

Internet Poker: Examining Motivations, Behaviors, Outcomes, and Player Traits using Structural Equations Analysis

Michael D. Smith, Matthew C. Rousu, & Paul Dion

Susquehanna University, Selinsgrove, Pennsylvania, USA
Email: smithmichaeld@susqu.edu

Abstract

Hypotheses explaining outcomes from internet poker were tested by using structural equations modeling: Personal characteristics and traits were proposed to influence motivation, leading to gaming behavior and then to outcomes. One hundred ninety-four participants from an internet poker forum completed online assessment. Three separate outcomes were supported: social-emotional gains, monetary winnings/losses, and negative experiences. One third of the participants reported some negative outcomes and 12% said these were significant; two thirds indicated no negative outcomes. Problems were most linked to the trait of Neuroticism, younger age, and more hours played, but unrelated to amounts won or lost. Gaming for social-emotional benefits mediated fewer negative outcomes. Financial gain motivation was a key mediator for gaming behavior. Findings were consistent with research showing negative emotionality and youth to be associated with poor gambling outcomes. The model suggests concrete actions that can be taken to minimize problem gaming while maximizing healthier involvement with online poker.

Résumé

Diverses hypothèses concernant les effets des jeux de poker en ligne ont été mises à l'épreuve au moyen d'une modélisation par équation structurelle : il a été proposé que différents traits de personnalité influencent la motivation au jeu, la décision de jouer et enfin les effets du jeu. Un nombre de 194 participants à un forum internet sur le poker ont rempli un formulaire d'évaluation en ligne. Trois types distincts d'effets ont été observés : des gains socio-affectifs, des pertes ou des gains en argent, et des expériences négatives. Un tiers des participants ont indiqué avoir subi des effets négatifs et 12 % que ces effets négatifs étaient importants. Les deux autres tiers ont dit n'avoir subi aucun effet négatif. Les problèmes étaient majoritairement liés au névrosisme, à un jeune âge et à un nombre d'heures de jeu plus important, mais étaient sans lien avec les sommes perdues ou gagnées. Jouer dans le but d'en tirer un

avantage de nature socio-affective a donné lieu à moins d'effets négatifs, tandis que la motivation liée à la perspective d'un gain financier s'est révélée être un médiateur essentiel des comportements associés au jeu. Les conclusions de l'étude concordent avec les recherches qui montrent qu'un état affectif dépressif et un jeune âge sont associés aux effets négatifs que peut entraîner le jeu. Ce modèle permet de croire qu'il est possible de prendre des mesures pour minimiser les problèmes de jeu tout en favorisant de façon optimale une saine participation aux jeux de poker en ligne.

Introduction

Playing poker on the internet represents one of the most popular online gaming activities, the growth of which may coincide with (a) substantially increased availability of casino table gaming across much of North America (Wood & Williams, 2007) and (b) popularization of poker playing itself on television, in films, and through any number of online media (Bradley & Schroeder, 2009). Although the numbers of people participating in online poker can be difficult to estimate, one of the most popular internet poker rooms (i.e., www.pokerstars.com) typically reports 200,000 concurrent players on Sunday, its busiest day of the week (Pokerstars, 2009). Even though Pokerstars might represent the most frequented internet poker room, it is certainly not the only one available. Hundreds of online opportunities exist where interested persons can play, observe, study, and communicate regarding internet poker (e.g., see www.pokersites.com).

Many individuals play online poker for actual money—buying credits and then using them to place bets on their virtual cards. The number of online gamers playing for real money appears to have increased significantly over the past several years (Romer, 2005), likely in proportion to the growth of online poker overall. Even though only about 1% or less of adults typically report involvement with online gambling (Wood & Williams, 2007), the steady growth of internet gaming has invariably led to concerns about problems that might be associated with its spread. Recent meta-analyses regarding all forms of problem gambling (whether online or not) suggest that approximately 4% of adults in North America exhibit symptoms of pathological gambling (Shaffer & Hall, 2001).

Of greater concern has been research suggesting that younger players, especially on college campuses, might gamble online more than other groups and experience increased levels of problem gambling as a result. For example, Petry and Weinstock (2007), in a sample of more than 1,300 undergraduates, found that one fourth of the students had ever gambled on the internet, with about 6% doing so weekly; two thirds of such regular gamblers met criteria for pathological gambling compared with a third of that number for infrequent gamers and only 5% of non-internet

student gamblers. The reasons for their increased level of problem gambling relative to other groups are not well understood.

Although a body of published research has examined pathological gambling and online gaming, much less work has focused specifically on any one particular type of game—despite the likelihood that significant differences exist between game types and that individual factors might interact with game-specific elements in terms of how one might approach and react to a given gambling format (Petry & Weinstock, 2007). Researchers have tended to aggregate data across all of the various formats, with much less work conducted relative to internet gambling, perhaps because of its relative novelty compared with in vivo gaming and because most gamblers still seem to gamble in physical spaces such as casinos. What this means is that relatively little work has been published specifically on poker (despite its immense popularity) and even less regarding individuals who play poker online. Given the probability that different games played in different venues might exhibit various outcomes and/or attract persons with disparate characteristics, there exists a need to conduct studies that focus more specifically on given activities (poker) occurring in a defined context (the internet).

Moreover, the great majority of published studies have addressed the problems associated with gambling, with much less attention paid to nonproblem gambling or the motivations that might lead one to start gaming in the first place. Most of these studies have focused on identifying correlates of higher risk gambling behavior such as youth risk factors (Lusier, Derevensky, Gupta, Bergevin, & Ellenbogen, 2007) or substance use (Ladd & Petry, 2003). Little work has been done specifically with people gaming on the internet and even fewer studies have focused on nonproblem online gamblers to better understand how this large group of individuals pursues their interest without reporting significant difficulty as a result. In the important work of preventing, identifying, and remediating problem gambling behavior, it would seem necessary to understand how many individuals can engage in online gaming without developing pathological behavioral patterns.

Personality may also be a key factor in mediating problem versus nonproblem gaming behaviors, though it has not been well studied with respect to internet gambling. When personality has been considered in relation to internet gaming, it has primarily been with respect to pathological gambling. More generally, the five-factor model (McCrae & Costa, 1987) of personality has been used to explore problem gambling, with recent research showing that aspects of the traits of Neuroticism (negative emotionality and emotional instability) and Extraversion (positive emotionality and social involvement) may be especially relevant in identifying subtypes of problem gamblers (Vachon & Bagby, 2009). Thus, it would be logical to examine online gaming behavior with respect to these personality traits, given that individual expression of traits may influence other tendencies that impact gaming behavior and its potential positive and negative outcomes.

