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PROBLEM AND PATHOLOGICAL GAMBLER SUBTYPES: A CLUSTER ANALYSIS OF ASSOCIATED FEATURES OF BLASZCZYNSKI AND NOWER'S PATHWAYS MODEL

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PROBLEM AND PATHOLOGICAL GAMBLER SUBTYPES:
A CLUSTER ANALYSIS OF ASSOCIATED FEATURES OF
BLASZCZYNSKI AND NOWER'S PATHWAYS MODEL

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

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Abstract

This study used hierarchical cluster analysis to empirically investigate several of the associated features of Blaszczynski&Nower's (2002) Pathways Model of problem and pathological gambling. Online questionnaires were administered to 177 gamblers, who responded to instruments measuring gambling behaviors, gambling cognitions, boredom susceptibility, risk-taking, depression, anxiety, impulsivity, ADHD features, and antisocial features. Hierarchical cluster analysis using Ward's method and confirmatory analysis produced a four-cluster solution of distinct gambler subtypes. Using the Pathways Model as a theoretical basis, these clusters were labeled *Antisocial Impulsivist*, *Emotionally Vulnerable – Risk and Boredom, Emotionally Vulnerable – Depression and Anxiety*, and *Behaviorally Conditioned*. The findings were largely consistent with the Pathways Model, but those who would likely be categorized as "Emotionally Vulnerable" gamblers according to the Pathways Model were parsed into two separated clusters. These clusters represented a differentiation between gamblers with emotional vulnerabilities, with one group possessing personality characteristics associated with the Pathways model, and another group possessing mood disturbance characteristics. The findings served to validate the belief that there are subtypes of problem and pathological gamblers with different gambling motivations and comorbid psychological problems, and provide additional evidence for the evolution of the Pathways Model.

Introduction

Over the past decade, increased availability and widespread social acceptance of gambling in the United States, as well as in several countries throughout the world, have likely increased the number of adults who report gambling behaviors and who meet criteria for pathological gambling. Pathological gambling has been associated with several negative social and financial consequences (National Research Council [NRC], 1999) and has also been demonstrated to be associated with a number of comorbid psychological problems such as depression (Ibañez et al., 2001; Johansson, Grant, Kim, Odlaug, &Götestam, 2009; Kallmen, Andersson, &Adren, 2008; Lorains, Cowlishaw, & Thomas, 2011), anxiety disorders (Lorains, Cowlishaw, & Thomas, 2011; Petry, Stinson, & Grant, 2005; Ste-Marie, Gupta, &Derevensky, 2006) and personality disorders (Cunningham-Williams, Cottler, Compton, &Spitznagel, 1998; Petry et al., 2005; Pietrzak&Petry, 2004; Sacco, Cunningham-Williams, Ostmann, &Spitznagel, 2008). Pathological gambling has also been associated with an increased risk for suicidality (Blaszczynski& Farrell, 1998; Hodgins, Mansley, &Thygesen, 2006; Ledgerwood, Steinberg, Wu, & Potenza, 2005; Penfold, Hatcher, Sullivan, & Collins, 2006).

Explanations for people's gambling motivations are generally rooted in behavioral and cognitive theories, in which gamblers are reinforced via behavioral and operant conditioning and continue to gamble due to irrational cognitions in which gamblers believe they are able to control outcomes and "beat" casinos that hold an unquestioned statistical advantage (Aasved, 2002; Mazur, 2010; Petry, 2005). However, several contemporary theoretical models of pathological gambling suggest that, while

conditioning and erroneous beliefs may explain pathological gambling at a fundamental level, those who gamble at more severe levels may be doing so in part because of greater emotional, biological, and psychological vulnerability (e.g., Blaszczynski&Nower, 2002; Graham &Lowenfeld, 1986; Stewart, Zack, Collins, Klein, &Fragopoulos, 2008).

Since the 1970s, gambling researchers have attempted to demonstrate that, while pathological gamblers as a group share certain characteristics, there are likely certain subtypes of gamblers that vary according to etiology, motivation, personality, co-occurring disorders, and severity (Milosevic & Lidgerwood, 2010). To date, researchers and treatment professionals have not fully embraced any one model of pathological gambler subtypes. This has led to a scenario in which both researchers and treatment professionals have relied on a variety of frameworks and continue to create new models, rather than working to construct and empirically validate a unified theory. However, in their recent comprehensive review on pathological gambling subtyping, Milosevic and Ledgerwood (2010) noted similarities between nearly every model posited over the past 40 years with Blaszczynski and Nower's (2002) theoretical pathways model of problem and pathological gambling, calling for future research to further validate and build upon the model.

The Subtyping of Pathological Gamblers

The Pathways Model. In 2002, Blaszczynski and Nower used existing knowledge of gambler subtypes to create a theoretical pathways model of problem and pathological gambling. Their stated purpose was to "integrate biological, personality, developmental, cognitive, learning theory and environmental factors described in the

literature into a theoretical framework" (p. 491). They proposed that problem and pathological gamblers might be classified into the following subtypes: Behaviorally Conditioned, Emotionally Vulnerable, and Antisocial Impulsivist. The Behaviorally Conditioned problem gambler is generally the least pathological and becomes addicted to gambling through availability of gambling and classical and operant conditioning. Emotionally Vulnerable problem gamblers also have access to gambling and are subject to conditioning, but they also "present with premorbid anxiety and/or depression, a history of poor coping and problem-solving skills, and negative family background experiences, developmental variables and life events" (Blaszczynski&Nower, 2002, p. 492). Specifically, Emotionally Vulnerable problem gamblers display evidence of greater risk taking and boredom proneness than is typical, exhibit elevated levels of depression and anxiety, and experience life stresses and substance use. Additionally, Blaszczynski and Nower asserted that this second pathway to pathological gambling features biological vulnerabilities (serotonergic, noradrenergic, dopaminergic, and EEG differentials) not present in the first pathway. The third subtype, the Antisocial Impulsivist problem gambler, possesses the same biopsychosocial vulnerabilities as the Emotionally Vulnerable gambler, but additionally possesses maladaptive behaviors rooted in impulsivity and similar to features of antisocial personality disorder. The traits specifically associated with Antisocial Impulsivist problem gamblers are ADHD symptoms, impulsivity, antisocial behavior, and substance abuse. Figure 1 displays a visual representation of the Pathways Model.

Other models. Studies throughout the past four decades have attempted to place problem and pathological gamblers into categories according to motivation, pathology,

and personality. In their literature review of the subtyping of pathological gambling, Milosevic and Ledgerwood (2010) identified 18 published empirical studies and/or theoretical papers 1970 through 2009 that identified and labeled at least two subtypes of pathological gamblers. While there have been similarities between each of the models proposed, the sheer number of different classification systems and seeming lack of follow-up research (except perhaps by the original authors of each study) have led to a lack of consensus regarding which, if any, of the pathological gambling subtype models are most accurate or useful for future research and treatment. Milosevic and Ledgerwood's (2010) synthesis revealed that nearly all subtypes of gamblers described in previous studies had characteristics in common with Blaszczynski and Nower's (2002) theoretical pathways model of problem and pathological gambling. Furthermore, they argued that the previous subtype studies provided empirical support for the pathways model and called for unification around the model in the field of pathological gambling research and treatment (Milosevic &Ledgerwood, 2010).

The similarities between the pathways model and other proposed models of pathological gambler subtypes, as well as its theoretical rationale, makes it likely that the model is generally accurate and could provide utility to researchers and treatment professionals in creating a more widely accepted framework. While Blaszczynski and Nower's (2002) model has been supported by and maintains many similarities to the subtypes reviewed by Milosevic and Ledgerwood (2010), it remains a largely theoretical model. There have been few empirical studies examining the specific factors associated with each of the three subtypes.

Three of the most recent studies cited in Milosevic and Ledgerwood's literature review (Bonnaire, Bungener, &Varescon, 2009; Turner, Jain, Spence, &Zangeneh, 2008; Vachon&Bagby, 2009) tested the pathways model and found analogous subgroups of pathological gamblers, but did not use the precise constructs associated with the pathways model. Bonnaire et al. (2009) wished to "confirm the existence of Blaszczynski and Nower's subtypes of pathological gamblers among the French general population of gamblers" (p. 456) and found analogous results, but relied on sensation seeking, alexithymia, and depression inventories as their sole measures of the factors associated with the pathways model. Vachon and Bagby (2009) utilized a cluster analysis of 228 pathological and non-pathological gamblers to create their own three-cluster model of gambler subtypes. They also reported similarities between their own model and Blaszczynski and Nower's pathways model. However, this "first attempt to derive an empirically based taxonomy of [problem gamblers]" (p. 614) was based on results from a personality inventory that identified personality styles peripherally associated with the factors of the pathways model, rather than instruments measuring specific constructs of the model. Turner et al. (2008) perhaps conducted the most thorough empirical investigation of the pathways model to date. Their stated purpose was to "empirically test the extent to which the three pathways can be defined as distinct components among variables correlated with pathological gambling" (p. 282). They used component analysis to assess several factors associated with the pathways model. Turner et al. found evidence supporting the pathways model, but component analysis suggested Blaszczynski and Nower's Behaviorally Conditioned gambler maybe better divided into two different subtypes.

While these recent studies have provided some confirmatory evidence for Blaszczynski and Nower's pathways model, further empirical validation of the theoretical model is necessary before it is accepted as the standard-bearer of pathological gambler subtypes. It is likely that – perhaps because of a desire to finally find a theory around which to unite – Milsoevic and Ledgerwood's (2010) conclusion that the model has been validated is premature. In fact, some recent articles have used the model as a rationale for their design, despite the fact that it has not faced rigorous empirical validation (e.g., Ledgerwood&Petry, 2010; Nower&Blaszczynski, 2004). This study is designed to provide a more direct examination of the utility of Blaszczynski and Nower's dimensions in differentiating subtypes of problem gamblers. Specifically, the present study utilizes hierarchical cluster analysis to determine whether meaningful groups can be identified on the basis of individuals' scores on instruments selected to tap relevant psychological and social dimensions.

The purpose of the present study is to empirically test the assumptions of Blaszczynski and Nower's (2002) pathways model. While there has been some research conducted to validate the theory, to date there has not been a thorough empirical study examining the specific factors differentiating each of Blaszczynski and Nower's (2002) proposed subtypes of pathological gamblers. Studies specifically designed to explore the validity of Blaszczynski and Nower's (2002) typology are needed before researchers and treatment professionals unify around this as yet largely untested theory.

The present study contributes to the research on pathological gambling in two significant ways. First, this study adds to a growing body of research seeking to identify commonalities among a heterogeneous population of pathological gamblers and create a

practical model of pathological gambler subtypes. Second, this study serves to empirically validate and clarify a theoretical model that is already used in research and practice, and may provide guidance for future development of the model. Recent literature (e.g., Milosevic &Ledgerwood, 2010) has suggested that the pathological gambling research field embrace Blaszczynski and Nower's pathways model based on a growing body of research; however, the model's assumptions have not been sufficiently tested empirically to warrant such a conclusion.

Research Questions

The three primary research questions of interest are:

1. After exploratory cluster analysis of Blaszczynski and Nower's proposed factors associated with problem gamblers, can meaningful groups be identified?
2. What is the nature of these groups, and are they differentiated?
3. How do these subtypes relate to the pathways model?

Method

Participants & Procedures

Men and women ages 18 to 64, who self-identified as having problems with gambling, were recruited to complete an online questionnaire that included demographic questions and several instruments assessing pathological gambling, as well as constructs associated with Blaszczynski and Nower's (2002) pathways model of pathological gambling. Data were collected via Survey Monkey, an online program that allows for the creation of an Internet-based questionnaire. The survey was created by the primary investigator and was maintained by the Center for Educational Development and Research (CEDAR) at the University of Oklahoma. Only the primary investigator and CEDAR staff had access to data obtained. Data were collected and

maintained through the use of a secure server to prevent access to confidential information.

One hundred eighty two participants were recruited through a variety of methods. Five of these participants were excluded from the final sample because they either reported no problems with gambling or reported never having gambled at least weekly. This left a final sample of 177 participants. The majority of participants (*n* = 128; 72.3% of sample) responded to recruitment advertisements posted on online gambling forums. These participants were directed to an online survey and were asked to participate if they believed they may have a problem with gambling. Another 8 (4.4%) participants were recruited through a similar advertisement posted on the National Council on Problem Gambling's (NCPG) website. Participants were also recruited through referral from gambling treatment providers (*n* = 5; 2.8%) and contact with a Gamblers Anonymous group (*n* = 4; 2.3%), as well as through the Oklahoma State Gambling Helpline (*n* = 8; 4.5%). Six (3.4%) participants were recruited through Facebook and Twitter advertisments (3.4%). Finally, 18 (10.4%) additional participants were referred by participants who had already taken the survey. Those who participated and completed the online questionnaire were given an incentive of a $10 Wal-Mart online gift card, which was funded through two graduate research grants from the University of Oklahoma.

Participants reported living in 32 different U.S. states and 3 Canadian provinces. The most represented states were California (*n* = 25; 14.1%), Pennsylvania (*n* = 19; 10.7%), Oklahoma (*n* = 15; 8.5%), Florida (*n* = 13; 7.3%), and New York (*n* = 12; 6.8%). Of the 177 participants, 113 were men (63.8%) and 64 were women (36.2%).

The reported ethnicities of participants were 84.7% White/Caucasian (*n* = 150), 5.1% Black/African-American (*n* = 9), 5.1% Asian/Asian-American (*n* = 9), 2.8% Hispanic or Latino/Latina (*n* = 5), 1.1% Native American or American Indian (*n* = 2), and 1.1% Multiracial (*n* = 2).

On the survey, participants completed the South Oaks Gambling Screen (SOGS; Lesieur& Bloom, 1987), the most widely used gambling screening instrument. 99 (55.9%) of the participants scored a '5' or higher on the SOGS, classifying them as pathological gamblers. 27 (15.3%) of participants scored a '3' or '4' on the SOGS, classifying them as problem gamblers. 43 (24.3%) of the gamblers scored a '1' or '2' on the SOGS, classifying them as having some gambling problems. 8 (4.5%) of the gamblers scored a '0' on the SOGS, but were retained in the sample because they reported gambling at least weekly. Of the total sample, 159 (89.8%) participants reported that they had never received any treatment for gambling problems, 12 (6.8%) reported they had previously received treatment, and 6 (3.4%) reported they were currently in treatment for gambling problems.

Participants were also asked to identify their favorite type of gambling activity. The most frequently reported favorite gambling activity was slots (*n*=91; 51.4%). In descending order, the remaining favorite gambling activities reported were poker (*n* =38; 21.5%), blackjack (*n* =21; 11.9%), sports betting (*n* = 9; 5.1%), video poker (*n* =9; 5.1%), lottery/scratch tickets (*n* = 3; 1.7%), craps/dice (*n* = 2; 1.1%), keno (*n* = 1; 0.6%), roulette (*n* = 1; 0.6%), horses/racing (*n* =1; 0.6%), and other table games (*n* =1; 0.6%).

Instruments

South Oaks Gambling Screen(SOGS). Lesieur and Bloom (1987) developed the SOGS as an instrument for the identification of pathological gamblers in clinical populations. The SOGS was based on a series of interviews with alcohol and drug abuse inpatients, in which those reporting gambling behavior were questioned. Lesieur and Blume created 60 questions based on these interviews and the DSM-III pathological gambling criteria, eventually reducing the total number of items to 20. A score of five or greater was selected as a cutoff to indicate *probable pathological gambling*. Though Lesieur and Blume created only the cutoff of five, many researchers have used scores of 3 or 4 on the SOGS as criteria indicating *problem gambling* (Wickwire Jr., Whelan, West, Meyers, McCausland, &Leullen, 2007).

The SOGS possesses adequate reliability and validity. It correlates with *DSM*-IV diagnostic criteria in both clinical and general population samples (r = .83; r = .77). Participants who score higher than 4 on the SOGS are classified as probable pathological gamblers. While there have been other measures of pathological gambling developed more recently, the SOGS has remained the most widely used instrument for assessing disordered gambling (Petry, 2005).Internal consistency reliability of the present study's sample for the SOGS was high (α = .92).

Sensation Seeking Scale - form V (SSS-V). The SSS-V (Zuckerman,Eysenck, &Eysenck, 1978) is a 40-item instrument that assesses respondents' optimal levels of stimulation and arousal, which Zuckerman labeled 'sensation seeking.' Respondents must select one of two choices for each item that offer opposing preferences, such as whether or not one would like to try surfing. Factor analysis of the SSS-V yielded four

factors that are subscales of the instrument: Thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility. For the present study, the boredom susceptibility subscale was of specific interest. Boredom susceptibility refers to an intolerance of repetition and non-stimulating situations. Reported internal consistency reliability of the SSS-V boredom susceptibility subscale was recently reported to be adequate (α = .72; Zuckerman, 2007). Internal consistency reliability of the present study's sample was moderate (α = .65).

The Gambling Related Cognitions Scale (GRCS). The GRCS (Raylu & Oei, 2004) is a 23-item survey instrment that uses a Likert-type 7-point scale, ranging from "strongly disagree" to "strongly agree." The instrument is composed of five subscales that assess respondents' level of belief in gambling-related cognitions, including illusion of control, predictive control, interpretive bias, gambling expectancies, and inability to stop gambling. For the present study, the predictive control subscale is of specific interest. Predictive control refers to a gambler's belief that he or she has the ability to predict gambling outcomes. Reported reliability for the overall scale was high (α = .93), and subscales demonstrated moderate to high reliability (α = .77 through.91). Internal consistency reliability for the present study's sample was high (α = .93).

Domain Specific Risk Taking Scale – Revised (DOSPERT). The DOSPERT Scale (Blais& Weber, 2006) is a 30-item self-report questionnaire that asks respondents to rate how likely they would be to engage in behaviors across five domains, ranging from 1 (extremely unlikely) to 7 (extremely likely). The five subscales assess the respondent's level of risk-taking in ethical, financial, health/safety, recreational, and social domains. Internal consistency estimates across domains ranged from α = .71

to.86, and the DOSPERT demonstrated adequate construct validity. Internal consistency reliability for the present study's sample was high (α = .89).

Patient Health Questionnaire (PHQ – 9). The PHQ – 9 (Kroenke, Spitzer, & Williams, 2001) is a 9-item self-report instrument designed to assess depression in primary health care. Each item states a symptom of depression and asks respondents to identify how often they have been bothered by the problem over the last two weeks. Each item is scored as 0, 1, 2, or 3, depending on whether the respondent reports experiencing the problems "not at all" (0), "several days" (1), "more than half the days" (2), or "nearly every day" (3).A total score of 0 through 27 is then calculated. The PHQ-9 demonstrated high internal consistency reliability in two pilot studies (α = .89; α = .86), and demonstrated high test-retest reliability (α = .84).A meta-analysis of the PHQ-9 reported it to be a reliable and effective instrument for depression screening (Wittkampf, Naeije, Schene, Huyser, & van Weert, 2007). Internal consistency reliability for the present study's sample was high (α = .92).

Generalized Anxiety Disorder Screener (GAD – 7). The GAD-7 (Spitzer, Kroenke, Williams, & Lowe, 2006) is a 7-item self-report instrument used to assess generalized anxiety disorder in primary health care. Each item states an anxiety symptom and asks respondents to identify how often they have been bothered by the problem over the last two weeks. Each item is scored as 0, 1, 2, or 3, depending on whether the respondent reports experiencing the problems "not at all" (0), "several days" (1), "more than half the days" (2), or "nearly every day" (3).A total score of 0 through 21 is then calculated. The GAD-7 demonstrated high internal consistency (α = .89) in a general population sample and has been reported to be a valid tool for the

screening of generalized anxiety disorder in clinical practice and research (Lowe et al., 2008). Internal consistency reliability for the present study's sample was high (α = .96).

Eysenck's Impulsivity Scale – 7 (EIS – 7). The EIS – 7 is the 19-item impulsivity subscale of the Eysenck Impulsivity Questionnaire (EIQ; Eysenck&Eysenck, 1978). The items ask respondents to answer "yes" or "no" to questions about one's impulsivity, such as "Do you usually make up your mind quickly?" It is scored from 0 through 19, where an answer of "yes" equals one point. The EIS – 7 subscale has been validated for use as a stand-alone instrument and has good internal consistency (α = .84; Eysenck, Pearson, Esting, &Allsopp, 1985). Internal consistency reliability for the present study's sample was high (α = .85).

Adult ADHD Self-Report Scale (ASRS). The ASRS (Kessler et al., 2005) was developed in conjunction with the World Health Organization (WHO) to create a relatively simple self-administered ADHD screening scale for adults. Respondents are asked to rate how often they experience 18 symptoms associated with adult ADHD on a scale of 0 (never) to 4 (often); each of the items is scored as a 0 (if the frequency does not meet the clinical cutoff) or a 1 (if the frequency meets the clinical cutoff). Cutoff scores vary among items. Total scores of 0-3 indicate "low" ADHD symptoms, while a score of 4-8 indicates "moderate" symptoms. A score of 9 or higher is considered to be within the "clinical" range of ADHD. Internal consistency for the self-report version was high (α = .88), and the ASRS demonstrated high concurrent validity (*r* = .84) with a rater-administered version (Adler et al. 2006). Internal consistency reliability for the present study's sample was adequate (α = .76).

Self-Report Psychopathy Scale (SRPS). The SRPS (Levenson, Kiehl, & Fitzpatrick, 1995) is a 26-item self-report questionnaire designed to assess psychopathic, or antisocial, personality features in non-institutionalized samples. Each item is measured on a scale of 0 (disagree strongly) to 4 (agree strongly) based on how strongly one agrees with a statement. The instrument taps two factors; the first 16 items assess for primary psychopathy (e.g., "for me, what's right is whatever I can get away with" and "people who are stupid enough to get ripped off usually deserve it") and the last 10 items assess for secondary psychopathology (e.g., "I find myself in the same kinds of trouble, time after time" and "love is overrated"). For the present study, the primary psychopathy subscale was of specific interest. A recent investigation of the SRPS's reliability demonstrated adequate internal consistency reliability (Factor 1: α = .85; Factor 2: α = .72; Seibert, Miller, Few, Zeichner, & Lynam, 2010). Internal consistency reliability for primary psychopathy among the present study's sample was high (α = .89).

Results

Data Analysis

In order to empirically investigate how participants may be placed into subtype groups based on associated features of the Pathways Model, hierarchical cluster analysis was utilized. Agglomerative hierarchical cluster analysis is the recommended method of cluster analysis for counseling psychology research whose purpose is to identify homogenous subtypes (Borgen& Barnett, 1987). Additionally, cluster analysis has become a frequently used method by which pathological gambling researchers have attempted to identify problem and pathological gambler subtypes (e.g., Gonzalez-

Ibanez, Aymani, Jiminez, Domenech, Granero, &Lourido-Ferreira, 2003; Graham &Lowenfeld, 1986; Lesieur, 2001; Stewart, Zack, Collins, Klein, &Fragopoulos, 2008; Vachon&Bagby, 2009).

An effort was made to identify the most differentiated and most theoretically pertinent measures by which the cluster analysis should be conducted. After data were collected, bivariate correlations were obtained on the eight measures of associated features of the Pathways Model (i.e., SSS-V boredom susceptibility subscale, GRCS predictive control subscale, DOSPERT total score, PHQ-9 total score, GAD-7 total score, EIS-7 total score, ASRS total score, and SRPS primary psychopathy subscale (see Table 1). These correlations were examined in order to determine whether there was multi-collinearity among measures and to help identify the most differentiated of the eight measures. The two instruments most highly correlated were the PHQ-9 (depression) and GAD-7 (anxiety; r = .81). A decision to retain the PHQ-9 in the cluster analysis was made, and to remove the GAD-7. This decision was made based on the fact that the PHQ-9 was the most differentiated of these scales from other instruments. Additionally, the GAD-7 shared substantial collinearity with another theoretically important measure, the EIS (impulsivity; r= .42). Two other subscales were removed from consideration for the cluster analysis, the GRCS predictive control subscale, and the ASRS (ADHD assessment). The GRCS predictive control subscale was not included because, according to the Pathways Model, all three proposed subtypes should be comprised of gamblers that share irrational gambling cognitions. Therefore, scores on this subscale should not be highly across clusters. The ASRS subscale was not included

due to substantial correlations with the PHQ-9 (r = .53) and the EIS (r = .51), two measures deemed among the most theoretically important and differentiated.

