 2010).

Expectations of material gain/loss were found to positively correspond to gambling frequency for both high school and college students. The relation between material gain and symptomatology, by contrast, was only found in the high school sample. It is noteworthy that expectancies of physical danger shifted to this factor for the college students. This finding could be due to the fact that college students reported betting in ways that were legal and more socially acceptable for their age. As such, the dangerous aspects of illegal gambling the adolescents engaged in may be less salient. Alternatively, perception of physical danger may be better conceptualized as a material loss for college students.

While the item loadings remained largely consistent, parent disapproval contributed markedly less variance to the overall factor structure for the college students than for the high school students. These findings are consistent with previous research investigating the fading role of parental influence after students' transition to college (Abar & Turrisi, 2008; Wetherill et al., 2009). Specifically, regression models for the factor structure's prediction of gambling symptomatology and frequency suggest all of the predictive variance of parental disapproval is better accounted for by one of the other four factors.

The predictive differences of outcome expectancies for the college student was significantly weaker than had been found in high school student samples. This may simply reflect the demographic differences between the two samples. Findings within the alcohol literature suggest that outcome expectancies may be less influential for older, versus younger, adolescents. In this literature expectancies have been shown to increase, then stabilize and eventually decrease over young adulthood (Sher, Wood, Wood, & Raskin, 1996). Longitudinal research would be needed to understand how role transitions, the opportunity to gamble legally, and increased financial obligations might influence the relation between outcome expectations and gambling behavior across these age groups. Perhaps the AGES in its present form may be missing important expectancies that have become specifically salient for college students. Peer relations, gambling motives, or involvement in other risky health behaviors may have a more influential role in the decision to gamble.

While providing strong psychometrics for AGES, this study also has several limitations. First, the study is correlational, making it impossible to specify the interaction between expectations and behavior over time. Additionally, expectancies developed using a high school sample were presented to college students without modification. If college student responses had been used to develop the measure, different results may have been found. The reduced amount of explained variance could be due to insufficient presentation of expectancies, a shift in the salience of expectancies, the low symptomatology rates, or other sample differences.

However, despite significant differences in sampling, the stability of the factors suggests a good starting point for future investigations of college student expectancies and gambling. In order to assess the utility of expectancies as predictors of college student gambling risk behaviors, it will be important to test other gambling risk predictors in future research. Future research with larger samples and more symptomatic gamblers would also allow for more precise investigation of how expectancies may change across demographics as has been explored in the alcohol literature. Longitudinal research projects aimed at identifying expectancies for gamblers and non-gamblers and how these expectancies truly predict future gambling risk will also prove valuable.

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Table 1

Frequency of Past Year Gambling Involvement (n =411)

	Not at all		A few times a year		About once a month		About once a week		A few times per week		Almost daily	
Activity	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Cards	306	75.0	91	22.3	10	2.5	1	0.2	0	0	0	0
Animals	383	93.2	19	4.6	7	1.7	2	0.5	0	0	0	0
Sports	309	75.2	76	18.5	16	3.9	7	1.7	2	0.5	1	0.2
Dice	371	90.3	27	6.6	8	1.9	2	0.5	2	0.5	1	0.2
Lottery	238	57.9	122	29.7	28	6.8	18	4.4	4	1.0	1	0.5
Bingo	389	94.6	15	3.6	3	0.7	3	0.7	1	0.2	0	0
Stock Market	379	92.2	22	5.4	3	0.7	4	1.0	1	0.2	0	0
Slots	354	86.1	44	10.7	5	1.2	6	1.5	1	0.2	0	0
Games of Skill	304	74.0	76	18.5	18	4.4	5	1.2	6	1.5	1	0.2

Note. Participants who failed to indicate the frequency of which they gambled for an activity were excluded from the frequency count by item.

Table 2

Maxplane solution factor pattern for the exploratory factor analysis (n=411)

Item	Affect	Self-evaluation	Social Consequences	Material Gain / Loss	Parental Disproval
AGEQ 1	.29	.00	.07	**.42**	.20
AGEQ 2	.14	**.67**	.17	.16	.84
AGEQ 3	.49	**.54**	.03	.09	.09
AGEQ 5	.04	.16	.34	**.62**	.05
AGEQ 6	.13	.07	.02	**.54**	.09
AGEQ 7	.05	.05	.24	**.68**	.18
AGEQ 8	.02	.12	.00	**.71**	.17
AGEQ 9	.11	.07	.09	.05	**.80**
AGEQ 10	.14	.11	.02	**.89**	.12
AGEQ 11	.01	.48	.23	**.57**	.48
AGEQ 12	.24	**.63**	.03	.24	.20
AGEQ 13	**.74**	.17	.05	.01	.01
AGEQ 14	.03	**.46**	.06	.00	.07
AGEQ 15	**.83**	.08	.03	.01	.12
AGEQ 16	**.67**	.02	.03	.02	.04
AGEQ 17	.55	**.46**	.03	.17	.14
AGEQ 18	**.90**	.06	.07	.14	.03
AGEQ 19	.06	**.50**	.10	.17	.02
AGEQ 20	**.75**	.03	.00	.07	.06
AGEQ 21	.03	.15	.05	.15	**.80**
AGEQ 22	**.72**	.15	.04	.10	.17
AGEQ 23	.09	.11	**.60**	.00	.17
AGEQ 24	.00	.15	**.61**	.11	.20

Table 3

Confirmatory Factor Loadings with nonparametric bootstrap loadings (95% CI)

Item	Standardized CFA Loadings	Bootstrap Standardized Loadings	Lower 95% CI	Upper 95% CI
AGEQ 1	.50	.50	.40	.59
AGEQ 2	.53	.53	.42	.63
AGEQ 3	.71	.71	.62	.78
AGEQ 5	.50	.51	.43	.61
AGEQ 6	.67	.67	.58	.73
AGEQ 7	.52	.52	.43	.60
AGEQ 8	.81	.81	.76	.85
AGEQ 9	.84	.84	.75	.90
AGEQ 10	.79	.78	.73	.83
AGEQ 11	.58	.57	.46	.65
AGEQ 12	.73	.74	.64	.80
AGEQ 13	.80	.80	.70	.85
AGEQ 14	.70	.70	.60	.77
AGEQ 15	.87	.87	.82	.90
AGEQ 16	.61	.60	.47	.73
AGEQ 17	.83	.83	.77	.88
AGEQ 18	.78	.77	.71	.85
AGEQ 19	.60	.60	.49	.68
AGEQ 20	.76	.76	.68	.83
AGEQ 21	.85	.85	.77	.90
AGEQ 22	.84	.84	.77	.88
AGEQ 23	.71	.71	.58	.83
AGEQ 24	.86	.87	.73	.98