We propose that a structural equations modeling (SEM) approach would be an effective means to examine motivations and outcomes related to playing poker online. Further, SEM simultaneously considers the intercorrelations between a set of variables so as to test the fit between a proposed model and one's actual observations; it is excellent at exploring the mediating effects so vital to a complex understanding of human behavior. Thus, our study assessed several personal characteristics (age, income, education, and personality), motivations for playing poker online (earning money, relaxing, or socializing), behavior associated with online play (studying the game, amounts wagered, and hours playing), and potential outcomes from play (money won or lost and negative experiences). We do not specifically address the issue of gambling or internet *addiction*, but instead focus on *life outcomes* related to playing online poker in order to take a broader view of internet gaming, in which problems could certainly occur among a universe of possibilities.

It is our belief that in examining the relationships among this entire set of variables as a whole, we may be more able not only to identify cofactors for problem online poker outcomes and associated behaviors, but also to begin to discover more about the relationship between the factors that lead to these outcomes. Further, and perhaps of equal importance, we want to begin delineating the motivations, characteristics, and behaviors of online poker players who do *not* report significant levels of difficulty associated with internet poker. By examining both sets of circumstances, we seek a more balanced view of online gaming in terms of what players hope to gain from the game, as well as its negative impacts.

Method

Participants

Volunteers for the study were recruited from an internet-based poker forum, internet Texas Holdem (ITH, www.internettexasholdem.com), where interested individuals register for information and web-based discussion about matters related to playing poker online. Members of this forum are individuals from across the world, of varying ages and backgrounds, and with different motivations to play. To qualify for participation, individuals needed to (a) be registered members of ITH (in order to access the website and receive recruitment emails); (b) have made at least 10 postings to the ITH forum before enrolling in the study; (c) be at least 18 years of age; and (d) be playing or have played online poker for actual monetary gain and/or loss. We excluded individuals with 10 or fewer ITH postings, as many of these represent spam—posting under false pretenses. We wanted to increase the likelihood that individuals responding to our solicitation actually played poker online and were more than incidental participants so that the results would more validly address our research questions. With the large number of attributes we assess in our survey, we needed to ensure a large enough sample to have sufficient power.

Table 1
Demographic Characteristics of the Sample (N=194)

Variable	Number	Percentage
Gender		
Female	5	2.6
Male	189	97.4
Age		
18–25	20	10.3
26–35	63	32.5
36–50	86	44.3
51+	25	12.9
Education		
High school or less	16	8.2
Vocational, associates, or some college	63	32.5
College degree	65	33.5
Graduate degree	50	25.8
Employment		
Full time (40 hr+)	142	73.2
Part time (1–39 hr)	36	18.6
Not working	16	8.2
Annual Income in US\$ (N=190)		
0–50k	67	35.3
51k–99k	59	31.0
100k–199k	50	26.3
200k +	14	7.4

Over a 4-week period, 194 ITH members completed the survey. As shown in Table 1, most people in the sample were men ($N=189$, 97.4%) in their late 30s (mean age 38.0 years, $SD=10.51$). They were typically employed full time ($N=169$, 87.1%) and earned a median yearly income of US\$70,000 (ranging from no income to US\$600,000 per year). About 20% of participants had been self-employed in the past, with another approximately 20% of the sample currently self-employed. Twenty participants were aged 25 years or younger (10.3%), with five participants (2.6%) aged 62 years or older.

Participants reported high levels of education, with 91.8% ($N=178$) completing at least some college and 59.3% ($N=115$) having attained a college degree or higher. Eight participants (4.1%) were currently enrolled in college classes. Only two (1%) had not completed their high school diploma. The majority of participants resided in the United States ($N=118$, 60.8%), with the second and third most frequent countries of residence being the United Kingdom ($N=46$; 23.7%) and Canada ($N=12$, 6.2%), respectively (these three accounting for 90.7% of the total sample).

Materials

Participants completed an internet-based survey through the Survey Monkey web service, an online survey company that charges a small fee to format and administer questionnaires. All monetary amounts were denominated in or converted to US dollars.

Informed consent. Given the nature of this study as an internet-based project, face-to-face discussion of informed consent was not possible. Thus, information that outlined procedures, risks, and benefits related to the study was presented in detail to participants via the first web page that they saw. Participants needed to mark a checkbox to indicate their understanding of the study, its contents, and confidentiality protections before they could continue to the survey. They were further informed that a donation (US\$2.00) would be made to a children's charity (Colombianitos, a group providing assistance to children and families in Colombia) for each person who enrolled in the study. Individuals reaching the end of the survey were able to register for a small stake in winnings earned by a well-known player during an upcoming online poker tournament. For this incentive, participants would need to enter their ITH screen name so that they could be contacted should the player win. Screen names were stored in a file that was separate from the survey data.

Survey items. After confirming that they currently played online poker for actual money or had done so in the past, participants were asked a series of questions about their demographics, when they started playing, when they began to play for real stakes, and the amount they had won or lost during the past 6 months. In the next series of questions, participants indicated how much time they played and the amount they wagered on internet poker during a "typical" week, both overall and in four different types of online poker games (*limit*—players are limited in the amount they can wager in any round of betting; *multi-table tournaments*—players compete against dozens, hundreds, or even thousands of players in a contest in which the prize money is awarded to the top finishers; *no-limit*—players are not limited in the amount they can wager; and *sit-and-go*—a tournament that typically has only one table of players and in which prize money is awarded to the top finishers).

The last section of the survey addressed the benefits and problems that participants associated with playing online poker and assessed two personality traits (Emotional Stability and Extraversion). For the cost-benefit items (see Table 2), participants rated a series of statements using a 7-point scale based on the degree to which each statement matched the participant's self-perception (1=*not at all like me*, 4=*somewhat like me*, and 7=*exactly like me*). Negative outcome items were based on a subset of difficulties experienced by individuals with problem gambling behaviors (*Diagnostic and Statistical Manual of Mental Disorders*, 4th ed., text rev.; American Psychiatric Association, 2000) believed to most interfere with adaptive functioning and social relationships; consideration was given to maintaining relative brevity in

Table 2
Items Assessing Negative and Positive Experiences from Online Poker

Negative Experiences

1. I spend too much time playing online poker
2. I spend too much money playing online poker
3. I find myself playing online poker when I should be doing something else
4. When I can't play I find myself getting upset or down
5. I find it hard to cut back on the amount of time that I play
6. Playing has left less time for personal relationships

Positive Experiences

1. I've made a good number of friends playing online poker
 2. Socializing with other players is a main reason I play online poker
 3. I get a sense of accomplishment playing online poker
 4. Online poker helps me to relax and unwind
 5. Online helps me earn money for the "extras" in life
 6. Online poker helps to pay the monthly bills like food, rent, utilities, etc.
-

the research instrument. Negative outcome (i.e., "cost") items demonstrated a good level of internal consistency ($\alpha=.850$) and were reliable enough to use as a single scale. However, reliability analysis of the perceived benefit items suggested that they did not assess a unitary construct ($\alpha=.481$); there appeared to be more than one concept being measured by this scale. We therefore conducted a principal components analysis of the perceived benefits scale by using a varimax rotation to produce orthogonal components (i.e., the model would be resolved such that individual items tended to load on only one of the components). This analysis resulted in the three-component solution (using .500 as the loading criterion for placement into a component) shown in Table 3. No item exceeded the criterion for more than one component and the model accounted for 69.7% of the overall variance. Given the items loading onto each component, we labeled the first as "Financial Gain," the second as "Socializing," and the third as "Relaxation." These three components have been used in subsequent data analyses in place of the total score for the perceived benefits scale.

