Gambling Problems, Distress and Proneness to Depression in the Winnipeg Area Study

by

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Abstract

Legalized gambling in Canada has increased dramatically over the last two decades. The existing literature suggests that a subgroup of individuals with gambling problems might be characterized by an emotional vulnerability to depression, although psychological factors related to such vulnerability have rarely been examined. This thesis utilized a representative community sample to examine the relationship between self-criticism, a psychological factor reflecting vulnerability to depression, distress and gambling problems and to provide data on the prevalence and correlates of gambling problems in Winnipeg. Results indicated that self-criticism is significantly related to gambling problems and this relationship was stronger among women. The prevalence of gambling problems was 11%, double the most recently reported Canada-wide estimates. Correlates of gambling problems revealed in the current study were consistent with previous research. These results have important implications for treatment and prevention efforts as well as public policy regarding gambling and gambling advertising in Canada.

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Dedication

I would like to dedicate this thesis to my mother, Elaine Pagura, the strongest and most loving woman I know.

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Chapter 1: Introduction

Objectives

The primary objective of this thesis is to examine the role of distress and self-criticism, a cognitive construct that functions as a vulnerability factor for depression, in gambling problems. The secondary objective of this thesis is to provide data on the prevalence and gambling behavior correlates of gambling problems in Winnipeg, Manitoba, Canada, a city marked by numerous gambling opportunities, including a high concentration of video lottery terminals (VLTs) and the presence of permanent casinos.

Background

Legalized gambling in Canada has increased dramatically over the last two decades. Lotteries represented much of the gambling activity in Canada for the first 20 years following the legalization of gambling in 1969. However, by the early 1990s, the first casinos and video lottery terminals (VLTs) had been introduced and gambling in Canada began to change dramatically (Smitheringale, 2003). Health and social costs due to problem gambling have often been overlooked as a result of benefits of gambling for the Canadian economy. In Manitoba, funding for programs addressing gambling problems was not established until 4 years after the introduction of the first permanent casino (Smitheringale, 2003).

Federal and provincial governments in Canada are in full control of the legal gambling industry, with gambling representing a significant source of revenue for the government (Marshall, 1998). For instance, in Manitoba, the net revenue from gambling in the fiscal year 2001-2002 totaled over 248 million dollars for the provincial government (Smitheringale, 2003). Indeed, the rapid expansion of gambling has been

driven by the economic needs of governments and their attempts to create additional sources of revenue without increasing taxes (Korn & Shaffer, 1999). Additionally, the social benefit to charities, non-profit organizations and community service agencies through gambling has been emphasized in Canada (Campbell & Smith, 1998) and the entertainment value of gambling behaviors has been promoted in marketing strategies (Province of Manitoba, 2008).

These promotional strategies have proven remarkably successful; approximately three quarters of Canadians age 15 and over gambled in 2002, spending over 11 billion dollars (Marshall & Wynne, 2004). Furthermore, approximately 5% of the adult population experienced problems with gambling or were at risk for gambling problems (Marshall et al., 2004). It is clear that gambling problems, although a relatively new phenomenon in Canada, are a prevalent issue. In fact, gambling problems have been described as a "relatively novel form of addiction," (Wiebe & Cox, 2001, p.149) different from typically studied forms of addiction such as alcohol and drug problems. This form of addiction has been shown to have different correlates compared to substance addictions. For example, individuals affected by gambling problems are more likely to have higher incomes, to be female, married, educated and employed compared to individuals affected by alcohol problems (Wiebe et al., 2001). In this context, it is important that the costs of gambling to both individuals and Canadian society as a whole are recognized and research is conducted to inform public policy, education, prevention and treatment services.

Gambling Problems and Pathological Gambling

Gambling is defined as, "risking something of value on the outcome of an event when the probability of winning is less than certain," (Korn et al., 1999, p.292). As such, gambling encompasses behaviors as diverse as playing slot machines or VLTs, buying lottery tickets, and engaging in high-risk or impulsive financial trading. These behaviors, although not inherently pathological, can transition into disordered gambling, recognized by the *Diagnostic and Statistical Manual of Mental Disorders 4th Edition* (DSM-IV; American Psychiatric Association, 2000) as an impulse control disorder called pathological gambling (See Appendix A for DSM-IV criteria). DSM-IV describes this diagnosis as, "persistent and recurrent maladaptive gambling behavior that disrupts personal, family or vocational pursuits," (American Psychiatric Association, 2000, p.671).

A commonly used measure to assess gambling problems is the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987), a 20-item scale which allows for identification of problem gambling (scores of 3 or 4) as well as probable pathological gambling (scores of 5 or more). In order to better examine the nature of gambling in Canada, researchers have developed a new gambling measure known as the Canadian Problem Gambling Index (CPGI; Ferris & Wynne, 2001a).

The CPGI was intended to be a more meaningful indicator of problem gambling for use in epidemiological surveys, including an assessment of prevalence as well as indicators of the social and environmental context of gambling. A continuum of four levels of gambling behavior are recognized on the basis of CPGI scores and frequency of gambling: 1) Non-problem gambling, 2) Low-risk gambling, 3) Moderate-risk gambling,

and 4) Problem gambling. These categories vary only slightly from groupings commonly used in previous research with the SOGS, the major difference being that the CPGI does not categorize individuals with probable pathological gambling. This is especially important given that studies have shown the SOGS to overestimate the prevalence of pathological gambling (Cox, Enns, & Michaud, 2004a; Ladouceur et al., 2000). The other important difference is that the CPGI contains two levels of gamblers at risk for gambling problems (low-risk and moderate-risk) while the previously used categorization identified only "at-risk" gamblers. This allows more potential problem gamblers to be identified and allows populations typically under-represented in treatment-seeking populations to be identified, including women, ethnic minorities and individuals with low socioeconomic status (Ferris & Wynne, 2001b). This extension of the CPGI is especially important given that, at the population-level, the most harm is associated with subclinical gambling problems due to their increased prevalence (Brownson, Newschaffer, & Ali-Abarghoui, 1997).

Prevalence of Gambling Problems and Pathological Gambling

The most recent national data on the prevalence of gambling in Canada comes from the Canadian Community Health Survey Cycle 1.2 (CCHS 1.2), a study conducted by Statistics Canada in 2002, which collected data on mental health and well-being (Gravel & Beland, 2005). A multi-stage stratified cluster design was utilized to ensure the sample would be representative of the Canadian general population age 15 and older living in private dwellings in the 10 Canadian provinces. The final sample included 36,984 respondents who were interviewed in their homes by professional interviewers. According to the CCHS 1.2, 24.2% of Canadians were non-gamblers, while 71.0% of

Canadians engaged in non-problem gambling in 2002 (Marshall et al., 2004). In contrast, 5% of the adult population experienced problems with gambling or were at risk for gambling problems: 2.8% of Canadians were considered low-risk gamblers, 1.5% moderate-risk gamblers and 0.5% problem gamblers (Marshall et al., 2004).

Other epidemiological studies of pathological gambling and gambling problems across Canada and the United States have yielded similar prevalence estimates (Ladouceur, 1996; Shaffer, Hall, & Vander Bilt, 1999; Shaffer & Hall, 2001). A meta-analysis of gambling studies conducted before June 30, 1999 in the United States and Canada cited prevalence estimates of 1.5% for past-year pathological gambling and 2.5% for past-year subclinical gambling problems among adults (Shaffer et al., 2001). Notably, prevalence estimates were significantly higher for adolescents compared to adults (4.8% for past-year pathological gambling and 14.6% for past-year subclinical gambling problems). Additionally, this study found that prevalence estimates among adults had increased significantly over 20 years, in accordance with the widespread increase in the availability of gambling opportunities (Shaffer et al., 2001).

Prevalence estimates of pathological gambling and gambling problems do vary across provinces in Canada, as would be expected given the variance in gambling venues across provinces (Cox, Yu, Afifi, & Ladouceur, 2005). In fact the two provinces with both permanent casinos as well as the highest concentrations of VLTs, Manitoba and Saskatchewan, have the highest rates of gambling problems (moderate-risk or problem gambling as defined by the CPGI). Compared to a past-year prevalence of 2.0% for gambling problems in Canada as a whole, Manitoba and Saskatchewan each had corresponding prevalence estimates of 2.9% (Cox et al., 2005). Further, representative

samples of the capital city of Manitoba, Winnipeg, revealed correspondingly high lifetime prevalence figures of 5.6% (Cox, Kwong, Michaud, & Enns, 2000) and 6.1% (Cox et al., 2004a) as well as a past-year prevalence estimate of 3.2% (Cox et al., 2004a) for problem gambling or probable pathological gambling according to the SOGS.

Correlates of Gambling Problems and Pathological Gambling

Gambling problems and pathological gambling are associated with many negative consequences. For example, data from the CCHS 1.2 showed that problem gamblers in Canada, as compared to non-problem gamblers, were more likely to report poor or fair health, financial difficulties, relationship problems, interference at work, high or extreme levels of stress, high distress, alcohol dependence, major depression and suicidal ideation (Marshall et al., 2004).

In terms of psychiatric comorbidities, gambling is often found to be highly related to externalizing disorders such as drug/alcohol dependence and antisocial personality disorder in both treatment seeking (Ibanez et al., 2001) and epidemiological samples (Crockford & el-Guebaly, 1998; Petry, Stinson, & Grant, 2005). Gambling is also often found to be associated with depressive symptoms (Blaszczynski, McConaghy, & Frankova, 1990; Blaszczynski, Steel, & McConaghy, 1997; Getty, Watson, & Frisch, 2000; Ibanez et al., 2001; Steel & Blaszczynski, 1998), major depression and other mood disorders (Crockford et al., 1998; Ibanez et al., 2001; Kim, Grant, Eckert, Faris, & Hartman, 2006; Petry et al., 2005; Potenza, Xian, Shah, Scherrer, & Eisen, 2005) and suicidal behaviors (Beaudoin & Cox, 1999; Bland, Newman, Orn, & Stebelsky, 1993; Cunningham-Williams et al., 2005; Ledgerwood & Petry, 2004; Ledgerwood, Steinberg, Wu, & Potenza, 2005; Marshall et al., 2004; Petry & Kiluk, 2002; Saboia Martins,

Tavares, Sabbatini da Silva Lobo, Galetti, & Gentil, 2004). In addition, reports from Addictions Foundation of Manitoba (AFM) frontline clinicians specializing in gambling counseling (Cox, 1998), conducted as background for several studies (Beaudoin et al., 1999; Wiebe et al., 2001), repeatedly note clients presenting to the problem gambling program for feelings of loneliness and distress. Many of these individuals attempted to cope with such troubles through the use of VLT machines and subsequently developed further life difficulties and gambling problems.

Categorizations of Gamblers

Several groups of researchers have proposed typologies or groupings of pathological gamblers in accordance with the various observed comorbidities described above. The first such typology was proposed by Moran (1970) based on an observational study of 50 male pathological gamblers. Moran classified all subjects into one of five non-mutually-exclusive types of pathological gambling which varied in terms of the relative importance of social and individual factors. These five groups were termed: subcultural, neurotic, impulsive, psychopathic and symptomatic gambling. Subcultural gambling is used to describe gambling that occurs primarily due to social factors such as the frequency of opportunities and venues for gambling and attitudes and beliefs about gambling. Despite the relative importance of social factors in subcultural gambling, individual factors still influence whether the gambling becomes pathological. Neurotic gambling refers to gambling that serves to provide relief or escape from stressful events or negative emotional states. Moran found that although neurotic gambling was typically frequent and undisciplined, abstinence was possible when alternative coping mechanisms were provided. In contrast, impulsive gambling refers to gambling that is associated with

loss of control, ambivalence and craving. Of all the types of gambling, impulsive gambling most resembles other addictions such as alcohol and substance dependence. Psychopathic gambling and symptomatic gambling simply refer to gambling that is secondary to another disorder, specifically psychopathy for the former and a particular mental illness for the latter. In these two groups gambling can be understood as a symptom of the primary mental illness. The strong connection between depressive symptoms and pathological gambling is evidenced by the large proportion of neurotic gamblers, the most common subtype representing 34% of Moran's sample. In addition, 90% of the symptomatic gamblers were characterized by depression. Impulsive and psychopathic gamblers were also common, representing 18% and 24% of the sample, respectively (Moran, 1970).

Although utilizing divergent methodologies, several other authors have proposed or evaluated typologies of gamblers as well (Blaszczynski, 2000; Blaszczynski & Nower, 2002; Bellaire & Caspari, 1992; Steel & Blaszczynski, 1996; Zimmerman, Meeland, & Krug, 1985). The number of types varies depending on the study and many methodological differences exist across studies, however there are important commonalities that warrant attention. Every study includes a group of gamblers characterized by depression or emotional vulnerability (with varied terms such as neurotic gamblers, emotionally disturbed gamblers, emotionally vulnerable gamblers, etc.) and a group characterized by impulsive, antisocial personality disorder-like traits (termed impulsive gamblers, biologically-based impulsive gamblers, antisocial impulsivist problem gamblers, etc.). These two groups of gamblers likely differ significantly.

Gambling behaviors associated with feelings of depression and loneliness may be of lower severity, qualitatively different, or more commonly found in one sex than those typically associated with externalizing behavior. These types of gambling problems are particularly important for two reasons. First, it is recognized that at a population level the most harm is associated with gamblers with subclinical problems, due to their increased prevalence compared to those with clinically disordered gambling (Brownson et al., 1997). Second, a recent study found that the correlates of gambling differed depending on the sex of respondents (Blanco, Hasin, Petry, Stinson, & Grant, 2006). Specifically, females with gambling problems were significantly more likely to have lifetime mood and anxiety disorder diagnoses compared to men. In contrast, men with gambling problems were significantly more likely than women to have lifetime diagnoses of alcohol and drug use disorders. Other studies in treatment seeking samples have also found female gamblers to have higher levels of depression (Getty et al., 2000; Ibanez et al., 2001). These differences are unsurprising given that previous studies have demonstrated major differences between the sexes in their expression of psychological distress (Almeida & Kessler, 1998; Kessler, Berglund, Demler, & Walters, 2005a; Kessler, Chiu, Demler, Merikangas, & Walters, 2005b). It appears that gambling problems associated with loneliness and depression may be especially important to consider in women, a population commonly overlooked in terms of gambling problems.