After removing the aforementioned four measures, it was determined that a hierarchical cluster analysis on five measures was most theoretically sound. Three of the five measures retained represented associated features of the Pathways Model's "Emotionally Vulnerable" subtype. This included the SSS-V boredom susceptibility subscale and DOSPERT measures (representing the personality components of the "Emotionally Vulnerable" gambler), and the PHQ-9 (representing one of the mood disturbance components of the "Emotionally Vulnerable" gambler). Two of the measures retained represented associated features of the Pathways Model's "Antisocial Impulsivist" subtype. These measures included the EIS-7 (impulsivity) and the SRPS primary psychopathy subscale (anti-social behavior). Because all participants, regardless of cluster membership, should possess traits associated with the Pathways Model's "Behaviorally Conditioned" gambler, it was deemed unnecessary to include associated features from that subtype.

Cluster Analysis

After making the decision to retain the SSS-V boredom susceptibility subscale, the DOSPERT, the PHQ-9, the EIS-7, and the SRPS primary psychopathy subscale, a hierarchical cluster analysis was conducted on these five measures of associated features of the Pathways Model. As recommended by counseling psychology literature, Ward's minimum variance method was used to agglomerate clusters based on the squared Euclidean distances between individual cases (Borgen& Barnett, 1987; Hair & Black, 2000).

Participants' scores on the five measures identified as most pertinent were converted into z-scores and used as clustering variables. In order to determine a final cluster solution, the resulting dendgrogram (see Figure 2) and distance changes within the agglomeration table (see Table 2) were examined. Additionally, consideration was given to the theoretical foundation laid by the Pathways Model and Milosevic and Ledgerwood's (2010) comprehensive review of pathological gambling suptyping literature. This examination revealed four distinct clusters, each of which were organized by distances of less than five squared Euclidean units.

Confirmatory Analysis

After identifying a four-cluster solution that appeared to be the best fit for the data, a multivariate analysis of variance (MANOVA) and discriminant analysis were conducted for confirmatory validation of the cluster solution. A MANOVA was conducted to test whether there were significant differences between each of the four identified clusters on each of the five associated features of the Pathways Model. The homogeneity of variance assumption was tested for the five variables, and it was determined that the assumptions were not met, as two of the Levene's*F* tests were statistically significant ($p > .05$). To account for this, another MANOVA (see Table 3) was conducted in which a random number generator was used to select 31 participants from the two largest clusters, so that each of the four clusters tested had similar numbers of participants. Results of the MANOVA were statistically significant (Wilks' Lambda = .059, $F(3, 119) = 37.91$, $p < .001$). This confirmed the fact that all four clusters were significantly different on each of the five variables.

Additionally, a discriminant function analysis was performed using the five associated features of the Pathways model as predictors of membership within the four clusters (see Table 4). The overall Chi-square test was significant (Wilks Lambda = .063, Chi-square = 64.215, df = 8, Canonical correlation = .910, p <.001). The three functions extracted accounted for 75.1% of the variance. Reclassification of cases based on the new canonical variables was highly successful: 94.4% of the cases were correctly reclassified into their original categories (See Table 5), confirming the fit of the four-cluster solution.

Cluster Solution

After the decision was made that a four-cluster solution was the best fit for the data, and this decision was validated by confirmatory analysis, data were examined to determine what differentiated each cluster. In order to do so, means and standard deviations were calculated for the entire sample on each of the five instruments: SSS-V Boredom Susceptibility subscale (M = 3.1; SD = 2.2), DOSPERT (M = 92.8; SD = 28.2), PHQ-9 (M = 7.5; SD = 6.8), EIS-7 (M = 7.6; SD = 4.7), and SRPS primary psychopathy subscale (M = 31.1; SD = 9.3). Mean scores on each of the five instruments within each cluster were then compared to the sample means to determine what differentiated each of the four clusters. Clusters were then labeled, based on patterns observed among mean scores of each instrument across clusters while giving consideration to theory, especially the Pathways Model's proposed three pathological gambler subtypes (see Table 6).

The first cluster (n = 31) was distinct from all other clusters in that it was the only cluster with elevated scores on the EIS-7 (M = *14.3;* +1.45 SD) and the SRPS

primary psychopathy subscale (*M* = 42.0, +1.17 *SD*). This suggests that members of this cluster were more impulsive and had greater antisocial tendencies than members of all other clusters. In addition, members of this cluster had elevated scores on all three other instruments: SSS-V Boredom Susceptibility subscale (*M* = 5.2; +.96*SD*), DOSPERT (risk-taking; *M* = 126.9; +1.21 *SD*), and PHQ-9 (depression; *M* = 13.5; + 89 *SD*). In giving consideration to the subtypes proposed by the Pathways Model, and in observing that members of this group seemed to closely resemble Blaszczynski and Nower's third PG pathway, this cluster was labeled *Antisocial Impulsivist*.

The second cluster (*n* = 53) was differentiated from other clusters in that scores on the SSS-V Boredom Susceptibility subscale (*M* = 4.1; +.46*SD*) and the DOSPERT (risk-taking; *M* = 104.7; +.42 *SD*) were higher than the third and fourth clusters, but that scores on the PHQ-9 (depression; *M* = 5.0; -.38 *SD*) were lower than the first and third clusters. Essentially, members of this cluster were more prone to boredom and had greater risk-taking needs, but reported fewer depression symptoms than the sample average. This cluster's scores on the EIS-7 (impulsivity; *M* = 7.0*;* -.13 *SD*) and the SRPS primary psychopathy subscale (*M* = 33.1, +.21*SD*) did not substantially differ from the sample means. This cluster's elevation of risk-taking and boredom proneness appear analogous to the personality features of Blaszczynski and Nower's second PG subtype, but the lower depression scores make for a poor fit with this subtype's mood features. Therefore, a decision was made to label this cluster based on its fit within the pathways model: *Emotionally Vulnerable – Risk and Boredom*.

The third cluster (*n* = 30) scores looked essentially opposite of the scores of the *Emotionally Vulnerable – Risk and Boredom* cluster, in that SSS-V Boredom

Susceptibility (*M* = 2.1; -.48 *SD*) and DOSPERT (*M* = 74.9; -1.12 *SD*) scores were substantially lower than the sample mean, while PHQ-9 (*M* = 15.8, +1.23 *SD*) scores were elevated. Additionally, SRPS primary psychopathy subscale (*M* = 25.7; -.58 *SD*) scores were lower than the sample mean. Scores on the EIS-7 (*M*= 7.9; +.08*SD*) were similar to the sample mean. To reflect the fact that this cluster appeared analogous to the mood features of Blaszczynski and Nower's second PG subtype but not the personality features, the cluster was labeled *Emotionally Vulnerable – Depression and Anxiety*. The decision to include anxiety in the cluster label was based on the fact that anxiety scores were highly correlated with depression scores, and members of this cluster had elevated scores on the GAD-7, as well.

The fourth cluster (*n* = 63) was distinct from all other clusters in that scores on all five instruments were low. Scores on the SSS-V Boredom Susceptibility subscale (*M* = 1.7; -.63), DOSPERT (*M* = 74.5; -.65 *SD*), PHQ-9 (*M* = 2.6; -.72 *SD*), EIS-7 (*M* = 4.6; -.51 *SD*), and SRPS primary psychopathy subscale (*M* = 26.7; -.51 *SD*) were all substantially lower than the sample means. This suggests that members of this cluster did not experience the associated mood and personality features associated with the second and third PG subtypes proposed by the Pathways Model, and are thus analogous to the first PG subtype. Therefore, this cluster was labeled *Behaviorally Conditioned*.

Discussion

The present study used associated features of Blaszczynski and Nower's (2002) theoretical Pathways Model to determine whether similar subtypes would be revealed after cluster analysis, and to identify potential discrepancies. The four-cluster solution that resulted was largely analogous to the Pathways Model's subtypes, with the

Behaviorally Conditioned and *Antisocial Impulsivist* clusters conforming to the first and third of Blaszczynski and Nower's PG subtypes. Blaszczynski and Nower's second PG subtype, the "Emotionally Vulnerable" gambler, was essentially parsed into two different clusters: *Emotionally Vulnerable – Risk & Boredom* and *Emotionally Vulnerable – Depression & Anxiety*. Further examination of the demographic characteristics of each cluster, as well as scores on additionally administered instruments not maintained for the cluster analysis, shed more light onto nuances of the four-cluster solution and its fit within the framework of the Pathways Model.

The Pathways Model posits that all problem and pathological gamblers are initially prone to develop a disorder through the ecological factors of availability and accessibility of gambling. Additionally, all problem and pathological gamblers become behaviorally conditioned and habituated to gambling and eventually begin "chasing" to recoup gambling losses, which leads to greater financial losses and eventual problem and pathological gambling. These are the characteristics associated with not only "Behaviorally Conditioned" gamblers, but are also foundational requirements for "Emotionally Vulnerable" and "Antisocial Impulsivist" gamblers. What differentiates "Emotionally Vulnerable" PGs from the "Behaviorally Conditioned" gamblers is the addition of premorbid emotional vulnerabilities. "Antisocial Impulsivist" gamblers also possess these emotional vulnerabilities, but additionally possess impulsive and antisocial personality characteristics that impact functioning. It is thus fair to assert that each of the three subtypes may be viewed as having ascending levels of problem and pathological gambling severity.

The first cluster identified, the *Antisocial Impulsivist* cluster, is comprised of gamblers who fit into the third and most severe of the Pathways Model's subtypes. These gamblers were not only the only group with elevated levels of impulsivity and antisocial features, but they also had elevated levels of boredom proneness, risk-taking needs, and depression. This suggests that this subtype not only possesses the same emotional vulnerabilities of the Pathways Model's second subtype, they actually possess these vulnerabilities at a more severe level than those who would fit into Blaszczynski and Nower's "Emotionally Vulnerable" subtype. Additionally, while scores from the GAD-7 (anxiety), ASRS (ADHD), and GRCS (irrational gambling cognitions) instruments were not retained for cluster analysis, members of the *Antisocial Impulsivist* cluster had higher scores on these three measures than the three other clusters. While the SOGS was developed as a screening instrument with a cutoff score indicating probable pathological gambling, it is notable that the mean SOGS score for this group was the highest of all four clusters (M = 12.1).

Other notable demographic findings are indicative of more specific characteristics of *Antisocial Impulsivist* cluster membership. For example, men are overrepresented in this cluster (83.9% vs. 63.8% of the total sample). Additionally, there is an overrepresentation in this cluster of favorite gambling activities that are more active and allow greater control of outcomes (poker: 32.3% vs. 21.5% of the total sample; blackjack: 19.4% vs. 11.9%, and sports betting: 19.4% vs. 5.1%). Not surprisingly, members of this cluster underreported slots as the favorite gambling activity (25.8% vs. 51.4%). It is likely that these preferences in gambling activities are explained by greater impulsivity and needs for arousal. It is also possible that increased

antisocial characteristics impact these gambling preferences, in which one's skill and control may be utilized to win money from other players (as in poker) or to try to "beat" the house (as in blackjack or sports betting).

The next two clusters identified, the *Emotionally Vulnerable – Risk and Boredom* and *Emotionally Vulnerable – Depression and Anxiety* clusters are notable in that they appear to represent two specific components of the Pathways Model's second gambler subtype, the "Emotionally Vulnerable" gambler. Specifically, the *Emotionally Vulnerable – Risk and Boredom* cluster is analogous to the personality features of this subtype, while the *Emotionally Vulnerable – Depression and Anxiety* cluster is analogous to the mood disturbance features. That is, cluster analysis revealed that gamblers who would likely be categorized as "Emotionally Vulnerable" within the Pathways Model paradigm may actually be better viewed as two distinct groups.

When looking at the demographics of these two clusters, perhaps the most significant difference is the gender composition. In the *Emotionally Vulnerable – Risk and Boredom* cluster, there is an overrepresentation of men (79.2% vs. 63.8% of the total sample), while the *Emotionally Vulnerable – Depression and Anxiety* has an overrepresentation of women (60.0% vs. 36.2%). This suggests that men who would likely be categorized as "Emotionally vulnerable" gamblers within the Pathways Model framework are likely to have greater risk-taking needs and boredom proneness than "Behaviorally Conditioned" gamblers, but do not experience depression or anxiety at greater levels. Alternatively, women in this category are more likely to report higher levels of depression and anxiety, but are less likely to possess the same risk-taking needs and susceptibility to boredom. Reported preferred gambling activities among

each cluster additionally demonstrate differentiation. In the *Emotionally Vulnerable – Risk and Boredom* cluster, there is an overrepresentation of poker players (34.0% vs. 21.5%) and an underrepresentation of slots players (37.7% vs. 51.4%). Conversely, members of the *Emotionally Vulnerable – Depression and Anxiety* report slots as their favorite gambling activity at an overrepresented level (83.3% vs. 51.4%) and substantially underreport three gambling activities associated with control and action (poker: 6.7% vs. 21.5%; blackjack: 0% vs. 11.9%; and sports betting: 3.3% vs. 5.1%). This suggests that members of these two clusters likely gamble as a way of meeting different emotional needs. That is, members of the *Emotionally Vulnerable – Risk and Boredom*group may typically participate in more active gambling activities as a way of meeting their needs to relieve boredom and take risks, while members of the *Emotionally Vulnerable – Depression and Anxiety* cluster may participate in more passive gambling activities as a way of escaping from a dysphoric mood. This discrepancy may be understood by considering Lesieur and Blume's (1991) conceptualization of "action" and "escape" gamblers, who gamble in order to meet different needs.

The final group, the *Behaviorally Conditioned* cluster, appears to be analogous to the Pathways Model's first gambler subtype, the "Behaviorally Conditioned" gambler. This group is comprised of participants who either meet criteria for problem or pathological gambling or report gambling at least weekly, but do not report the same emotional vulnerabilities or personality characteristics as the other three groups. Not surprisingly, the participants in this cluster reported the lowest mean SOGS score among all four clusters ($M = 4.2$). This average score is actually slightly below the

SOGS cutoff of five that indicates probable pathological gambling. Among this cluster of 63 participants, 20 scored a five or higher on the SOGS, while an additional 13 scored a three or four, indicating problem gambling. The remaining 30 participants did not meet the cutoff for problem or pathological gambling. The fact that this somewhat heterogenous group of participants clustered together on measures of boredom susceptibility, risk-taking, depression, impulsivity, and antisocial features suggests that there are people who meet problem and pathological gambling criteria, but do not possess the same risk factors that may make pathological gambling more likely or more severe. These people who meet problem and pathological gambling criteria likely gamble due to the reasons postulated by the Pathways Model; they have access to gambling, become conditioned to gambling behaviors, chase losses and begin suffering financial consequences.

The findings of the present study suggest two significant implications for the future of gambler subtyping research. The first of these implications is that the results provide further empirical evidence in support of the Pathways Model. Hierarchical cluster analysis of five key features of the model revealed 4 subtypes of gamblers that are generally analogous to the "Behaviorally Conditioned," "Emotionally Vulnerable," and "Antisocial Impulsivist" subtypes of the Pathways Model. This reaffirms the understanding of problem and pathological gamblers as a heterogenous group in which different gamblers possess different risk factors and severity levels of biological and emotional vulnerabilities, as well as psychopathology. As suggested by Milosevic and Ledgerwood (2010), the time has come for the Pathways Model to be utilized as the

paradigm by which problem and pathological gambling researchers conceptualize gambler subtypes.

The second implication of the present study's findings is that the second Pathways Model subtype, the "Emotionally Vulnerable" gambler, may be better understood as two subsets (see Figure 3). Gamblers who have emotional vulnerabilities that make them more likely to become pathological gamblers appear to cluster separately according to the personality features of boredom proneness and risk-taking, and the mood disturbances of depression and anxiety. Furthermore, there appears to be a gender component related to these subsets, as men may be more likely to possess the emotional vulnerabilities of personality, while women may be more likely to possess mood disturbances. Much of the past research on gambler subtypes that was incorporated into the Pathways Model was based on primarily male samples, and the findings of the present study suggest that further investigation into the ways that men and women may possess different vulnerabilities that lead them to pathological gambling is warranted.

The findings of the present study contribute to a growing body of literature suggesting that there is significant heterogeneity among problem and pathological gamblers. While *pathological gambling* is a diagnosable disorder in the DSM-IV, it is apparent that those meeting criteria possess a wide range of motivations for their gambling behaviors and may possess a variety of associated comorbid psychological stressors. Furthermore, those who do not meet criteria for pathological gambling may possess similar motivations and stressors, and would likely benefit from psychological treatment. Thus, it is important that those presenting for gambling treatment are not

rigidly placed into a one-size-fits-all approach. The type and intensity of treatment required for those who resemble the *Behaviorally Conditioned* group is likely different than those who are *Antisocial Impulsivist*gamblers. Much of the treatment currently provided to problem and pathological gamblers is rooted in cognitive-behavioral and motivational interviewing approaches derived fromaddiction treatment practices. There is significant evidence of the efficacy of such treatments (e.g., Hodgins&Diskin, 2008; Morasco, Ledgerwood, Weinstock, &Petry, 2009), though it is likely that many gamblers may require more intense and comprehensive treatment than others. Furthermore, because motivations and individual pathways towards pathological gambling differ, it seems apparent that individualized treatment should address specific factors unique to each gambler. Though pathological gambling can be found in the DSM-IV, gambling behavior may be viewed as a coping strategy for those dealing with primary psychological distress. Comprehensive, individualized treatment should address not only behaviors but also underlying psychological problems. For example, a middle-aged woman who gambles as a way to cope with depression and anxiety would likely benefit from treatment addressing these motivations. Alternatively, a young man with antisocial personality features and high impulsivity may require a different course of treatment.

There are limitations to the present study. While *pathological gambling* is a diagnostic category in the DSM-IV, the construct of *problem gambling* is somewhat nebulous. By utilizing a sample that was not entirely comprised of gamblers who met SOGS criteria for pathological gambling, it was possible to determine that there were participants who met criteria that nevertheless clustered with and seemed to better

resemble those who did not meet criteria for pathological gambling. However, a more homogenous group of participants who all met SOGS criteria for pathological gambling may have yielded different results. Another limitation is that it was necessary to choose only five of many associated features of the Pathways Model by which participants were clustered. While these features comprised key components of two of the Pathways Model's subtypes, the analysis neglected to include substance use and biological vulnerabilities, two important constructs within the model. Future research related to the Pathways Model should likely consider the implications of these additional factors. Additionally, scores on one of the five instruments used to assess the associated features, the SSS-V boredom susceptibility, only demonstrated moderate internal consistency among survey respondents.

It should also be noted that there are certain limitations regarding the study's sample. Previous research on problem and pathological gambler subtyping has often been demographically homogenous; samples have generally had overrepresentations of White men. While this study had adequate representation of female gamblers, non-White gamblers were underrepresented. Thus, the generalizability of this study to ethnic minority populations may be limited.

References

Aasved, M. (2002). The psychodynamics and psychology of gambling. Springfield, IL: Charles C Thomas.

Adler, L. A., Spencer, T., Faraone, S. V., Kessler, R. C., Howes, M. J., Biederman, J., and Secnik, K. (2006). Validity of pilot adult ADHD self-report scale (ASRS) to rate adult ADHD symptoms. *Annals of Clinical Psychiatry*, *18*(3), 145-148.

Blais, A., & Weber, E. U. (2006). A Domain-Specific Risk-Taking (DOSPERT) scale for adult populations. *Judgment and Decision Making*, *1*(1), 33-47.

Blaszczynski, A., &Farell, E. (1998). A case series of 44 completed gambling-related suicides. *Journal of Gambling Studies*, *14*(2), 93-109.

Blaszczynski, A., &Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction*, 97, 487-499.

Bonnaire, C., Bungener, C., &Varescon, I. (2009). Subtypes of French pathological gamblers: Comparison of sensation seeking, alexithymia and depression scores. *Journal of Gambling Studies*, *25*, 455-471.

Borgen, F. H., & Barnett, F. H. (1987). Applying cluster analysis in counseling psychology research. *Journal of Counseling Pychology*, *34*(4), 456-468.

Cunningham-Williams, R. M., Cottler, L. B., Compton, W. M., &Spitznagel, E. L. (1998). Taking chances: Problem gamblers and mental health disorders--Results from the St. Louis Epidemiological Catchment Area (ECA) Study. *American Journal of Public Health*, *88*(7), 1093-1096.

Eysenck, S. B. G., &Eysenck, H. J. (1978). Impulsiveness and venturesomeness: Their position in a dimensional system of personality description. *Psychological Reports*, *43*, 1247-1255.

Gonzalez-Ibanez, A., Aymami, M. N., Jimenez, S., Domenech, J. M., Granero, R., Lourido-Ferreira, M. R. (2003). Assessment of pathological gamblers who use slot machines.*Psychological Reports*, *93*(3), 707-716.

Graham, J. R., &Lowenfeld, B. H. (1986). Personality dimensions of the pathological gambler.*Journal of Gambling Behavior*, *2*, 58-66.

Hair, J. F., & Black, W. C. (2000). Cluster analysis. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 147-205). Washington, DC: American Psychological Association.

Hodgins, D., &Diskin, K. M. (2008). Motivational interviewing in the treatment of

problem and pathological gambling. In H. Arkowitz, H. A. Westra, & W. R. Miller (Eds.), *Motivational interviewing in the treatment of problem and pathological gambling* (pp. 225-248). New York: Guilford Press.

Hodgins, D. C., Mansley, C., &Thygesen, K. (2006). Risk factors for suicide ideation and attempts among pathological gamblers. *The American Journal on Addictions*, *15*, 303-310.

Ibañez, A., Blanco, C., Donahue, E., Lesieur, H. R., Pérez de Castro, I., Fernández-Piqueras, J., &Sáiz-Ruiz, J. (2001). Psychiatric comorbidity in pathological gamblers seeking treatment.*American Journal of Psychiatry*, *158*, 1733-1735.

Johansson, A., Grant, J. E., Kim, S., Odlaug, B. L., &Götestam, K. (2009). Risk factors for problematic gambling: A critical literature review. *Journal of Gambling Studies*, *25*(1), 67-92.

Kallmen, H., Andersson, P., &Andren, A. (2008). Are irrational beliefs and depressive mood more common among problem gamblers than non-gamblers? A survey study of Swedish problem gamblers and controls.*Journal of Gambling Studies*, *24*(4), 441-450.

Kessler, R. C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., Howes, M. J., Jin, R., Secnik, K., Spencer, T., Ustun, T. B., & Walters, E. E. (2005). The World Health Organization adult ADHD self-report scale (ASRS): A short screening scale for use in the general population. *Psychological Medicine*, *35*, 245-256.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606-613.

Ledgerwood, D. M., &Petry, N. M. Subtyping pathological gamblers based on impulsivity, depression, and anxiety. (2010). *Psychology of Addictive Behaviors*, *24*(4), 680-688.

Ledgerwood, D. M., Steinberg, M. A., Wu, R., & Potenza, M. N. (2005).Self-reported gambling-related suicidality among gambling helpline callers.*Psychology of Addictive Behaviors*, *19*(2), 175-183.