Table 3
Component Loadings of the Positive Experience Items

Perceived benefit items	Financial Gain	Socializing	Relaxation
Sense of accomplishment	.504	.282	.452
Earn money for extras	.857	-.014	.044
Earn money for bills	.772	.115	-.260
Made friends playing	.093	.824	.100
Socializing with players	.047	.850	-.087
Relaxation	-.140	-.050	.861
<i>Proportion of variance in model</i>	.269	.249	.179

Emotional Stability and Extraversion were assessed by using items combined from the International Personality Item Pool (Goldberg, et al., 2006), a well-established public domain resource providing banks of individual items and scales for various personality traits. We selected scales designed to assess the personality traits of Neuroticism and Extraversion in accordance with the five-factor model (McCrae & Costa, 1987). Ten questions for each trait were paired into five composite items per trait. Participants used a 7-point scale to indicate the degree to which they were more similar to one statement or the other (e.g., “seldom feel blue” vs. “often feel blue” for Emotional Stability and “am the life of the party” vs. “keep in the background” for Extraversion). Both of these personality scales demonstrated good levels of internal consistency and were deemed reliable measures (Extraversion, $\alpha=.903$; Neuroticism, $\alpha=.843$).

Procedure

The owner of ITH was approached as a community partner for conducting this research project. He was involved in reviewing the informed consent documents, developing incentives, and approving survey items. He posted an advertisement for the project on the ITH website and allowed the investigators to send two recruitment emails to all registered members with more than 10 forum postings (1,505 email addresses, yielding a response rate of 13.9%). Note that the owner of ITH did not request any changes in the survey, did not have access to the data once collected, and did not review the results. Advertisement and recruitment emails contained information about the study and a clickable link to the study’s web page via Survey Monkey. Items were designed such that they could not be left blank, although participants could “click out” of the survey whenever they wished. Participants who exited the survey by closing their web browser would not have necessarily viewed a debriefing page. All procedures were approved by the Susquehanna University Human Subjects Research Committee.

Results

General Findings—Descriptives

Hours played. Participants reported playing internet poker a median of 6 to 10 hr during a typical week during the past 3 months, with about a third of the sample playing more than 11 hr per week. There was a fairly equal distribution of time across the four game types, although individuals tended to favor multi-table tournaments and sit-and-go games over the other two formats. Participants typically devoted 1 to 5 hr per week to a given format. Lastly, individuals played in several types of games per week, competing in an average of three of the four game types during a usual week during the past 3 months.

Those playing more hours in sit-and-go games also tended to play multi-table games more, $r(194)=.238$, $p<.001$, but stayed away from no-limit games, $r(194)=-.182$,

$p=.011$. Playing more frequently in limited betting games was inversely associated with time playing unlimited betting games, $r(194)=-.336$, $p<.001$. Hours playing multi-table games were not associated with the amount of time spent in limit or no-limit poker games. Thus, players in the no-limit games tended not to participate in the sit-and-go or limit game formats.

No-limit and sit-and-go games also showed different patterns of association with respect to age: The younger an individual, the more time they spent in the no-limit format, $r(194)=-.209$, $p=.003$, whereas older individuals tended to play more in sit-and-go games, $r(209)=.174$, $p=.015$. There was no association between hours played and age for the other game types. Two other demographic variables were significantly associated with time played. Employment status was negatively related to playing sit-and-go games, $r(194)=-.204$, $p=.004$, perhaps because these players also tended to be older. Second, education level was negatively associated with playing multi-table tournaments, $r(194)=-.171$, $p=.017$.

Amounts wagered, won, and lost. Participants were first asked whether they won money or lost money overall from playing poker over the past 6 months. Participants were then asked to report how much they won or lost. The median winnings during the past 6 months for all participants were US\$250. However, the range of winnings and losses was quite large, with 10 (5.2%) participants reporting losses equal to or greater than US\$1000 (the maximum reported loss was US\$20,000). Fifty-one (26.2%) participants reported winnings at or exceeding US\$1000, with nine (4.6%) of this group reporting gains of US\$10,000 or more (to a maximum of US\$50,000) in the past 6 months.

Amounts wagered and won or lost were associated with several of the game types and with overall hours of play. Winnings were positively associated with the number of hours spent playing multi-table, $r(194)=.227$, $p=.001$, and no-limit, $r(194)=.221$, $p=.002$, formats. Time spent in multi-table games was also associated with greater amounts wagered, $r(194)=.318$, $p<.001$. However, playing more in the sit-and-go format was associated with decreased winnings, $r(194)=-.155$, $p=.031$, but higher levels of wagering, $r(194)=.147$, $p=.041$. There were no significant associations between hours played in the no-limit format with winnings or amounts wagered.

Motivations and negative outcomes. As noted, perceived motivations for and negative outcomes from playing internet poker were assessed by using the items presented in Table 2. Because motivation items reflected three separate components, analyses for these items were conducted on the basis of each of the components individually. Given their acceptable level of internal consistency, results for the negative outcome items were determined through the use of the total score for those items as a scale.

Motivations—Perceived Benefits: The Financial Gain, Socializing, and Relaxation components evidenced fairly normal distributions around their means. Mean scores

for the Financial Gain (3.51, $SD=1.31$) and Socializing (2.63, $SD=1.42$) components suggested that the average participant endorsed these outcomes as being “somewhat like me” and “usually not like me,” respectively; 16% ($n=31$) of participants endorsed “usually like me” for Financial Gain and 10% ($n=19$) endorsed this for Socializing (a score of at least 6 of 7) or higher. The mean score for Relaxation was somewhat higher, with the average participant endorsing this reason for playing as being “somewhat like me” (4.20, $SD=1.64$) and 23% ($n=45$) of the sample scoring at least 5 of 7 (“usually like me”) in this area.