Psychological Factors in Gambling Problems and Pathological Gambling

The consequences of gambling problems are vast and frequently studied. In contrast, the study of determinants of gambling problems is a relatively neglected field (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004). One area that holds potential for

determinants of pathological gambling involves psychological factors like personality traits and cognitive vulnerabilities. The literature examining personality factors in pathological gambling has largely focused on traits related to the externalizing type of gambling and has yielded mixed results (Petry, 2001). While some studies find higher levels of impulsivity and related traits among adults with pathological gambling (Alvarez-Moya et al., 2007; Blaszczynski et al., 1997; Carlton & Manowitz, 1994; Cunningham-Williams et al., 2005; Fernandez-Aranda et al., 2006; Janiri, Martinotti, Dario, Schifano, & Bria, 2007; Kim & Grant, 2001; Lightsey & Hulsey, 2002; Steel et al., 1998; Tavares, Zilberman, Hodgins, & el-Guebaly, 2005), others have found no difference (Blaszczynski et al., 1990; Bonnaire, Lejoyeux, & Dardennes, 2004; Parke, Griffiths, & Irwing, 2004) or even lower levels (Allcock & Grace, 1988; Blaszczynski, Wilson, & McConaghy, 1986; Dickerson, Hinchy, & Fabre, 1987).

A small literature has examined some traits relevant to the emotionally vulnerable type of gambling problems. Neuroticism, one of the five basic dimensions of personality defined by the widely accepted Five Factor Model of personality (Costa & McCrae, 1992; McCrae & John, 1992), reflects proneness to distress or negative affectivity and is highly related to internalizing disorders (Clark & Watson, 1991; Mineka, Watson, & Clark, 1998). Several researchers have used the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975) measure of Neuroticism in order to investigate the role of this personality dimension in gambling problems. Several studies have found pathological gamblers to score significantly higher on Neuroticism compared to EPQ norms (Blaszczynski et al., 1986; Blaszczynski et al., 1997) as well as healthy controls (Blaszczynski, Buhrich, & McConaghy, 1985; Roy, Custer, Lorenz & Linnoila, 1989).

One other study used the Multidimensional Personality Questionnaire (MPQ; Patrick, Curtin, & Tellegen, 2002) to examine a dimension analogous to Neuroticism (Digman, 1990), known as Negative Emotionality (Slutske, Caspi, Moffitt, & Poulton, 2005). This study examined a large, longitudinal survey of a complete birth cohort of young adults in New Zealand and found that individuals with gambling problems at age 21 had significantly higher Negative Emotionality at age 18 compared to individuals without gambling problems (Slutske et al., 2005).

Evidence that significant associations exist between gambling and suicidality, depression and distress suggests that a construct representing a broad diathesis for internalizing problems, such as Neuroticism, may be important to consider as a potential determinant or vulnerability factor for gambling problems. The few studies that have been done indeed revealed important relationships between Neuroticism and gambling problems (Blaszczynski et al., 1985; Blaszczynski et al., 1986; Blaszczynski et al., 1997; Roy et al., 1989; Slutske et al., 2005). However, Neuroticism is a broad, nonspecific personality factor related to all internalizing disorders and an increased understanding of gambling problems might be reached through the examination of more specific factors. The construct of self-criticism can be conceptualized as a lower-order cognitive factor nested within the larger dimension of Neuroticism (Dunkley, Blankstein, & Flett, 1997; Pagura, Cox, & Enns, 2008; Mongrain, 1993). Through the hierarchical nature of personality, lower-order factors have to the potential to reveal more specific relationships between psychological factors and specific forms of psychopathology such as gambling problems. Elevated self-criticism may be prevalent among individuals with gambling

problems, especially those with emotional vulnerability-related gambling, and may help to explain the nature of gambling problems among emotionally vulnerable individuals.

Self-Criticism

Self-criticism is a cognitive factor characterized by harsh and persistent negative self-scrutiny and self-evaluation that reflects a proneness to depression (Blatt & Zuroff, 1992). This factor stems from an early conceptualization of a subtype of depression known as introjective or self-critical depression (Blatt, 1974; Blatt, D'Afflitti, & Quinlan, 1976a; Blatt, D'Afflitti, & Quinlan, 1976b). Blatt and colleagues also proposed an orthogonal subtype of depression known as anaclitic or dependent depression, which is concerned primarily with interpersonal relatedness and is not of concern for the current research (Blatt, 1974). Proposed to arise from issues in self-definition, self-critical depression involves feelings of unworthiness, inferiority, and guilt, needs for excessive achievement and perfection, fears of disapproval or criticism and behaviors such as constant self-scrutiny, self-evaluation and competition (Blatt, 1974). Such feelings, needs, fears and behaviors cause self-critical individuals to be vulnerable to developing depression in response to life events that threaten their self-definition or self-esteem (Blatt et al., 1992). A brief measure of self-criticism has demonstrated significant associations with various forms of psychopathology, including major depression (Cox, McWilliams, Enns, & Clara, 2004), post-traumatic stress disorder (Cox, MacPherson, Enns, & McWilliams, 2004) and social phobia (Cox, Fleet, & Stein, 2004).

No study to date has examined the role of self-criticism in gambling problems, however the results of a recent study show promise for this cognitive factor. A focus group of Gamblers Anonymous members, an expert panel, and a community telephone

survey were utilized to create and validate a measure of psychological traits important in problem gambling (Rockloff & Dyer, 2006). The final measure consisted of 4 traits (Escape, Esteem, Excess and Excitement) and was found to possess excellent reliability as well as convergent and discriminant validity. These four psychological traits happen to correspond well to the externalizing and internalizing types of gambling problems discussed previously. Excess and Excitement are psychological dimensions reflecting impulsivity and sensation-seeking and correspond to the antisocial impulsivist gambler, while Escape and Esteem reflect the emotionally vulnerable gambler who views himself or herself negatively and uses gambling as a means of escape from everyday problems. Items tapping Esteem are conceptually very similar to self-criticism and further suggest the importance of this type of trait. Examples of Esteem items include, "I rarely live up to my own values or standards," "I am often embarrassed by the stupid things I say or do," and "I usually feel guilty for something I've said or done" (Rockloff et al., 2006). Self-criticism is an established cognitive factor with a strong literature and in combination with observed associations between depression and gambling problems, Rockloff and Dyer's (2006) study strongly argues for its utility in understanding gambling problems.

The theoretical framework relating self-criticism to problem gambling emerges from the work of Dickerson and Baron (2000). Specifically, these authors have outlined a schema of processes that contribute to self-control over gambling behavior. Although this schema contains variables beyond the scope of the current project, a modified schema (Figure 1) highlights the processes examined in the current study. Self-criticism is likely to directly impact choice/control over gambling as well as affect negative mood, which in turn impacts choice and control over gambling. Because self-criticism is a

vulnerability factor for the development of negative mood and depression, it may allow a point of intervention before gambling problems develop. Gambling may be especially likely to occur as a means of escape among individuals with self-criticism because it offers an opportunity for achievement. Wins may help a self-critical individual to validate their personal worth and they may attribute such wins to their own skill or prowess. In turn, losses may be interpreted as a personal failure among self-critical individuals and their response may be further attempts to win or chase losses to redeem themselves and self-soothe, leading to the development of gambling problems.

Current Study

The existing literature suggests that depression is common among individuals with gambling problems and, further, that a subgroup of individuals with gambling problems might be characterized by an emotional vulnerability to depression. Although some psychological factors have been investigated in gambling problems, factors related to such vulnerability have rarely been examined. In this context, self-criticism is a promising psychological variable to examine in relation to gambling problems. The current study proposes to examine the relationship between this cognitive vulnerability to depression, distress and gambling problems using a large community sample that is representative of the city of Winnipeg, Manitoba, Canada. This is an ideal sample in which to conduct the current study. Winnipeg is the site of the first government casino in Canada (Marshall, 1998) and is located in one of the provinces with the most VLTs per capita (5.8 VLTs per 1000 adults; Azmier, 2001). In addition, previous studies have shown a high prevalence of gambling in Winnipeg (Cox et al., 2000; Cox et al., 2004a), consistent with the wide availability of gambling venues (Cox et al., 2005; Jacques,

Ladouceur, & Ferland, 2000). The current study will also examine the prevalence, sociodemographic correlates and gambling behavior correlates of gambling problems assessed by the CPGI in Winnipeg. A previous study found a high prevalence of gambling problems using the SOGS (Cox et al., 2000), but no study to date has used the CPGI in this population.

Chapter 2: Methods

Sample

Until very recently the Winnipeg Area Study (WAS) was an annual research project conducted by the Sociology Department at the University of Manitoba (Lewis & Roberts, 2006). Independent researchers had the opportunity to include measures in this nationally renowned and highly respected community survey in order to investigate topics of their choice. The WAS has previously been used to investigate psychopathology in the general population in previous studies of gambling (Cox et al., 2000; Cox et al., 2004a) and landmark studies on the topics of social phobia and posttraumatic stress disorder (Stein, Torgrud, & Walker, 2000; Stein, Walker, & Forde, 1996; Stein, Walker, Hazen, & Forde, 1997; Stein, Walker, & Forde, 2000). This survey represents a powerful research vehicle for studying mental health problems in the general population and therefore is ideal for investigating the relationship between problem gambling and proneness to depression. In this context, several measures were included in the 2006 WAS in order to address the research questions discussed above. The survey design and methodology of the WAS has been approved by the Psychology and Sociology Research Ethics Board at the University of Manitoba.

The WAS includes a random sample of all working telephone numbers in the city of Winnipeg, identified from the Manitoba Telephone System's "Fast Finder" Directory for Winnipeg in 2006. The random sample was generated using a program developed at the University of Alberta. The household was the primary sampling unit and respondents in each household were selected on the basis of age, residence in the household and sex. Eligible respondents were living at the address and were at least age 18. Each

questionnaire randomly designated whether the respondent for the household should be male or female. The following rules were given to interviewers to follow: 1) If the person answering the telephone was of the designated sex, only that individual could be interviewed; 2) If the person answering the phone was not of the designated sex, interviewers were to ask the person to choose an individual of the designated sex in the household without giving guidelines for selection. If the chosen person refused, interviewing another household member of the same sex was not permitted. If the selected person was unavailable at the time, the interviewers were to make every effort to set up an interview with that person; 3) If a person of the designated sex did not reside in the household, the respondent must be the individual who answered the telephone. Interviewers were instructed to deviate from this protocol only as needed to ensure equal representation of sexes in the sample.

Ten interviewers conducted all interviews for the 2006 WAS. All interviewers had previous experience conducting telephone interviews and eight of these individuals had served as interviewers for a previous WAS. All interviewers attended a two hour training session which involved a review of the technique of telephone interviewing, WAS protocols including confidentiality, and the specific content of the 2006 questionnaire. Each interviewer was supplied with a handbook designed specifically for the WAS and was required to sign a contract as well as a Confidential Non-Disclosure Agreement. In order to ensure confidentiality, no identifying names, addresses or phone numbers were recorded in the data and telephone numbers were removed from the questionnaires prior to archival.

All interviews were conducted over the telephone. Most interviews occurred when the respondent was at home, but occasionally occurred at another number convenient to the respondent. All interviews began with the interviewer informing the respondent that all information provided would be kept confidential and that they were free to decline responding to any question they deemed inappropriate. The mean length of the interview was 22 minutes with a standard deviation of 4.6 minutes and range of 10 to 51 minutes. The final number of households interviewed was 750 and the response rate of eligible households was 65.1%.

Interviewers attempted to contact each telephone number 10 times before considering it a non-contact, recording each attempt and time period. A total of 462 telephone numbers were considered non-contacts. Telephone numbers which were not in service or were connected to fax machines or other non-residential numbers (e.g. commercial numbers, voice mailboxes, cell phones, pagers or computer lines) were also recorded. Information was also recorded as to the type of contact with residential numbers, including answering machine contact. Telephone numbers were replaced in 464 cases, under the following six circumstances: 1) The individual had limited or no knowledge of English, 2) The individual was younger than 18 years, 3) The individual was a functionally disabled elder, 4) The individual was in poor health, 5) The individual had a hearing impairment, and 6) Other reasons prevented the interview, such as a death or illness in the family.

The representativeness of the 2006 WAS was compared to the 2001 Canadian Census data for Winnipeg, whenever possible. If such comparisons were not possible, the 2006 WAS was compared to previous WAS samples. Overall, results indicated that the

2006 WAS sample was an acceptable representation of the population of Winnipeg. The 2006 WAS sample was consistent with 2001 Census data in terms of sex and age, and differed only slightly in terms of household size and ownership of dwelling. Additionally, the 2006 WAS sample was consistent with previous WAS samples in terms of current living arrangement, employment, residence characteristics, and quality of interviews and differed only slightly in terms of individual and household income. The only prominent inconsistency between the 2006 WAS sample and the 2001 Census was in terms of education. Individuals with higher levels of education appear to be over-represented in the 2006 WAS sample, although it is not clear whether this represents sampling error or results from differences in the way education is measured.

Measures

Sociodemographics

Sociodemographic variables assessed in the WAS that will be included in the current study include: sex (male, female), age (18-24 years, 25-44 years, 44-64 years, 65 or more years), ethnicity (North American, European, Asian, Aboriginal, Other), education (less than high school, high school, more than high school), marital status (married/cohabiting, separated/divorced/widowed, never married) employment status (employed, student, retired, unemployed/other), household income (under $6,000-$33,999, $34,000-$54,999, $55,000-$89,999, $90,000 and over) and area of Winnipeg (South, West, North, Central). See Appendix B for a detailed description of the coding of ethnicity (Morning, 2008) and Appendix C for a detailed description of the coding of area of Winnipeg (City of Winnipeg, 2009).