Lesieur, H. R. (2001). Cluster analysis of types of inpatient pathological gamblers. Dissertation Abstracts International, 62B, 2065.

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

Lesieur, H. R., &Blume, S. B. (1991) When lady luck loses: Women and compulsive gambling. In N. Van Den Bergh (Ed.), *Feminst perspectives on addiction* (pp. 181-197). New York: Springer Publishing Co.

Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a noninstitutionalized population. *Journal of Personality and Social Psychology*, *68*(1), 151-158.

Lorains, F. K., Cowlishaw, S., & Thomas, S. A. (2011). Prevalence of comorbid disorders in problem and pathological gambling: Systematic review and meta-analysis of population surveys. *Addiction*, 106(3), 490-498

Lowe, B., Decker, Ol, Muller, S., Brahler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population.*Medical Care*, *46*(3), 266-274.

Mazur, J. (2010). What's luck got to do with it?: The history, mathematics, and psychology behind the gambler's illusion. Princeton, NJ: Princeton University Press.

Milosevic, A., &Ledgerwood, D. M. (2010). The subtyping of pathological gambing: A comprehensive review. *Clinical Psychology Review*, *30*, 988-998.

Morasco, B. J., Ledgerwood, D. M., Weinstock, D. M., &Petry, N. M. (2009). Cognitive-behavioral approaches to pathological gambling. In G. Simos (Ed.), *Cognitive behavior therapy: A guide for the practising clinician, Vol. 2* (pp. 112-126). New York: Routledge/Taylor & Francis Group.

Nower, L., &Blaszczynski, A. (2004). The Pathways Model as harm minimization for youthgamblers in educational settings. *Child & Adolescent Socail Work Journal*, *21*(1), 25-45.

Penfold, A., Hatcher, S., Sullivan, S., & Collins, N. (2006). Gambling problems and attempted suicide: Part II-Alcohol abuse increases suicide risk. *International Journal of Mental Health and Addiction*, *4*(3), 273-279.

Petry N. M. (2005). Pathological gambling: Etiology, comorbidity, and treatment. Washington, DC: American Psychological Society.

Petry, N. M., Stinson, F. S., & Grant, B. F. (2005). Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: Results from the National Epidemiological Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry*, *66*(5), 564–74.

Raylu, N., &Tian, P. S. O. (2004). The gambling related cognitions scale (GRCS): Development, confirmatory factor validation and psychometric properties. *Addiction*, *99*, 757-769.

Sacco, P., Cunningham-Williams, R. M., Ostmann, E., &Spitznagel, E. (2008). The association between gambling pathology and personality disorders.*Journal of Psychiatric Research*, *42*(13), 1122-1130.

Seibert, L. A., Miller, J. D., Few, L. R., Zeichner, A., &Lynam, D. R. (2010). An examination of the structure of self-report psychopathy measures and their relations with general traits and externalizing behaviors.*Personality Disorders: Theory, Research, and Treatment*, doi:10.1037/a0019232.

Spitzer, R. L., Kroenke, K., Williamsn, J. B. W., & Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092-1097.

Ste-Marie, C., Gupta, R., &Derevensky, J. L. (2006). Anxiety and social stress related to adolescent gambling behavior and substance use. *Journal of Child & Adolescent Substance Abuse*, *15*(4), 55-74.

Stewart, S. H., Zack, M., Collins, P., Klein, R. M., &Fragopoulos, F. (2008). Subtyping pathological gamblers on the basis of affective motivations for gambling: Relations to gambing problems, drinking problems, and affective motivations for drinking. *Psychology of Addictive Behaviors*, *22*, 257-268.

Turner, N. E., Jain, U., Spence, W., &Zangeneh, M. (2008). Pathways to pathological gambling: Component analysis of variables related to pathological gambling. *International Gambling Stuedies*, *8*(3), 281-298.

Vachon, D. D., &Bagby, R. M. (2009). Pathological gambling subtypes.*Psychological Assessment*, *21*, 608-615.

Wickwire, Jr., E. M., Whelan, J. P., West, R., Meyers, A., McCausland, C., &Leullen, J. (2007). Perceived availability, risks, and benefits of gambling among college students.*Journal of Gambling Studies*, *23*(4), 395-408.

Wittkampf, K. A., Naeije, L., Schene, A. H., Huyser, J., & van Weert, H. C. (2007). Diagnostic accuracy of the mood module of the Patient Health Questionnaire: A systematic review. *General Hospital Psychiatry*, *29*(5), 388-395.

Zuckerman M., Eysenck S. B. G., &Eysenck H. J. (1978). Sensation seeking in England and America: Cross-cultural, age and sex comparisons. *Journal of Consulting and Clinical Psychology,46*, 139–149.

Table 1

Correlation Matrix of Eight Original Instrument Scores

	SSSbs	GRCSpc	DOSPERT	PHQ	GAD	EIS	ASRS	SRPS
SSSbs	1	.166	.341	.125	.153	.408	.237	.317
GRCSpc	.166	1	.278	.235	.247	.328	.280	.355
DOSPERT	.341	.278	1	.165	.153	.449	.328	.383
PHQ	.125	.235	.165	1	.807	.379	.534	.229
GAD	.153	.247	.153	.807	1	.417	.499	.184
EIS	.408	.328	.449	.379	.417	1	.509	.344
ASRS	.237	.280	.328	.534	.499	.509	1	.175
SRPS	.317	.355	.383	.229	.184	.344	.175	1

Note. SSbs = boredom susceptibility; GRCSpc = predictive control subscale; DOSPERT = risk-taking; PHQ = depression; GAD = anxiety; EIS = impulsivity; ASRS = ADHD features; SRPS = primary psychopathy features

Table 2

Agglomeration Schedule for Hierarchical Cluster Analysis

	Cluster Combined			Stage First Cluster Appears		
Stage	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
1	49	61	.010	0	0	60
2	52	159	.043	0	0	7
3	40	153	.079	0	0	51
4	56	59	.136	0	0	71
5	45	57	.218	0	0	68
6	58	154	.304	0	0	104
7	52	146	.409	2	0	17
8	44	148	.517	0	0	31
9	17	120	.637	0	0	74
10	62	72	.766	0	0	38
11	37	69	.912	0	0	37
12	47	149	1.063	0	0	38
13	68	152	1.219	0	0	104
14	21	28	1.384	0	0	129
15	89	101	1.552	0	0	94
16	64	145	1.732	0	0	62
17	52	78	1.917	7	0	53
18	48	65	2.105	0	0	32
19	126	129	2.294	0	0	46
20	46	160	2.488	0	0	49
21	43	77	2.683	0	0	68
22	167	174	2.883	0	0	75
23	169	177	3.087	0	0	106
24	96	98	3.300	0	0	128
25	53	156	3.519	0	0	30
26	10	15	3.741	0	0	79
27	55	151	3.986	0	0	113
28	7	24	4.233	0	0	118
29	70	158	4.490	0	0	121
30	53	60	4.750	25	0	134
31	44	147	5.016	8	0	49
32	48	75	5.283	18	0	116

33	20	29	5.555	0	0	73
34	136	137	5.845	0	0	125

	Cluster Combined			Stage First Cluster Appears		
Stage	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
32	48	75	5.283	18	0	116
33	20	29	5.555	0	0	73
34	136	137	5.845	0	0	125
35	38	150	6.139	0	0	96
36	41	143	6.434	0	0	113
37	37	39	6.730	11	0	57
38	47	62	7.026	12	10	110
39	54	76	7.339	0	0	72
40	116	128	7.653	0	0	127
41	32	175	7.969	0	0	97
42	30	127	8.287	0	0	85
43	11	112	8.616	0	0	70
44	73	155	8.949	0	0	86
45	18	115	9.287	0	0	93
46	113	126	9.629	0	19	74
47	131	132	9.981	0	0	88
48	117	118	10.343	0	0	99
49	44	46	10.709	31	20	71
50	104	105	11.077	0	0	103
51	40	142	11.457	3	0	112
52	13	107	11.838	0	0	80
53	52	67	12.232	17	0	66
54	170	172	12.647	0	0	91
55	22	23	13.063	0	0	73
56	81	88	13.481	0	0	92
57	37	141	13.910	37	0	96
58	33	164	14.342	0	0	131
59	83	100	14.780	0	0	120
60	49	66	15.219	1	0	110
61	31	163	15.660	0	0	123
62	63	64	16.115	0	16	72
63	79	82	16.588	0	0	92
64	12	111	17.067	0	0	152
65	165	166	17.586	0	0	83
66	52	157	18.123	53	0	90

67	74	144	18.662	0	0	116
68	43	45	19.201	21	5	130

	Cluster Combined			Stage First Cluster Appears		
Stage	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
69	14	114	19.771	0	0	127
70	11	109	20.344	43	0	101
71	44	56	20.939	49	4	112
72	54	63	21.549	39	62	124
73	20	22	22.181	33	55	136
74	17	113	22.821	9	46	99
75	167	173	23.492	22	0	106
76	4	86	24.165	0	0	120
77	26	121	24.859	0	0	103
78	138	161	25.568	0	0	109
79	10	19	26.286	26	0	118
80	13	119	27.023	52	0	111
81	91	95	27.784	0	0	132
82	35	140	28.556	0	0	98
83	139	165	29.338	0	65	137
84	106	108	30.153	0	0	143
85	30	130	30.979	42	0	133
86	51	73	31.810	0	44	134
87	90	92	32.645	0	0	105
88	122	131	33.492	0	47	136
89	36	42	34.403	0	0	130
90	52	71	35.335	66	0	124
91	168	170	36.274	0	54	131
92	79	81	37.214	63	56	115
93	9	18	38.174	0	45	144
94	5	89	39.145	0	15	117
95	27	125	40.116	0	0	102
96	37	38	41.100	57	35	147
97	32	171	42.105	41	0	151
98	35	176	43.111	82	0	151
99	17	117	44.148	74	48	150
100	94	103	45.223	0	0	132
101	11	16	46.334	70	0	108
102	25	27	47.473	0	95	138
103	26	104	48.614	77	50	146

104	58	68	49.788	6	13	141
105	90	97	50.991	87	0	148

	Cluster Combined			Stage First Cluster Appears		
Stage	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
106	167	169	52.206	75	23	145
107	80	87	53.426	0	0	139
108	11	110	54.651	101	0	143
109	138	162	55.880	78	0	123
110	47	49	57.155	38	60	126
111	8	13	58.438	0	80	146
112	40	44	59.751	51	71	121
113	41	55	61.115	36	27	156
114	134	135	62.493	0	0	125
115	79	84	63.897	92	0	153
116	48	74	65.326	32	67	149
117	5	102	66.769	94	0	148
118	7	10	68.243	28	79	144
119	2	3	69.783	0	0	135
120	4	83	71.325	76	59	153
121	40	70	72.934	112	29	147
122	85	93	74.569	0	0	154
123	31	138	76.223	61	109	140
124	52	54	77.914	90	72	155
125	134	136	79.644	114	34	142
126	47	50	81.402	110	0	155
127	14	116	83.219	69	40	133
128	6	96	85.278	0	24	159
129	21	123	87.450	14	0	158
130	36	43	89.647	89	68	141
131	33	168	91.845	58	91	140
132	91	94	94.064	81	100	164
133	14	30	96.367	127	85	150
134	51	53	98.682	86	30	149
135	2	99	101.059	119	0	168
136	20	122	103.494	73	88	158
137	34	139	106.067	0	83	145
138	25	124	108.746	102	0	157
139	1	80	111.645	0	107	167

140	31	33	114.679	123	131	166
141	36	58	118.038	130	104	160
142	133	134	121.398	0	125	166

	Cluster Combined			Stage First Cluster Appears		
Stage	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
143	11	106	124.803	108	84	152
144	7	9	128.246	118	93	163
145	34	167	131.711	137	106	161
146	8	26	135.588	111	103	157
147	37	40	139.587	96	121	156
148	5	90	143.601	117	105	159
149	48	51	147.719	116	134	165
150	14	17	152.040	133	99	162
151	32	35	156.666	97	98	161
152	11	12	161.690	143	64	172
153	4	79	166.951	120	115	154
154	4	85	172.942	153	122	167
155	47	52	179.058	126	124	165
156	37	41	185.888	147	113	160
157	8	25	192.779	146	138	163
158	20	21	199.679	136	129	162
159	5	6	208.642	148	128	164
160	36	37	218.570	141	156	171
161	32	34	228.840	151	145	170
162	14	20	239.459	150	158	172
163	7	8	251.420	144	157	173
164	5	91	263.401	159	132	169
165	47	48	275.691	155	149	171
166	31	133	288.249	140	142	170
167	1	4	302.777	139	154	168
168	1	2	318.839	167	135	169
169	1	5	339.548	168	164	176
170	31	32	361.337	166	161	174
171	36	47	386.505	160	165	174
172	11	14	414.581	152	162	173
173	7	11	445.069	163	172	175
174	31	36	533.065	170	171	175
175	7	31	630.155	173	174	176

176	1	7	880.000	169	175	0

Table 3

Between-Subjects Effects from MANOVA of 4-Cluster Solution

	Mean Square	*F*	*p*	Partial Eta-Squared
SSbs	85.45	31.60	<.001	.443
DOSPERT	20555.33	61.38	<.001	.607
PHQ	1255.07	57.87	<.001	.593
EIS	511.22	45.27	<.001	.533
SRPS	1751.47	31.53	<.001	.443

Note. SSbs = boredom susceptibility; DOSPERT = risk-taking; PHQ = depression; EIS = impulsivity; SRPS = primarypsychopathy features.

Table 4

Summary of Canonical Discriminant Functions

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	4.822[a]	75.1	75.1	.910
2	1.506[a]	23.5	98.6	.775
3	.091[a]	1.4	100.0	.288

Test of Function(s)	Wilks' Lambda	Chi-square	df	*p*
1 through 3	.063	474.558	15	.000
2 through 3	.366	172.441	8	.000
3	.917	14.863	3	.002

Table 5

Discriminant Analysis Classification Results

	Predicted Group Membership				
	AI	EV-R&B	EV-D&A	BC	Total
Antisocial Impulsivist	93.5	3.2	3.2	.0	100.0
Emotionally Vulnerable – Risk & Boredom	1.9	90.6	1.9	5.7	100.0
Emotionally Vulnerable – Depression & Anxiety	.0	.0	96.7	3.3	100.0
Behaviorally Conditioned	.0	3.2	.0	96.8	100.0

Note. 94.4% of original grouped cases correctly classified

Table 6

Means and Standard Deviations of Four Cluster Solution

Total Sample (N = 177)	Mean	SD
BS	3.10	2.18
DOSPERT	92.79	28.24
PHQ	7.47	6.81
EIS	7.57	4.66
SRPS	31.11	9.29

Antisocial Impulsivist	Mean	SD
BS	5.19	2.20
DOSPERT	126.94	23.44
PHQ	13.55	6.21
EIS	14.32	2.47
SRPS	42.00	9.21

Emotionally Vulnerable – Risk & Boredom	Mean	SD
BS	4.09	1.86
DOSPERT	104.74	21.57
PHQ	5.04	3.56
EIS	6.96	3.23
SRPS	33.06	8.30

Emotionally Vulnerable – Depression & Anxiety	Mean	SD
BS	2.07	1.46
DOSPERT	74.90	15.96
PHQ	15.83	5.92
EIS	7.90	4.16
SRPS	25.77	6.10

Behaviorally Conditioned	Mean	SD
BS	1.73	1.32
DOSPERT	74.46	16.98
PHQ	2.56	2.05
EIS	4.60	3.14
SRPS	26.67	5.6

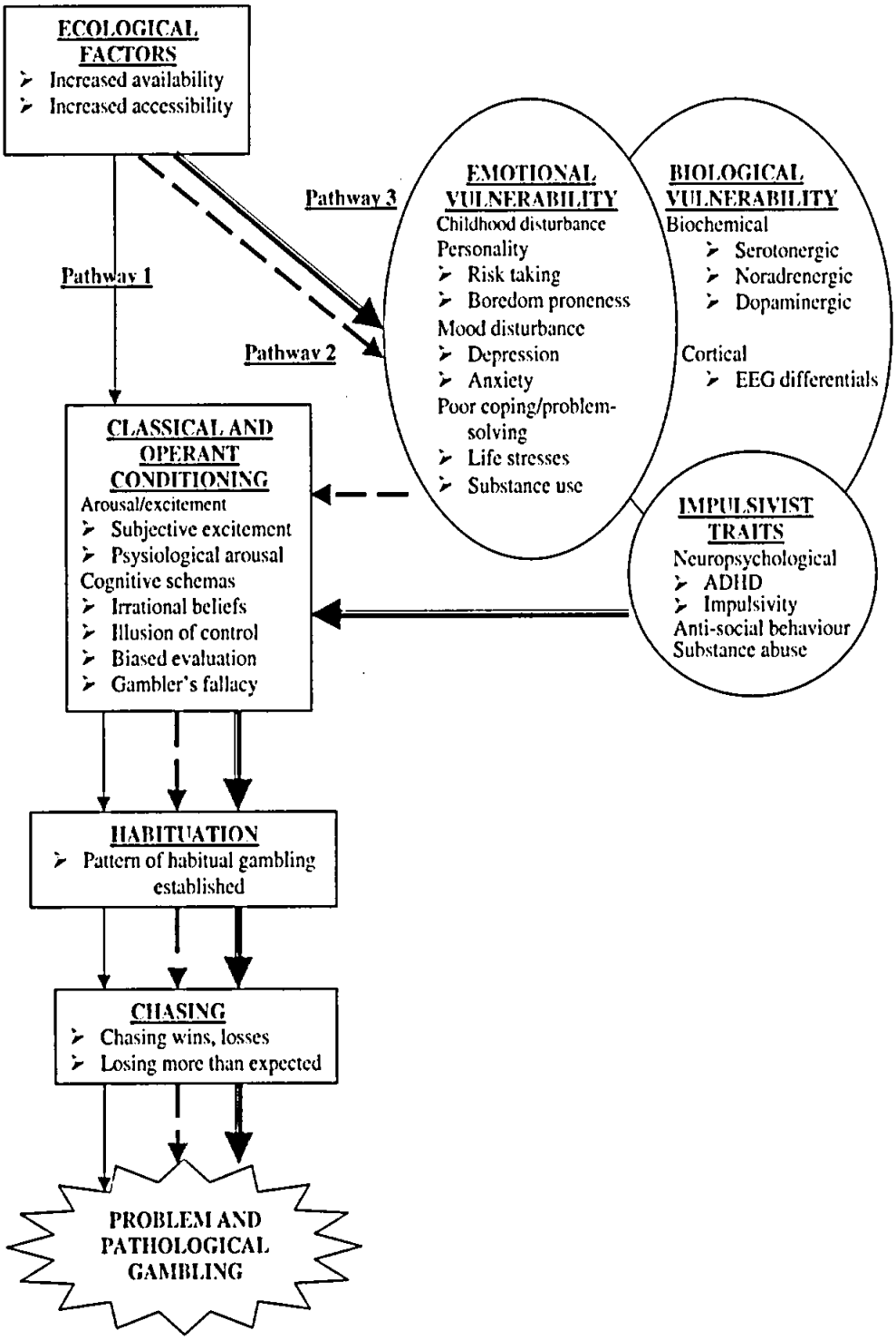


*Figure 1.*The Pathways Model (Blaszczynski&Nower, 2002).

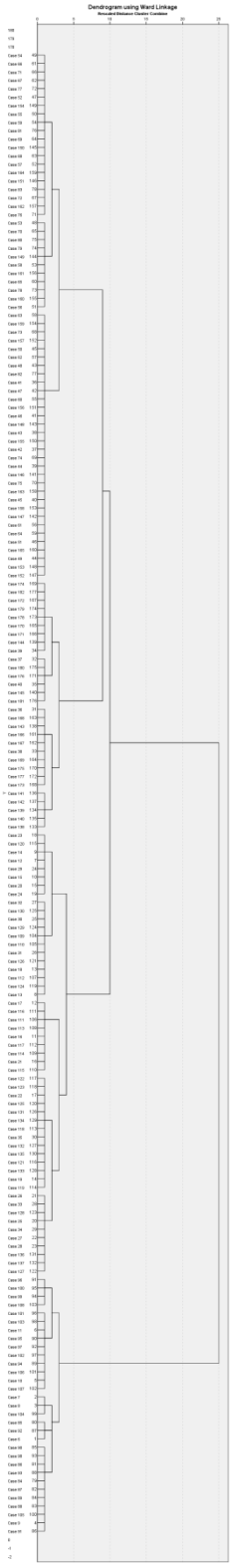


*Figure 2.*Dendrogram of the hierarchical cluster analysis for the 5 associated features of the Pathways Model.

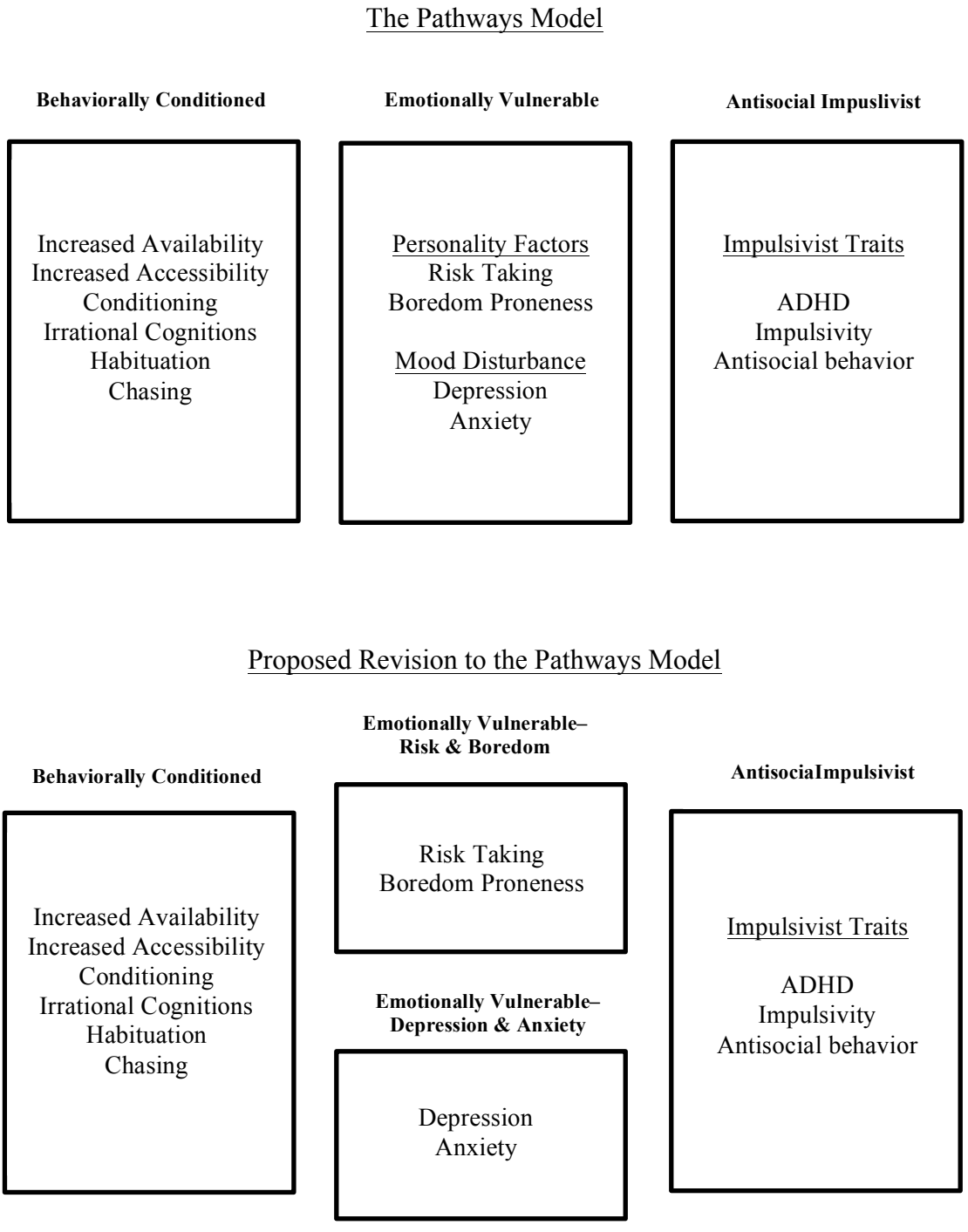


Figure 3. Comparison of Pathways Model to present study's findings.