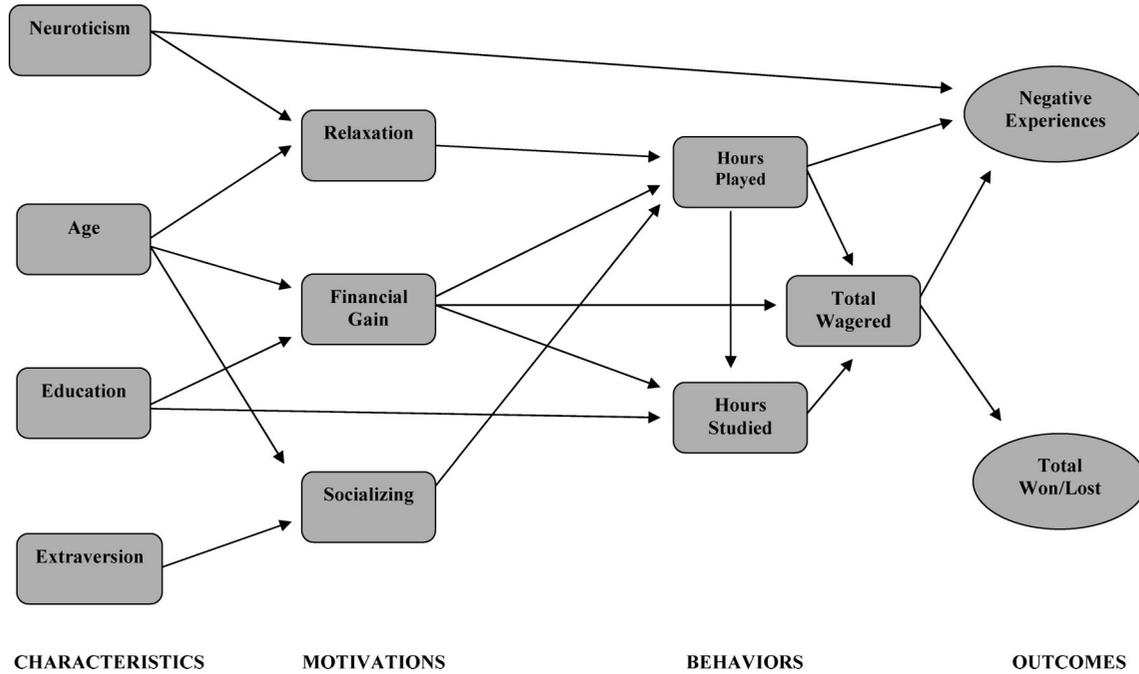
Negative Outcomes—Perceived Downsides: The distribution of the total score for perceived negative outcomes from playing poker online was clustered around a mean score of 2.31 ($SD=1.16$), corresponding to “not like me” on the 7-point scale. A total of 12 players (6% of the sample) evidenced average scale scores of 5 or higher for negative outcomes, suggesting that the concerns described by scale items were “usually like me” or more. Moreover, 53 participants (27%) had an average score of 4, which indicated that the issues presented by the items were “somewhat” typical of their own situations. Combining these two groups, about one third of the sample endorsed some level of significant downside as a result of playing online poker, although the degree of these negative outcomes was not assessed.

A Structural Equations Model of Motivations and Negative Outcomes

The SEM procedure for this analysis was conducted with Amos 17.0, using maximum likelihood estimation in a measured variable model, which used factor scores to represent multi-item scales to capture the common variance in each construct. An initial conceptual model (see Figure 1) was developed that linked dependent variables with likely mediating elements, which would then predict a number of outcomes of interest. In this model, we suggested that personality traits (Extraversion and Neuroticism) and demographic characteristics (age, income, and education) would form a set of preconditions that impacted motivations for playing poker online (Relaxation, Socializing, and Financial Gain). In turn, these motives were hypothesized to affect playing behaviors and, through them, one’s winnings/losses and gambling problem outcomes. The null hypothesis in the structural equation modeling approach assumes that the model generated from this set of theoretical relationships will match the covariance matrix produced by using one’s actual sample data. Thus, if the null hypothesis were supported ($p>.05$ in a chi-square test between the two covariance matrices), there would be no statistical difference between the theoretical model and one’s research data—the data could be said to match the proposed model. The chi-square value divided by its degrees of freedom should also approximate 1.00 for a model to be considered to match the data set.

Further tests of the research model were conducted through “fit indices” that described the degree to which a preconceived research model matches the data that has been collected. Amos 17.0 uses the goodness of fit index (GFI), the adjusted

Figure 1. Initial model: understanding online poker outcomes as functions of personality, age, education, motivation, and gaming behavior

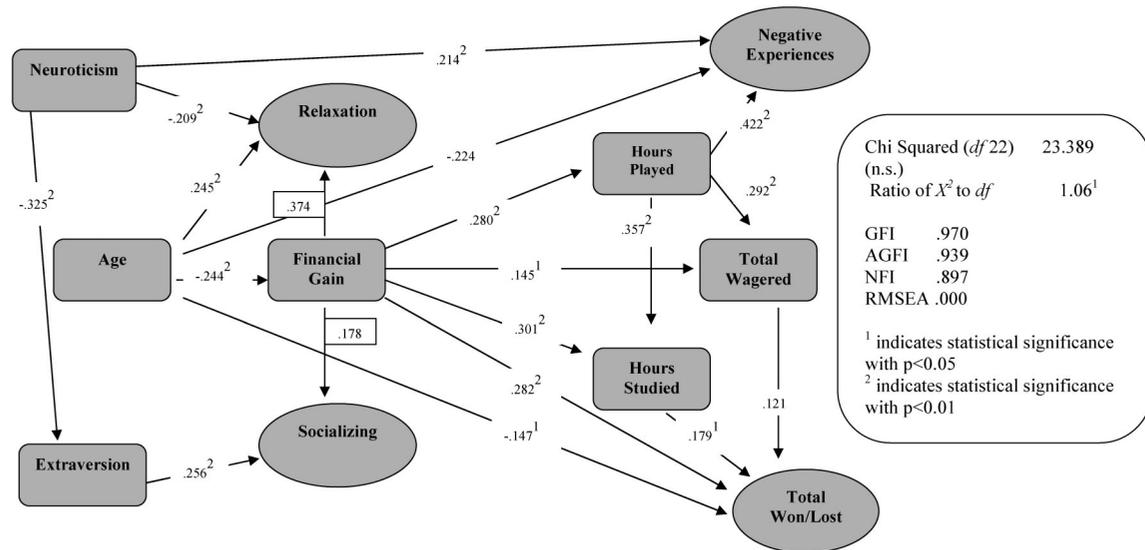


goodness of fit index (AGFI), the normed fit index (NFI), and the root mean square error of approximation (RMSEA) to assess the degree to which a proposed model corresponds to actual empirical results. It is generally assumed that the GFI and AGFI should equal or exceed .900, whereas the NFI should approach or pass .950; RMSEA should fall below 0.05 (see Arbuckle, 2008, for a complete discussion of Amos 17.0 fit indices). Approximation of these expectations is usually considered sufficient to accept the validity of a structural model.