Self-Criticism

A brief, 9-item measure of self-criticism was used in the current study (Bagby, Parker, Joffe, & Buis, 1994; See Appendix D). This scale was reconstructed using items from the original measure of self-criticism, the *Depressive Experiences Questionnaire* (DEQ; Blatt et al., 1976a), based on exploratory and confirmatory factor analysis. This measure will be referred to as the *Reconstructed Depressive Experiences Questionnaire* (R-DEQ) for the remainder of this thesis. Responses are coded on a 4-point scale (0=Strongly Disagree, 1=Disagree, 2=Agree, 3=Strongly Agree) and scores on each item are summed to create a self-criticism score ranging from 0-27. This response format varies from that of the original DEQ, in which responses were coded on a 7-point scale from 1=Strongly Disagree to 7=Strongly Agree. The WAS requires that response scales have a maximum of 4 possible responses due to the nature of telephone-based interviews. A recent study validated this measure and scoring procedure by comparing it with more complex scoring procedures in use (Desmet et al., 2007). Desmet and colleagues (2007) concluded that this 9-item measure and its scoring procedure are simple and provide important advantages over other more complex measures and scoring procedures such as decreased length of the measure and good model fit and external validity. This scale has demonstrated discriminant validity using samples of adults, college students, outpatients with depression and outpatients with panic disorder with agoraphobia (Bagby et al., 1994). This scale also has been shown to possess excellent test-retest reliability ($r = 0.83$) over a period of 4 weeks (Bagby et al., 1994).

Canadian Problem Gambling Index

The Canadian Problem Gambling Index (CPGI, Ferris et al., 2001a), a 9-item instrument, was used to assess the spectrum of 12-month gambling behaviors (See Appendix E). These 9-items include 2 items derived from the SOGS, 2 items derived from DSM-IV criteria for pathological gambling and 5 new items. Each of these items is scored on a 4-point scale (Never = 0; Sometimes = 1; Most of the time = 2; Almost always = 3). Responses to each item are summed. Scores thus range from 0-27 and can be divided into 4 categories (0, 1-2, 3-7, and ≥ 8) which indicate increasing levels of gambling problems: nonproblem gambling (score of 0), low-risk for gambling problems (scores of 1-2), moderate-risk for gambling problems (scores of 3-7), and problem gambling (scores of 8-27).

The following description provides a summary of the construction and validation of the CPGI. More detailed information can be found elsewhere (Ferris et al., 2001a). The initial content of the CPGI was based on information gleaned from a thorough literature review and expert consultation and consisted of 46 items. This initial questionnaire was tested in a pilot study, general population survey and clinical validation study (Wynne, 2003). The steps leading to the final 9-item version of the CPGI included: 1) exploratory factor analysis to examine the factor structure of the scale and item loadings on these factors, 2) item analysis to determine items to exclude based on irrelevance, redundancy, or low reliability, and 3) parallel confirmatory factor analysis to confirm the hypothesized factor structure of the final version of the CPGI. Results of the confirmatory factor analysis suggested that the CPGI is composed of a single underlying factor, that of problem gambling. Several different scoring schemes were examined and the most

appropriate scheme was chosen based on its fit to the data, correlation with other gambling measures, sensitivity, specificity, ease of administration and resulting prevalence rates. Psychometric properties of reliability and validity were also assessed. Internal consistency of the CPGI is good (Cronbach's alpha = 0.84) and test-retest reliability was acceptable (0.78). The CPGI has clear face validity, as gambling experts reviewed the item content and agreed that it reflected problem gambling very well. The CPGI also possesses concurrent validity (criterion-related validity) as it correlates well with both the DSM-IV and SOGS (r = 0.83 with each measure). The CPGI had a higher correlation with the clinical interviews (r = 0.48) than either the DSM-IV or SOGS, despite the fact that it is only a moderate correlation. The CPGI also possesses construct validity, that is, high and low scores on the instrument are associated with factors that could be hypothesized based on theory and logical reasoning. For example, a specific construct validity hypothesis that was tested and proven correct was that spending and gambling frequency would lie on a continuum with the highest levels being among those with problem gambling and the lowest among those with non-problem gambling.

The CPGI also contains questions examining gambling involvement and correlates of gambling that are not used in the calculation of problem gambling. Questions on gambling involvement, such as what specific gambling activities the respondent engaged in, how often each type of gambling activity was engaged in, as well as how much money the respondent spent on each gambling activity are included in the WAS. Respondents are also asked what their favorite gambling activity is, the length of time spent engaging in the activity on each occasion, where they engage in the activity and with whom they engage in the activity. Finally, one item which asks respondents

whether they have gambled as a means of forgetting problems or escaping feelings of depression was included in the WAS.

K-6 Distress Scale

The K-6 Distress Scale (K-6) is a short, popular method of assessing distress in the past month which is used primarily in large nationally representative health surveys (Kessler et al., 2002; See Appendix F). The final scale was developed through the use of an initial pilot study, Item Response Theory analysis, a two-stage clinical reappraisal study and a local convenience sample. The scale consists of 6 items assessing depressed mood (2 items), motor agitation, fatigue, worthless guilt and anxiety each scored on a 4-point scale (0=None of the time, 1=A little of the time, 2=Most of the time, 3=All of the time). Scores on each item are summed resulting in an overall score ranging from 0-18, with higher scores indicating more distress. The scale possesses strong psychometric properties, including the ability to discriminate individuals with a DSM-IV diagnosis from those without (Furukawa, Kessler, Slade, & Andrews, 2003; Kessler et al., 2002).

Analytic Strategy

In order to describe the variables assessed in the current study, the means and standard deviations of the continuous variables, specifically, age, CPGI score, distress and self-criticism will be calculated. Correlations among these variables will also examined.

Preliminary analyses will determine the specific structure of the remaining analyses. Shaffer and colleagues' (1999) categorizations of gamblers will be used for the following analyses if preliminary analyses deem them appropriate. That is, if non-gamblers, non-problem gamblers and low-risk gamblers do not differ significantly on

distress or self-criticism, they will be combined into one group equivalent to Shaffer and colleagues' Level 1 gamblers. If there are significant differences, the groups will be separated accordingly. Due to the low prevalence of problem gambling, moderate-risk and problem gamblers will be combined into one group equivalent to Shaffer and colleagues' Level 2 gamblers.

The primary research question will then be examined using linear and categorical analyses. Linear analyses will be used to show associations whereas categorical analyses will provide for more public health applicable inferences and an opportunity to tease apart differences between at-risk and problem gamblers. Separate linear regressions using CPGI score as the dependent variable will determine if there is a significant relationship between distress and gambling problems and between self-criticism and gambling problems. Due to the differential associations between sex and depression in the literature (Blanco et al., 2006; Getty et al., 2000; Ibanez et al., 2001; Kessler et al., 2005a, 2005b), interactions with sex will be examined. Regressions will also be repeated after adjusting for sociodemographic factors significantly associated with levels of gambling. Significant sociodemographic correlates will be determined using regression models as well. A final regression model will test whether self-criticism scores are significantly associated with gambling problems after adjusting for sociodemographic factors and distress.

Categorical analyses will vary depending on the groupings of gamblers, as described above. If two groups of gamblers are used (Level 1 vs. Level 2), logistic regressions will be employed using a variable differentiating these two groups as the dependent variable to determine if distress and self-criticism (in separate regressions) are predictive of gambling problems. If more than two gambling groups are used,

multinomial regressions will be used to examine whether distress and self-criticism are predictive of gambling group. Again, interactions with sex will be tested in regression analyses and regressions will be repeated after adjusting for sociodemographic factors significantly associated with gambling. A final regression will test whether self-criticism scores are significantly associated with gambling group after adjusting for sociodemographic factors and distress.

All statistical analyses will be examined using the *Statistical Package for the Social Sciences (SPSS) Software Version 15.0 for Windows* (SPSS, 2006).

The following hypotheses are proposed for the main research questions:

Linear Analyses

(1) Distress scores will be significantly positively associated with CPGI scores before and after adjusting for sociodemographic factors.

(2) There will be a significant interaction between distress scores and sex in predicting CPGI scores, in that there will be a stronger relationship between distress scores and CPGI scores among women.

(3) Self-criticism scores will be significantly positively associated with CPGI scores before and after adjusting for sociodemographic factors.

(4) There will be a significant interaction between self-criticism scores and sex in predicting CPGI scores, in that there will be a stronger relationship between self-criticism scores and CPGI scores among women.

(5) Self-criticism scores will be significantly positively associated with CPGI scores after adjusting for sociodemographic factors and distress. (This analysis will be

done separately among men and women if the hypothesized significant interactions above exist).

Objective 1.1 examines these 5 hypotheses among the entire WAS sample. Objective 1.3 examines these 5 hypotheses only among individuals who endorsed past-year gambling in the WAS.

Categorical Analyses

(1) Distress scores will be significantly higher among individuals with Level 2 gambling compared to those with Level 1 gambling, before and after adjusting for sociodemographic factors.

(2) There will be a significant interaction between distress scores and sex in predicting Level 2 gambling (compared to Level 1 gambling), in that there will be a stronger relationship between distress scores and Level 2 gambling among women.

(3) Self-criticism scores will be significantly higher among individuals with Level 2 gambling compared to those with Level 1 gambling, before and after adjusting for sociodemographic factors.

(4) There will be a significant interaction between self-criticism scores and sex in predicting Level 2 gambling (compared to Level 1 gambling), in that there will be a stronger relationship between self-criticism scores and Level 2 gambling among women.

(5) Self-criticism scores will be significantly higher among individuals with Level 2 gambling (compared to Level 1 gambling) after adjusting for sociodemographic

factors and distress. (This analysis will be done separately among men and women if the hypothesized significant interactions above exist).

Objective 1.2 examines these 5 hypotheses among the entire WAS sample. Objective 1.4 examines these 5 hypotheses only among individuals who endorsed past-year gambling in the WAS.

Descriptive statistics will next be utilized to examine the prevalence of gambling and gambling problems in the sample (Objective 2.1). The prevalence of each of the 5 levels of gambling assessed by the CPGI (nongambling, nonproblem gambling, low-risk gambling, moderate-risk gambling, and problem gambling) will be reported. Cross-tabulations will then be used to describe the sociodemographic profile of each level of gambling as well as nongambling. Descriptive statistics and logistic regressions will also be used to describe the various gambling behavior correlates assessed in the CPGI (Objective 2.2).

Chapter 3: Results

Sample Characteristics

As described in the Methods, overall results indicated that the 2006 WAS sample was an acceptable representation of the population of Winnipeg. The sample was equally composed of males (n=375, 50%) and females (n=375; 50%). Ten point one percent (n=76) of the sample was age 18-24, 34.9% (n=262) were age 25-44, 36.0% (n=270) were age 45-64 and 17.3% (n=130) of the sample was in the oldest age category, age 65 and over. Twelve individuals (1.6%) did not provide data on their age.

The majority of the sample was married or in a common-law relationship (n=434, 57.9%). The remainder of the sample was nearly equally divided between separated, widowed or divorced marital status (n=156, 20.8%) and single or never married marital status (n=153, 20.4%). Seven individuals (0.9%) did not provide data on their marital status.

The sample was distributed fairly equally across the four income categories, although 243 (32.4%) individuals did not provide data on their household income. Fifteen point six percent (n=117) of the sample reported a household income of less than $6,000 to $33,999. Fifteen point nine percent (n=119) of the sample reported a household income between $34,000 and $54,999. Eighteen point one percent (n=136) of the sample reported a household income between $55,000 and $89,999. Finally, 18.1% (n=135) of the sample reported a household income of $90,000 or more.

The majority of the sample had more than a high school education (n=471, 62.8%), 19.5% (n=146) had a high school or equivalent degree and 17.3% (n=130) had

less than a high school education. Three individuals (0.4%) did not provide data on their level of education.

The majority of the sample were was categorized as being of European ethnicity (n=406, 54.1%), while 27.2% (n=204) were categorized as being of North American ethnicity, 9.3% (n=70) were categorized as being of Asian ethnicity, 4.0% (n=30) were categorized as being of Aboriginal ethnicity and 2.8% (n=21) were categorized as being of Other ethnicity. Nineteen individuals (2.5%) did not provide data on their ethnicity.

Fifty-six point zero percent of the sample (n=420) reported being employed, while 13.9% (n=104) reported being students, 22.8% (n=171) reported being retired and 7.3% (n=55) reported being unemployed or other.

Three hundred and seventeen respondents (42.3%) reported living in the South area of Winnipeg, 83 respondents (11.1%) reported living in the West area of Winnipeg, 262 respondents (34.9%) reported living in the North area of Winnipeg and 74 respondents (9.9%) reported living in the Central area of Winnipeg. Fourteen respondents (1.9%) did not provide data on the area of Winnipeg in which they lived.

Preliminary Analyses

As a first step in the analytic procedure, missing value analyses were conducted on R-DEQ, K6 and CPGI items. Table 1 lists the items and number and percent of missing values for each item in the R-DEQ. The highest percent missing on any item was 4.7%. The multiple imputation procedure in the SPSS program was used to impute these values, based on other non-missing responses to R-DEQ items. Table 2 lists the items and number and percent of missing values for each item in the K-6. Again, the highest percent missing (1.1%) for a single item was within normal limits. The multiple

imputation procedure in the SPSS program was also used to impute these values, based on other non-missing responses to K-6 items. Table 3 lists the number and percent of missing values for each item in the CPGI. There were only 3 missing responses on the entire CPGI. Due to this, a statistical multiple imputation approach was not used. A value was inserted based on the average of the respondents' other responses on the CPGI. In all three cases, changing the score by 1 point in either direction would have no effect on the respondents' categorization according to the CPGI.