Appendix A: Online Questionnaire

University of Oklahoma
Institutional Review Board
Information Sheet to Participate in a Research Study

Project Title: Problem and Pathological Gambler Subtypes: A Cluster Analysis of Associated Features of Blaszczynski and Nower's Pathways Model
Principal Investigator: Mark Yapelli
Department: Educational Psychology

You are being asked to volunteer for this research study. This study is being conducted at The University of Oklahoma. You were selected as a possible participant because you are between the ages of 18 and 64 and have gambled in the past.

Please read this information sheet and contact me to ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study
The purpose of this study is to determine new ways to classify problem gambling behavior according to severity level and associated characteristics.

Number of Participants:
About 200 people will take part in this study.

Procedures:
If you agree to be in this study, you will be asked to complete a questionnaire including items that ask you to identify gambling behaviors and certain characteristics.

Length of Participation:
Completing the questionnaire should take approximately 30 minutes.

Risks and Benefits
The study has the following risks: By asking you to answer several questions about gambling behaviors, it is possible that you may be triggered and thus be more likely to have an urge to gamble after completing the survey. Additionally, completing the survey may make you aware of a potential gambling problem, and cause minimal distress.

If you become distressed during or after completing the survey, you may contact the following resource: The Problem and Compulsive Gambling Hotline: 1-800-522-4700

The benefits to participation are: None.

Compensation:
After completing the survey, you will be given the option to provide an email address to which a 10-dollar Wal-Mart gift certificate will be sent.

Confidentiality:
In published reports, there will be no information included that will make it possible to identify you. Data will be collected anonymously. Research records will be stored securely and only approved researchers will have access to the records.

There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the OU Institutional Review Board.
Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Contacts and Questions:
If you have concerns or complaints about the research, the researcher(s) conducting this study can be contacted at 405-325-2914 or markyapelli@ou.edu. Additionally, his faculty sponser may be contacted at: Jody Newman; 405-325-2914 or jlnewman@ou.edu

Contact the researcher(s) if you have questions or if you have experienced a research related injury.
If you have any questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other

than individuals on the research team or if you cannot reach the research team, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu.

Please keep this information sheet for your records. By providing information to the researcher(s), I am agreeing to participate in this study.

***1. By selecting "yes," you will be consenting to participate in the study and will be taken to the beginning of the survey.**

- ◯ Yes, I consent to participate in the study
- ◯ No, I do not consent to participate in the study

Information About You

In order to successfully complete our study, we would like to know more about you.
The information you provide will not be used to identify you in any way.

2. How did you learn about this survey?

- ◯ State Gambling Helpline
- ◯ Online Forum/Message Board
- ◯ Gambling Treatment Provider
- ◯ Gamblers Anonymous
- ◯ NCPG Website
- ◯ Facebook
- ◯ Twitter
- ◯ Flyer

Other (please specify)

*3. How old are you?

*4. In what state/province do you live?

5. Which ethnicity best applies to you?

- ◯ Black/African-American
- ◯ Hispanic or Latino/Latina
- ◯ Asian/Asian-American
- ◯ Arabic/Middle-Eastern
- ◯ Native American or American Indian
- ◯ White/Caucasian

Other (please specify)

*6. What is your gender?

- ◯ Male
- ◯ Female

Other (please specify)

***7. Have you ever been treated for a gambling problem?**

- ◯ Yes, I am currently in treatment
- ◯ Yes, I have been treated in the past
- ◯ No, I have never received treatment

***8. When was the last time you gambled?**

◯ Within the past week ◯ Within the past month ◯ Within the past 6 months ◯ Within the past year ◯ Over a year ago

***9. What is your favorite type of gambling?**

Other (please specify)

***10. Have you ever gambled online?**

◯ Yes ◯ No

11. How often do you gamble online?

- ◯ Daily
- ◯ 2 to 6 times/week
- ◯ About once/week
- ◯ 2-3 times/month
- ◯ About once/month
- ◯ Between 6-11 times/year
- ◯ Between 1-5 times/year

12. Approximately what percentage of your total gambling occurs online?

◯ 0% ◯ 25% ◯ 50% ◯ 75% ◯ 100%

***13. Please indicate which of the following types of gambling you have done in your lifetime.**

For each type, mark one answer: "Not at All," "Less than Once a Week," or "Once a Week or More." Please check one answer for each statement:

	Not at All	Less than Once a Week	Once a Week or More
Played cards for money	◯	◯	◯
Bet on horses, dogs, or other animals (at OTB, the track or with a bookie)	◯	◯	◯
Bet on sport (parlay cards, with bookie at Jai Alai)	◯	◯	◯
Played dice games, including craps, over and under or other dice games	◯	◯	◯
Went to casinos (legal or otherwise)	◯	◯	◯
Played the numbers or bet on lotteries	◯	◯	◯
Played bingo	◯	◯	◯
Played the stock and/or commodities market	◯	◯	◯
Played slot machines, poker machines, or other gambling machines	◯	◯	◯
Bowled, shot pool, played golf, or some other game of skill for money	◯	◯	◯
Played pull tabs or "paper" games other than lotteries	◯	◯	◯
Some form of gambling not listed above	◯	◯	◯

***14. What is the largest amount of money you have ever gambled with on any one-day?**

- ◯ Never gambled
- ◯ $1.00 or less
- ◯ More than $1.00 up to $10.00
- ◯ More than $10.00 up to $100.00
- ◯ More than $100.00 up to $1,000.00
- ◯ More than $1,000.00 up to $10,000.00
- ◯ More than $10,000.00

***15. Check which of the following people in your life has (or had) a gambling problem.**

- ☐ No one
- ☐ Father
- ☐ Brother/Sister
- ☐ My Child(ren)
- ☐ A Friend or Someone Important in My Life
- ☐ Mother
- ☐ My Spouse/Partner
- ☐ Another Relative

***16. When you gamble, how often do you go back another day to win back money you have lost?**

- ◯ Never
- ◯ Most of the Times I Lose
- ◯ Some of the Time (less than half the time I lose)
- ◯ Every Time I Lose

***17. Have you ever claimed to be winning money gambling, but weren't really? In fact, you lost?**

- ◯ Never
- ◯ Yes, less than half the time I lost
- ◯ Yes, most of the time

***18. Do you feel you have ever had a problem with betting or money gambling?**

- ◯ No
- ◯ Yes
- ◯ Yes, in the past, but not now

***19. Did you ever gamble more than you intended to?**

- ◯ Yes
- ◯ No

***20. Have people criticized your betting or told you that you had a problem, regardless of whether or not you thought it was true?**

- ◯ Yes
- ◯ No

***21. Have you ever felt guilty about the way you gamble, or what happens when you gamble?**

- ◯ Yes
- ◯ No

***22. Have you ever felt like you would like to stop betting money on gambling, but didn't think you could?**

- ◯ Yes
- ◯ No

***23. Have you ever hidden betting slips, lottery tickets, gambling money, IOUs, or other signs of betting or gambling from your spouse, children or other important people in your life?**

◯ Yes ◯ No

***24. Have you ever argued with people you live with over how you handle money?**

◯ Yes ◯ No

25. (If you answered "yes" to the previous question) Have money arguments ever centered on your gambling?

◯ Yes ◯ No

***26. Have you ever borrowed from someone and not paid them back as a result of your gambling?**

◯ Yes ◯ No

***27. Have you ever lost time from work (or school) due to betting money or gambling?**

◯ Yes ◯ No

28. If you borrowed money to gamble or to pay gambling debts, who or where did you borrow from (check "Yes or "No" for each)

	Yes	No
From household money	◯	◯
From your spouse	◯	◯
From other relatives or in-laws	◯	◯
From banks, loan companies, or credit unions	◯	◯
From credit cards	◯	◯
From loan sharks	◯	◯
You cashed in stocks, bonds, or other securities	◯	◯
You sold personal or family property	◯	◯
You borrowed on your checking accounts (passed bad checks)	◯	◯
You have (had) a credit line with a bookie	◯	◯
You have (had) a credit line with a casino	◯	◯

Interest and Preference Test

Directions:

Each of the items below contains two choices A and B. Please indicate which of the choices most describes your likes or the way you feel. In some cases you may find items in which both choices describe your likes or feelings. Please choose the one which better describes your likes of feelings. In some cases you may find items in which you do not like either choice. In these cases mark the choice you dislike least. Do not leave any items blank. It is important you respond to all items with only one choice, A or B. We are interested only in your likes or feelings, not in how others feel about these things or how one is supposed to feel. There are no right or wrong answers as in other kinds of tests. Be frank and give your honest appraisal of yourself.

***29. ----------**

◯ There are some movies I enjoy seeing a second or even third time.

◯ I can't stand watching a movie that I've seen before.

***30. ----------**

◯ I get bored seeing the same old faces.

◯ I like the comfortable familiarity of everyday friends.

***31. ----------**

◯ I dislike people who do or say things just to shock or upset others.

◯ When you can predict almost everything a person will do and say he or she must be a bore.

***32. ----------**

◯ I usually don't enjoy a movie or play where I can predict what will happen in advance.

◯ I don't mind watching a movie or play where I can predict what will happen in advance.

***33. ----------**

◯ I enjoy looking at home movies, videos, or travel slides.

◯ Looking at someone's home movies, videos, or travel slides bores me tremendously.

***34. ----------**

◯ I prefer friends who are excitingly unpredictable.

◯ I prefer friends who are reliable and predictable.

*35. ----------

◯ I enjoy spending time in the familiar surroundings of home.

◯ I get very restless if I have to stay around home for any length of time.

*36. ----------

◯ The worst social sin is to be rude.

◯ The worst social sin is to be a bore.

*37. ----------

◯ I like people who are sharp and witty even if they do sometimes insult others.

◯ I dislike people who have their fun at the expense of hurting the feelings of others.

*38. ----------

◯ People should dress according to some standard of taste, neatness, and style.

◯ People should dress in individual ways even if the effects are sometimes strange.

***39. Please indicate the extent to which you agree with the value expressed in each statement.**

	Strongly Disagree	Moderately Disagree	Mildly Disagree	Neither Agree or Disagree	Mildly Agree	Moderately Agree	Strongly Agree
Gambling makes me happier	◯	◯	◯	◯	◯	◯	◯
I can't function without gambling	◯	◯	◯	◯	◯	◯	◯
Losses when gambling are bound to be followed by a series of wins	◯	◯	◯	◯	◯	◯	◯
Relating my winnings to my skill and ability makes me continue gambling	◯	◯	◯	◯	◯	◯	◯
Gambling makes things seem better	◯	◯	◯	◯	◯	◯	◯
It is difficult to stop gambling as I am so out of control	◯	◯	◯	◯	◯	◯	◯
Specific numbers and colors can help increase my chances of winning	◯	◯	◯	◯	◯	◯	◯
A series of losses will provide me with a learning experience that will help me win later	◯	◯	◯	◯	◯	◯	◯
Relating my losses to bad luck and bad circumstances make me continue gambling	◯	◯	◯	◯	◯	◯	◯
Gambling makes the future brighter	◯	◯	◯	◯	◯	◯	◯
My desire to gamble is so overpowering	◯	◯	◯	◯	◯	◯	◯

***40. Please indicate the extent to which you agree with the value expressed in each statement.**

	Strongly Disagree	Moderately Disagree	Mildly Disagree	Neither Agree or Disagree	Mildly Agree	Moderately Agree	Strongly Agree
I collect specific objects that help increase my chances of winning	◯	◯	◯	◯	◯	◯	◯
When I have a win once, I will definitely win again	◯	◯	◯	◯	◯	◯	◯
Relating my losses to probability makes me continue gambling	◯	◯	◯	◯	◯	◯	◯
Having a gamble helps reduce tension and stress	◯	◯	◯	◯	◯	◯	◯
I'm not strong enough to stop gambling	◯	◯	◯	◯	◯	◯	◯
I have specific rituals and behaviors that increase my chances of winning	◯	◯	◯	◯	◯	◯	◯
There are times that I feel lucky and thus, gamble those times only	◯	◯	◯	◯	◯	◯	◯
Remembering how much money I won last time makes me continue gambling	◯	◯	◯	◯	◯	◯	◯
I will never be able to stop gambling	◯	◯	◯	◯	◯	◯	◯
I have some control over predicting my gambling wins	◯	◯	◯	◯	◯	◯	◯
If I keep changing my numbers, I have less chances of winning than if I keep the same numbers every time	◯	◯	◯	◯	◯	◯	◯

***41. For each of the following statements, please indicate the likelihood that you would engage in the described activity or behavior if you were to find yourself in that situation. Provide a rating from Extremely Unlikely to Extremely Likely using the following scale:**

	Extremely Unlikely	Moderately Unlikely	Somewhat Unlikely	Not Sure	Somewhat Likely	Moderately Likely	Extremely Likely
Admitting that your tastes are different from those of a friend	◯	◯	◯	◯	◯	◯	◯
Going camping in the wilderness	◯	◯	◯	◯	◯	◯	◯
Betting a day's income at the horse races	◯	◯	◯	◯	◯	◯	◯
Investing 10% of your annual income in a moderate growth mutual fund	◯	◯	◯	◯	◯	◯	◯
Drinking heavily at a social function	◯	◯	◯	◯	◯	◯	◯
Taking some questionable deductions on your income tax return	◯	◯	◯	◯	◯	◯	◯
Disagreeing with an authority figure on a major issue	◯	◯	◯	◯	◯	◯	◯
Betting a day's income at a high-stake poker game	◯	◯	◯	◯	◯	◯	◯
Having an affair with a married man/woman	◯	◯	◯	◯	◯	◯	◯
Passing off somebody else's work as your own	◯	◯	◯	◯	◯	◯	◯
Going down a ski run that is beyond your ability	◯	◯	◯	◯	◯	◯	◯
Investing 5% of your annual income in a very speculative stock	◯	◯	◯	◯	◯	◯	◯
Going whitewater rafting at high water in the spring	◯	◯	◯	◯	◯	◯	◯
Betting a day's income on the outcome of a sporting event	◯	◯	◯	◯	◯	◯	◯
Engaging in unprotected sex	◯	◯	◯	◯	◯	◯	◯

***42. For each of the following statements, please indicate the likelihood that you would engage in the described activity or behavior if you were to find yourself in that situation. Provide a rating from Extremely Unlikely to Extremely Likely using the following scale:**

	Extremely Unlikely	Moderately Unlikely	Somewhat Unlikely	Not Sure	Somewhat Likely	Moderately Likely	Extremely Likely
Revealing a friend's secret to someone else	◯	◯	◯	◯	◯	◯	◯
Driving a car without wearing a seat belt	◯	◯	◯	◯	◯	◯	◯
Investing 10% of your annual income in a new business venture	◯	◯	◯	◯	◯	◯	◯
Taking a skydiving class	◯	◯	◯	◯	◯	◯	◯
Riding a motorcycle without a helmet	◯	◯	◯	◯	◯	◯	◯
Choosing a career that you truly enjoy over a more secure one	◯	◯	◯	◯	◯	◯	◯
Speaking your mind about an unpopular issue in a meeting at work	◯	◯	◯	◯	◯	◯	◯
Sunbathing without sunscreen	◯	◯	◯	◯	◯	◯	◯
Bungee jumping off a tall bridge	◯	◯	◯	◯	◯	◯	◯
Piloting a small plane	◯	◯	◯	◯	◯	◯	◯
Walking home alone at night in an unsafe area of town	◯	◯	◯	◯	◯	◯	◯
Moving to a city far away from your extended family	◯	◯	◯	◯	◯	◯	◯
Starting a new career in your mid-thirties	◯	◯	◯	◯	◯	◯	◯
Leaving your young children alone at home while running an errand	◯	◯	◯	◯	◯	◯	◯
Not returning a wallet you found that contains $200	◯	◯	◯	◯	◯	◯	◯

***43. Over the last 2 weeks, how often have you been bothered by any of the following problems?**

	Not at All	Several Days	More Than Half the Days	Nearly Every Day
Little interest or pleasure in doing things	◯	◯	◯	◯
Feeling down, depressed, or hopeless	◯	◯	◯	◯
Trouble falling or staying asleep, or sleeping too much	◯	◯	◯	◯
Feeling tired or having little energy	◯	◯	◯	◯
Poor appetite or overeating	◯	◯	◯	◯
Feeling bad about yourself--or that you are a failure or have let yourself or your family down	◯	◯	◯	◯
Trouble concentrating on things, such as reading the newspaper or watching television	◯	◯	◯	◯
Moving or speaking so slowly that other people could have noticed? Or the opposite--being so fidgety or restless that you have been moving around a lot more than usual	◯	◯	◯	◯
Thoughts that you would be better off dead or of hurting yourself in some way	◯	◯	◯	◯

***44. Over the last 2 weeks, how often have you been bothered by the following problems?**

	Not at All	Several Days	Over Half the Days	Nearly Every Day
Feeling nervous, anxious, or on edge	◯	◯	◯	◯
Not being able to stop or control worrying	◯	◯	◯	◯
Worrying too much about different things	◯	◯	◯	◯
Trouble relaxing	◯	◯	◯	◯
Being so restless that it's hard to sit still	◯	◯	◯	◯
Becoming easily annoyed or irritable	◯	◯	◯	◯
Feeling afraid as if something awful might happen	◯	◯	◯	◯

***45. The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.**

	Never	Almost Never	Sometimes	Fairly Often	Very Often
In the last month, how often have you been upset because of something that happened unexpectedly?	◯	◯	◯	◯	◯
In the last month, how often have you felt that you were unable to control the important things in your life?	◯	◯	◯	◯	◯
In the last month, how often have you felt nervous and "stressed?"	◯	◯	◯	◯	◯
In the last month, how often have you felt confident about your ability to handle your personal problems?	◯	◯	◯	◯	◯
In the last month, how often have you felt that things were going your way?	◯	◯	◯	◯	◯
In the last month, how often have you found that you could not cope with all the things that you had to do?	◯	◯	◯	◯	◯
In the last month, how often have you been able to control irritations in your life?	◯	◯	◯	◯	◯
In the last month, how often have you felt that you were on top of things?	◯	◯	◯	◯	◯
In the last month, how often have you been angered because of things that were outside of your control?	◯	◯	◯	◯	◯
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	◯	◯	◯	◯	◯

***46. Please answer each question with either the YES or the NO following the questions. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the question.**

	Yes	No
Do you often buy things on impulse?	◯	◯
Do you generally do and say things without stopping to think?	◯	◯
Do you often get into a jam because you do things without thinking?	◯	◯
Are you an impulsive person?	◯	◯
Do you usually think carefully before doing anything?	◯	◯
Do you often do things on the spur of the moment?	◯	◯
Do you mostly speak before thinking things out?	◯	◯
Do you often get involved in things you later wish you could get out of?	◯	◯
Do you get so carried away by new and exciting ideas, that you never think of possible snags?	◯	◯
Do you need to use a lot of self control to keep out of trouble?	◯	◯
Would you agree that almost everything enjoyable is illegal or immoral?	◯	◯
Are you often surprised at people's reactions to what you do or say?	◯	◯
Do you think an evening out is more successful if it is unplanned or arranged at the last moment?	◯	◯
Do you usually work quickly without bothering to check?	◯	◯
Do you often change your interests?	◯	◯
Before making up your mind, do you consider all the advantages and disadvantages?	◯	◯
Do you prefer to sleep on it before making decisions?	◯	◯
When people shout at you, do you shout back?	◯	◯
Do you usually make up your mind quickly?	◯	◯

***47. Please answer the questions below, rating yourself on each of the criteria shown using the rating scale:**

	Never	Rarely	Sometimes	Often	Very Often
How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?	◯	◯	◯	◯	◯
How often do you have difficulty getting things in order when you have to do a task that requires organization?	◯	◯	◯	◯	◯
How often do you have problems remembering appointments or obligations?	◯	◯	◯	◯	◯
When you have a task that requires a lot of thought, how often do you avoid or delay getting started?	◯	◯	◯	◯	◯
How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?	◯	◯	◯	◯	◯
How often do you feel overly active and compelled to do things, like you were driven by a motor?	◯	◯	◯	◯	◯

***48. For each item below, state whether you disagree strongly, disagree somewhat, agree somewhat, or agree strongly**

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
Success is based on survival of the fittest; I am not concerned about the losers	◯	◯	◯	◯
For me, what's right is whatever I can get away with	◯	◯	◯	◯
In today's world, I feel justified in doing anything I can get away with to succeed	◯	◯	◯	◯
My main purpose in life is getting as many goodies as I can	◯	◯	◯	◯
Making a lot of money is my most important goal	◯	◯	◯	◯
I let others worry about higher values; my main concern is with the bottom line	◯	◯	◯	◯
People who are stupid enough to get ripped off usually deserve it	◯	◯	◯	◯
Looking out for myself is my top priority	◯	◯	◯	◯
I tell other people what they want to hear so that they will do what I want them to do	◯	◯	◯	◯
I would be upset if my success came at someone else's expense	◯	◯	◯	◯
I often admire a really clever scam	◯	◯	◯	◯
I make a point of trying not to hurt others in pursuit of my goals	◯	◯	◯	◯
I enjoy manipulating other people's feelings	◯	◯	◯	◯
I feel bad if my words or actions cause someone else to feel emotional pain	◯	◯	◯	◯
Even if I were trying very hard to sell something, I wouldn't lie about it	◯	◯	◯	◯
Cheating is not justified because it is unfair to others	◯	◯	◯	◯

***49. For each item below, state whether you disagree strongly, disagree somewhat, agree somewhat, or agree strongly**

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
I find myself in the same kinds of trouble, time after time	◯	◯	◯	◯
I am often bored	◯	◯	◯	◯
I find that I am able to pursue one goal for a long time	◯	◯	◯	◯
I don't plan anything very far in advance	◯	◯	◯	◯
I quickly lose interest in tasks I start	◯	◯	◯	◯
Most of my problems are due to the fact that other people just don't understand me	◯	◯	◯	◯
Before I do anything, I carefully consider the possible consequences	◯	◯	◯	◯
I have been in a lot of shouting matches with other people	◯	◯	◯	◯
When I get frustrated, I often "let off steam" by blowing my top	◯	◯	◯	◯
Love is overrated	◯	◯	◯	◯

***50. How many days did you drink alcohol in the past 30 days?**

***51. How many days did you drink alcohol to intoxication in the past 30 days?**

***52. How much money would you say you spent on alcohol in the past 30 days?**

***53. In the past 30 days, how many days have you experienced alcohol problems?**

***54. How troubled or bothered have you been by these alcohol problems in the past 30 days?**

◯ Not at all ◯ Slightly ◯ Moderately ◯ Considerably ◯ Extremely

***55. How important to you now is treatment for these alcohol problems?**

◯ Not at all ◯ Slightly ◯ Moderately ◯ Considerably ◯ Extremely

***56.**

	Yes	No
Heroin	◯	◯
Methadone	◯	◯
Other opiates/analgesics (Morphine; Dilaudid; Demerol; Percocet; Darvon; Talwin; Codeine; Tylenol 2,3,4; Syrups, Robittusin, Fentanyl)	◯	◯
Barbituarates (Nembutal, Seconol, Tuinol, Amytal, Pentobarbital, Secobarbital, Phenobarbital, Fiorinol)	◯	◯
Sedatives/Hypnotics/Tranquilizers (Valium, Xanax, Librium, Ativan, Serax, Quaaludes, Tranxene, Dalmane, Halcion, Miltown)	◯	◯
Cocaine (Cocaine Crystal, Free-Base Cocaine, or "Crack" or "Rock")	◯	◯
Amphetamines (Monster, Crank, Benzedrine, Dexedrine, Ritalin, Preludin, Methamphetamine, Speed, Ice, Crystal)	◯	◯
Cannabis (Marijuana, Hashish, Pot)	◯	◯
Hallucinogens (LSD [Acid], Mescaline, Mushrooms [Psilocybin], Peyote, Green, PCP [Phencyclidine], Angel Dust, Ecstasy)	◯	◯

***57. How many days have you used more than one substance (including alcohol) in the past 30 days?**

58. In the past 30 days, how many days have you experienced drug problems?

***59. How troubled or bothered have you been by these drug problems in the past 30 days?**

☐ Not at all ☐ Slightly ☐ Moderately ☐ Considerably ☐ Extremely

***60. How important to you now is treatment for these drug problems?**

☐ Not at all

☐ Slightly

☐ Moderately

☐ Considerably

☐ Extremely

You have completed the questionnaire. Thank you for your time!