Our proposed model was not found to completely fit the data. We therefore amended the model, keeping our hypotheses in mind, with the addition and removal of linkages between variables to achieve better fit indices—an empirical and iterative approach during which one maintains fidelity to initial constraints (i.e., characteristics + demographics → motivations → gaming behaviors → outcomes) while making adjustments. The resulting model is presented in Figure 2. As can be seen in the inset, the final model met five of the above criteria: (a) the null hypothesis could not be rejected, as $p = .479$; (b) χ^2/df approximated 1.00; (c) $GFI > .900$ (actual $GFI = .970$); (d) $AGFI > .900$ (actual $AGFI = .939$); and (e) the RMSEA of 0.000 fell below 0.05. The model also nearly met the sixth criterion: $NFI = .897$, as opposed to equaling or surpassing .950. Values at these levels represent a good degree of model fit with the data.

The final model preserves relationships between most of the internal characteristics, motivations, behaviors, and outcomes, as well as the relationships between the

Figure 2. Final structural equations modeling (SEM) solution showing standardized coefficients. GFI=goodness of fit index; AGFI=adjusted goodness of fit index; NFI=normed fit index; RMSEA=root mean square error of approximation



Financial Gain motivation and behaviors and outcomes. Associations among behaviors and outcomes were little altered. However, note that education fell out of the final model completely; it was not significantly predictive of downstream elements. Another difference between the final and conceptual model was that the Relaxation and Socializing motivations were not significantly related to poker-playing behaviors, nor did they significantly predict winnings and losses or undesirable outcomes from playing internet poker; they were endpoints in and of themselves. It should be emphasized that the actual amount of money that participants said they won or lost was *not* related to their report of difficulties resulting from online play, nor was the degree to which participants wagered real money or spent time in building poker-playing skills. No significant predictive pathways were found with respect to these potential relationships (all $ps > .05$).

To present this complex set of relationships, we will start by considering the outcomes from playing poker online and then work backward through behavior, motivation, and personal characteristics. It appears that the model of best fit is one in which participants reported three sets of outcomes: social-emotional gains, monetary winnings and losses, and negative life experiences associated with playing internet poker.

Social-emotional gains. Table 4 presents unstandardized and standardized regression weights, critical ratios (which approximate t values), standard errors, and significance levels of the critical ratios for each of the linkages present in the model of best fit, whereas Table 5 presents the bivariate correlations for all of the variables in the final model. The Relaxation and Socializing factors were not related

to the poker-playing behavior variables, winnings and losses, or negative life experiences resulting from internet gambling, and the hypothesized pathways between them and total hours played were not found to be significant. Linkages representing these relationships have been dropped, as neither predicted playing behavior. Thus, these motivational factors appeared to be outcomes as well as incentives for playing poker online. Examination of the social-emotional factors shows that different types of participants were seeking out one or the other (or perhaps both). Persons reporting Relaxation as a primary motivation tended to be older ($\beta=.245, p<.001$) and to exhibit lower scores on Neuroticism ($\beta=-.209, p=.001$); that is, they evidenced higher levels of emotional stability and more positive emotionality. However, those reporting more of a Socialization motivation tended to score higher, not surprisingly, on Extraversion ($\beta=.256, p <.001$). The final model accounted for 20% of the variance in Relaxation and 10% of the variance in Socializing. Further, it should be noted that individuals who reported playing internet poker for financial gain were not exclusively seeking monetary winnings. At least some individuals also played in order to obtain social and emotional benefits through interactions with other players, as seen in the significant pathway leading from Financial Gain to Socializing ($\beta=.178, p=.01$). Some also may have been seeking and obtaining stress relief from playing internet poker, a finding evidenced in the observed relationship leading from Financial Gain to Relaxation ($\beta=.374, p<.001$).

Table 4
Statistical Values for Relationships Specified in the Final SEM Solution

Relationship	B	SE B	β	CR	<i>p</i>
Age→Financial Gain	-.092	.027	-.244	-3.457	<.001
Age→Negative Experiences	-.150	.042	-.224	-3.622	<.001
Age→Relaxation	.054	.015	.245	3.638	<.001
Age→Total Won/Lost	-76.056	34.016	-.147	-2.236	.035
Extraversion→Socializing	.100	.027	.256	3.688	<.001
Financial Gain→Hours Played	.188	.047	.280	4.003	<.001
Financial Gain→Hours Studied	.344	.074	.301	4.658	<.001
Financial Gain→Relaxation	.217	.039	.374	5.559	<.001
Financial Gain→Socializing	.130	.051	.178	2.562	.010
Financial Gain→Total Wagered	.482	.235	.145	2.052	.040
Financial Gain→Total Won/Lost	387.924	99.250	.282	3.909	<.001
Hours Played→Hours Studied	.610	.110	.357	5.536	<.001
Hours Played→Negative Experiences	1.122	.164	.422	6.837	<.001
Hours Played→Total Wagered	1.443	.350	.292	4.118	<.001
Hours Studied→Total Won/Lost	214.456	83.822	.179	2.558	.011
Neuroticism→Extraversion	-.410	.087	-.325	-4.720	<.001
Neuroticism→Negative Experiences	.257	.074	.214	3.477	<.001
Neuroticism→Relaxation	-.082	.026	-.209	-3.209	.001
Total Wagered→Total Won/Lost	50.047	27.203	.121	1.840	.066

Note. CR=critical ratio; SEM=structural equations modeling.

Table 5
Pearson Correlations between Variables Included in the Final SEM Model

	Age	Extraversion	Neuroticism	Relaxation	Financial Gain	Socializing	Hours Played	Total Wagered	Hours Studied	Negative Experiences	Total Won/Lost
Age	1.000										
Extraversion	-.065	1.000									
Neuroticism	.096	-.331**	1.000								
Relaxation	.122	.064	-.206**	1.000							
Financial Gain	-.237**	.072	.316**	1.000							
Socializing	-.104	.265**	-.149*	.154*	1.000						
Hours Played	.041	.100	.069	.091	.278**	1.000					
Total Wagered	-.165*	.169*	-.096	.077	.230**	.201**	1.000				
Hours Studied	-.051	.085	.016	.138**	.418**	.220**	.443**	1.000			
Hours Studied	-.051	.085	.016	.138**	.418**	.220**	.443**	.187**	1.000		
Negative Experiences	-.181*	.023	.224**	.005	.242**	.100	.243**	.243**	.243**	1.000	
Total Won/Lost	-.244**	.029	-.043	.104	.415**	.133	.116	.242**	.324**	.090	1.000

Note. SEM=structural equations modeling.
* $p < .05$. ** $p < .01$.