Table 4 presents the means and standard deviations of all continuous variables in the current study as well as all correlations between items. Two continuous CPGI scores are listed in this table. CPGI score A excludes non-gamblers, who did not answer the remainder of the CPGI questions. In contrast, CPGI score B includes non-gamblers, assigning them a value of 0 in the analyses. This would designate non-gamblers as numerically equivalent to individuals who gambled in the past year and experienced no problems as a result of their gambling, according to the CPGI. As discussed earlier, the mean age of the sample was 47.4 (Standard Deviation (SD) = 17.4). Mean CPGI score was 0.4 (SD = 1.5) when non-gamblers were excluded and 0.3 (SD = 1.3) when including non-gamblers with a score of zero. Mean K-6 score was 2.2 (SD = 2.6) and mean R-DEQ score was 10.2 (SD = 3.8).

All bivariate correlations between CPGI scores, K-6 scores and DEQ scores were positive and significant at a p value less than 0.01 (r ranging from 0.19-0.51). This means increasing CPGI scores were associated with increasing distress and self-criticism. Level of distress also increased as self-criticism increased. The highest significant correlation was between K-6 (distress) score and R-DEQ (self-criticism) score (r = 0.51). The only

significant correlation between age and the other variables of interest was a negative correlation between distress and age ($r = -0.15$, $p < 0.01$), indicating that self-reported distress decreased as age increased.

Table 5 shows the results of cross-tabulations and chi-square tests of association between sociodemographic variables and CPGI gambling categories. All chi-square tests of association were significant except for the associations between marital status and gambling category and between area of Winnipeg and gambling category.

In order to determine the structure of the categorical analyses, 1-way ANOVAs were conducted separately with K6 and R-DEQ total scores (See Table 6). All comparisons between non-gamblers, non-problem gamblers and low-risk gamblers were tested using contrasts. Contrasts were also used to test differences between moderate-risk and problem gamblers. Low-risk gamblers scored significantly higher on self-criticism (Mean = 11.6) than non-gamblers (Mean = 10.3) and non-problem gamblers (Mean = 9.8), while the latter two groups did not significantly differ from each other. Problem gamblers (Mean = 16.9) scored significantly higher than moderate-risk gamblers (Mean = 11.2) on self-criticism. In terms of distress, non-gamblers (Mean = 2.9) had significantly higher levels of distress that non-problem gamblers (Mean = 1.8), while the low-risk gamblers did not differ significantly from either group (Mean = 2.5). Problem gamblers (Mean = 9.4) scored significantly higher on distress than moderate-risk gamblers (Mean = 2.6). Since there were significant differences between non-gamblers, non-problem gamblers and low-risk gamblers in both self-criticism and distress total scores, these three groups were not combined. Moderate-risk and problem gamblers also differed on both self-criticism and distress total scores, but due to the low prevalence of problem

gambling, these groups were combined to allow for additional analyses. Since these groupings result in four categories, multinomial regression models, rather than logistic regression models, were employed in subsequent categorical analyses.

Of the three continuous variables of interest, only self-criticism showed a normal distribution. K6 and CPGI scores showed significant positive skew. In order to meet the assumptions of linear regressions, K6 and CPGI scores were transformed with a $\log_{10}$ transformation. This transformation significantly improved the skew of these variables. The log-transformed K6 variable was used as an independent variable in subsequent analyses. The log-transformed CPGI score was used as the dependent variable in all linear regression models.

Objective 1.1 - Linear Regression Models in the Whole Sample

In order to determine sociodemographic covariates for use in linear regression models examining self-criticism and distress, separate regression models were analyzed with each sociodemographic variable predicting the log of continuous CPGI score (Table 7). Dummy variables were created for each categorical sociodemographic variable, while age was examined as a continuous measure. Of all sociodemographic variables under consideration, only education and ethnicity were significantly associated with gambling. Individuals with a high school education (Beta = -0.14, $p = 0.005$) and more than a high school education (Beta = -0.19, $p < 0.001$) had lower levels of gambling problems, relative to individuals with less than a high school education. Individuals of Aboriginal ethnicity were more likely to have higher levels of gambling problems, compared to individuals of North American ethnicity (Beta = 0.10, $p = 0.008$). No other differences in terms of ethnicity were significant. As a result of these relationships, education and

ethnicity were entered as covariates in subsequent linear regression models of gambling problems.

The three linear regression models examining levels of distress in the whole sample are presented in Table 8. Distress was positively and significantly related to level of gambling problems when entered into a bivariate linear regression model (Beta = 0.12, p = 0.001). Independent variables of sex, distress score and a sex-by-distress interaction term were next entered into a model predicting gambling problems to examine the interaction between sex and distress score. This interaction was not significant and as a result the third model examining distress and gambling was not stratified by sex. The final model examined the association between distress and gambling problems after adjusting for sociodemographic covariates of education and ethnicity. Despite adjustment for these sociodemographic factors, distress remained significantly and positively related to gambling problems (Beta = 0.11, p = 0.004).

The four linear regression models examining levels of self-criticism are presented in Table 9. Self-criticism was positively and significantly related to gambling problems in a bivariate linear regression model (Beta = 0.18, p < 0.001). The next model, which examined the potential interaction between sex and self-criticism scores by entering independent variables of sex, self-criticism, and a sex-by-self-criticism interaction term, also did not reveal a significant interaction. Again, due to this result, the next two models were not stratified by sex. Self-criticism remained positively and significantly associated with gambling problems after adjusting for ethnicity and education (Beta = 0.18, p < 0.001). The last model examined whether self-criticism remained associated with gambling problems after adjusting for both sociodemographic covariates and distress

scores. In this model self-criticism was significantly and positively related to gambling problems (Beta = 0.15, $p < 0.001$). The association between distress and gambling problems was no longer significant (Beta = 0.04, $p = 0.36$).

Objective 1.2 - Multinomial Regression Models in the Whole Sample

An identical set of analyses to Objective 1.1 was employed to examine multinomial regression models predicting CPGI gambling groups. First, in order to determine sociodemographic covariates for use in multinomial regression models examining self-criticism and distress, separate regression models were analyzed with each sociodemographic variable predicting CPGI gambling group (Table 10). Dummy variables were created for each categorical sociodemographic variable, while age was examined as a continuous measure. Females were significantly less likely than males to be non-problem gamblers, relative to non-gamblers (Odds Ratio (OR) = 0.67, 95% Confidence Interval (CI) = 0.48-0.85, $p < 0.05$). Individuals who were separated, divorced or widowed were significantly less likely than those who were married or cohabiting to be low-risk gamblers, relative to non-gamblers (OR = 0.36, 95% CI = 0.13-0.99, $p < 0.05$). Individuals in the second lowest income category (OR = 2.22, 95% CI = 1.21-4.07, $p < 0.01$) and those in the highest income category (OR = 2.40, 95% CI = 1.32-4.37, $p < 0.01$) were significantly more likely than those in the lowest income category to be non-problem gamblers, relative to non-gamblers. Compared to employed respondents, students (OR = 0.43, 95% CI = 0.27-0.70, $p < 0.001$), retired respondents (OR = 0.61, 95% CI = 0.40-0.93, $p < 0.05$) and unemployed respondents (OR = 0.30, 95% CI = 0.16-0.56, $p < 0.001$) were significantly less likely to be non-problem gamblers, relative to non-gamblers. Students (OR = 0.20, 95% CI = 0.05-0.91, $p < 0.05$)

and retired respondents (OR = 0.24, 95% CI = 0.07-0.83, $p < 0.05$) were also less likely to be moderate-risk or problem gamblers (relative to non-gamblers) compared to employed respondents. The only significant difference in education was that compared to individuals with less than a high school education, individuals with more than a high school education (OR = 0.25, 95% CI = 0.10-0.63, $p < 0.01$) were less likely to be moderate-risk or problem gamblers, relative to non-gamblers. There were no significant associations between gambling categories and area of Winnipeg. Last, compared to individuals of North American ethnicity, those of Asian (OR = 0.36, 95% CI = 0.20-0.66, $p < 0.001$) and Other (OR = 0.36, 95% CI = 0.13-0.97, $p < 0.05$) ethnicities were less likely to be non-problem gamblers, relative to non-gamblers. However, the multinomial regression model of the ethnicity dummy variables encountered unexpected singularities in the Hessian matrix. This indicates that either some predictor variables should be excluded or some categories should be merged. In the case of this thesis, the ethnicity variable was not included in further multinomial regression models for two reasons; (1) This variable has been infrequently examined in the gambling literature, and (2) It does not make sense to combine categories of ethnicity, other than to increase the size of the "other" group, which does not provide very specific or valuable information. As a result of these relationships, only sex, marital status, household income, education and employment were entered as covariates in subsequent multinomial regression models of gambling problems.

The three multinomial regression models examining distress are presented in Table 11. In a bivariate multinomial regression where only distress scores were entered to predict gambling group, the only significant difference was that increases in distress

scores decreased the odds of being a non-problem gambler compared to a non-gambler (OR = 0.22, 95% CI = 0.13-0.39, $p < 0.001$). Independent variables of sex, distress score and a sex-by-distress interaction term were next entered into a model predicting gambling categories to examine the interaction between sex and distress score. This interaction was not significant and as a result the third model examining distress and gambling was not stratified by sex. The final model examined the association between distress and gambling categories after adjusting for the sociodemographic covariates described above. After adjusting for these sociodemographic factors, the effect remained that increases in distress scores were related to a decreased odds of being a non-problem gambler compared to a non-gambler (Adjusted OR (AOR) = 0.25, 95% CI = 0.12-0.54, $p < 0.001$).

The four multinomial regression models examining levels of self-criticism are presented in Table 12. In the bivariate multinomial regression model with continuous self-criticism score entered alone, increases in self-criticism were related to an increased odds of being a low-risk gambler (OR = 1.09, 95% CI = 1.01-1.18, $p < 0.05$) or a moderate-risk/problem gambler (OR = 1.15, 95% CI = 1.05-1.27, $p < 0.01$) compared to a non-gambler. The next model, which examined the potential interaction between sex and self-criticism scores by entering independent variables of sex, self-criticism, and a sex-by-self-criticism interaction term, did not reveal a significant interaction. Again, due to this result, the next two models were not stratified by sex. After adjusting for sociodemographic covariates, self-criticism scores were not significantly related to gambling category. The last model examined whether self-criticism scores were associated with gambling problems after adjusting for both sociodemographic covariates

and distress scores. In this model increasing distress scores were significantly associated with a decreased odds of being a non-problem gambler relative to a non-gambler (AOR = 0.20, 95% CI = 0.08-0.48, $p < 0.001$) and increases in self-criticism scores were significantly related to increased odds of being a low-risk gambler relative to a non-gambler (AOR = 1.13, 95% CI = 1.00-1.28, $p < 0.05$).

Objective 1.3 - Linear Regression Models in Gamblers

An identical set of regressions as Objective 1.1 was next conducted only among individuals who endorsed gambling in the past-year. The three linear regression models examining levels of distress among gamblers are presented in Table 13. Distress was positively and significantly related to level of gambling problems when entered into a bivariate linear regression model (Beta = 0.18, $p < 0.001$). Independent variables of sex, distress score and a sex-by-distress interaction term were next entered into a model predicting gambling problems to examine the interaction between sex and distress score. This interaction was not significant and as a result the third model examining distress and gambling was not stratified by sex. The final model examined the association between distress and gambling problems after adjusting for sociodemographic covariates of education and ethnicity. Despite adjustment for these sociodemographic factors, distress remained significantly and positively related to gambling problems (Beta = 0.17, $p < 0.001$).

The four linear regression models examining levels of self-criticism are presented in Table 14. Self-criticism was positively and significantly related to gambling problems in a bivariate linear regression model (Beta = 0.20, $p < 0.001$). The next model, which examined the potential interaction between sex and self-criticism scores by entering

independent variables of sex, self-criticism, and a sex-by-self-criticism interaction term revealed a significant interaction (Beta = 0.38, p = 0.03). As a result, the next two models were stratified by sex. Self-criticism remained positively and significantly associated with gambling problems after adjusting for ethnicity and education among both men (Beta = 0.12, p = 0.048) and women (Beta = 0.28, p < 0.001), although the Beta was substantially larger among women and the relationship just reached statistical significance among males. The last model examined whether self-criticism remained associated with gambling problems after adjusting for both sociodemographic covariates and distress scores. In this model distress was not significantly related to gambling problems among men or women. However, the association between self-criticism and gambling problems remained significant among women (Beta = 0.23, p = 0.001), but not men.

Objective 1.4 - Multinomial Regression Models in Gamblers

An identical set of regressions as Objective 1.2 was next conducted only among individuals who endorsed gambling in the past-year. The three multinomial regression models examining distress are presented in Table 15. In a bivariate multinomial regression where only distress scores were entered to predict gambling group, distress scores significantly increased the odds of being a low-risk gambler (OR = 2.49, 95% CI = 1.00-6.20, p < 0.05) and a moderate-risk/problem gambler (OR = 7.85, 95% CI = 2.34-26.35, p < 0.001) compared to a non-problem gambler. Independent variables of sex, distress score and a sex-by-distress interaction term were next entered into a model predicting gambling categories to examine the interaction between sex and distress score. This interaction was not significant and as a result the third model examining distress and

gambling was not stratified by sex. The final model examined the association between distress and gambling categories after adjusting for the sociodemographic covariates described previously. After adjusting for these sociodemographic factors, there were no significant differences in distress.