If you wish, you may now enter an email address to which a 10-dollar Wal-Mart gift certificate will be sent. Your choice to provide this information is optional. The information will be stored securely and not be used to identify you or your responses in any way.

61. Enter the email address to which you wish to have the gift card sent:

You should receive your gift card within 1 week of completing this survey. If you have not received the card after 1 week, please email gamblingsurvey1@gmail.com to let the researcher know.

Appendix B: IRB Approval Letter

The UNIVERSITY of OKLAHOMA

Institutional Review Board for the Protection of Human Subjects

Approval of Initial Submission – Expedited Review – AP01

Date: February 20, 2012

IRB#: 0490

Principal Investigator: Mr. Mark F. Yapelli, MA

Approval Date: 02/19/2012

Expiration Date: 02/18/2013

Study Title: Problem and Pathological Gambler Subtypes: A Cluster Analysis of Associated Features of Blaszczynski and Nower's Pathways Model

Expedited Category: 7 - Low risk behavioral research

Collection/Use of PHI: No

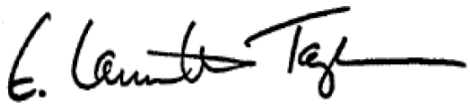
On behalf of the Institutional Review Board (IRB), I have reviewed and granted expedited approval of the above-referenced research study. To view the documents approved for this submission, open this study from the *My Studies* option, go to *Submission History*, go to *Completed Submissions* tab and then click the *Details* icon.

As principal investigator of this research study, you are responsible to:

- Conduct the research study in a manner consistent with the requirements of the IRB and federal regulations 45 CFR 46.
- Obtain informed consent and research privacy authorization using the currently approved, stamped forms and retain all original, signed forms, if applicable.
- Request approval from the IRB prior to implementing any/all modifications.
- Promptly report to the IRB any harm experienced by a participant that is both unanticipated and related per IRB policy.
- Maintain accurate and complete study records for evaluation by the HRPP Quality Improvement Program and, if applicable, inspection by regulatory agencies and/or the study sponsor.
- Promptly submit continuing review documents to the IRB upon notification approximately 60 days prior to the expiration date indicated above.

If you have questions about this notification or using iRIS, contact the IRB @ 405-325-8110 or irb@ou.edu.

Cordially,



E. Laurette Taylor, Ph.D.

Chair, Institutional Review Board

Appendix C: Prospectus

Chapter 1

Overview

Over the past decade, increased availability and widespread social acceptance of gambling in the United States, as well as in several countries throughout the world, have likely increased the number of adults who report gambling behaviors and who meet criteria for pathological gambling. Pathological gambling has been associated with several negative social and financial consequences (National Research Council [NRC], 1999) and has also been demonstrated to be associated with a number of comorbid psychological problems such as depression (Ibañez, 2001; Johansson, Grant, Kim, Odlaug, &Götestam, 2009; Kallmen, Andersson, &Adren, 2008; Lorains, Cowlishaw, & Thomas, 2011), anxiety disorders (Lorains, Cowlishaw, & Thomas, 2011; Petry, Stinson, & Grant, 2005; Ste-Marie, Gupta, &Derevensky, 2006) and personality disorders (Cunningham-Williams, Cottler, Compton, &Spitznagel, 1998; Cunningham-Williams, Ostmann, &Spitznagel, 2008; Petry et al., 2005; Pietrzak&Petry, 2004). Pathological gambling has also been associated with an increased risk for suicidality (Blaszczynski& Farrell, 1998; Hodgins, Mansley, &Thygesen, 2006; Ledgerwood, Steinberg, Wu, & Potenza, 2005; Penfold, Hatcher, Sullivan, & Collins, 2006).

Explanations for people's gambling motivations are generally rooted in behavioral and cognitive theories, in which gamblers are reinforced via behavioral and operant conditioning and continue to gamble due to irrational cognitions in which gamblers believe they are able to control outcomes and "beat" casinos that hold an unquestioned statistical advantage (Aasved, 2002; Mazur, 2010; Petry, 2005). However,

several contemporary theoretical models of pathological gambling suggest that, while conditioning and erroneous beliefs may explain pathological gambling at a fundamental level, those who gamble at more severe levels may be doing so in part because of greater emotional, biological, and psychological vulnerability (e.g., Blaszczynski&Nower, 2002; Graham &Lowenfeld, 1986; Stewart, Zack, Collins, Klein, &Fragopoulos, 2008).

Background of the Problem

Since the 1970s, gambling researchers have attempted to demonstrate that, while pathological gamblers as a group share certain characteristics, there are likely certain types of gamblers that vary according to etiology, motivation, personality, co-occurring disorders, and severity (Milosevic & Lidgerwood, 2010). To date, researchers and treatment professionals have not fully embraced any one model of pathological gambler subtypes. This has led to a scenario in which both researchers and treatment professionals have relied on a variety of frameworks and continue to create new models, rather than working to construct and empirically validate a unified theory. However, in their recent comprehensive review on pathological gambling subtyping, Milosevic and Ledgerwood (2010) noted similarities between nearly every model posited over the past 40 years with Blaszczynski and Nower's (2002) theoretical pathways model of problem and pathological gambling, calling for future research to further validate and build upon the model.

Statement of the Problem

The purpose of the current study is to empirically test the assumptions of Blaszczynski and Nower's (2002) pathways model. While there has been some research

conducted to validate the theory, to date there has not been a thorough empirical study examining the specific factors differentiating each of Blaszczynski and Nower's (2002) proposed subtypes of pathological gamblers. Studies specifically designed to explore the validity of Blaszczynski and Nower's (2002) typology are needed before researchers and treatment professionals unify around this as yet largely untested theory.

The present study contributes to the research on pathological gambling in two significant ways. First, this study adds to a growing body of research seeking to identify commonalities among a heterogeneous population of pathological gamblers, and to create a practical model of pathological gambler subtypes. Second, it serves to empirically validate and clarify a theoretical model that is already used in research and practice, and may serve to provide suggestions for future directions for the model. Recent literature (e.g., Milosevic &Ledgerwood, 2010) has suggested that the pathological gambling research field embrace Blaszczynski and Nower's pathways model based on a growing body of research; however, the model's assumptions have not been sufficiently tested empirically to warrant such a conclusion.

The foundation of the present study is rooted in a well-established literature base that has demonstrated biological, psychological, and social bases of gambling behaviors. The following chapter will present a comprehensive review of empirical and theoretical literature on pathological gambling. The chapter will initially present theoretical understandings of gambling behavior, current pathological gambling treatments, and a background of the measurement and assessment of pathological gambling. This will be followed by a review of prevalence studies and evidence of co-occurring disorders and personality features associated with pathological gambling.

Finally, the rationale for the current study will be elaborated, in which the key assumptions of the pathways model will be described, and a case for further validation of the model will be presented.

Chapter 2

Literature Review

Gambling Nomenclature

In pathological gambling research, the term *gambling* traditionally refers to money being wagered on games of chance. These games include cards (e.g., poker, casino table games), dice (e.g., craps), slot machines, lotteries (e.g., weekly drawings or scratch tickets), bingo, roulette, racing (e.g., horse or greyhound races), and sporting events (Petry, 2005).

The two most commonly used terms to classify disordered gambling are pathological gambling and problem gambling. *Pathological gambling* refers to "a mental disorder characterized by a continuous or periodic loss of control over gambling, a preoccupation with gambling and with obtaining money with which to gamble, irrational thinking, and a continuation of the behavior despite adverse consequences" (NRC, 1999, p. 21). *Problem gambling* refers to "gambling behavior that results in any harmful effects to the gambler, his or her family, significant others, friends, coworkers, etc." (NRC, 1999, p. 21). In essence, pathological gambling refers to a specific, diagnosable disorder whereas problem gambling refers to harmful gambling behavior that may not meet criteria for pathological gambling.

Behavioral Theories

Perhaps the most widely accepted explanation for why people gamble stems from the behavioral work of B. F. Skinner. According to Skinner's theory of operant conditioning, all behaviors are learned responses to stimuli, and gambling is no different. Learned behaviors are those that are reinforced, and, in gambling, monetary rewards serve as positive reinforcement for the behavior (Aasved, 2002).

Among the strongest schedules of reinforcement for maintaining a learned behavior is a variable ratio schedule, in which a reinforcer is provided after an average number of behaviors has occurred. A slot machine is an excellent example of a variable ratio schedule of reinforcement, as an approximate number of pulls of a slot machine will yield a win (Petry, 2005). In fact, most types of gambling involve variable-ratio schedules, as well as a variable-magnitude schedule of reinforcement (Chóliz, 2010). That is, no matter what has occurred during the previous bet, the next bet could theoretically always be a big winner. Thus, gamblers are not only reinforced by their actual wins, but may also be reinforced by persistence and "near-misses" (e.g., matching two of three spaces on a slot machine). Pathological gamblers do not win in the long-term (the odds make it literally impossible), but continue to gamble despite losing. Behavioral theorists believe that the uncertainty associated with the variable-ratio, variable-magnitude schedules of reinforcement is likely what allows losing gamblers to continue; casinos and other gambling proprietors prey on a false sense of hope. (Aasved, 2002; Chóliz, 2010).

Pavlov's theory of classical conditioning may also be used to explain certain gambling behaviors. The premise of classical conditioning contends that a behavior is a

reflexive response to a stimulus, and that this response may be elicited by an unrelated stimulus if it is presented often enough with an unconditioned stimulus. In relation to gambling, certain stimuli, such as the sound of casino chips or electronic machines or the shuffling of cards may induce arousal that reinforces the gambling experience (Aasved, 2002; Czerny, Koenig, & Turner, 2008). Superstitions of gamblers may be created in a similar way. For example, winning while holding a lucky charm or by playing the numbers of a loved one's birthday can lead gamblers to believe that these are more than coincidences (Petry, 2005).

Cognitive Theories

Cognitive theorists believe that the persistence of gambling despite losses stems from unrealistic thinking, or *irrational cognitions*. Because there is no way to win in the long-term, cognitive theorists believe that those thinking rationally would not continue to gamble. Assuming that financial reward is the ultimate goal of gambling, pathological gamblers must have irrational cognitions associated with their gambling behaviors (Aasved, 2002).

Among the most studied irrational gambling cognitions is that of *the gambler's fallacy*, a gambler's belief that he or she is "due for a win;" with every loss, the likelihood of winning increases. While every spin of a roulette wheel is an independent event, a gambler may believe that since the last four spins have landed on red, black will be a more likely outcome the next time (Aasved, 2002). Another irrational gambling cognition is the *illusion of control*, in which gamblers believe they have an ability to affect the outcome of a bet. For example, studies have demonstrated that people are more likely to bet more money at a craps table when it is their turn to throw

the dice, and that people consider lottery numbers that they have chosen to be more likely to win than those that are auto-selected by machines (Petry, 2005). According to cognitive theorists, this illusion of control is related to *attributional biases*. When a person wins money gambling, they are more likely to attribute it to their own personal skill, whereas a loss is more likely to be attributed to bad luck (Aasved, 2002). The illusion of control is among the most well established risk factors for pathological gambling (Johansson, Grant, Kim, Odlaug, &Götestam, 2009).

There is also some evidence to suggest that those who experience *beginner's luck*— that is, winning in their earliest gambling endeavors— are more likely to become pathological gamblers. An early history of gambling success may cause gamblers to expect winning and, therefore, encourage them to persist through losing gambling sessions. Gamblers have also demonstrated a selective memory bias, in which they tend to remember their wins and forget their losses (Aasved, 2002).

When a gambler has persisted and has continued to lose greater and greater sums of money, they may be subject to what cognitive theorists call *entrapment*. When this occurs, gamblers believe that they have lost so much money that their only hope is to keep gambling in an attempt to win it all back. Entrapment is also commonly referred to as *chasing* losses (Petry, 2005).

Treatment

According to the National Research Council's (NRC; 1999) critical review of pathological gambling, only 8% of pathological gamblers receive treatment for gambling, and virtually none of potential problem gamblers receive treatment. The data suggesting the low treatment rate for pathological gambling suggest that the vast

majority of pathological gamblers either do not stop gambling or stop gambling in lieu of treatment. Those who do stop gambling tend to do so in response to either financial or emotional stressors (Petry, 2004).

According to one study that sampled lifetime pathological gamblers who had ceased gambling, more than half reported stopping without help from psychological, pharmacological, or support group help. Eighty-four percent of this sample quit gambling *cold turkey*, while the rest scaled back their gambling over time. Among those who stopped gambling without treatment, approximately 80% said that they wanted to deal with their problem on their own. Other reasons for not seeking formal treatment included embarrassment, stigma, unawareness of treatment opportunities, perceived inability to share their problems, and believing their problem was not severe enough to require treatment. (Hodgins& el-Guebaly, 2000).

The two most common forms of treatment for problem gambling are Gamblers Anonymous (GA) and cognitive and behavioral therapy (Grant & Potenza, 2004; Petry, 2004).

Gamblers Anonymous. The first GA 12-step group began in 1957, and there are presently more than 1,000 GA chapters throughout the United States. GA is a "self-help fellowship" that was initially modeled after Alcoholics Anonymous (AA). Members of GA use a disease-model of pathological gambling; GA proposes that pathological gambling has no cure and can only be arrested by total abstinence from gambling (Petry, 2005).

GA was among the first recognized effective treatments for pathological gamblers. In their seminal work on the treatment of pathological gamblers, Custer and

Milt (1985) wrote: “We say without hesitation that the most important step a compulsive gambler can take toward recovery is to get into Gamblers Anonymous and become a steady and active participant” (p. 199). Custer (1982, 1985) also suggested that GA was more psychiatrically oriented than AA and other 12-step groups and helped pathological gamblers identify and correct deficits in character that enable their gambling behaviors.

While anecdotal evidence suggests that GA is effective for some pathological gamblers, there have been few published works that have empirically examined GA’s efficacy. Most studies that have looked at GA attendance have found that less than 25% of new attendees returned for a second meeting, and that less than 10% achieved abstinence for one year (Hodgins&Petry, 2004).

Hodgins and Petry (2004) noted that some data have suggested that a combination of GA and a professional treatment program may be efficacious for pathological gamblers. Four studies in the 1980s and 1990s reported abstinence rates of greater than 50% for gamblers who received professional treatment in conjunction with GA attendance. Petry (2003) found that gamblers seeking professional treatment were significantly more likely to remain in a treatment program if they also attended GA meetings, and those who attended GA meetings in conjunction with treatment were significantly more likely to abstain from gambling than those who only received professional treatment.

Cognitive and behavioral treatments. Early psychological treatments for pathological gambling were largely behavioral in nature. Many of the first treatments, developed in the late 1960s and early 1970s, involved providing patients with aversive

stimuli (e.g., electric shocks) while they were exposed to gambling stimuli. The rationale for these treatments was the perceived behavioral component of gambling. According to the results of six such studies, these behavioral treatments were effective, with over half of subjects stopping gambling after treatment. Systematic desensitization was another early behavioral treatment attempted with pathological gamblers. However, results from studies throughout the 1970s and early 1980s demonstrated that this technique was not particularly effective (Petry, 2005).

As cognitive psychological theories became more popular in the 1980s and 1990s, cognitive techniques became more common in the treatment of pathological gambling. These treatments primarily focused on attempting to eliminate or modify the irrational cognitions of gamblers (Petry, 2005). One such treatment directed patients to make imaginary bets on actual events, such as horse races or sporting events, while the therapist attempted to demonstrate the patients' inability to make money in the long term (Toneatto&Sobell, 1990). Other treatments focused on not only cognitive restructuring, but also problem solving and social skills training (Petry, 2005). According to Petry (2005), while there has been some evidence of the efficacy of cognitive treatments, it is unclear whether irrational cognitions are actually modified through treatment.

Contemporary treatments are typically individual or group multi-session therapies, though brief interventions such as self-directed workbooks (e.g., Ladouceur&Lachance, 2007b) or single-session interventions have also become more common (Hodgins&Diskin, 2008). In these cognitive approaches to gambling treatment, the primary goal is to identify and modify cognitive distortions. Three

observational studies that asked gamblers to verbalize gambling cognitions reported that more than 70% of gambling-related cognitions are illogical or irrational. Many gamblers are unaware about the randomness of gambling, and education about probability and the specific nature of the patient's preferred method of gambling is typically a part of treatment (Hodgins&Petry, 2004).

While some patients may be quickly convinced that their cognitions are irrational, others may be directed by the therapist to collect experiential evidence in order to prove this to them. Therapists may direct patients to monitor their cognitions while gambling. Cognitive techniques typically use Socratic questioning with the intention of helping patients to begin to doubt their irrational cognitions (Hodgins&Petry, 2004). This approach has been more specifically utilized through motivational interviewing, which has become perhaps the most frequently utilized approach by clinicians in traditional psychotherapy settings for the treatment of pathological gamblers (Hodgins&Diskin, 2008).

Other treatment models are cognitive-behavioral in nature, and require patients to identify gambling triggers, erroneous cognitions and the positive and negative consequences of their gambling behaviors (e.g., Ladouceur&Lachane, 2007a). Patients are also directed to replace gambling behaviors with other activities that offer similar reinforcements. For example, a patient may be directed to plan a leisure activity that provides him or her with pleasurable stimuli (e.g., fishing, bicycling, golf) during high-risk times, such as Friday nights or on payday (Hodgins&Petry, 2004).

Pharmacological treatments. Because of observed abnormalities in serotonin, norephinephrine, and dopamine in pathological gamblers, antidepressants and mood

stabilizers have been used in the treatment of pathological gamblers. However, no psychotropic drugs have been approved by the Food and Drug Administration for the treatment of pathological gambling, and more research is needed to determine what drugs may be effective (Petry, 2005).

Among the first drugs to be used in the treatment of gamblers were serotonin reuptake inhibitors. It has been noted that pathological gambling may have obsessive-compulsive elements, and serotonin reuptake inhibitors have shown efficacy for obsessive-compulsive spectrum disorders (Hollander, Kaplan, &Pallanti, 2004). In 2002, Zimmerman, Breen, and Posternak administered citalopram (Celexa) to nine patients over a 12-week period, and eight responded to treatment. Some studies have been conducted that examined pathological gamblers' response to fluvoxamine (Luvox). Hollander et al. (1998) found that seven of ten pathological gamblers responded to Luvox, and exhibited more than a 25% decrease in gambling behaviors. A follow-up double-blind trial also found a significant reduction in gambling behaviors among patients treated with Luvox (Hollander, DeCaria, &Finkell, 2000). A third study, which was also a double-blind, placebo-controlled study of fluvoxamine, reported that only males and younger pathological gamblers responded to Luvox (Blanco, Petkova, Ibañez, &Sáiz-Ruiz, 2002).

There has also been some evidence to suggest the efficacy of mood stabilizers in treating pathological gambling. In an early study assessing the efficacy of mood stabilizers, Haller and Hinterhuber (1994) found that one pathological gambler ceased gambling after being treated with carbamazepine. Because comorbidity between bipolar spectrum disorders and pathological gambling has been estimated to be as high as 30%,

studies have been conducted to assess the efficacy of lithium carbonate and valproate (mood stabilizers effective in the treatment of mania) for the treatment of pathological gamblers. One single-blind trial and one double-blind, placebo-controlled trial demonstrated the efficacy of both lithium carbonate and valproate in the treatment of pathological gambling (Hollander, Kaplan, &Pallanti, 2004).

Measurement

DSM criteria. Pathological gambling was first included in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) in 1980. The DSM-III criteria for pathological gambling were based primarily on the clinical experience of Robert Custer and other treatment professionals (NRC, 1999). Original diagnostic criteria for pathological gambling required pathological gamblers to meet three of the following seven criteria:

- Arrest due to attempts to obtain money for gambling.
- Default on debts.
- Disrupted family relationships.
- Borrowing of money from illegal sources.
- Inability to account for loss of money.
- Loss of work.
- Necessity for another person to provide money.

(American Psychiatric Association, 1980).

The original DSM-III criteria were criticized for being overly focused on financial and other external consequences and for being uni-dimensional. As a result,

the DSM revision in 1987 (DSM-III-R) amended the criteria to resemble the criteria for substance dependence (National Research Council, 1999).

The updated diagnostic criteria for pathological gambling required four of the following nine criteria to be met:

- Preoccupation with gambling.
- Frequent gambling of larger amounts of money.
- A need to increase the size of bets.
- Irritability if unable to gamble.
- Repeated loss of money by gambling and returning to win back losses ("chasing").
- Repeated efforts to stop gambling.
- Frequent gambling when expected to meet obligations.
- Sacrifice of important activities in order to gamble.
- Continuation of gambling despite financial, social, occupational, or legal problems.

(American Psychiatric Association, 1987).

After publication of these criteria, treatment professionals sought out a compromise between DSM-III and DSM-III-R criteria (Rosenthal, 1989). Further analysis by treatment professionals and researchers led to the current criteria for pathological gambling found in the DSM-IV, published in 1994 (National Research Council, 1999).

DSM-IV diagnostic criteria for pathological gambling require five or more of the following behaviors to be met:

- Preoccupation with gambling, needing to gamble with more money.
- Unsuccessful attempts to control or stop gambling.

- Irritability when attempting to stop gambling.
- Gambling to escape problems or relieve a dysphoric mood.
- "Chasing" losses.
- Lying to conceal involvement with gambling.
- Committing illegal acts to finance gambling.
- Jeopardizing a relationship, job, or educational or career opportunity.
- Relying on others to provide money for financial problems due to gambling

(American Psychiatric Association, 1994).

These 10 criteria were developed to include three dimensions of pathological gambling: disruption, loss of control, and dependence (National Research Council, 1999). It is currently unknown whether the upcoming DSM-V, scheduled to be published in 2013, will continue to use the same diagnostic criteria or if the American Psychiatric Association will amend the criteria.

The DSM-IV criteria for pathological gambling have been used in several population surveys to assess for problem and pathological gamblers. However, there has been criticism of its use for this purpose because its initial development was based on clinical populations (McMillen& Wenzel, 2006). Additionally, the DSM-IV criteria have been criticized for making no differentiation among the 10 criteria in terms of severity. Strong and Kahler (2007) used a Rasch model item-response analysis to argue that the 10 symptoms fall on a continuum of severity, in which "Is preoccupied with gambling" is the least severe symptom, and "Has committed illegal acts to finance gambling" is the most severe. Strong and Kahler viewed their study as the first step in providing anchors for pathological gambling symptoms according to the DSM-IV.