Monetary winnings and losses. The model accounted for approximately 24% of the variance in the amount of money participants won or lost playing internet poker. The SEM solution in Figure 2 shows that the number of hours one spent playing was not directly related to winnings and losses—only through the total amount wagered and the number of hours spent educating oneself about the game did the number of hours playing online have a mediating influence on financial outcomes. The more hours one played poker online, the more one tended to wager ($\beta = .292$, $p < .001$) and to engage in poker self-improvement activities ($\beta = .357$, $p < .001$), both of which were positively related to the amount won ($\beta = .121$, $p = .066$ ¹; $\beta = .179$, $p = .011$, respectively). As suggested in the initial conceptual model, all three of these behavioral elements were predicted by a motivation for Financial Gain such that the more one sought financial gain, the more hours one played poker online ($\beta = .280$, $p < .001$), the more money was wagered ($\beta = .145$, $p = .04$), and the more hours one spent in skill development activities ($\beta = .301$, $p < .001$). Moreover, one's winnings or losses were directly related to being motivated by the monetary aspects of the game ($\beta = .282$, $p < .001$) in addition to the mediating relationship that monetary motivation had upon playing behaviors.

Age again represented a significant influence on a participant's winnings and losses, both in a direct and a mediating sense. The younger a player, the more they tended to express Financial Gain as a key motivation for playing poker online ($\beta = -.244$, $p < .001$). Given the relationship between Financial Gain and winnings, it appears that a money motivation partially mediated the impact of age upon reported poker earnings through the behavioral variables. Further examination of participant age with analysis of variance (ANOVA), using Bonferroni-adjusted post hoc analyses, showed that for Financial Gain, it was those in the youngest age group (18–25 years) who expressed earning money most strongly as a reason for playing internet poker, $F(3, 190) = 4.76$, $p = .003$, significantly more so than those in the two older groups. In fact, the means for Financial Gain among the four age groups declined as participants got older (18–25 years, $M = 13.15$; 26–35 years, $M = 10.90$; 36–50 years, $M = 10.06$; 51 and older, $M = 9.60$).

In addition to having this indirect influence on winnings through the Financial Gain motivation, age also directly and inversely predicted the total amount won or lost playing internet poker games ($\beta = -.147$, $p = .025$); higher total winnings were associated with younger players. The two youngest age groups (18–25 and 26–35 years) won significantly more money than the two older groups (36–50 and 51+ years), $F(3, 190) = 5.93$, $p = .001$. Neither personality variable was related to poker winnings or losses.

¹Normally one would have excluded this nonsignificant association. However, doing so reduced the fit indices. Thus, we kept the linkage in the final model and noted that it approached significance at the $p = .05$ level.

Negative life experiences. The total score on the 6-item scale assessing negative outcomes from playing online poker was directly predicted by the total number of hours one spent playing ($\beta=.422$, $p<.001$), the score on Neuroticism ($\beta=.214$, $p<.001$), and age ($\beta=-.224$, $p<.001$). The model incorporating these relationships accounted for 29% of the variance in negative online poker outcomes. The number of hours playing poker on the internet evidenced the strongest relationship with negative life experience, as did higher levels of emotional instability and negative emotionality (i.e., a higher Neuroticism score). With respect to age, younger players evidenced more problems than did older players. An ANOVA of total negative outcome scores by age showed that players aged 35 years and younger were significantly more likely to report internet poker-related difficulties ($M=15.40$, $SD=7.15$) than players aged 36 years or older ($M=12.77$, $SD=6.63$), $F(1, 192)=7.01$, $p=.009$.

Discussion

This project sampled the membership of an online internet poker players' forum in order to model how personal characteristics, motivations for play, and playing behaviors were related to two outcomes: (a) amounts of money won and lost and (b) negative personal impacts from playing internet poker. Both of these were maintained in the final SEM solution. However, we also found a third outcome, social and emotional gains from playing (the Socializing and Relaxation factors), which had originally been proposed as motivational influences but which the data instead (or also) showed to be end points. The data also suggested that participants played poker online for a relatively substantial number of hours per week, with one third averaging more than 10 hr per week. Most people played in more than one of the gaming formats, with older players showing somewhat more variety in their gaming practices than younger players, who tended to cluster in games that did not have preset wagering limits.

Other age differences also emerged. Younger individuals appeared to play more from a desire to win money, and they actually did earn more money as a result of their play. Participant age was both a direct predictor of amount won or lost and an indirect influence, mediated through the Financial Gain motivation and total amounts of money wagered during play. Older players were less interested in playing poker to earn money. They expressed more motivation for using online poker as a way to relax, wagering and winning less money than younger individuals.

Personality factors were directly related to playing motivations and outcomes. Not surprisingly, scores on Extraversion were directly related to the desire of individuals to play in order to socialize with other people—more extraverted persons being attracted to group interactions that generate positive emotions. On the other hand, people expressing more of the Neuroticism trait appeared to use online poker less for relaxation than did people with lower scores on this trait. Other research has suggested that a positive relationship would have been more likely (e.g., McGrath,

Stewart, Klein, & Barrett, 2010; Stewart, Zack, Collins, & Klein, 2008). However, in this study, the single item measure of relaxation may not have been associated with its negative reinforcement value vis-à-vis stress and instead may have been more related to gambling as a pleasant activity (i.e., its positive reinforcement value). Thus, gamers with a higher score on Neuroticism would be thought of as seeking out internet poker less for enjoyment than for other affective reasons.

In our original model, we had anticipated that Extraversion would be mediated through social motivation to predict an increased number of hours playing and would therefore be related to negative outcomes. Some previous research with alcohol and drug use had shown support for the idea that problem use was related to the social orientation of one's personality (Kilbey, Downey, & Breslau, 1998; Nezlek, Pilkington, & Bilbro, 1994). However, this was not the case in our sample. Instead, it was Neuroticism (negative emotionality) that was directly predictive of outcomes associated with gambling problems. Research has previously demonstrated such a link between negative emotionality and the problem use of substances, but typically as a less common route than the social influence pathway (Baer, 2002). That the current study did not evidence social influence as a factor in the emergence of problems related to internet poker may suggest differences in developmental processes between online gaming behaviors and in vivo difficulties. It may also point to individual differences in the types of people who are more attracted to online versus actual environments in which potentially risky outcomes may occur.

We had originally proposed three motivational factors to mediate playing behavior and thereby outcomes. However, only the motivational factor for Financial Gain proved to be related to playing behavior and hence to winnings, losses, and negative personal experiences. Financial Gain mediated amounts won and lost by participants, as well as doing so indirectly by influencing the amounts of money wagered and the number of hours spent improving poker skills. The number of hours playing, although influenced by Financial Gain, was not related to amounts won or lost, but did mediate negative outcomes along with the personality trait of Neuroticism and a younger age. The Financial Gain motivation itself was not directly related to negative outcomes.