The four multinomial regression models examining levels of self-criticism among gamblers are presented in Table 16. In the bivariate multinomial regression model with continuous self-criticism score entered alone, increases in self-criticism were related to an increased odds of being a low-risk gambler (OR = 1.13, 95% CI = 1.05-1.21, $p < 0.01$) and a moderate-risk/problem gambler (OR = 1.19, 95% CI = 1.09-1.30, $p < 0.001$) compared to a non-problem gambler. The next model, which examined the potential interaction between sex and self-criticism scores by entering independent variables of sex, self-criticism, and a sex-by-self-criticism interaction term, did not reveal a significant interaction. Again, due to this result, the next two models were not stratified by sex. After adjusting for sociodemographic covariates, increases in self-criticism scores significantly increased the odds of being a low-risk gambler compared to a non-problem gambler (AOR = 1.10, 95% CI = 1.00-1.20, $p < 0.05$). The last model examined whether self-criticism scores were associated with gambling problems after adjusting for both sociodemographic covariates and distress scores. In this model, neither distress scores nor self-criticism scores were significantly related to gambling category.

Objective 2.1 - Prevalence of Gambling & Gambling Problems

Of the 750 respondents in the WAS, 186 (24.8%) did not gamble in the past-year. Thus the prevalence of gambling in the past year was 75.2%. Four hundred and eighty individuals (64.0%) did not experience any problems with their gambling and were

designated as non-problem gamblers according to the CPGI. Fifty-five individuals (7.3%) were designated as low-risk gamblers and 22 individuals (2.9%) were designated as moderate-risk gamblers. Finally, 7 respondents (0.9%) were classified as problem gamblers according to the CPGI.

Objective 2.2 - Correlates of CPGI Gambling Scores

Table 17 shows the results of cross-tabulations and chi-square tests of association between CPGI correlates of gambling and CPGI gambling categories. All past year gambling activities, except purchasing of lottery tickets, were significantly associated with level of gambling problems in chi-square analyses. Amount of money spent in the past year on gambling activities was also significantly related to CPGI gambling category in the chi-square analysis. Lottery tickets, VLTs outside casinos, VLTs or slot machines in casinos and other casino games, endorsed as favorite gambling activities were all significantly associated with CPGI gambling categories when examined individually. A categorical variable differentiating favorite gambling activity was also significantly associated with CPGI gambling categories in the chi-square analysis. Location of favorite gambling activity and length of time spent playing favorite gambling activity were also significantly related to CPGI gambling categories in chi-square analyses.

Table 18 presents bivariate multinomial regression models examining each CPGI correlate of gambling and CPGI gambling category, which was divided into three categories as described above. Individuals who played scratch and win tickets in the past year were more likely to be low-risk gamblers (OR = 2.45, 95% CI = 1.36-4.43, $p < 0.01$) and moderate-risk/problem gamblers (OR = 7.45, 95% CI = 2.55-21.73, $p < 0.001$) compared to non-problem gamblers. Purchasing of lottery tickets in the past year was not

significantly related to CPGI gambling category in the multinomial regression model. Individuals who played bingo in the past year were significantly more likely to be moderate-risk/problem gamblers (OR = 3.51, 95% CI = 1.47-8.36, $p < 0.01$), relative to non-problem gamblers, but there was no significant difference in the likelihood of bingo playing between low-risk and non-problem gamblers. Individuals who spent between $101 and $250 in the past year on gambling activities were significantly more likely to be low-risk gamblers relative to non-problem gamblers (OR = 3.35, 95% CI = 1.44-7.77, $p<0.01$). Individuals who played VLTs outside casinos in the past year were more likely to be low-risk gamblers (OR = 3.16, 95% CI = 1.78-5.61, $p < 0.001$) and moderate-risk/problem gamblers (OR = 11.37, 95% CI = 4.70-27.50, $p < 0.001$) compared to non-problem gamblers. Individuals who VLTs or slot machines in casinos in the past year were also more likely to be low-risk gamblers (OR = 3.10, 95% CI = 1.76-5.47, $p < 0.001$) and moderate-risk/problem gamblers (OR = 4.24, 95% CI = 1.97-9.13, $p < 0.001$) compared to non-problem gamblers. Individuals who spent more than $251 on gambling activities in the past year were more likely to be low-risk (OR = 6.69, 95% CI = 3.10-14.45, $p < 0.001$) and moderate-risk/problem gamblers (OR = 20.08, 95% CI = 6.62-60.95, $p < 0.001$) relative to non-problem gamblers.

Individuals who endorsed purchasing lottery tickets as their favorite gambling activity were significantly less likely to be low-risk (OR = 0.46, 95% CI = 0.25-0.85, $p < 0.05$) and moderate-risk/problem gamblers (OR= 0.04, 95% CI = 0.01-0.32, $p < 0.01$) relative to non-problem gamblers. On the other hand, individuals who endorsed playing VLTs outside of casinos as their favorite gambling activity were significantly more likely to be low-risk (OR= 3.89, 95% CI = 1.70-8.90, $p < 0.001$) and moderate-risk/problem

gamblers (OR = 12.14, 95% CI = 5.14-28.67, $p < 0.001$), relative to non-problem gamblers. Individuals who endorsed playing VLTs or slot machines in casinos as their favorite gambling activity were significantly more likely to be moderate-risk/problem gamblers (OR = 3.36, 95% CI = 1.19-9.48, $p < 0.05$) relative to non-problem gamblers. Finally, individuals who endorsed playing other casino games as their favorite gambling activity were significantly more likely to be low-risk gamblers (OR = 2.57, 95% CI = 1.16-5.68, $p < 0.05$) relative to non-problem gamblers. There were no significant differences in the likelihood of gambling categories across individuals who endorsed playing scratch & win tickets or bingo as their favorite gambling activity. The only significant difference in terms of location of favorite gambling activity was that individuals who endorsed "other" locations were less likely to be moderate-risk/problem gamblers (OR = 0.07, 95% CI = 0.02-0.23, $p < 0.001$) relative to non-problem gamblers. Finally, length of time engaged in favorite gambling activity was strongly related to CPGI gambling category. Individuals who gambled for more than one hour were significantly more likely to be low-risk (OR = 3.79, 95% CI = 2.09-6.87, $p < 0.001$) and moderate-risk/problem gamblers (OR = 8.71, 95% CI = 3.51-21.60, $p < 0.001$), relative to non-problem gamblers.

Chapter 4: Discussion

The primary objective in this thesis was to examine the role of self-criticism in gambling problems, an extension of previous literature showing important associations between depressive symptoms or distress and gambling problems. The relationship between self-criticism and gambling problems was examined in a series of regression models, the most stringent including adjustments for sociodemographic factors associated with gambling problems and level of current distress. Moreover, all regression models were examined in linear and multinomial models as well as in the whole WAS sample and among individuals who reported gambling in the past year.

The first hypothesis was that distress and gambling problem scores would be significantly and positively related. This hypothesis was confirmed through correlation and regression models. As gambling problems increased, so did distress. This relationship was also found in all regression models, except for the multinomial regression model in the whole WAS sample. Counter-intuitively, this model revealed that increases in distress scores significantly *decreased* the odds of an individual being a non-problem gambler relative to a non-gambler. As all individuals inevitably experience some distress in their lives, it could be that non-problem gambling may actually be a positive experience that allows some individuals to cope with and alleviate their distress. As predicted, most differences in distress related to gambling problems remained significant after adjusting for sociodemographic factors associated with gambling problems. In dividing continuous gambling problem scores into categories however, information is lost, resulting in less power in the analysis. This loss of power may be responsible for some lack of confirmation of the first hypothesis in multinomial models.

The second hypothesis was that there would be a significant interaction between distress and sex in predicting gambling problems. This hypothesis was not confirmed in any regression model examined. Although women typically experience higher levels of distress than men (Almeida et al., 1998), the relationship between gambling problems and distress did not significantly differ for men and women. Overall, higher levels of gambling problems are associated with higher levels of distress regardless of sex.

The third hypothesis was that self-criticism and gambling problem scores would be significantly and positively associated. This hypothesis was confirmed through correlation and regression models. As gambling problems increase, so do levels of self-criticism. This was clearly demonstrated in linear regression models both unadjusted and adjusted, however results were not entirely straightforward in the multinomial regression models. In the analysis of the whole WAS sample, non-gamblers and non-problem gamblers did not significantly differ in their self-criticism scores, although increases in self-criticism did significantly increase the odds of individuals being low-risk or moderate-risk/problem gamblers relative to non-gamblers. However, these differences were no longer significant after adjusting for sociodemographic factors significantly associated with gambling problems.

The multinomial regression model among gamblers only revealed that increases in self-criticism scores significantly increase the odds of an individual being a low-risk and moderate-risk/problem gambler relative to a non-problem gambler, although only the difference between low-risk and non-problem gamblers remained significant after adjusting for sociodemographic variables. The fact that these findings drop from significance after adjusting for sociodemographics is likely a result of low power in the

analysis due to the categorization of gambling problem groups. Across the two models, the results clearly show that increasing self-criticism is associated with an increasing level of gambling problems and that self-criticism is not useful in differentiating individuals who gamble without problems from those that do not gamble at all.

These results are consistent with previous research showing associations between gambling problems and depression (ex. Kim et al., 2006) as well as discussions by Gamblers Anonymous members of the role of self-criticism-like traits in their gambling (Rockloff et al., 2006). Although this relationship between self-criticism and gambling problems is clear, the mechanism of action between such a psychological vulnerability to depression and gambling problems remains open for determination. Some authors have proposed an effect of negative mood and depressive symptoms in impairing subjective control in gambling (Dickerson & Baron, 2000) and it is quite likely that self-criticism would have a similar effect. As discussed previously, gambling may be an especially enticing activity for individuals with self-criticism because it offers an opportunity for achievement and the opportunity to validate their personal worth when winning. However, when losses are likewise interpreted as personal failure among self-critical individuals, their self-control may be impacted, resulting in subsequent attempts to win or chase losses to redeem themselves and self-soothe. This loss of control may then result in significant gambling problems.

Another potential mechanism of action includes the role of negative mood in causing hormonal and/or neurotransmitter changes that lead certain individuals to behaviorally self-medicate depressive symptoms (Kim et al., 2006). These biological

changes may also result in compromised self-control and it is likely that the effect of self-criticism on gambling works through a complex interplay of multiple mechanisms.

The fourth hypothesis was that a significant interaction between self-criticism and sex would exist in predicting gambling problems. Across the four models examined, this hypothesis was confirmed in only one. There was a significant interaction between self-criticism and sex in the linear regression model among gamblers, meaning that there exists a differential relationship between self-criticism and gambling problems among men and women. As a result of this finding, subsequent linear regression models among gamblers were conducted among men and women separately. After adjusting for sociodemographic factors, self-criticism was significantly associated with gambling problems in both men and women although the strength of the association was stronger among women (Beta = 0.28 in women, Beta = 0.12 in men). It appears that among women, the role of self-criticism in gambling problems is more prominent. However, this relationship emerged in only one of four regression models examined. This finding of a stronger relationship between self-criticism and gambling problems among women is consistent with previous studies showing the presence of more mood disorders among female pathological gamblers compared to male pathological gamblers (Blanco et al., 2006). Although in line with predictions and previous literature, this finding requires replication.

There are several reasons why significant interactions may not have emerged in the other models as expected. Linear regression analyses by definition have more power to detect differences than multinomial regression analyses since information is necessarily lost upon categorization. Thus the failure to find significant relationships in

multinomial regressions may have been due to a lack of power. It may also be that somehow the inclusion of non-gamblers in the regression model diluted the effects and hence a significant interaction did not emerge in the models including the whole WAS sample. According to the ANOVA results, non-gamblers and non-problem gamblers did not have significantly different mean levels of self-criticism, yet they did differ in proportion of males and females. Specifically, females were less likely to be non-problem gamblers relative to non-gamblers. These relationships may have diluted the sex by self-criticism interaction when both non-gamblers and non-problem gamblers were included in the model.

The fifth hypothesis was that self-criticism would be significantly associated with gambling problems after adjusting for sociodemographic factors and distress. This was the most stringent model examined and aimed to determine whether self-criticism is predictive of gambling problems beyond the effect of distress. This hypothesis was confirmed in three of the four models and only among females, as expected, in one of these models. The linear regression model in gamblers revealed that among female gamblers, self-criticism is significantly associated with gambling problems after adjusting for sociodemographics and distress. The association between self-criticism and gambling problems among male gamblers was no longer significant after additionally adjusting for distress.

The multinomial regression model in the whole WAS sample also revealed a significant effect of self-criticism after adjusting for sociodemographic factors and distress. Specifically, increases in self-criticism were significantly associated with increased odds of an individual being a low-risk gambler compared to a non-gambler.

This was the only significant difference, likely due to low sample sizes available in the multinomial analyses. Again, the inclusion of non-gamblers in the analysis of the whole WAS sample may have resulted in some dilution of the effects and hence no significant findings.

The fact that self-criticism emerged as a significant predictor of gambling problems at all in such a stringent model is encouraging. Again, this relationship appears to be stronger among females who are more likely to fall into the emotionally-vulnerable gambling category. The lack of significant findings among males may indeed be related to the increased proportion of antisocial/impulsive gamblers in males, a group of gamblers who would be expected to show a weaker relationship between self-criticism and gambling problems. Females have typically been likely less likely than males to be diagnosed with addictive disorders related to the antisocial/impulsive type of gambling (Kessler et al., 2005a, 2005b). These results emphasize the importance of addressing gambling problems in women and suggest that self-criticism may be an important target for treatment and prevention efforts.

These results and interpretations are tempered by the findings of non-significant relationships between self-criticism and gambling problems after adjusting for distress in one of the four models. The reason for the loss of significance of self-criticism likely lies in the overlap between self-criticism and distress. These two variables are clearly theoretically linked and were significantly correlated in the present analyses. It appears that much of the relationship between self-criticism and gambling problems can be explained by current symptoms of distress, as evidenced by attenuated relationships when distress is included as a covariate. This does not eliminate the implications for self-

criticism as a potential treatment and prevention target, however. Self-criticism is a unique trait that is potentially malleable, while general distress is much less specific and less informative for intervention efforts.