Screening/measurement instruments. According to a meta-analysis conducted by Shaffer, Hall, and Bilt (1997), there had been 25 different assessment instruments used in the measurement of pathological and problem gambling as of 1997. Many of the tests developed were based on DSM-III or DSM-IV diagnostic criteria for pathological gambling. These instruments had been primarily used as screening tools, but some had also become commonly used in research that sought to identify problem and pathological gamblers (National Research Council, 1999). At that point in time, the South Oaks Gambling Screen (SOGS) had become the most widely accepted instrument for screening problem and pathological gamblers, as well as for identifying problem and pathological gamblers in research.

South Oaks Gambling Screen. Lesieur and Bloom (1987) developed the SOGS as a new instrument for the identification of pathological gamblers. The SOGS was based on a series of interviews with alcohol and drug abuse inpatients, in which those reporting gambling behavior were questioned. Lesieur and Blume created 60 questions based on these interviews and the DSM-III pathological gambling criteria, and eventually narrowed them down to 20. A score of five or greater was selected as a cutoff to indicate *probable pathological gambling*. Though Lesieur and Blume created only the cutoff of five, many researchers have used scores of 3 or 4 on the SOGS as indications of *problem gambling* (Wickwire Jr., Whelan, West, Meyers, McCausland, &Leullen, 2007).

As the SOGS became more frequently used in population surveys, many researchers criticized its applicability for this type of research. There were concerns that using a screening instrument that had been developed in clinical settings may lead to a

high rate of "false positives" for pathological gambling in general population surveys (National Research Council, 1999). Several researchers (e.g., Culleton, 1989; Goldstein & Simpson, 1995) argued that, because pathological gambling is a relatively low-occurring disorder within the general population, the SOGS tends to overestimate the prevalence of problem and pathological gamblers in population surveys. In 2002, Stinchfield determined that the SOGS had satisfactory reliability in both the general population and gambling treatment samples. However, he also found that the SOGS had poor accuracy in terms of identifying pathological gamblers within the general population, yielding a 50% false positive rate. DSM-IV diagnostic criteria were determined to be more accurate in identifying pathological gamblers in the general population.

Kuentzel, Henderson, and Melville (2008) found that two measures of social desirability bias were negatively correlated with South Oaks Gambling Screen (SOGS) scores. Unlike previous criticisms that the SOGS may over-identify pathological gamblers, their work provided evidence that self-report data on gambling problems were influenced by a tendency to attempt to appear more socially desirable, and that this likely caused people to underreport symptoms of problem and pathological gambling on the SOGS.

Despite criticism, the SOGS has remained the most widely used instrument for assessing disordered gambling (Petry, 2005).Weinstock, Whelan, Meyers, and McCausland (2007) recently compared the SOGS with DSM-IV criteria for the screening of college student samples. They determined that the SOGS demonstrated adequate internal consistency and convergent, construct, and discriminant validity, and

recommended that the SOGS continue to be used for college student samples, rather than DSM-IV criteria.

Canadian Problem Gambling Index. Ferris and Wynne introduced The Canadian Problem Gambling Index (CPGI) in 2001. Unlike the SOGS, the CPGI was developed specifically as an instrument for use in general population-based studies (Young & Stevens, 2008). Ferris and Wynne's intent was to create a measure that would elicit a more normal distribution of responses than the SOGS or DSM-IV criteria by focusing on the general population, rather than clinical populations. The final CPGI report demonstrated good reliability and validity, and Ferris and Wynne argued that the revised CPGI was more appropriate for assessing pathological gambling in general population surveys than the SOGS or DSM-IV criteria. While there have been fewer reviews of the CPGI than of older measurements, the CPGI has demonstrated greater construct and classification validity than the SOGS and DSM-IV criteria (McMillen& Wenzel, 2006) and has been found to be more useful in population surveys (Neale, Delfabbro, & O'Neil, 2005). More recently, Brooker, Clara, and Cox (2009) found support for a unifactorial model of the Canadian Problem Gambling Index (CPGI). Their study provided validity evidence for the CPGI as an accurate measure of problem gambling in population studies.

Young and Stevens (2008) compared the SOGS with the CPGI in identifying problem gamblers in Australia's Northern Territory. The results provided evidence that the SOGS appears biased towards classification of disadvantaged minority groups as problem gamblers and suggested that the CPGI may be more appropriate for population surveys of gambling involvement. They also suggested that the emphasis of the SOGS

on items related to money issues may cause overrepresentation of economically disadvantaged groups, and, further, that the CPGI may be less likely to over-identify economic and ethnic minority groups as problem gamblers.

Gamblers Anonymous 20 Questions. Perhaps the oldest gambling screen is the Gamblers Anonymous Twenty Questions (20Q), which was developed in 1958. The 20Q remains the preferred instrument for assessing problem gambling by Gamblers Anonymous (Toneatto, 2008). While the 20Q is not typically used in population surveys of pathological gambling, Toneatto (2008) argued that it is important to assess its reliability and validity because of its continued widespread use. He found evidence supporting the reliability and validity of the 20Q in treatment-seeking populations. However, Toneatto also determined that the 20Q yielded higher false positive rates of pathological gambling than the SOGS and DSM-IV criteria and, thus, recommended it not be used in general population surveys.

Newer Addictions-Based Measurements. While pathological gambling is currently classified by the DSM-IV as an impulse control disorder, many researchers have noted its similarity to substance dependence and other physiological addictions (National Research Council, 1999). As a result, some newer instruments have been developed by modifying drug and alcohol abuse inventories for use in identifying problem and pathological gamblers. For example, Petry (2007) argued that the Addiction Severity Index (ASI) might be useful for assessing problem and pathological gambling. Her study demonstrated convergent validity between the ASI and the SOGS. Petry suggested that the ASI might be a useful tool for assessing comorbidity of pathological gambling with other psychosocial factors associated with problem

gambling. She also recommended that the ASI might be modified for pathological gamblers by developing financial questions as a section of the instrument. Additionally, Weiss and Petry (2008) developed an inventory of precipitating gambling events based on the Inventory of Drinking Situations (IDS). This new instrument, the Inventory of Gambling Situations (IGS), was found to be able to assess antecedents that precipitate gambling episodes in pathological gamblers.

Prevalence Studies

National prevalence rates. In 1975, The University of Michigan Survey Research Center conducted the first national study that attempted to determine national prevalence rates of pathological gambling. Based on the responses of 1,736 American adults, 0.77 percent of the national sample was classified as probable compulsive gamblers, while another 2.33 percent were classified as potential problem gamblers (NRC, 1999). In their meta-analysis of measurement instruments, Shaffer et al. (1997) also looked at national prevalence rates, combining data from the United States and Canada. They found that 1.60 percent of the general adult population could be classified as pathological gamblers, and another 3.95 percent were classified as problem gamblers. A third prevalence study was conducted by the National Opinion Research Center (NORC) of the University of Chicago. According to their findings, 0.9 percent of the United States adult population met criteria for pathological gambling at some point in their lifetime (NRC, 1999).

The Gambling Impact and Behavior Study (GIBS), conducted in 1998-1999, randomly sampled 2,417 American adults, and found that 0.80% had a lifetime history

of pathological gambling, according to DSM-IV criteria. More recently, population data from the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) have been used as a benchmark of pathological gambling prevalence in the American general population (Desai, Desai, & Potenza, 2007). Of the 43,039 participants in the NESARC, 0.40% met DSM-IV criteria for pathological gambling (Slutske, 2006).

There have also been studies of national prevalence rates of problem and pathological gambling in other countries. In a study using the CPGI as an assessment instrument and results from the Canadian Community Health Survey (CCHS), the national prevalence of gambling problems in Canada was determined to be 2.0% for those 15 and older (Cox, Yu, Afifi, &Ladouceur, 2005). In a sample specific to Quebec, Ladouceur, Jacques, Chevalier, Sevigny, and Hamel (2005) found that, in 2002, 0.8% of the province's adult population could be classified as probable pathological gamblers, which did not significantly differ from a similar Quebec study in 1996 that reported a prevalence rate of 1.0% (Ladoucer, Jacques, Ferland, & Giroux, 1999). A survey of Ontario adults yielded relatively similar results (Wiebe, Single, &Falkowski-Ham, 2001; 0.7% of the population were identified as probable pathological gamblers), as did studies in New Brunswick (New Brunswick Department of Health and Wellness, 2001; 1.4%) and Manitoba (Brown, Patton, Dhaliwal, Pankratz, &Broszeit, 2002; 1.1%).

In 1991, Abbott and Volberg used the SOGS to identify gambling prevalence in New Zealand and found that 2.7% of the general population met criteria for pathological gambling at some point in their lifetime, and another 4.2% met criteria for problem gambling. In a national survey conducted in 2002, 3.5% of Norway's general

population aged 15-74 was classified as at-risk for pathological gambling (Lund, 2007). Three smaller Norwegian studies estimated that 0.6% (Gotestam& Johansson, 2003), 0.7% (Lund &Nordlund, 2003), and 1.9% (Kavli&Berntsen, 2005) of the general population could be identified as pathological gamblers. In one of the most recent national prevalence studies, Wardle et al. (2007) found that 0.5% of the adult population of Great Britain met CPGI criteria for pathological gambling, and 0.6% met criteria according to the DSM-IV.

Adolescent prevalence rates. Studies of adolescents and college students have consistently yielded higher prevalence rates of problem and pathological gambling than in general adult population surveys (Derevensky, Gupta, & Winters, 2003). In 1996, Shaffer and Hall found that between 4.4% and 7.4% of a sample of 13 to 20-year-olds met criteria for pathological gambling. Shaffer et al.'s 1997 meta-analysis found that a median of 6.1% of adolescents met criteria for pathological gambling. The National Research Council estimated that, based on data from several studies, "the proportion of pathological gamblers among adolescents may be more than three times that of adults (5.0 versus 1.5 percent)" (National Research Council, 1999, p. 89). In a longitudinal study of 468 18-year-olds, 5.3% of subjects had met criteria for problem gambling at some point in their lives after 11 years had passed (Slutske, Jackson, &Sher, 2003). A study of university students in Connecticut reported that 5.2% met SOGS criteria for pathological gambling (Engwall, Hunter, & Steinberg, 2004). A 2007 study, using the CPGI as its assessment instrument, classified 2.2% of Canadian youth aged 15 to 24 as moderate-risk or problem gamblers (Huang & Boyer). In 2008, 2.1% of a sample of 14 to 21-year-olds met problem or pathological gambling criteria within the previous year,

and 11% reported gambling more than twice per week (Welte, Barnes, Tidwell, & Hoffman, 2008).

While pathological gambling rates of college students and adolescents have been consistently higher than those reported in adult population studies, there have been concerns that youth gambling rates have been inflated (Derevensky et al., 2003). The National Research Council cautioned that adolescent studies might not be directly comparable to adult population studies because of differing measures and criteria for pathological gambling. They also noted that adolescents and college students might have different perceptions of debt incurred and likely have less money than adults, creating the potential for more false positives in instruments with greater emphasis on financial consequences (NRC, 1999). Derevensky et al. (2003) noted that the use of different measures and instruments, the varying age ranges of target populations, cultural differences, and different regional availability of gambling for young people might all contribute to overestimates of youth gambling problems.

It is also important to note that, in addition to the fact that studies of adolescents and college students have typically yielded pathological gambling rates around 5%, a majority of college students have gambled in their lifetime. Today's college-aged students have grown up in a society with increased availability and acceptance of gambling, and a large number of college students and adolescents report that gambling is a common experience (Wickwire, Jr. et al., 2007). Shaffer et al.'s (1997) meta-analysis revealed that a median of 85% of adolescents reported gambling at some point in their lives. Sixty-seven percent of a Connecticut college student sample had gambled in their lifetime (Engwall et al., 2005). Welte et al. (2008) found that 68% of 14 to 21-

year-olds reported gambling within the past year. In another 2008 study, 89.1% of college students reported gambling in their lifetime (Weinstock &Petry, 2008).

Demographic Risk Factors

Gender. Gender is perhaps the most well-established risk factor associated with pathological gambling (Johansson et al., 2009). According to Petry (2005), "male gender has been repeatedly demonstrated to be a risk factor for gambling problems" (p. 70). Among the general population surveys of gambling conducted in the United States between 1975 and 1997, 18 provided information in terms of gender. Of these 18 studies, 17 reported that men were more likely to meet problem or pathological gambling criteria than women (National Research Council, 1999). More recent studies have consistently yielded similar results, in which men are at greater risk than women for problem and pathological gambling. In her analysis of NESARC data, Slutske (2006) found that men were approximately two and-a-half times more likely than women to meet pathological gambling criteria. Lund's (2007) Norwegian study determined that men were about three times more likely to be classified as at-risk gamblers.

Among studies of college-aged people and adolescents, men have also been demonstrated to be at greater risk than women for problem and pathological gambling. Huang and Boyer's (2007) study of Canadian youth found that young women were less likely than men to gamble at all, and were one-third as likely to meet criteria for moderate-risk of problem gambling. Huang et al. (2007) found that male student-athletes were more than three times as likely to bet on sports than female student-athletes. Both previously mentioned Internet gambling studies of college students found

that young men were significantly more likely than young women to gamble online (Griffiths et al., 2007; Petry& Weinstock, 2007). Griffiths and Barnes (2008) also found that male college students were more likely than females to be Internet gamblers and were also more likely than females to be problem Internet gamblers.

It is important to note that, while women have consistently been found to be at a lesser risk than men for problem and pathological gambling, Black women have often been overrepresented in studies that have provided demographic breakdowns. For example, in a study of gambling help-line callers in Connecticut, Barry, Steinberg, Wu, and Potenza (2008) found that women made up a significantly higher proportion of problem gamblers (54.5%) among Blacks than among White women (39.7%). Desai and Potenza (2008) found that, among males, pathological gambling did not significantly differ by race. However, there was a strong association between female problem gambling and the African-American racial group (African-American women accounted for 12.4% of the female sample, but 31% of female problem or pathological gamblers). In their analysis of NESARC data, Alegría, Petry, Hasin, Liu, Grant, and Blanco (2009) found that, among disordered gamblers, significantly more Blacks (45.9%) than Whites (27.9%) were women.

Ethnic minorities. Non-White ethnicity has also been historically associated with increased risk for problem and pathological gambling. This phenomenon has been observed among ethnic minority groups in the United States, Canada, Australia, New Zealand, and Sweden (Petry, 2005). Every study analyzed by the NRC (1999) reported that ethnic minority groups were overrepresented among problem and pathological gamblers. In a recent analysis of NESARC data, Alegría et al. (2009) found that that the

lifetime prevalence of disordered gambling for Native Americans/Asians (2.3%) and Blacks (2.2%) was significantly higher than for Whites (1.2%). Welte, Barnes, Wieczorek, Tidwell, and Parker (2004) reported that African-Americans, Hispanics, and Asians in an American sample were more likely to meet pathological gambling criteria than Whites. Johansson, Grant, Kim, Odlaug, and Gotestam (2009) found evidence that African-American, Hispanic, and Asian immigrants and ethnic groups are at a greater risk for problem gambling. Lang and Omori (2009) found that Blacks were less likely to play the lottery than Whites, but those Blacks who did play spent more than three times the amount of money than the average White player.

Few of the previously mentioned studies that have focused on college students and adolescent populations have provided information on gambling differences between White and non-White groups. One finding of note came from Welte et al.'s (2008) survey of 14 to 21-year-olds, in which Blacks were less likely than Whites to have gambled in the past year, but those who did gamble were more likely to be classified as problem gamblers.

Socioeconomic status and education. Fifteen studies analyzed by the NRC (1999) reported that individuals with incomes under $25,000 per year were overrepresented in problem and pathological gambling groups. The National Research Council (1999) also found that persons who had completed only high school or less were overrepresented. In an analysis of 12 prevalence studies from 10 different countries, Petry (2005) found that lower socioeconomic status was related to increased rates of disordered gambling in all but one study. Volberg, Dickerson, Ladouceur, and Abbott (1996) found that people receiving social welfare were significantly more likely

to meet pathological gambling criteria than those not receiving public assistance. It is important to note that, because many studies use financial issues as a measure of disordered gambling, the representation of low-income problem gamblers may be inflated.

Interestingly, data obtained from studies of college students and adolescents have not been as consistent in identifying an inverse relationship between income and problem and pathological gambling. For example, Weinstock, Whelan, Meyers, and Watson (2007) found that college students with higher incomes gambled more frequently than those with lower incomes. Fisher (1999) found that British adolescents with higher disposable incomes were more likely to meet criteria for problem gambling. Welte et al. (2008) found that young people from lower socioeconomic backgrounds were less likely to have gambled in their lifetime than those from wealthier backgrounds. However, those who did gamble were more likely to be problem gamblers. Internet gambling, which has been reported as most common among 18 to 24-year-olds, has also demonstrated an association with higher education levels and higher levels of employment (Griffiths et al., 2009).

Age. Johanson et a. (2009) reported that, according to analysis of three large prevalence studies, age (specifically, being younger than 29 years old) is among the most well-established risk factors of pathological gambling. Studies of adolescents and college students have consistently yielded higher prevalence rates of problem and pathological gambling than in general adult population surveys (Derevensky, Gupta, & Winters, 2003). In 1996, Shaffer and Hall found that between 4.4% and 7.4% of a sample of 13 to 20-year-olds met criteria for pathological gambling. Shaffer et al.'s

1997 meta-analysis found that a median of 6.1% of adolescents met criteria for pathological gambling. The National Research Council estimated that, based on data from several studies, "the proportion of pathological gamblers among adolescents may be more than three times that of adults (5.0 versus 1.5 percent)" (National Research Council, 1999, p. 89). In a longitudinal study of 468 18-year-olds, 5.3% of subjects had met criteria for problem gambling at some point in their lives after 11 years had passed (Slutske, Jackson, &Sher, 2003). A study of university students in Connecticut reported that 5.2% met SOGS criteria for pathological gambling (Engwall, Hunter, & Steinberg, 2004). A 2007 study, using the CPGI as its assessment instrument, classified 2.2% of Canadian youth aged 15 to 24 as moderate-risk or problem gamblers (Huang & Boyer). In 2008, 2.1% of a sample of 14 to 21-year-olds met problem or pathological gambling criteria within the previous year, and 11% reported gambling more than twice per week (Welte, Barnes, Tidwell, & Hoffman, 2008). Furthermore, two European studies demonstrated that onset of gambling at an earlier age was associated with problem and pathological gambling (Bondolfi, Osiek, & Ferrero, 2000; Volberg, Abbot, Rönnberg, &Munck, 2001)

While pathological gambling rates of college students and adolescents have been consistently higher than those reported in adult population studies, there have been concerns that youth gambling rates have been inflated (Derevensky et al., 2003). The National Research Council cautioned that adolescent studies might not be directly comparable to adult population studies because of differing measures and criteria for pathological gambling. They also noted that adolescents and college students might have different perceptions of debt incurred and likely have less money than adults,

creating the potential for more false positives on instruments with greater emphasis on financial consequences (NRC, 1999). Derevensky et al. (2003) noted that the use of different measures and instruments, the varying age ranges of target populations, cultural differences, and different regional availability of gambling for young people might all contribute to overestimates of youth gambling problems.

It is also important to note that, in addition to the fact that studies of adolescents and college students have typically yielded pathological gambling rates around 5%, a majority of college students have gambled in their lifetime. Today's college-aged students have grown up in a society with increased availability and acceptance of gambling, and a large number of college students and adolescents report that gambling is a common experience (Wickwire, Jr. et al., 2007). Shaffer et al.'s (1997) meta-analysis revealed that a median of 85% of adolescents reported gambling at some point in their lives. Sixty-seven percent of a Connecticut college student population had gambled in their lifetime (Engwall et al., 2005). Welte et al. (2008) found that 68% of 14 to 21-year-olds reported gambling within the past year. In another 2008 study, 89.1% of college students reported gambling in their lifetime (Weinstock &Petry, 2008).

Comorbidity

Substance use disorders. Previous comprehensive literature reviews have revealed significant associations between pathological gambling and substance abuse disorders (National Research Council, 1999; Petry, 2005). In an early comorbidity study, Lesieur, Blume, and Zoppa (1986) found that the rate of pathological gambling was positively associated with the number of substances used by an individual. The National Research Council's (1999) analysis of several comorbidity studies found that

"persons admitted to chemical dependence treatment programs are three to six times more likely to be problem gamblers than people from the general population" (p. 131). Similarly, in an analysis of three national surveys, Petry (2005) found evidence of a strong relationship between pathological gambling and alcohol use. Her analysis also revealed that lifetime rates of alcohol or other drug diagnoses ranged from "about one quarter to over two-thirds across studies" among treatment-seeking pathological gamblers (p. 89). Analysis of results from 2001-2002 NESARC data revealed that 73.2% of pathological gamblers met DSM criteria for an alcohol use disorder, while 38.1% had a drug use disorder (Petry, Stinson, & Grant, 2005). In a recent Canadian study, Rush, Bassani, Urbanoski, and Castel (2008) found that those who were substance-dependent were three times more likely to be at moderate or high risk for problem gambling than the general adult population. In their meta-analysis of pathological gambling population surveys, Lorains, Cowlishaw, and Thomas (2011) reported a prevalence rate of 57.5% for substance use disorders among problem and pathological gamblers. There have been indications that problem and pathological gamblers are not only more likely to suffer from substance use disorders, but that those with substance use disorders are more likely to exhibit more severe levels of gambling. For example, el-Guebaly et al. (2006) reported on the results of a national Canadian survey and noted that gamblers with alcohol or drug use disorders were nearly three times more likely to be moderate/high severity gamblers than those without substance use disorders. Gamblers with both substance use disorders and mood or anxiety disorders were five times more likely to be moderate/high severity gamblers.

In addition to alcohol and drug use, some studies have shown an association between problem and pathological gambling and tobacco use (Petry, 2005). Lorains et al. (2011) reported that nicotine dependence was the most commonly occurring comorbid disorder of problem and pathological gamblers, with 60.1% of problem and pathological gamblers meeting criteria. This was nearly identical to the results from the NESARC (60.4%; Petry et al., 2005). Grant, Kim, Odlaug, and Potenza (2008) found that 45% of treatment-seeking problem gamblers reported daily smoking versus 16.7%-22.4% among the general population. In addition, they reported that daily smoking was associated with more severe gambling symptoms.

Depression. In their critical literature review, Johansson et al. (2009) determined that depression has been demonstrated to be a probable pathological gambling risk factor. Petry (2005) reported that NESARC data suggested high rates of comorbidity between major mood disorders and pathological gambling. Using the Beck Depression Inventory (Beck & Steer, 1993), Ibañez et al. (2001) reported higher rates of depression associated with pathological gamblers reporting more severe gambling symptoms. Early comorbidity studies were largely unable to show significant associations between pathological gambling and depression, but more recent studies have demonstrated this association, especially among treatment-seeking pathological gamblers. (NRC, 1999; Petry, 2005).Kallmen, Andersson, and Adren (2008) reported a small but significant relationship between depression and problem gambling in Sweden. Rush et al. (2008) did not specifically look at depression, but found an association between problem gambling and Axis I disorders for the Canadian general population. Lorains et al. (2011) found that 37.9% of problem and pathological gamblers from

eleven population studies suffered from at least one comorbid mood disorder. NESARC data from 2001-2002 indicated a 49.6% prevalence rate for mood disorders among problem and pathological gamblers.