Overall, the results show that relatively few people (5% of the sample) experienced the most significant negative consequences from playing poker online, but that a somewhat larger group (though still a minority at 27%) reported some downsides resulting directly from their playing. Consistent with other research examining problem gambling (e.g., Holtgraves, 2009), our data strongly suggest that people may have gotten into trouble with poker because they spent too many hours involved in play and not primarily because of the amounts of money that they wagered or lost. In fact, neither the amount of money lost (or won), nor the type of online poker game played, nor the time spent studying poker was found to be associated with negative personal outcomes. We speculate that this may indicate

that too much time devoted to playing poker online may significantly interfere with adaptive behavior—it would take time from relationships, work, study, or other tasks that lead to success and satisfaction. As other priorities fall to the wayside, difficulties emerge as a result.

Results from this study suggest that players with higher levels of negative experiences appear to fall into a time trap as a result of wanting to earn money from online poker, a relationship that is especially true for younger individuals and for people who tend to be more pessimistic, moodier, or emotionally negative (the Neuroticism trait). Showing the strongest regression coefficient, the relationship between time played and negative experiences was especially important, the single largest regression value in the entire model. Time taken from other adaptive activities interacted with youth and emotional negativity to result in negative experiences for the online poker player. It may be that the younger or more emotionally vulnerable player could be especially prone to disruption of their daily lives by spending too much time gaming online. Time that could be spent coping with other exigencies may be spent gaming, leading to accumulating problems.

Younger persons may not have been as able to manage time demands as well as older individuals, or may have shown increased motivation for earning money through poker in order to supplement their incomes in ways that older people did not (especially because younger people tend to have less income). Less emotionally positive individuals could use online poker in an escapist manner to avoid stress in other areas of their lives (Nelson, Gebauer, LaBrie, & Shaffer, 2009). In fact, Neuroticism was related to two different outcomes: using poker less for relaxation while experiencing more problems as a result of play. Persons with higher Neuroticism scores played poker less for relaxation and showed more problems from it, whereas those with lower scores on this trait showed the reverse; they played more to unwind and had fewer problems with it. The combination of younger, more emotionally vulnerable individuals with spending a good number of hours playing poker online represented the most likely pathway for developing significant problems with the game.

Participants less likely to show problems were older and expressed more positive emotion and optimism. A subgroup of nonproblem players also seemed to play online poker for the social-emotional advantages of the game in terms of relaxation and the opportunity to socialize with other players. Among those participants with fewer gaming-related problems who also reported more interest in financial gain, the more “studious” players and those somewhat less motivated by winnings seemed to show the fewest difficulties. Financially motivated players who studied the game more, but who wagered less, tracked toward winning more money without developing problems from their participation in online poker. It really does seem that the key behavioral link in our sample between financial motivation and gaming-related problems was the number of hours one spent playing, especially for the younger and more emotionally negative players.

Although these findings seem to be fairly robust within our data set, one should exercise caution in generalizing to larger populations. The response rate to our email solicitation was lower than we had hoped, adding to the healthy skepticism that should always be used regarding nonrandom sampling methods. We also collected data from a website used by players to discuss and learn the game, not from one where people actually played poker online. This may add a second level of selection bias, possibly skewing results toward a more serious and/or experienced poker player with perhaps relatively less participation from more casual or less experienced individuals. In hindsight, it would have been useful to more carefully assess the impact of negative poker outcomes in order to parse them with more detail. We also might have used a more established means of assessing problem gambling behaviors, such as the South Oaks Gambling Screen (Lesieur & Blume, 1987), although the purpose of the study did not include identification of individuals who might have met the criteria for pathological gambling. It also may have been useful to assess additional personality characteristics (such as Conscientiousness) from the five-factor model that could affect measured outcomes. Further, one should note that the large majority of the sample were men; women were nearly absent from our participant group. Although, as we noted earlier, there is some reason to believe this proportion may reflect actual gender disparities with internet poker, it still raises two problems: (a) We cannot be completely sure that such gender disparities exist, and (b) it means that we are largely unable to comment upon the characteristics of the women who do play poker online. Such shortcomings could be addressed by future research in this area. Last, our factor for relaxation constituted only one item in the scale, and it is difficult to assess exactly what participants were ranking as “relaxation” when answering this item.

Despite these concerns in the present study, we believe its findings offer evidence for pathways through which some individuals develop problems playing poker online, especially for younger individuals and for those playing Internet poker who think that their time spent playing Internet poker (regardless of how long they play) negatively impacts their ability to fulfill other obligations and needs. The relationship between age and problem gaming is particularly noteworthy given the number of young people thought to be accessing online forms of gaming, including poker (Jacobs, 2000; Shaffer & Hall, 1996). Many internet gambling websites appear to specifically cater to younger individuals (Messerlian, Byrne, & Derevensky, 2004). Further, earlier risky involvement with problem gambling appears to be associated with more severe difficulties in future years, especially for those who have other psychosocial difficulties (Winters, Stinchfield, Botzet, & Anderson, 2002)—which is troubling, given that the current study found a link between emotional instability and negative outcomes from online poker.

Players become involved with online poker for a variety of often overlapping reasons and bring with them personal characteristics that affect their vulnerability to negative outcomes. In better understanding these motivations, behaviors, and characteristics, we could more effectively assist those at risk of developing gaming

difficulties and enhance the experience for everyone involved by tailoring the virtual environment accordingly. Providing players with ways to more effectively manage their online time, deal with stress and negative emotions, and focus on healthy social-emotional outcomes all appear likely to mitigate problems somewhat independently of how much money is wagered, won, or lost.

The results found in this paper should inform many areas. First, several online poker sites (e.g., www.fulltiltpoker.com and www.pokerstars.com) have some responsible gaming features. For example, both www.pokerstars.com and www.fulltiltpoker.com allow a player to exclude him- or herself from the site. A better understanding of which players are likely to develop problems may be useful to sites that do care about the long-term health of their players. Some literature may also be informed by these results. Those who do research in problem gambling should better delineate those factors that predict problem involvement with online gaming while recognizing that most players probably will not develop negative outcomes from Internet poker. In so doing, we would have a much clearer understanding about the factors that attract nonproblem players to the online gaming environment. We could then work to create virtual experiences to promote healthier gaming and thus minimize the likelihood that vulnerable individuals would experience serious negative outcomes because of their involvement with Internet poker.

References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Arbuckle, J. L. (2008). *Amos 17.0 user's guide*. Crawfordville, FL: Amos Development Corporation.
- Baer, J. S. (2002). Student factors: Understanding individual variation in college drinking. *Journal of Studies on Alcohol, Supplement, 14*, 40–53.
- Bradley, C., & Schroeder, R. D. (2009). Because it's free poker! A qualitative analysis of free Texas-hold'em poker tournaments. *Sociological Spectrum, 29*, 401–430.
- Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. C. (2006). The International Personality Item Pool and the future of public-domain personality measures. *Journal of Research in Personality, 40*, 84–96.
- Holtgraves, T. (2009). Gambling, gambling activities, and problem gambling. *Psychology of Addictive Behaviors, 23*, 295–302.