The second objective of the current thesis was to provide an up-to-date estimate of the prevalence of past-year gambling problems in Winnipeg, Manitoba using the CPGI and to examine sociodemographic and gambling behavior correlates of gambling problems. The percentage of the WAS sample who did not engage in gambling in the past year (24.8%) was nearly equal to that found in the CCHS 1.2 (24.2%), the most recent nationally representative survey of the Canadian population using the same measure (Marshall et al., 2004). However, more individuals in the WAS sample reported problem levels of gambling. A higher proportion of individuals in the WAS sample reported low-risk (7.3% vs. 2.8%), moderate-risk (2.9% vs. 1.5%) and problem gambling (0.9% vs. 0.5%), compared to proportions found in the CCHS 1.2. The remaining 64% of the WAS sample reported non-problem gambling (compared to 71% in the CCHS 1.2). The combined prevalence of moderate-risk and problem gambling (3.8%) is also higher than that obtained for the province of Manitoba in the CCHS 1.2 (2.9%, Cox et al., 2005). The higher prevalence of gambling problems found in the Winnipeg population in the current study may be due to the wide availability of gambling venues (Cox et al., 2005; Smitheringale, 2003), with a high concentration of VLTs and two permanent casinos located in the city. This increase could also be an effect of time, since the estimates obtained in the CCHS 1.2 date back to the year 2002.

The most recent estimate of gambling problems in the city of Winnipeg population was derived used the SOGS (Cox et al., 2004a). This is not easily compared to

the estimate derived from the CPGI in the current thesis, as many differences exist between the SOGS and the CPGI.

In terms of sociodemographic and CPGI correlates of gambling problems, the current results were in line with previous epidemiological research (Marshall et al., 2004). Increased spending on gambling as well as increased length of time spent gambling is related to higher odds of having gambling problems. In terms of gambling activities, nearly all individuals who gamble purchase lottery tickets. However, this activity is not significantly related to gambling problems and appears to be a relatively non-pathogenic form of gambling. On the other hand, playing VLTs outside of casinos increase the odds of being a moderate-risk/problem gambler by over 11 times and individuals who endorsed gambling on VLTs outside of casinos as their favorite activity had an over 12 times increased odds of being a moderate-risk/problem gambler.

Limitations

The current thesis research is marked by a number of strengths, including the use of a brief, valid self-criticism measure that has never been examined in relation to gambling problems, use of an extensively validated measure of gambling appropriate in a Canadian context and use of a large representative community sample in a population with a previously documented high prevalence of gambling problems (Cox et al., 2000). Despite these strengths, the limitations of the research are important to consider when interpreting the findings.

The major limitation of the current study involves its cross-sectional nature. It is impossible to infer causality or know whether distress and self-criticism were caused by gambling or vice versa. Although distress may fluctuate greatly over the course of one's

life, fluctuation is less likely with self-criticism, as it represents a somewhat stable psychological factor (Blatt, 1990). This suggests that it may be possible to predict future gambling problems using levels of self-criticism, however longitudinal studies would be required to confirm this potential. Despite the inability to determine causation, the current results reveal a definite association between self-criticism and gambling problems.

The second major limitation is power inadequacy when examining correlates of problem gambling, which stems from the low prevalence of problem gambling. As a result of the low prevalence of problem gambling, individuals in this category were combined with those in the moderate-risk gambling group. This results in an inability to specifically examine the characteristics of the more severe group, which may differ notably from less extreme groups of gamblers. In fact, results of preliminary analyses examining levels of self-criticism across gambling groups did reveal that problem gamblers had much higher mean levels of self-criticism and distress than all other groups. Future studies with enough power to examine problem gamblers on their own are warranted.

A third limitation is that the diagnosis of major depressive disorder according to the DSM-IV was not assessed, thus although respondents may be distressed, it is impossible to know if they meet DSM-IV criteria for depression or other defined mental disorders, such as anxiety and bipolar disorders. This additional assessment would have provided additional information on the interplay between distress, self-criticism and depression in gambling problems.

A fourth limitation lies in the fact that although telephone interviews were conducted by experienced trained lay interviewers, face-to-face interviews with clinicians

may have been superior. Some variables assessed in the current study are of a sensitive nature and respondents may have been more willing to discuss these issues in-person with a clinician. This may have decreased missing responses on sensitive items, although the prevalence of missing responses in the current research was not excessive. On the contrary, it may be that the use of telephone interviews made it easier for respondents to share sensitive information in comparison to sharing information in face-to-face interviews.

A fifth limitation also lies in the use of telephone interviews. Individuals with the most severe difficulties as a result of gambling problems may not have a home telephone or may be out engaging in gambling activities rather than at home to answer the telephone. This would lead to an underestimate of the prevalence of gambling problems and associated difficulties and may have impacted other results.

A sixth limitation includes the lack of a measure of response bias. Individuals with significant gambling problems may be unlikely to accurately report their gambling behaviors or associated problems. Future research on gambling problems might be enhanced by objective measures of gambling problems (ex. records of spending) or interviews with family and friends to confirm respondent reports.

The current findings are also limited by a lack of measurement of traits indicative of the antisocial/impulsive category of gambling. Since both categories of gamblers are likely included in the present study, the presence of the antisocial/impulsive gamblers may have weakened the results, given that the strongest relationship between self-criticism and gambling problems would likely be found among the emotionally vulnerable gamblers. Future studies may benefit from an assessment of both antisocial or

impulsive traits as well as self-criticism and distress, in order to fully examine the prevalent subtypes of gambling.

Finally, the fact that adolescents were not assessed in the WAS is the eighth limitation of the current research. Gambling is a prevalent phenomenon in adolescent populations (Shaffer et al., 2001) and self-criticism may play an important role in initiation of gambling. Since adolescent gambling may provide an opportunity for early intervention in order to prevent future negative consequences of gambling problems, it is important that future research examines this population.

Implications

The current results indicate that there is a high prevalence of gambling problems in Winnipeg and those individuals with gambling problems are vulnerable to mood disorders and are marked by significant distress. These findings have important applications in various realms, including treatment of gambling problems, prevention of gambling problems and public policy regulating gambling and gambling advertising.

These findings would be of interest to clinicians working with clients suffering from both depression and gambling. Self-criticism and associated depression could be an important factor motivating individuals to gamble as well as a consequence of gambling and thus should be considered in the treatment of gamblers. In addition, individuals with depression might be at an increased risk of experiencing negative consequences of gambling and thus it may be important for clinicians to inquire about gambling behaviors. Selective-serotonin reuptake inhibitors have been shown to be successful in treating pathological gambling and Kim and colleagues (2006) suggest that it may be through an

"anti-obsessional" effect, impacting the self-control that is likely affected by self-criticism and depressive symptoms.

Since the role of self-criticism may be prominent in some individuals' gambling issues, it is important that psychotherapies for gambling address this pathogenic psychological vulnerability factor. Self-criticism can be specifically targeted in cognitive-behavioral therapy. Self-criticism is proposed to stem from issues in self-definition and involves feelings of unworthiness, inferiority and guilt, needs for excessive achievement and perfection, fears of disapproval or criticism and behaviors such as constant and harsh self-scrutiny, self-evaluation, and competition (Blatt, 1974). Thoughts related to these feelings and fears could be addressed and challenged, through typical cognitive-behavioral strategies such as using thought records, identifying inaccurate cognitions and challenging the accuracy of cognitions. In addition, the negative behaviors associated with self-criticism and gambling could be addressed and new behaviors practiced and eventually incorporated into daily life. Studies do suggest that controlled gambling, rather than abstinence, may be a realistic treatment goal for some individuals with gambling problems (Ladouceur, 2005).

As discussed, self-criticism is likely to directly impact choice/control over gambling as well as affect negative mood, which in turn impacts choice and control over gambling. Because self-criticism is a vulnerability factor for the development of negative mood and depression it may allow a point of intervention before gambling problems develop, through incorporation as a target or focus of prevention efforts. It is important that prevention efforts be targeted at youth, since many individuals begin gambling before adulthood. Since the current research did not include youth, it is important that the

current research questions be examined in younger populations before applying such efforts. Programs that focus on developing self-esteem and clearly explaining the negative consequences of gambling to adolescents would be beneficial. Some endeavors focusing on the latter have been studied and hold promise for more widespread prevention efforts (Ferland, Ladouceur, & Vitaro, 2002).

In stark contrast to such prevention efforts and the results of the current thesis are the marketing strategies of gambling venues that tout gambling as an entertainment activity. Specifically, the current results show that a sizeable minority of individuals are experiencing gambling problems that are associated with increased self-criticism and distress. These individuals are clearly not representative of "those who choose fun," (Province of Manitoba, 2008) contrary to the typical way government sponsored advertising portrays casino gambling. Aside from this incongruence between reality and the picture evoked by such marketing strategies, there is the potential that such marketing could be especially detrimental to those individuals who are most vulnerable. Individuals who are self-critical and distressed would mostly likely welcome a form of escape. The current slogan gracing billboards by the Casinos of Winnipeg, "Come for the fun of it," may be particularly enticing. It is important that the provincial government recognize the negative impact of gambling marketing on its most vulnerable consumers.

The current findings suggest the need for enhanced public health initiatives to alert individuals to the negative consequences of gambling in the community, particularly when gambling on VLTs. Public policy should be directed toward decreasing the widespread availability of VLTs both in location as well as the times of operation. The fact that most VLTs in Winnipeg are located in venues where alcohol is available only

serves to compound the problem. When self-control of gambling may already be decreased by self-criticism, the addition of alcohol only worsens the problem. In addition, community-level interventions and public programs could target self-criticism and low self-esteem in an attempt to decrease the negative consequences of gambling.

Conclusion & Future Directions

This study represents the first investigation of a psychological factor reflecting vulnerability for mood disorders in relation to gambling problems. The findings reveal that self-criticism is significantly related to gambling problems and may hold value in the treatment and prevention of such problems. Before a thorough understanding of the complex relationship between self-criticism and gambling problems is reached however, future research is required.

Results of the current thesis pave the way for future studies of psychological vulnerability factors for gambling by showing a cross-sectional association between gambling and a pathogenic psychological factor known as self-criticism. Future longitudinal studies can examine whether self-criticism is indeed a prospective risk factor for gambling problems. Such studies would benefit from the inclusion of adolescents and measures of antisocial/impulsive traits, response bias, DSM-IV disorders, objective measures of gambling problems, as well as friend and family reports of respondents' gambling problems. This would ideally be done in a community-based, nationally representative study using in-person interviews, similar to the CCHS 1.2, which would allow for sufficient sample sizes to examine problem gamblers as a separate group from other individuals who are at-risk for problem gambling.

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Figure 1. Relationships between self-criticism, distress and gambling problem examined in the present study

Table 1. Missing value analysis of *Reconstructed Depressive Experiences Questionnaire* items

	Missing Values
Items	**n (%)**
I often find that I don't live up to my own standards or ideals	17 (2.3)
Many times I feel helpless.	11 (1.5)
There is a considerable difference between how I am now and how I would like to be.	13 (1.7)
I tend not to be satisfied with what I have.	13 (0.4)
Often, I feel that I have disappointed others.	12 (1.6)
No matter how close a relationship between two people is, there is always a large amount of uncertainty and conflict.	35 (4.7)
I never really feel secure in a close relationship.	31 (4.1)
Often, I feel threatened by change.	14 (1.9)
I am very satisfied with myself and my accomplishments.	16 (2.1)

Table 2. Missing value analysis of *K-6 Distress Scale* items

Items	**Missing Values**
During the last 30 days, how often did…	**n (%)**
You feel nervous?	1 (0.1)
You feel hopeless?	5 (0.7)
You feel restless or fidgety?	2 (0.3)
You feel so depressed that nothing could cheer up?	2 (0.3)
You feel that everything was an effort?	8 (1.1)
You feel worthless?	4 (0.5)

Table 3. Missing value analysis of *Canadian Problem Gambling Index* items

Items	**Missing Values**
In the past 12 months,	**n (%)**
How often have you needed to gamble with larger amounts of money to get the same feeling of excitement?	1 (0.1)
When you gambled, how often did you go back another day to try and win back the money you lost?	1 (0.1)
How often have you borrowed money or sold anything to get money to gamble?	1 (0.1)
How often have you felt that you might have a problem with gambling?	0 (0.0)
How often has gambling caused you any health problems, including stress or anxiety?	0 (0.0)
How often have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?	0 (0.0)
How often has your gambling caused financial problems for you or your family?	0 (0.0)
How often have you felt guilty about the way you gamble or what happens when you gamble?	0 (0.0)
How often have you bet more than you could really afford to lose?	0 (0.0)

Table 4. Means and standard deviations of continuous variables and correlations between continuous variables

Variable	Age	CPGI Score A	CPGI Score B	Distress	Self-Criticism
Age	1.00	--	---	--	--
CPGI Score	-0.04	1.00	---	--	--
Distress	**-0.15****	**0.29****	**0.22****	1.00	--
Self-Criticism	0.05	**0.19****	**0.17****	**0.51****	1.00
Mean	47.4	0.4	0.3	2.2	10.2
Standard Deviation	17.4	1.5	1.3	2.6	3.8

CPGI Score A excludes non-gamblers, who do not answer CPGI questions.
CPGI Score B includes non-gamblers with a score of 0, equivalent to gamblers who experienced no problems with their gambling according to the CPGI.
**Correlation is significant at the 0.01 level (2-tailed).