Suicidality. While it is impossible to accurately report the causes and associations of suicide, researchers have historically believed there to be a strong association between pathological gambling and suicide and suicidal ideation. This assumption intuitively follows the evidence of co-occurring mood and substance use disorders, which have also been linked to suicidality. In a study analyzing 44 gambling-related suicides, Blaszczynski and Farrell (1998) found evidence of comorbid depression, large financial debts, and relationship problems as contributing to the suicidality of pathological gamblers. It has additionally been reported that abuse of alcohol increases the risk of suicide among pathological gamblers (Penfold, Hatcher, Sullivan, & Collins, 2006). The NRC (1999) found that pathological gambling literature has reported a strong association between pathological gambling and suicidal thoughts and/or attempts. Petry (2005) found high rates of suicide attempts and ideation among treatment-seeking gamblers. She also cited two studies that suggested suicide rates increased in U.S. cities when access to casinos increased, and noted that Las Vegas has the highest suicide rate in the country for both residents and visitors. A Canadian study of 101 problem and pathological gamblers found that 32.7% of the sample reported at least one suicide attempt, and another 38.6% reported having thoughts of suicide (Hodgins, Mansley, &Thygesen, 2006). However, the findings also indicated that the majority of suicide attempts were more influenced by comorbid conditions, such as substance abuse or depression, rather than being specifically related to gambling

problems. But there has also been evidence that more severe levels of pathological gambling may be linked to suicide, as Ledgerwood, Steinberg, Wu, and Potenza (2005) reported an association between increased gambling severity and gambling-related suicidal ideation.

Anxiety disorders. General population studies of pathological gambling and anxiety disorder comorbidity have been largely inconclusive. However, there has been some evidence to suggest that treatment-seeking gamblers have high rates of both generalized anxiety disorders and specific anxiety disorders (Petry, 2005). The previously mentioned meta-analysis of population surveys of problem and pathological gambling found that 37.4% of problem and pathological gamblers met criteria for at least one type of anxiety disorder (Lorains et al., 2011). Petry et al. (2005) reported that 41.3% of problem and pathological gamblers had an anxiety disorder. Additionally, Ste-Marie, Gupta, and Derevensky (2006) reported a relationship between state and trait anxiety and adolescent problem gambling, and also found that adolescents with higher state and trait anxiety scores reported more severe gambling problems. There has also been some evidence of comorbidity with obsessive-compulsive disorder (OCD) (Petry, 2005). For example, Blaszczynski (1999) reported that treatment-seeking gamblers had higher scores on an OCD inventory than a control group. In an analysis of the relationship between OCD and pathological gambling, Frost, Meagher, and Riskind (2001) reported that pathological lottery gamblers had more obsessive, compulsive, and hoarding symptoms than non-pathological lottery gamblers.

Personality disorders. In their report on 2001-2002 NESARC, Petry et al. (2005) found a strong relationship between pathological gambling and personality

disorders, with 60.8% of problem and pathological gamblers meeting DSM criteria for a personality disorder. Cunningham-Williams, Cottler, Compton, and Spitznagel (1998) found that problem gamblers were more than six times more likely to meet criteria for antisocial personality disorder (ASPD) than non-gamblers. Petry (2005) reported that six of seven studies of ASPD and gambling found associations between ASPD and problem and pathological gambling. Pietrzak and Petry (2004) found an association between ASPD and pathological gambling. Two other studies found a significant association between pathological gambling and borderline personality disorder (Petry et al., 2005; Sacco, Cunningham-Williams, Ostmann, &Spitznagel; 2008).

ADHD. The NRC's 1999 report suggested mounting evidence throughout the 1990s that there was an association between pathological gambling and attention deficit hyperactivity disorder (ADHD). Rugle and Melamed (1993) reported that gamblers demonstrated more ADHD symptoms than non-gamblers. Specker et al. (1995) additionally reported that pathological gamblers were more likely to meet ADHD criteria than non-gamblers. Carlton and Manowicz (1994), analyzing childhood diagnoses of ADHD in adult pathological gamblers, reported a higher than average rate of childhood ADHD than in the general population. More recently, Rodriguez-Jimenez et al. (2006) reported a 29.1% rate of childhood ADHD among a sample of pathological gamblers. The reported link between ADHD and pathological gambling suggests evidence of the importance of impulsivity as a feature of the pathological gambler.

Sensation Seeking. Sensation seeking is a personality trait that reflects an individual's optimal level of stimulation and arousal; those needing higher levels of stimulation and arousal score higher on sensation seeking inventories (Zuckerman,

1994). Research attempting to correlate higher levels of sensation seeking with problem and pathological gambling have been inconclusive. Intuitively, some studies have found evidence that higher levels of sensation seeking are associated with problem gambling (Gupta, Derevensky, &Ellenbogen, 2006; Kuley& Jacobs, 1988), while others have found no significant differences (Bonnaire, Lejoveux, &Dardennes, 2004; Parke, Griffiths, &Irwing, 2004). Perhaps counter-intuitively, some studies have actually reported lower levels of sensation seeking among problem gamblers when compared to non-gamblers (Blanco, Orensanz-Muñoz, Blanco-Jerez, &Saiz-Ruiz 1996; Carrasco, Saiz-Ruiz, Hollander, Cesar, & Lopez-Ibor, 1994).

Disinhibition and impulsivity. However, studies that have specifically looked at the relationship between disinhibition—one of the subscales of the Sensation Seeking Scale form V (SSS-V; Zuckerman, Eysenck, &Eysenck, 1978)—and problem gambling have more conclusively shown higher levels among problem gamblers. For example, Fortune and Goodie (2010) reported on the role of subscale scores within the SSS-V. They found that problem gamblers scored significantly higher on the disinhibition subscale of the SSS-V than non-gamblers. Alessi and Petry (2003) reported an association between impulsivity and levels of severity of pathological gambling. Additionally, studies have reported higher rates of impulsivity among pathological gamblers compared to non-pathological gamblers (Nower, Derevensky, & Gupta, 2004; Steel & Blaszcynski,1998). One potential confounding variable is the comorbidity of substance use among pathological gamblers, as substance use has a well-established link to impulsivity. However, a recent comparison study between pathological gamblers with and without substance use disorders found that pathological gamblers displayed

impulsive behaviors at a greater rate than non-gamblers, regardless of substance use history (Ledgerwood, Alessi, Phoenix, &Petry, 2009).

The Subtyping of Pathological Gamblers

The Pathways Model. In 2002, Blaszczynski and Nower used existing knowledge of gambler subtypes to create a theoretical pathways model of problem and pathological gambling. Their stated purpose was to "integrate biological, personality, developmental, cognitive, learning theory and environmental factors described in the literature into a theoretical framework" (p. 491). They proposed that problem and pathological gamblers might be classified into the following subtypes: Behaviorally Conditioned, Emotionally Vulnerable, and Antisocial Impulsivist. The Behaviorally Conditioned problem gambler is generally the least pathological and becomes addicted to gambling through availability of gambling and classical and operant conditioning. Emotionally Vulnerable problem gamblers also have access to gambling and are subject to conditioning, but they also "present with premorbid anxiety and/or depression, a history of poor coping and problem-solving skills, and negative family background experiences, developmental variables and life events" (Blaszczynski&Nower, 2002, p. 492). Specifically, Emotionally Vulnerable problem gamblers display evidence of greater risk taking and boredom proneness than is typical, exhibit elevated levels of depression and anxiety, and experience life stresses and substance use. Additionally, Blaszczynski and Nower asserted that this second pathway to pathological gambling features biological vulnerabilities (serotonergic, noradrenergic, dopaminergic, and EEG differentials) not present in the first pathway. The third subtype, the Antisocial Impulsivist problem gambler, possesses the same biopsychosocial vulnerabilities as the

Emotionally Vulnerable gambler, but additionally possesses maladaptive behaviors rooted in impulsivity and similar to features of antisocial personality disorder. The traits specifically associated with Antisocial Impulsivist problem gamblers are ADHD symptoms, impulsivity, antisocial behavior, and substance abuse.

Other models. Studies throughout the past four decades have attempted to place problem and pathological gamblers into categories according to motivation, pathology, and personality. In their literature review of the subtyping of pathological gambling, Milosevic and Ledgerwood (2010) identified 18 published empirical or theoretical studies from 1970 through 2009 that identified and labeled at least two subtypes of pathological gamblers. While there have been similarities between each of the models proposed, the sheer number of different classification systems and seeming lack of follow-up research (except perhaps by the original authors of each study) have led to a lack of consensus regarding which, if any, of the pathological gambling subtype models are most accurate or useful for future research and treatment. Milosevic and Ledgerwood's (2010) synthesis revealed that nearly all subtypes of gamblers described in previous studies had characteristics in common with Blaszczynski and Nower's (2002) theoretical pathways model of problem and pathological gambling. Furthermore, they argued that the previous subtype studies provided empirical support for the pathways model, and called for unification around the model in the field of pathological gambling research and treatment (Milosevic &Ledgerwood, 2010).

The similarities between the pathways model and other proposed models of pathological gambler subtypes, as well as its theoretical rationale, makes it likely that the model is generally accurate and could provide utility to researchers and treatment

professionals in creating a more widely accepted framework. While Blaszczynski and Nower's (2002) model has been supported by and maintains many similarities to the subtypes reviewed by Milosevic and Ledgerwood (2010), it remains a largely theoretical model. There have been few empirical studies examining the specific factors associated with each of the three subtypes.

Three of the most recent studies cited in Milosevic and Ledgerwood's literature review (Bonnaire, Bungener, &Varescon, 2009; Turner, Jain, Spence, &Zangeneh, 2008; Vachon&Bagby, 2009) tested the pathways model and found analogous subgroups of pathological gamblers, but did not use the precise constructs associated with the pathways model. Bonnaire et al. (2009) wished to "confirm the existence of Blaszczynski and Nower's subtypes of pathological gamblers among the French general population of gamblers" (p. 456) and found analogous results, but relied on sensation seeking, alexithymia, and depression inventories as their sole measures of the factors associated with the pathways model. Vachon and Bagby (2009) utilized a cluster analysis of 228 pathological and non-pathological gamblers to create their own three-cluster model of gambler subtypes. They also reported similarities between their own model and Blaszczynski and Nower's pathways model. However, this "first attempt to derive an empirically based taxonomy of [problem gamblers]" (p. 614) was based on results from a personality inventory that identified personality styles peripherally associated with the factors of the pathways model, rather than instruments measuring specific constructs of the model. Turner et al. (2009) perhaps conducted the most thorough empirical investigation of the pathways model to date. Their stated purpose was to "empirically test the extent to which the three pathways can be defined as

distinct components among variables correlated with pathological gambling" (p. 282). They used component analysis to assess several factors associated with the pathways model. Turner et al. found evidence for the pathways model, but found a four-factor solution that suggested Blaszczynski and Nower's Behaviorally Conditioned gambler be broken into two different subtypes.

While these recent studies have provided some confirmatory evidence for Blaszczynski and Nower's pathways model, further empirical validation of the theoretical model is necessary before it is accepted as the standard-bearer of pathological gambler subtypes. It is likely that – perhaps because of a desire to finally find a theory around which to unite – Milsoevic and Ledgerwood's (2010) conclusion that the model has been validated is premature. In fact, some recent articles have used the model as a rationale for their design, despite the fact that it has not faced rigorous empirical validation (e.g., Ledgerwood&Petry, 2010; Nower&Blaszczynski, 2004). This study is designed to provide a more direct examination of the utility of Blaszczynski and Nower's dimensions in differentiating subtypes of problem gamblers. Specifically, the current study will use exploratory cluster analysis to determine whether meaningful groups can be identified on the basis of individuals' scores on instruments selected to tap relevant psychological and social dimensions.

Chapter 3

Methods

Participants & Procedures

Men and women ages 18 to 64 will be recruited from pathological gambling treatment programs, Gamblers Anonymous groups, and the Oklahoma state gambling

helpline. Participants will complete an electronic questionnaire that will include demographic questions and several instruments assessing pathological gambling, as well as constructs associated with Blaszczynski and Nower's (2002) pathways model of pathological gambling. It is anticipated that the time to complete the questionnaire will take approximately 30 minutes. Participation will be voluntary, and those who complete the questionnaire will be provided with a 10-dollar gas card as an incentive. After completion of the survey, participants will be taken to a separate page that will allow them to provide a mailing address so that they may receive the gas card; no other identifying information will be collected.

Data will be collected via Survey Monkey, an online program that allows for the creation of an Internet-based questionnaire. The survey will be created by the primary investigator and will be maintained by the Center for Educational Development and Research (CEDAR) at the University of Oklahoma. Only the primary investigator and CEDAR staff will have access to data obtained. Data will be collected and maintained through the use of a secure server to prevent access to confidential information.

Potential participants will be provided with a web-address to the electronic survey. Treatment providers and Gamblers Anonymous group leaders will be contacted by the primary investigator and will be asked to distribute the web-address along with an information sheet explaining the purpose and procedure of the study. Callers to the Oklahoma state gambling helpline will be provided with the web address at the completion of their phone call by helpline staff.

Instruments

South Oaks Gambling Screen(SOGS). Lesieur and Bloom (1987) developed the SOGS as an instrument for the identification of pathological gamblers in clinical populations. The SOGS was based on a series of interviews with alcohol and drug abuse inpatients, in which those reporting gambling behavior were questioned. Lesieur and Blume created 60 questions based on these interviews and the DSM-III pathological gambling criteria, eventually reducing the total number of items to 20. A score of five or greater was selected as a cutoff to indicate *probable pathological gambling*. Though Lesieur and Blume created only the cutoff of five, many researchers have used scores of 3 or 4 on the SOGS as criteria indicating *problem gambling* (Wickwire Jr., Whelan, West, Meyers, McCausland, &Leullen, 2007).

The SOGS possesses adequate reliability and validity. It correlates with *DSM*-IV diagnostic criteria in both clinical and general population samples (r = .83; r = .77). Participants who score higher than 4 on the SOGS are classified as probable pathological gamblers. While there have been other measures of pathological gambling developed more recently, the SOGS has remained the most widely used instrument for assessing disordered gambling (Petry, 2005; Kuentzel et al., 2008).

Sensation Seeking Scale - form V (SSS-V). The SSS-V (Zuckerman et al., 1978) is a 40-item instrument that assesses respondents' optimal levels of stimulation and arousal, which Zuckerman labeled 'sensation seeking.' Respondents must select one of two choices for each item that offer opposing preferences, such as whether or not one would like to try surfing. Factor analysis of the SSS-V yielded four factors that are subscales of the instrument: Thrill and adventure seeking, experience seeking,

disinhibition, and boredom susceptibility. Reported internal consistency reliability of the SSS-V was high (α = .94).

The Gambling Related Cognitions Scale (GRCS). The GRCS (Raylu & Oei, 2004) is a 23-item survey instrment that uses a Likert-type 7-point scale, ranging from "strongly disagree" to "strongly agree." The instrument is composed of five subscales that assess respondents' level of belief in gambling-related cognitions, including illusion of control, predictive control, interpretive bias, gambling expectancies, and inability to stop gambling. Reported reliability for the overall scale was high (α = .93), and subscales demonstrated moderate to high reliability (α = .77 through.91).

Domain Specific Risk Taking Scale – Revised (DOSPERT). The DOSPERT Scale (Blais& Weber, 2006) is a 30-item self-report questionnaire that asks respondents to rate how likely they would be to engage in behaviors across five domains, ranging from 1 (extremely unlikely) to 7 (extremely likely). The five subscales assess the respondent's level of risk-taking in ethical, financial, health/safety, recreational, and social domains. Internal consistency estimates across domains ranged from α = .71 to .86, and the DOSPERT demonstrated adequate construct validity.

Beck Depression Inventory – II (BDI – II). The BDI – II (Beck, Steer, & Garbin, 1996) is a 21-item self-report instrument used to assess depression in clinical and normal populations. Each item lists four statements ranging in severity about a symptom of depression, and the respondent selects one statement. Each of the four statements are scored as 0, 1, 2, or 3 (in ascending order of severity), and a total score of 0 through 63 is calculated. The BDI-II is among the most widely-used depression inventories, and demonstrated high internal consistency (α = .92).

Beck Anxiety Inventory (BAI). The BAI (Beck & Steer, 1993) is a 21-item self-report instrument used to assess anxiety in clinical and normal populations. Each item lists four statements ranging in severity about a symptom of anxiety, and the respondent selects one statement. Each of the four statements are scored as 0, 1, 2, or 3 (in ascending order of severity), and a total score of 0 through 63 is calculated. The BAI demonstrated high internal consistency (α = .92) and is a widely-used and well-validated instrument.

Cohen Perceived Stress Scale (PSS-10). The PSS-10 (Cohen & Williamson, 1988) is a 10-item self-report measure in which respondents are asked to rate how often they have felt or thought a certain way regarding stressful life events. Each item is scored on a scale of 0 (never) to 4 (very often). The total score reflects two factors: a) negative feelings and inability to handle stress and b) positive emotions and an ability to handle stress. The PSS-10 demonstrated adequate internal consistency reliability (α = .78) and its structure was supported by confirmatory factor analysis (Harrington &Storch, 2006).

Addiction Severity Index Self-Report Form (ASI). The ASI (McLellan et al., 1992) was developed as a clinician-administered measure of seven domains related to addiction: alcohol use, drug use, medical problems, psychiatric symptoms, family and social problems, legal problems, and employment symptoms. In addition to the clinician-based structured interview, the ASI has been used as a self-report form and demonstrated adequate convergent validity for the alcohol (r = .87) and drug (r = .73) domains. Internal consistency for these domains on the self-report form was α = .87 and α = .77, respectively (Rosen, Henson, Finney, & Moos, 2000).

Eysenck's Impulsivity Scale – 7 (EIS – 7). The EIS – 7 is the 19-item impulsivity subscale of the Eysenck Impulsivity Questionnaire (EIQ; Eysenck&Eysenck, 1978). The items ask respondents to answer "yes" or "no" to questions about one's impulsivity, such as "Do you usually make up your mind quickly?" It is scored from 0 through 19, where an answer of "yes" equals one point. The EIS – 7 subscale has been validated for use as a stand-alone instrument and has good internal consistency (α = .84; Eysenck, Pearson, Esting, &Allsopp, 1985).

Adult ADHD Self-Report Scale (ASRS). The ASRS (Kessler et al., 2005) was developed in conjunction with the World Health Organization (WHO) to create a relatively simple self-administered ADHD screening scale for adults. Respondents are asked to rate how often they experience 18 symptoms associated with adult ADHD on a scale of 0 (never) to 4 (often); each of the items is scored as a 0 (if the frequency does not meet the clinical cutoff) or a 1 (if the frequency meets the clinical cutoff). Cutoff scores vary among items. Total scores of 0-3 indicate "low" ADHD symptoms, while a score of 4-8 indicates "moderate" symptoms. A score of 9 or higher is considered to be within the "clinical" range of ADHD. Internal consistency for the self-report version was high (α = .88), and the ASRS demonstrated high concurrent validity (α = .84) with a rater-administered version (Adler et al. 2006).

Self-Report Psychopathy Scale (SRPS). The SRPS (Levenson, Kiehl, & Fitzpatrick, 1995) is a 26-item self-report questionnaire designed to assess psychopathic, or antisocial, personality features in non-institutionalized samples. Each item is measured on a scale of 0 (disagree strongly) to 4 (agree strongly) based on how strongly one agrees with a statement. The instrument taps two factors; the first 16 items

assess for primary psychopathy (e.g., “for me, what’s right is whatever I can get away with” and “people who are stupid enough to get ripped off usually deserve it”) and the last 10 items assess for secondary psychopathology (e.g., “I find myself in the same kinds of trouble, time after time” and “love is overrated”). A recent investigation of the SRPS’s reliability demonstrated adequate internal consistency reliability (Factor 1: α = .85; Factor 2: α = .72; Seibert, Miller, Few, Zeichner, & Lynam, 2010).

Research Question

The three primary research questions of interest are:

1. After exploratory cluster analysis of Blaszczynski and Nower’s proposed factors associated with problem gamblers, can meaningful groups be identified?
2. What is the nature of these groups, and are they differentiated?
3. How do these subtypes relate to the pathways model?

Data Analysis

Instruments assessing the associated factors of Blaszczynski and Nower’s theoretical model will be given to individuals identified as problem and pathological gamblers. In order to qualify as a participant, survey respondents must score at least a ‘3’ on the SOGS.

An Exploratory cluster analysis will be conducted in order to determine whether meaningful subgroups can be identified using measures emerging from Blaszczynski and Nower’s pathways model.

References

Aasved, M. (2002). The psychodynamics and psychology of gambling. Springfield, IL: Charles C Thomas.

Abbott, M. W., &Volberg, R. A. (1991). *Gambling and problem gambling in New Zealand: Report on phase one of the national survey*. Research Series No. 12. Wellington: New Zealand Department of Internal Affairs.

Adler, L. A., Spencer, T., Faraone, S. V., Kessler, R. C., Howes, M. J., Biederman, J., and Secnik, K. (2006). *Annals of Clinical Psychiatry*, *18*(3), 145-148.

Alegría, A. A., Petry, N. M., Hasin, D. S., Liu, S., Grant, B. F., & Blanco, C. (2009). Disordered gambling among racial and ethnic groups in the US: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *CNS Spectrums*, *14*(3), 132-142.

Alessi, S. M., &Petry, N. M. (2003). Pathological gambling severity is associated with impulsivity in a delay discounting procedure. *Behavioural Processes*, *64*, 345–354.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders. 3rd ed.* Washington, DC: American Psychiatric Association.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders. 3rd ed., revised.* Washington, DC: American Psychiatric Association.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders. 4th ed.* Washington, DC: American Psychiatric Association.

Barry, D. T., Steinberg, M. A., Wu, R., & Potenza, M. N. (2008).Characteristics of black and white callers to a gambling helpline.*Psychiatric Services*, *59*(11), 1347-1350.

Beck, A. T., & Steer, R. A. (1993).*Manual for the Beck Anxiety Inventory*. San Antonio, TX: The Psychological Corporation.

Beck, A. T., Steer, R. A., &Garbin, M. G. (1996).*Manual for the Beck Depression Inventory*, 2nd ed. San Antonio, TX: The Psychological Corporation.

Blanco, C., Orensanz-Munoz, L., Blanco-Jerez, C., &Saiz-Ruiz, J. (1996). Pathological gambling and platelet MAO activity: A psychobiological study. *American Journal of Psychiatry*, *153*, 119–121.

Blanco, C., Petkova, E., Ibañez, A., &Sáiz-Ruiz, J. (2002). A pilot placebo-controlled study of fluvoxamine for pathological gambling. *Annals of Clinical Psychiatry*, *14*, 9-15.

Blaszczynski, A., &Farell, E. (1998). A case series of 44 completed gambling-related suicides. *Journal of Gambling Studies*, *14*(2), 93-109.

Blaszczynski, A. P. (1999). Pathological gambling and obsessive-compulsive spectrum disorders. *Psychological Reports*, *84*, 107-113.

Blaszczynski, A., &Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction*, 97, 487-499.

Bondolfi, G., Osiek, C., & Ferrero, F. (2000). Prevalence estimates of pathological gambling in Switzerland.*ActaPsychiatricaScandinavica*, *101*, 473-475.

Bonnaire, C., Bungener, C., &Varescon, I. (2009). Subtypes of French pathological gamblers: Comparison of sensation seeking, alexithymia and depression scores. *Journal of Gambling Studies*, *25*, 455-471.

Bonnaire, C., Lejoyeux, M., &Dardennes, R. (2004). Sensation seeking in a French population of PGs: Comparison with regular and nongamblers. Psychological Reports, 94, 1361–1371.

Brooker, I. S., Clara, I. P., & Cox, B. J. (2009). The Canadian Problem Gambling Index: Factor structure and associations with psychopathology in a nationally representative sample. *Canadian Journal of Behavioural Science*, *41*(2), 109-114.