Jacobs, D. F. (2000). Juvenile gambling in North America: An analysis of long term trends and future prospects. *Journal of Gambling Studies*, *16*, 119–152.

Kilbey, M. M., Downey, K., & Breslau, N. (1998). Predicting the emergence and persistence of alcohol dependence in young adults: The role of expectancy and other risk factors. *Journal of Clinical Psychopharmacology*, *6*, 149–156.

Ladd, G. T., & Petry, N. M. (2003). A comparison of pathological gamblers with and without substance abuse treatment histories. *Experimental and Clinical Psychopharmacology*, *11*, 202–209.

Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry*, *144*, 1184–1188.

Lusier, I., Derevensky, J. L., Gupta, R., Bergevin, T., & Ellenbogen, S. (2007). Youth gambling behaviors: An examination of the role of resilience. *Psychology of Addictive Behaviors*, *21*, 165–173.

McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, *52*, 81–90.

McGrath, D. S., Stewart, S. H., Klein, R. M., & Barrett, S. P. (2010). Self-generated motives for gambling in two population-based samples of gamblers. *International Gambling Studies*, *10*, 117–138.

Messerlian, C., Byrne, A. M., & Derevensky, J. L. (2004). Gambling, youth and the Internet: Should we be concerned? *Canadian Child Adolescent Psychiatry Review*, *13*, 3–6.

Nelson, S. E., Gebauer, L., LaBrie, R. A., & Shaffer, H. J. (2009). Gambling problem symptom patterns and stability across individual and timeframe. *Psychology of Addictive Behaviors*, *23*, 523–533.

Nezlek, J. B., Pilkington, C. J., & Bilbro, K. G. (1994). Moderation in excess: Binge drinking and social interaction among college students. *Journal of Studies on Alcohol*, *55*, 342–351.

Petry, N. M., & Weinstock, J. (2007). Internet gambling is common among college students and is associated with poor mental health. *The American Journal on Addictions*, *16*, 325–330.

Pokerstars (2012). About pokerstars.net [Data on site utilization]. Retrieved from <http://www.pokerstars.com/press/2009-04-14.html/>

- Romer, D. (2005). Card playing trend in young people continues. *National Annenberg Risk Survey of Youth: The Annenberg Policy Center*. Philadelphia: The University of Pennsylvania.
- Shaffer, H. J., & Hall, M. N. (1996). Estimating the prevalence of adolescent gambling disorders: A quantitative synthesis and guide toward standard gambling nomenclature. *Journal of Gambling Studies*, *12*, 193–214.
- Shaffer, H. J., & Hall, M. N. (2001). Updating and refining meta-analytic prevalence of estimates of disordered gambling behavior in the United States and Canada. *Canadian Journal of Public Health*, *92*, 168–172.
- Stewart, S. H., Zack, M., Collins, P., & Klein, R. M. (2008). Subtyping pathological gamblers on the basis of affective motivations for gambling: Relations to gambling problems, drinking problems, and affective motivations for drinking. *Psychology of Addictive Behaviors*, *22*, 257–268.
- Vachon, D. D., & Bagby, R. M. (2009). Pathological gambling subtypes. *Psychological Assessment*, *21*, 608–615.
- Winters, K. C., Stinchfield, R. D., Botzet, A., & Anderson, N. (2002). A prospective study of youth gambling behaviors. *Psychology of Addictive Behaviors*, *16*, 3–9.
- Wood, R. T., & Williams, R. J. (2007). Problem gambling on the Internet: Implications for Internet gambling policy in North America. *New Media and Society*, *9*, 520–542.

Manuscript history: Submitted October 13, 2010; accepted October 16, 2011. This article was peer-reviewed. All URLs were available at the time of submission.

For correspondence: Michael D. Smith, Psy.D., Susquehanna University, Psychology Department, Susquehanna University, 514 University Ave., Selinsgrove, PA 17870, USA. E-mail: smithmichaeld@susqu.edu

Competing interests: None declared.

Ethics approval: The Human Subjects Review Committee at Susquehanna University approved the study “Online poker: Motivations for playing and attributes of a winning player” on October 7, 2008.

Contributors: Smith, Principal Investigator: conducted the research, formulated research questions, took lead role in writing the manuscript. Rousu, co-investigator: conducted the research, provided support in formulating research questions, took a significant role in writing the manuscript. Dion, co-investigator: conducted the data

analysis involving SEM, took a significant role in writing the results section and editing the manuscript.

Michael D. Smith obtained his PsyD from Indiana University of Pennsylvania in 1999 and then completed a two-year NIMH research fellowship at the Center for AIDS Intervention Research (CAIR) where he worked with Dr. David Seal on studies relating to human sexuality, relationships, and risk behavior. An expert in risk behaviors among adolescents and young adults, Dr. Smith is currently an associate professor of psychology at Susquehanna University. He has just completed a multi-year study of agency-based male sex workers, which culminated in a newly released book, *In the Company of Men*, co-authored with Dr. Christian Grov of CHEST and Brooklyn College. Dr. Smith's other research involves various forms of risk behavior such as alcohol use in young adults and gambling concerns.

Matthew C. Rousu is an associate professor of economics at Susquehanna University. He is an expert on experimental auction design and implementation. He uses his expertise on experimental auctions to study problems in agricultural economics, environmental economics, and public health—topics on which he has published extensively. He also consults as an expert in experimental auction design and other topics for both governmental and non-governmental agencies. Dr. Rousu's other research interest is in poker. In addition to this published paper, he also has studied/is studying what impacts a poker player's earnings, the emotional effect of an adverse event on a poker player's behavior, and theft in online poker organizations. He earned a BSBA in economics from the University of South Dakota and a PhD in economics from Iowa State University.

Paul Dion received his PhD in Management Studies from the University of Toronto in 1986. He has taught at the University of Minnesota, Bryant University in Rhode Island, and presently at Susquehanna University in Selinsgrove, Pennsylvania. His research interests include sales and marketing performance, service quality, and marketing logistics, and he has published approximately 40 articles in refereed publications such as *The Journal of Business Research*, *the Journal of Academy of Marketing Science*, *the International Journal of Purchasing and Materials Management*, and *Industrial Marketing Management*. He has taught a number of courses at the doctoral level, mainly in market research and advanced statistics, and has developed a PhD program in management for the University of the West Indies in St. Augustine, Trinidad and Tobago. He is also a consultant and instructor in a number of doctoral programs in Thailand.