Table 5. Cross-tabulations and chi-square tests of association examining sociodemographic variables according to gambling category

	Non-gambling (n=186)	Non-problem gambling (n=480)	Low-risk gambling (n=55)	Moderate-risk gambling (n=22)	Problem gambling (n=7)	
Sociodemographics	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**χ^2 (df)**
Sex						
Male	79 (42.5)	251 (52.3)	30 (54.5)	14 (63.6)	1 (14.3)	**10.89 (4)***
Female	107 (57.5)	229 (47.7)	25 (45.5)	8 (36.4)	6 (85.7)	
Age						
18-34	68 (37.0)	102 (21.6)	21 (38.9)	4 (19.0)	2 (28.6)	**30.47 (8)*****
35-54	57 (31.0)	212 (44.9)	14 (25.9)	14 (66.7)	3 (42.9)	
55+	59 (32.1)	158 (33.5)	19 (35.2)	3 (14.3)	2 (28.6)	
Ethnicity						
North American	41 (22.3)	142 (30.5)	13 (24.1)	7 (31.8)	1 (16.7)	**27.38 (16)***
European	102 (55.4)	261 (56.1)	27 (50.0)	12 (54.5)	4 (66.7)	
Asian (incl. Jewish/Arab)	28 (15.2)	35 (7.5)	5 (9.3)	2 (9.1)	0 (0.0)	
Aboriginal	5 (2.7)	17 (3.7)	6 (11.1)	1 (4.5)	1 (16.7)	
Other	8 (4.3)	10 (2.2)	3 (5.6)	0 (0.0)	0 (0.0)	
Education						
Less than High School	32 (17.2)	77 (16.1)	9 (16.7)	5 (22.7)	7 (100.0)	**35.75 (8)*****
High School	38 (20.4)	91 (19.0)	11 (20.4)	6 (27.3)	0 (0.0)	
More than High School	116 (62.4)	310 (64.9)	34 (63.0)	11 (50.0)	0 (0.0)	
Marital Status						
Married/Cohabiting	101 (54.9)	283 (59.3)	34 (63.0)	13 (61.9)	3 (42.9)	8.54 (8)
Separated/Divorced/Widowed	41 (22.3)	105 (22.0)	5 (9.3)	3 (14.3)	2 (28.6)	
Never Married	42 (22.8)	89 (18.7)	15 (27.8)	5 (23.8)	2 (28.6)	
Employment						
Employed	79 (42.5)	290 (60.4)	30 (54.5)	17 (77.3)	4 (57.1)	**31.29 (12)****

Student	37 (19.9)	59 (12.3)	6 (10.9)	2 (9.1)	0 (0.0)	
Retired	48 (25.8)	107 (22.3)	13 (23.6)	1 (4.5)	2 (28.6)	
Unemployed	22 (11.8)	24 (5.0)	6 (10.9)	2 (9.1)	1 (14.3)	
Household Income						
<$6,000 - $33,999	39 (33.1)	65 (19.3)	8 (22.2)	1 (8.3)	4 (80.0)	**28.11 (12)****
$34,000 - $54,999	23 (19.5)	85 (25.3)	10 (27.8)	0 (0.0)	1 (20.0)	
$55,000 - $89,999	32 (27.1)	90 (26.8)	9 (25.0)	5 (41.7)	0 (0.0)	
$90,000 and over	24 (20.3)	96 (28.6)	9 (25.0)	6 (50.0)	0 (0.0)	
Area of Winnipeg						
South	88 (47.6)	193 (41.2)	24 (45.3)	9 (40.9)	3 (42.9)	7.40 (12)
West	18 (9.7)	57 (12.2)	4 (7.5)	1 (14.3)	1 (14.3)	
North	56 (30.3)	176 (37.5)	19 (35.8)	2 (28.6)	2 (28.6)	
Central	23 (12.4)	43 (9.2)	6 (11.3)	1 (14.3)	1 (14.3)	

*p<0.05; **p<0.01; ***p<0.001

Table 6. One-way ANOVA results for comparisons between gambling groups on self-criticism and distress

	Non-gambling (n=186)	**Non-problem gambling (n=480)**	**Low-risk gambling (n=55)**	**Moderate-risk gambling (n=22)**	**Problem gambling (n=7)**
Mean					
Self-criticism	10.3[a]	9.8[b]	11.6[a,b]	11.2[c]	16.9[c]
K-6 distress	2.9[a]	1.8[a]	2.5	2.6[b]	9.4[b]

Categories with identical superscripts differed significantly at a p value less than 0.05 on self-criticism or distress.

Table 7. Linear regression models examining the sociodemographic correlates of continuous gambling score

	B	Standard Error	Beta	P value	R^2
Age					
Age	0.00	0.000	-0.045	0.22	0.002
Sex					
Male (reference)					
Female	-0.003	0.01	-0.01	0.84	0.000
Marital Status					
Married/Cohabiting (reference)					
Separated/Divorced/Widowed	-0.02	0.02	-0.04	0.29	
Never Married	0.01	0.02	0.03	0.39	0.003
Household Income					
<$6,000 - $33,999 (reference)					
$34,000 - $54,999	-0.03	0.02	-0.08	0.16	
$55,000 - $89,999	-0.01	0.02	-0.04	0.53	
$90,000 and over	-0.01	0.02	-0.04	0.53	0.004
Employment					
Employed (reference)					
Student	-0.01	0.02	-0.06	0.11	
Retired	-0.02	0.02	-0.05	0.17	
Unemployed	0.01	0.03	0.02	0.62	0.006
Education					
Less than High School (reference)					
High School	-0.06	0.02	**-0.14**	0.005	
More than High School	-0.06	0.02	**-0.19**	0.0001	0.020
Ethnicity					
North American (reference)					

European	-0.002	0.02	-0.004	0.92	
Asian	-0.002	0.02	-0.003	0.94	
Aboriginal	0.09	0.03	**0.10**	0.008	
Other	0.000	0.04	0.000	0.995	0.011
Area of Winnipeg					
South (reference)					
West	-0.01	0.02	-0.01	0.73	
North	0.003	0.02	0.01	0.85	
Central	0.003	0.02	0.01	0.91	0.000

Significant betas are bolded.

Table 8. Linear regression models examining the relationship between continuous gambling score and distress among all respondents

	B	Standard Error	Beta	Significance	R Square
Model 1: Unadjusted					
K6 Total Score	0.07	0.02	**0.12**	0.001	0.014
Model 2: Sex Interaction					
Sex					
Male (reference)					
Female	-0.02	0.02	-0.05	0.41	
K6 Total Score	0.03	0.07	0.06	0.65	
Sex * K6 Score Interaction	0.03	0.04	0.08	0.56	0.015
Model 3: Adjusted for Sociodemographics					
Ethnicity					
North American (reference)					
European	-0.004	0.02	-0.01	0.78	
Asian	-0.003	0.02	-0.004	0.92	
Aboriginal	0.07	0.03	**0.08**	0.04	
Other	-0.01	0.04	-0.01	0.89	
Education					
Less than high school (reference)					
High school	-0.05	0.02	**-0.11**	0.03	
More than high school	-0.05	0.02	**-0.15**	0.002	
K6 Total Score	0.06	0.02	**0.11**	0.004	0.035

Significant betas are bolded.

Table 9. Linear regression models examining the relationship between continuous gambling score and self-criticism among all respondents

	B	Standard Error	Beta	Significance	R Square
Model 1: Unadjusted					
DEQ Total Score	0.01	0.02	**0.18**	0.0001	0.029
Model 2: Sex Interaction					
Sex					
Male (reference)					
Female	-0.07	0.04	-0.19	0.07	
DEQ Total Score	-0.001	0.01	-0.03	0.82	
Sex * DEQ Score Interaction	0.01	0.003	0.28	0.07	0.033
Model 3: Adjusted for Sociodemographics					
Ethnicity					
North American (reference)					
European	-0.002	0.02	-0.01	0.88	
Asian	-0.01	0.02	-0.01	0.78	
Aboriginal	0.08	0.03	**0.09**	0.02	
Other	-0.01	0.04	-0.01	0.77	
Education					
Less than high school (reference)					
High school	-0.04	0.02	-0.09	0.07	
More than high school	-0.04	0.02	**-0.10**	0.03	
DEQ Total Score	0.01	0.002	**0.18**	0.0001	0.050
Model 4: Adjusted for Sociodemographics and Distress					
Ethnicity					
North American (reference)					
European	-0.003	0.02	-0.01	0.83	
Asian	-0.01	0.02	-0.01	0.78	

Aboriginal	0.08	0.03	**-0.10**	0.03	
Other	-0.01	0.04	-0.01	0.77	
Education					
Less than high school (reference)					
High school	-0.04	0.02	-0.09	0.06	
More than high school	-0.04	0.02	**-0.11**	0.03	
K6 Total Score	0.02	0.02	0.04	0.36	
DEQ Total Score	0.01	0.002	**0.15**	0.0001	0.051

Significant betas are bolded.

Table 10. Multinomial regression models examining sociodemographic correlates of gambling categories

	Non-gambling	**Non-problem gambling**	**Low-risk gambling**	**Moderate-risk/problem gambling**
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Age				
Age	1.00	1.01 (0.97-1.12)	0.99 (0.98-1.01)	0.99 (0.97-1.02)
Sex				
Male (reference)	1.00	1.00	1.00	1.00
Female	1.00	**0.67 (0.48-0.95)***	0.62 (0.34-1.13)	0.69 (0.32-1.51)
Marital Status				
Married/cohabiting (reference)	1.00	1.00	1.00	1.00
Separated/divorced/widowed	1.00	0.91 (0.60-1.40)	**0.36 (0.13-0.99)***	0.77 (0.27-2.24)
Never married	1.00	0.76 (0.49-1.16)	1.06 (0.52-2.15)	1.05 (0.40-2.74)
Household Income				
<$6,000 - $33,999 (reference)	1.00	1.00	1.00	1.00
$34,000 - $54,999	1.00	**2.22 (1.21-4.07)****	2.12 (0.73-6.14)	0.34 (0.04-3.09)
$55,000 - $89,999	1.00	1.69 (0.96-2.97)	1.37 (0.48-3.96)	1.22 (0.32-4.58)
$90,000 and over	1.00	**2.40 (1.32-4.37)****	1.83 (0.62-5.38)	1.95 (0.54-7.09)
Employment				
Employed (reference)	1.00	1.00	1.00	1.00
Student	1.00	**0.43**	0.43	**0.20**

		(0.27-0.70)* **	(0.16-1.12)	**(0.05-0.91)***
Retired	1.00	**0.61**	0.71	**0.24**
		(0.40-0.93)*	(0.34-1.45)	**(0.07-0.83)***
Unemployed	1.00	**0.30**	0.72	0.51
		(0.16-0.56)* **	(0.27-1.94)	(0.14-1.88)
Education				
Less than high school (reference)	1.00	1.00	1.00	1.00
High school	1.00	1.00	1.03	0.42
		(0.57-1.74)	(0.38-2.79)	(0.14-1.25)
More than high school	1.00	1.11	1.04	**0.25**
		(0.70-1.77)	(0.45-2.40)	**(0.10-0.63)****
Ethnicity[1]				
North American (reference)	1.00	1.00	1.00	1.00
European	1.00	0.74	0.84	0.80
		(0.49-1.12)	(0.39-1.78)	(0.32-2.02)
Asian	1.00	**0.36**	0.56	0.37
		(0.20-0.66)* **	(0.18-1.76)	(0.07-1.85)
Aboriginal	1.00	0.98	3.79	2.05
		(0.34-2.82)	(0.99-14.47)	(0.34-12.48)
Other	1.00	**0.36**	1.18	0.00
		(0.13-0.97)*	(0.27-5.13)	(0.00-0.00)
Area of Winnipeg				
South (reference)	1.00	1.00	1.00	1.00
West	1.00	1.44	0.82	1.63
		(0.80-2.60)	(0.25-2.64)	(0.47-5.63)
North	1.00	1.43	1.24	1.44
		(0.97-2.12)	(0.63-2.48)	(0.60-3.49)
Central	1.00	0.85	0.96	0.64
		(0.48-1.50)	(0.35-2.61)	(0.13-3.05)

[1]This multinomial regression model encountered unexpected singularities in the Hessian matrix; *p<0.05; **p<0.01; ***p<0.001

Table 11. Multinomial regression models examining the relationship between gambling categories and distress among all respondents

	Non-gambling	Non-problem gambling	Low-risk gambling	Moderate-risk/problem gambling
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Model 1: Unadjusted				
K6 Total Score	1.00	**0.22 (0.13-0.39)*** **	0.56 (0.21-1.50)	1.84 (0.52-6.57)
Model 2: Sex Interaction				
Sex				
Male (reference)	1.00	1.00	1.00	1.00
Female	1.00	0.65 (0.35-1.21)	0.62 (0.21-1.82)	0.44 (0.09-2.23)
K6 Total Score	1.00	0.15 (0.02-1.01)	0.55 (0.02-13.57)	0.67 (0.01-43.24)
Sex * K6 Score Interaction	1.00	1.36 (0.42-4.35)	1.05 (0.14-7.73)	2.04 (0.15-27.19)
Model 3: Adjusted for Sociodemographics				
Marital Status				
Married/cohabiting (reference)	1.00	1.00	1.00	1.00
Separated/divorced/widowed	1.00	1.65 (0.88-3.09)	0.37 (0.09-1.46)	2.32 (0.54-10.05)
Never married	1.00	**2.18 (1.10-4.32)***	1.51 (0.49-4.66)	3.81 (0.83-17.47)
Sex				
Male (reference)	1.00	1.00	1.00	1.00
Female	1.00	1.02 (0.65-1.62)	0.63 (0.28-1.42)	0.89 (0.29-2.73)