Brown, D., Patton, D., Dhaliwal, J., Pankratz, C., &Broszeit, B. (2002). *Gambling involvement and problem gambling in Manitoba*. Winnipeg, Canada: Addictions Foundation of Manitoba.

Carlton, P. L., &Manowicz, P. (1994). Factors determining the severity of pathological gamblers in males.*Journal of Gambling Studies*, *10*, 147-157.

Carrasco, J. L., Saiz-Ruiz, J., Hollander, E., Cesar, J., & Lopez-Ibor, J. J. (1994). Low platelet monoamine oxidase activity in pathological gambling. *Acta PsychiatricaScandinavica*, *90*, 427–431.

Chóliz, M. (2010). Experimental analysis of the game in pathological gamblers: Effect of the immediacy of the reward in slot machines. *Journal of Gambling Studies*, *26*(2), 249-256.

Cohen, S., & Williamson, G. (1988).Perceived stress in a probability sample of the United States.In S. Spacapam& S. Oskamp (Eds.).*The Social Psychology of*

Health. Newbury Park, CA: Sage Publications.

Cox, B. J., Yu, N., Afifi, T. O., &Ladouceur, R. (2005).A National Survey of Gambling Problems in Canada.*The Canadian Journal of Psychiatry*, *50*(4), 213-217.

Culleton, R. P. (1989). The prevalence rates of pathological gambling: A look at methods. *Journal of Gambling Behavior*, *5*(1), 22-41.

Cunningham-Williams, R. M., Cottler, L. B., Compton, W. M., &Spitznagel, E. L. (1998). Taking chances: Problem gamblers and mental health disorders--Results from the St. Louis Epidemiological Catchment Area (ECA) Study. *American Journal of Public Health*, *88*(7), 1093-1096.

Custer, R. L. (1982). Gambling and addiction. In R. Craig & S. Baker (Eds.), *Drug dependent patients: Treatment and research* (pp. 367-381). Springfield, IL: Charles C Thomas.

Custer, R. L. (1985). When luck runs out: Help for compulsive gamblers and their families. New York, NY: Facts on File, Inc.

Czerny, E., Koenig, S., & Turner, N. (2008). Exploring the mind of the gambler: Psychological aspects of gambling and problem gambling. In M. Zangeneh, A. Blaszcynski, & N. E. Turner (Eds.). *In the pursuit of winning: Problem gambling theory, research and treatment* (pp. 65-82). New York: Springer Science.

Delfabbro, P., Lahn, J., &Grabosky, P. (2006). Psychosocial correlates of problem gambling in Australian students. *Australian and New Zealand Journal of Psychiatry*, *40*(6–7), 587–595.

Derevensky, J. L., Gupta, R., & Dickson, L. (2004). Prevention and treatment of adolescent problem and pathological gambling. In J. E. Grant & M. N. Potenza (Eds.), *Pathological gambling: A clinical guide to treatment* (pp. 169-187). Washington, DC: American Psychiatric Publishing, Inc

Derevensky, J. L., Gupta, R., &Winters, K. (2003). Prevalence rates of youth gambling problems: Are the current rates inflated? *Journal of Gambling Studies*, *19*(4), 405-425.

Desai, R. A., Desai, M. M., & Potenza, M. N. (2007). Gambling, health, and age: Data from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychology of Addictive Behaviors*, *21*(4), 431-440.

Desai, R. A., & Potenza, M. N. (2008). Gender differences in the associations between past-year gambling problems and psychiatric disorders. *Social Psychiatry and Psychiatric Epidemiology*, *43*(3), 173-183.

el-Guebaly, N., Patten, S. B., Currie, S., Williams, J. A., Beck, C. A., Maxwell, C. J., & Li Wang, J. (2006). Epidemiological associations between gambling behavior, substance use & mood and anxiety disorders. *Journal of Gambling Studies*, *22*(3), 275-287.

Engwall, D., Hunter, R., & Steinberg, M. (2004). Gambling and other risk behaviors on university campuses. *Journal of American College Health*, *52*(6), 245-255.

Eysenck, S. B. G., &Eysenck, H. J. (1978). Impulsiveness and venturesomeness: Their position in a dimensional system of personality description. *Psychological Reports*, *43*, 1247-1255.

Eysenck, S. B. G., Pearson, P. R., Easting, G, &Allsopp, J. F. (1985). Age norms for impulsiveness, venturesomeness, and empathy in adults.*Personality and Individual Differences*, *6*, 613-619.

Ferris, J., & Wynne, W. (2001). The Canadian Problem Gambling Index: Final report. Ontario: Canadian Centre on Substance Abuse.

Fisher, S. (1999). A prevalence study of gambling and problem gambling in British adolescents.*Addiction Research*, *7*(6), 509–538.

Fortune, E. E., & Goodie, A. S. (2010). The relationship between pathological gambling and sensation seeking: The role of subscale scores. *Journal of Gambling Studies*, *26*(3), 331-346.

Frost, R. O., Meagher, B. M., &Riskind, J. H. (2001). Obsessive-compulsive features in pathological lottery and scratch-ticket gamblers. *Journal of Gambling Studies*, *17*, 5-19.

Goldstein, J. M., & Simpson, J. C. (1995).Definitions and applications to psychiatric research. In M. T. Tsuang, M. Tohen, & G .E. Zahner (Eds.)*Textbook in Psychiatric Epidemiology* (pp. 229-242). New York: Wiley-Liss.

Gøtestam, K.G., & Johansson, A. (2003). Characteristics of gambling and problematic gambling in the Norwegian context.A DSM-IV-based telephone interview study.*Addictive Behaviours*, 28, 189–197.

Graham, J. R., &Lowenfeld, B. H. (1986). Personality dimensions of the pathological gambler.*Journal of Gambling Behavior*, *2*, 58-66.

Griffiths, M., & Barnes, A. (2008). Internet gambling: an online empirical study among student gamblers. *International Journal of Mental Health & Addiction*, *6*, 194–204.

Griffiths, M., Parke, J. & Wood, R. (2002). Excessive gambling and substance abuse: Is there a relationship? *Journal of Substance Use*, *7*, 187–190.

Griffiths, M. & Sutherland, I. (1998). Adolescent gambling and drug use.*Journal of Community and Applied Social Psychology*, *8*, 423–427.

Griffiths, M., Wardle, H., Orford, J., Sproston, K., &Erens, B. (2009).Sociodemographic correlates of Internet gambling: Findings from the 2007 British Gambling Prevalence Survey. *CyberPsycholgoy& Behavior*, *12*(2), 199-202.

Gupta, R., Derevensky, J. L., &Ellenbogen, S. (2006). Personality characteristics and risk-taking tendencies among adolescent gamblers. *Canadian Journal of Behavioural Science*, 38, 201–213.

Haller, R., &Hinterhuber, H. (1994).Treatment of pathological gambling with carbamazepine (letter).*Pharmacopsychiatry*, *27*, 129.

Harrington, R. J., &Sotrch, E. Further pschometric support for the 10-item version of the perceived stress scale. *Journal of University Counseling*, *9*, 135-147.

Hodgins, D., &Diskin, K. M. (2008). Motivational interviewing in the treatment of problem and pathological gambling. In H. Arkowitz, H. A. Westra, W. R. Miller, & S. Rollnick (Eds.)*Motivational Interviewing in the Treatment of Psychological Problems* (pp. 225-248). New York: The Guilford Press.

Hodgins, D. C., & el-Guebaly, N. (2000). Natural and treatment-assisted recovery from gambling problems: A comparison of resolved and active gamblers. *Addictive Behaviors, 22,* 247-255.

Hodgins, D. C., Mansley, C., &Thygesen, K. (2006). Risk factors for suicide ideation and attempts among pathological gamblers. *The American Journal on Addictions*, *15*, 303-310.

Hodgins, D. C., &Petry, N. M. (2004).Cognitive and behavioral treatments. In J. E. Grant & M. N. Potenza (Eds.), *Pathological gambling: A clinical guide to treatment* (pp. 169-187). Washington, DC: American Psychiatric Publishing, Inc.

Hollander, E., DeCaria, C., &Finkell, J. N. (2000).A randomized double-blind fluvoxamine/placebo crossover trial in pathologic gambling.*Biological Psychiatry*, *47*, 813-817.

Hollander, E., DeCaria, C., Mari, E., Wong, C. M., Mosovich, S., Grossman, R., &Begaz, T. (1998).Short-term single-blind fluvoxamine treatment of pathological gambling.*American Journal of Psychiatry*, *155*, 1781-1783.

Hollander, E., Kaplan, A., &Pallanti, S. (2004). Pharmacological treatments. In J. E. Grant & M. N. Potenza (Eds.), *Pathological gambling: A clinical guide to treatment* (pp. 169-187). Washington, DC: American Psychiatric Publishing, Inc.

Huang, J., & Boyer, R. (2007). Epidemiology of youth gambling problems in Canada: A national prevalence study. *The Canadian Journal of Psychiatry*, *52*(10), 657-665.

Huang, J., Jacobs, D. F., Derevensky, J. L., Gupta, R., &Paskus, T. S. (2007).A national study on gambling among US college student-athletes.*Journal of American College Health*, *56*(2), 93-99

Ibañez, A., Blanco, C., Donahue, E., Lesieur, H. R., Pérez de Castro, I., Fernández-Piqueras, J., &Sáiz-Ruiz, J. (2001). Psychiatric comorbidity in pathological gamblers seeking treatment.*American Journal of Psychiatry*, *158*, 1733-1735.

Jackson, A. C., Dowling, N., Thomas, S. A., Bond, L., & Patton, G. (2008). Adolescent Gambling behaviour and attitudes: A prevalence study and correlates in an Australian population. *International Journal of Mental Health and Addiction*, *6*, 325-352.

Johansson, A., Grant, J. E., Kim, S., Odlaug, B. L., &Götestam, K. (2009). Risk factors for problematic gambling: A critical literature review. *Journal of Gambling Studies*, *25*(1), 67-92.

Kallmen, H., Andersson, P., &Andren, A. (2008). Are irrational beliefs and depressive mood more common among problem gamblers than non-gamblers? A survey study of Swedish problem gamblers and controls.*Journal of Gambling Studies*, *24*(4), 441-450.

Kavli, H, &Berntsen, W. (2005). *Study of gambling, gambling habits and gambling problems in the population*. Oslo, Norway: Market and Media Institute.

Kessler, R. C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., Howes, M. J., Jin, R., Secnik, K., Spencer, T., Ustun, T. B., & Walters, E. E. (2005). The World Health Organization adult ADHD self-report scale (ASRS): A short screening scale for use in the general population. *Psychological Medicine*, *35*, 245-256.

Kuentzel, J. G., Henderson, M. J., & Melville, C. L. (2008). The impact of social desirability biases on self-report among college student and problem gamblers. *Journal of Gambling Studies*, *24*(3), 307-319.

Kuley, N. B., & Jacobs, D. F. (1988). The relationship between dissociative-like

experiences and sensation seeking among social and problem gamblers. *Journal of Gambling Behavior*, 4, 197–207.

Ladd, G. T., &Petry, N. M. (2002). Disordered gambling among university-based medical and dental patients: a focus on Internet gambling. *Psychology of Addictive Behaviours*; *16*, 76–79.

Ladouceur, R., Dubé, D., &Bujold, A. (1994). Prevalence of pathological gambling and related problems among college students in the Quebec metropolitan area.*Canadian Journal of Psychiatry*, *39*, 289-293.

Ladouceur, R., Jacques, C., Chevalier, S., Sevigny, S., & Hamel, D. (2005).Prevalence of pathological gambling in Quebec in 2002.*The Canadian Journal of Psychiatry*, *50*(8), 451-456.

Ladouceur, R,, Jacques, C., Ferland, F., Giroux, I. (1999). Prevalence of problem gambling: A replication study 7 years later. *The Canadian Journal of Psychiatry*, *44*(8), 802-804.

Lacouceur, R., &Lachance, S. (2007a). Overcoming pathological gambling: Therapist guide. Oxford, UK: Oxford University Press.

Ladouceur, R., &Lachance, S. (2007b). Overcoming your pathological gambling. Oxford, UK: Oxford University Press.

Lang, K. B., & Omori, M. (2009) Can demographic variables predict lottery and pari-mutuel losses? An empirical investigation.*Journal of Gambling Studies*, *25*(2), 171-183.

Ledgerwood, D. M., Alessi, S. M., Phoenix, N., &Petry, N. M. (2009). Behavioral assessment of impulsivity in pathological gamblers with and without substance use disorder histories versus healthy controls. *Drug and Alcohol Dependence*, *105*(1-2), 89-96.

Ledgerwood, D. M., Steinberg, M. A., Wu, R., & Potenza, M. N. (2005).Self-reported gambling-related suicidality among gambling helpline callers.*Psychology of Addictive Behaviors*, *19*(2), 175-183.

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

Lesieur, H. R., Blume, S., &Zoppa, R. (1986). Alcoholism, drug abuse and gambling.*Acoholism: Clinical and Experimental Research*, *10*, 33-38.

Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a noninstitutionalized population. *Journal of Personality and Social Psychology*, *68*(1), 151-158.

Lorains, F. K., Cowlishaw, S., & Thomas, S. A. (2011). Prevalence of comorbid disorders in problem and pathological gambling: Systematic review and meta-analysis of population surveys. Addiction, 106(3), 490-498

Lund, I. (2007). Lessons from the grey area: A closer inspectionof at-risk gamblers. *Journal of Gambling Studies*, *23*(4), 409-419.

Lund, I., &Nordlund, S. (2003). *Gambling and problem gambling in Norway*. SIRUS report no 2. Oslo, Norway: Norwegian Institute for Alcohol and Drug Research.

Mazur, J. (2010). What's luck got to do with it?: The history, mathematics, and psychology behind the gambler's illusion. Princeton, NJ: Princeton University Press.

McLellan, A. T., Kushner, H. Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., &Argeriou, M. (1992). The fifth edition of the Addiction Severity Index.*Journal of Substance Abuse Treatment*, *9*, 199-213.

McMillen, J., & Wenzel, M. (2006). Measuring problem gambling: Assessment of three prevalence screens. *International Gambling Studies*, *6*, 147–174.

Milosevic, A., &Ledgerwood, D. M. (2010). The subtyping of pathological gambing: A comprehensive review. *Clinical Psychology Review*, *30*, 988-998.

National Research Council. (1999). Pathological Gambling.Washingon, DC: American Psychiatric Association.

Neal, P., Delfabbro, P. H., & O'Neil, M. (2005). *Problem gambling and harm: Towards a national definition*. Melbourne: National Gambling Research Program Working Party.

New Brunswick Department of Health &Wellness. (2001). *2001 survey of gambling and problem gambling in New Brunswick*.Frederieton , Canada: New Brunswick Department of Health and Wellness.

Parke, A., Griffiths, M., &Irwing, P. (2004). Personality traits in pathological gambling: Sensation seeking, deferment of gratification and competitiveness as risk factors. *Addiction Research and Theory*, 12, 201–212.

Penfold, A., Hatcher, S., Sullivan, S., & Collins, N. (2006). Gambling problems and attempted suicide: Part II-Alcohol abuse increases suicide risk. *International Journal of Mental Health and Addiction*, *4*(3), 273-279.

Petry, N. M. (2003). Patterns and correlates of Gamblers Anonymous attendance in pathological gamblers seeking professional treatment.*Addictive Behaviors, 28*, 1049-1062.

Petry N. M. (2005). Pathological gambling: Etiology, comorbidity, and treatment. Washington, DC: American Psychological Society.

Petry, N. M. (2007). Concurrent and predictive validity of the Addiction Severity Index in pathological gamblers.*The American Journal on Addictions*, *16*(4), 272-282.

Petry, N. M., Stinson, F. S., & Grant, B. F. (2005). Comorbidity of DSM-IV pathological
gambling and other psychiatric disorders: Results from the National Epidemiological Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry*, *66*(5), 564–74.

Petry, N. M., &Weisnstock, J. (2007). Internet gambling is common in college students and associated with poor mental health. *The American Journal on Addictions*, *16*(5), 325-330.

Pietrzak, R. H., Petry, N. M. (2004) Antisocial personality is associated with increased severity of gambling, medical, drug, and psychiatric problems among treatment seeking pathological gamblers. *Addiction, 100*, 1183-93.

Raylu, N., &Tian, P. S. O. (2004). The gambling related cognitionsscale (GRCS): Development, confirmatory factor validation and psychometric properties. *Addiction*, *99*, 757-769.

Rodriguez-Jimenez, R., Avila, C., Jimenez-Arriero, M. A., Ponce, G., Monasor, R., Himenez, M., Aragües, Hoenicka, J., Rubio, G., &Palomo, T. (2006). Impulsivity and sustained attention in pathological gamblers: Influence of childhood ADHD history. *Journal of Gambling Studies*, *22*, 451-461.

Rosen, C. S., Henson, B. R. Finney, J. W., & Moos, R. H. (2000). Consistency of self-administered and interview-based Addiction Severity Index composite scores.*Addiction*, *95*(3), 419-425.

Rosenthal, R. J. (1989). Pathological gambling and problem gambling: Problems of definition and diagnosis. In H. J. Shaffer, S.A. Stein, B. Gambino, & T. N. Cummings (Eds.) *Compulsive Gambling: Theory, Research, and Practice* (pp. 101-125). Lexington, MA: Lexington Books.

Rugle, L., &Melamed, L. (1993). Neuropsychological assessment of attention problems in pathological gamblers.*Journal of Nervous and Mental Disorders*, *18*(2), 107-112.

Rush, B. R., Bassani, D. G., Urbanoski, K. A., Castel, S. (2008).Influence of co-occurring mental and substanceuse disorders on the prevalence of problemgambling in Canada. *Addiction*, *103*(11), 1847-1856.

Sacco, P., Cunningham-Williams, R. M., Ostmann, E., &Spitznagel, E. (2008). The association between gambling pathology and personality disorders.*Journal of Psychiatric Research*, *42*(13), 1122-1130.

Seibert, L. A., Miller, J. D., Few, L. R., Zeichner, A., &Lynam, D. R. (2010). An examination of the structure of self-report psychopathy measures and their relations with general traits and externalizing behaviors.*Personality Disorders: Theory, Research, and Treatment*, doi:10.1037/a0019232.

Shaffer, H. J., & Hall, M. N. (1996). Estimating 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., &Bilt, J. V. (1997). *Estimating the Prevalence of Disordered Gambling Behavior in the United States and Canada: A Meta-Analysis*. Cambridge, MA: Harvard Medical School Division on Addictions.

Slutske, W. S. (2006). Natural recovery and treatment-seeking in pathological gambling: Results of two U.S. national surveys. *The American Journal of Psychiatry, 163*, 297-302.

Slutske, W. S., Jackson, K. M., &Sher, K. J. (2003). The natural history of problem fambling from age 18 to 29.*Journal of Abnormal Psychology, 112*(2), 263-274.

Specker, S. M., Carlson, G. A., Christenson, G. A., &Marcotte, M. (1995). Impulse control disorders and attentio deficit disorder in pathological gamblers. *Annals of Clinical Psychiatry*, *7*(4), 175-179.

Ste-Marie, C., Gupta, R., &Derevensky, J. L. (2006). Anxiety and social stress related to adolescent gambling behavior and substance use. *Journal of Child & Adolescent Substance Abuse*, *15*(4), 55-74.

Stewart, S. H., Zack, M., Collins, P., Klein, R. M., &Fragopoulos, F. (2008). Subtyping pathological gamblers on the basis of affective motivations for gambling: Relations to gambing problems, drinking problems, and affective motivations for drinking. *Psychology of Addictive Behaviors*, *22*, 257-268.

Stinchfield, R. (2002). Reliability, validity, and classification accuracy of the South Oaks Gambling Screen.*Addictive Behaviors*, *27*, 1-19.

Toneatto, T. (2008). Reliability and validity of the gamblers anonymous twenty questions. *Journal of Psychopathology and Behavioral Assessment*, *30*(1), 71-78.

Toneatto, T., &Sobell, L. C. (1990). Pathological gambling treated with cognitive theory: A case report. *Addictive Behaviors*, *15*, 497-501.

Turner, N. E., Jain, U., Spence, W., &Zangeneh, M. (2008). Pathways to pathological gambling: Component analysis of variables related to pathological gambling. *International Gambling Stuedies*, *8*(3), 281-298.

Turner, N. E., Macdonald, J., Bartoshuk, M., &Zangeneh, M. (2008).Adolescent gambling behaviour, attitudes, and gambling problems.*International Journal of Mental Health and Addiction*, *6*(2), 223-237.

Vachon, D. D., &Bagby, R. M. (2009). Pathological gambling subtypes.*Psychological Assessment*, *21*, 608-615.

Volberg, R. A., Abbot, M. W., Rönnberg, S., &Munck, I. M. E. (2001). Prevalence and risks of pathological gambling in Sweden.*ActaPsychiatricaScandinavica*, *104*(4), 250-256.

Volberg, R. A., Dickerson, M. G., Ladouceur, R., & Abbott, M. W. (1996). Prevalence studies and the development of services for problem gamblers and their families.*Journal of Gambling Studies*, *12*, 215-231.

Wardle, H., Sproston, K., Orford, J., Erens, B., Griffiths, M., Constantine, R., &Pigott, S. (2007).*The British Gambling Prevalence Survey 2007.*London: National Centre for Social Research.

Weinstock, J., Whelan, J. P., & Meyers, A. W. (2004). Behavioral assessment of gambling: An adaptation of the timeline followback method. *Psychological Assessment*, *16*, 72-80.

Weinstock, J., Whelan, J. P., & Meyers, A. W. (2008). College students' gambling behavior: When does it become harmful? *Journal of American College Health*, *56*(5), 513-521.

Weinstock, J., Whelan, J. P., Meyers, A. W., &McCausland, C. (2007). The performance of two pathological gambling screens in college students.*Assessment, 14*(4), 399-407.

Weiss, L. M., &Petry, N. M. (2008). Psychometric properties of the Inventory of Gambling Situations with a focus on gender and age differences.*Journal of Nervous and Mental Disease*, *196*(4), 321-328.

Welte, J. W., Barnes, G. M., Tidwell, M. O., & Hoffman, J. H. (2008). The prevalence of problem gambling among U.S. adolescents and young adults: Results from a national survey. *Journal of Gambling Studies*, *24*(2), 119-133.

Welte, J. W., Barnews, G. M., Wieczorek, W. F., Tidwell, M. C., & Parker, J. C. (2004). Risk factors for pathological gambling. *Addictive Behaviors*, *29*(2), 323-335.

Wickwire, Jr., E. M., Whelan, J. P., West, R., Meyers, A., McCausland, C., &Leullen, J. (2007). Perceived availability, risks, and benefits of gambling among college students.*Journal of Gambling Studies*, *23*(4), 395-408.

Wiebe J., Single, E., &Falkowski-Ham, A. (2001). *Measuring gambling and problem gambling in Ontario*. Toronto: Canadian Centre on Substance Abuse and Responsible Gambling Council.

Young, M., & Stevens, M. (2008). SOGS and CPGI: Parallel comparison on a diverse population. *Journal of Gambling Studies*, *24*(3), 337-356.

Zimmerman, M., Breen, R. N., &Posternak, M. A. (2002).An open-label study of citalopram in the treatment of pathological gambling.*Journal of Clinical Psychiatry*, *63*, 44-48.

Zuckerman, M. (1994). Behavioral expressions and biosocial bases of sensation seeking. Cambridge, UK: Cambridge University Press.

Zuckerman, M. (2007). The sensation seeking scale V (SSS-V): Still reliable and valid. *Personality and Individual Differences*, *43*, 1303-1305.

Zuckerman, M., Eysenck, S. B. G., &Eysenck, H. J. (1978). Sensation seeking in England and America: Cross-cultural, age and sex comparisons. *Journal of Consulting and Clinical Psychology,46*, 139–149.