Household Income				
<$6,000 - $33,999 (reference)	1.00	1.00	1.00	1.00
$34,000 - $54,999	1.00	**2.39**	1.86	0.46
		(1.20-4.76)*	(0.57-6.08)	(0.04-4.85)
$55,000 - $89,999	1.00	1.77	0.98	1.96
		(0.87-3.62)	(0.28-3.44)	(0.36-10.80)
$90,000 and over	1.00	**2.34**	1.04	3.89
		(1.09-5.00)*	(0.28-3.88)	(0.63-24.08)
Education				
Less than high school (reference)	1.00	1.00	1.00	1.00
High school	1.00	0.74	1.23	0.47
		(0.32-1.71)	(0.27-5.50)	(0.09-2.33)
More than high school	1.00	0.86	1.25	**0.18**
		(0.43-1.69)	(0.35-4.43)	**(0.04-0.79)***
Employment				
Employed (reference)				
Student	1.00	**0.38**	0.44	0.18
		(0.20-0.74)**	(0.13-1.56)	(0.02-1.67)
Retired	1.00	**0.42**	1.06	0.13
		(0.22-0.78)**	(0.39-2.93)	(0.01-1.36)
Unemployed	1.00	**0.40**	0.52	0.58
		(0.17-0.93)*	(0.10-2.68)	(0.10-3.58)
K6 Total Score	1.00	**0.25**	0.62	0.77
		(0.12-0.54)***	(0.17-2.30)	(0.14-4.23)

*p<0.05; **p<0.01; ***p<0.001

Table 12. Multinomial regression models examining the relationship between gambling categories and self-criticism among all respondents

	Non-gambling	**Non-problem gambling**	**Low-risk gambling**	**Moderate-risk/problem gambling**
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Model 1: Unadjusted				
DEQ Total Score	1.00	0.96 (0.92-1.01)	**1.09 (1.01-1.18)***	**1.15 (1.05-1.27)****
Model 2: Sex Interaction				
Sex				
Male (reference)	1.00	1.00	1.00	1.00
Female	1.00	0.82 (0.30-2.22)	0.31 (0.05-2.05)	0.14 (0.01-1.74)
DEQ Total Score	1.00	0.99 (0.86-1.15)	1.01 (0.79-1.29)	0.96 (0.71-1.32)
Sex * DEQ Score Interaction	1.00	0.98 (0.90-1.08)	1.06 (0.90-1.24)	1.13 (0.93-1.37)
Model 3: Adjusted for Sociodemographics				
Marital Status				
Married/cohabiting (reference)	1.00	1.00	1.00	1.00
Separated/divorced/widowed	1.00	1.68 (0.90-3.14)	0.34 (0.09-1.36)	2.72 (0.49-9.58)
Never married	1.00	**2.02 (1.03-3.97)***	1.35 (0.43-4.23)	3.45 (0.73-16.28)
Sex				
Male (reference)	1.00	1.00	1.00	1.00
Female	1.00	0.91 (0.58-1.44)	0.62 (0.27-1.40)	0.91 (0.30-2.78)

Household Income				
<$6,000 - $33,999 (reference)	1.00	1.00	1.00	1.00
$34,000 - $54,999	1.00	**2.53**	1.84	0.47
		(1.28-5.00)**	(0.56-6.08)	(0.04-5.12)
$55,000 - $89,999	1.00	1.82	1.07	2.39
		(0.90-3.68)	(0.30-3.78)	(0.41-13.95)
$90,000 and over	1.00	**2.50**	1.21	5.02
		(1.18-5.32)*	(0.32-4.59)	(0.77-32.95)
Education				
Less than high school (reference)	1.00	1.00	1.00	1.00
High school	1.00	0.71	1.33	0.56
		(0.31-1.62)	(0.29-6.08)	(0.11-2.88)
More than high school	1.00	0.86	1.43	0.23
		(0.44-1.67)	(0.40-5.12)	(0.05-1.04)
Employment				
Employed (reference)	1.00	1.00	1.00	1.00
Student	1.00	**0.39**	0.47	0.20
		(0.21-0.74)**	(0.13-1.66)	(0.02-1.88)
Retired	1.00	**0.51**	1.14	0.16
		(0.28-0.93)*	(0.42-3.09)	(0.02-1.60)
Unemployed	1.00	**0.35**	0.42	0.50
		(0.16-0.80)*	(0.08-2.23)	(0.08-3.19)
DEQ Total Score	1.00	0.97	1.08	1.10
		(0.92-1.03)	(0.97-1.19)	(0.97-1.26)
Model 3: Adjusted for Sociodemographics and Distress				
Marital Status				
Married/cohabiting (reference)	1.00	1.00	1.00	1.00
Separated/divorced/widowed	1.00	1.60	0.32	2.09
		(0.85-3.01)	(0.08-1.20)	(0.47-9.23)

Never married	1.00	**2.12**	1.39	3.51
		(1.07-4.20)*	(0.44-4.36)	(0.74-16.65)
Sex				
Male (reference)	1.00	1.00	1.00	1.00
Female	1.00	1.05	0.70	1.03
		(0.66-1.68)	(0.30-1.60)	(0.33-3.22)
Household Income				
<$6,000 - $33,999 (reference)	1.00	1.00	1.00	1.00
$34,000 - $54,999	1.00	**2.34**	1.70	0.43
		(1.17-4.65)*	(0.51-5.65)	(0.04-4.76)
$55,000 - $89,999	1.00	1.81	1.05	2.35
		(0.88-3.71)	(0.30-3.75)	(0.40-13.75)
$90,000 and over	1.00	**2.41**	1.16	4.76
		(1.12-5.17)*	(0.31-4.42)	(0.72-31.37)
Education				
Less than high school (reference)	1.00	1.00	1.00	1.00
High school	1.00	0.78	1.42	0.61
		(0.33-1.81)	(0.31-6.50)	(0.12-3.19)
More than high school	1.00	0.90	1.47	0.24
		(0.45-1.79)	(0.41-5.29)	(0.05-1.09)
Employment				
Employed (reference)	1.00	1.00	1.00	1.00
Student	1.00	**0.39**	0.47	0.20
		(0.20-0.74)**	(0.13-1.64)	(0.02-1.90)
Retired	1.00	**0.40**	0.94	0.13
		(0.21-0.76)**	(0.34-2.63)	(0.01-1.33)
Unemployed	1.00	**0.39**	0.46	0.54
		(0.17-0.91)*	(0.09-2.44)	(0.08-3.52)
K6 Total Score	1.00	**0.20**	0.28	0.25
		(0.08-0.48)***	(0.06-1.29)	(0.03-1.95)

DEQ Total Score	1.00	1.03 (0.97-1.10)	**1.13 (1.00-1.28)***	1.17 (0.99-1.37)

*p<0.05; **p<0.01; ***p<0.001

Table 13. Linear regression models examining the relationship between continuous gambling score and distress among past-year gamblers

	B	Standard Error	Beta	Significance	R Square
Model 1: Unadjusted					
K6 Total Score	0.12	0.03	**0.18**	0.0001	0.031
Model 2: Sex Interaction					
Sex					
Male (reference)					
Female	-0.02	0.03	-0.04	0.51	
K6 Total Score	0.06	0.09	0.09	0.50	
Sex * K6 Score Interaction	0.04	0.06	0.10	0.50	0.141
Model 3: Adjusted for Sociodemographics					
Ethnicity					
North American (reference)					
European	-0.002	0.02	-0.01	0.90	
Asian	0.02	0.03	0.03	0.56	
Aboriginal	0.07	0.04	0.08	0.08	
Other	0.01	0.06	0.01	0.86	
Education					
Less than high school (reference)					
High school	-0.06	0.03	**-0.11**	0.041	
More than high school	-0.08	0.02	**-0.18**	0.001	
K6 Total Score	0.11	0.03	**0.17**	0.0001	0.057

Significant betas are bolded.

Table 14. Linear regression models examining the relationship between continuous gambling score and self-criticism among past-year gamblers

	B	Standard Error	Beta	Significance	R Square
Model 1: Unadjusted					
DEQ Total Score	0.01	0.002	**0.20**	0.0001	0.040
Model 2: Sex Interaction					
Sex					
Male (reference)					
Female	-0.10	0.05	**-0.24**	0.04	
DEQ Total Score	-0.004	0.01	-0.07	0.59	
Sex * DEQ Score Interaction	0.01	0.004	**0.38**	0.03	0.048
Model 3: Adjusted for Sociodemographics – Males					
Ethnicity					
North American (reference)					
European	-0.01	0.03	-0.03	0.70	
Asian	-0.02	0.05	-0.02	0.72	
Aboriginal	0.02	0.06	0.02	0.78	
Other	0.04	0.08	0.03	0.62	
Education					
Less than high school (reference)					
High school	0.02	0.04	0.03	0.71	
More than high school	-0.01	0.04	-0.03	0.73	
DEQ Total Score	0.01	0.003	**0.12**	0.048	0.021
Model 3: Adjusted for Sociodemographics – Females					
Ethnicity					
North American (reference)					
European	0.02	0.03	0.05	0.46	
Asian	0.04	0.05	0.05	0.40	

Aboriginal	0.14	0.06	**0.15**	0.02	
Other	-0.04	0.08	-0.03	0.66	
Education					
Less than high school (reference)					
High school	-0.09	0.04	**-0.17**	0.02	
More than high school	-0.08	0.03	**-0.19**	0.01	
DEQ Total Score	0.02	0.003	**0.28**	0.0001	0.153
Model 3: Adjusted for Sociodemographics and Distress – Males					
Ethnicity					
North American (reference)					
European	-0.01	0.03	-0.04	0.58	
Asian	-0.01	0.05	-0.02	0.79	
Aboriginal	0.01	0.06	0.01	0.89	
Other	0.05	0.08	0.04	0.56	
Education					
Less than high school (reference)					
High school	0.02	0.04	0.04	0.66	
More than high school	-0.01	0.04	-0.04	0.68	
K6 Total Score	0.09	0.05	0.13	0.06	
DEQ Total Score	0.003	0.003	0.07	0.33	0.034
Model 3: Adjusted for Sociodemographics and Distress – Females					
Ethnicity					
North American (reference)					
European	0.02	0.03	0.04	0.53	
Asian	0.04	0.05	0.06	0.38	
Aboriginal	0.14	0.06	**0.14**	0.02	
Other	-0.04	0.08	-0.03	0.62	

Education					
Less than high school (reference)					
High school	-0.09	0.04	**-0.18**	0.02	
More than high school	-0.09	0.03	**-0.21**	0.005	
K6 Total Score	0.06	0.04	0.09	0.186	
DEQ Total Score	0.012	0.004	**0.23**	0.001	0.159

Significant betas are bolded.

Table 15. Multinomial regression models examining the relationship between gambling categories and distress among past-year gamblers

	Non-problem gambling	**Low-risk gambling**	**Moderate-risk/problem gambling**
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**
Model 1: Unadjusted			
K6 Total Score	1.00	**2.49 (1.00-6.20)***	**7.85 (2.34-26.35)*****
Model 2: Sex Interaction			
Sex			
Male (reference)	1.00	1.00	1.00
Female	1.00	0.98 (0.37-2.56)	0.75 (0.16-3.43)
K6 Total Score	1.00	4.14 (0.22-78.94)	5.70 (0.11-309.70)
Sex * K6 Score Interaction	1.00	0.72 (0.12-4.63)	1.26 (0.11-15.01)
Model 3: Adjusted for Sociodemographics			
Marital Status			
Married/cohabiting (reference)	1.00	1.00	1.00
Separated/widowed/divorced	1.00	**0.20 (0.05-0.78)***	1.27 (0.29-5.52)
Never married	1.00	0.61 (0.21-1.77)	1.74 (0.38-7.91)
Sex			
Male (reference)	1.00	1.00	1.00
Female	1.00	0.59 (0.28-1.27)	0.84 (0.28-2.57)

Household Income			
<$6,000 - $33,999 (reference)	1.00	1.00	1.00
$34,000 - $54,999	1.00	0.64	0.20
		(0.20-1.99)	(0.02-2.00)
$55,000 - $89,999	1.00	0.46	1.11
		(0.13-1.59)	(0.20-6.15)
$90,000 and over	1.00	0.38	1.79
		(0.11-1.28)	(0.29-11.14)
Education			
Less than high school (reference)	1.00	1.00	1.00
High school	1.00	1.60	0.69
		(0.40-6.40)	(0.15-3.09)
More than high school	1.00	1.36	**0.21**
		(0.41-4.53)	**(0.05-0.88)***
Employment			
Employed	1.00	1.00	1.00
Student	1.00	1.12	0.50
		(0.35-3.63)	(0.06-4.44)
Retired	1.00	2.38	0.37
		(0.92-6.15)	(0.04-3.68)
Unemployed	1.00	1.17	1.46
		(0.23-5.96)	(0.24-8.72)
K6 Total Score	1.00	2.69	2.77
		(0.77-9.42)	(0.52-14.82)

*p<0.05; **p<0.01; ***p<0.001

Table 16. Multinomial regression models examining the relationship between gambling categories and self-criticism among past-year gamblers

	Non-problem gambling	**Low-risk gambling**	**Moderate-risk/problem gambling**
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**
Model 1: Unadjusted			
DEQ Total Score	1.00	**1.13 (1.05-1.21)****	**1.19 (1.09-1.30)*****
Model 2: Sex Interaction			
Sex			
Male (reference)	1.00	1.00	1.00
Female	1.00	0.36 (0.06-2.11)	0.18 (0.02-1.94)
DEQ Total Score	1.00	1.01 (0.81-1.26)	0.97 (0.72-1.29)
Sex * DEQ Score Interaction	1.00	1.08 (0.94-1.25)	1.15 (0.96-1.39)
Model 3: Adjusted for Sociodemographics			
Marital Status			
Married/cohabiting (reference)	1.00	1.00	1.00
Separated/divorced/widowed	1.00	0.18 (0.05-0.72)	1.24 (0.28-5.47)
Never married	1.00	0.62 (0.22-1.80)	1.73 (0.37-8.14)
Sex			
Male (reference)	1.00	1.00	1.00
Female	1.00	0.67 (0.31-1.42)	0.99 (0.33-2.95)

Household Income			
<$6,000 - $33,999 (reference)	1.00	1.00	1.00
$34,000 - $54,999	1.00	0.60	0.19
		(0.19-1.89)	(0.02-1.89)
$55,000 - $89,999	1.00	0.51	1.36
		(0.15-1.78)	(0.23-8.01)
$90,000 and over	1.00	0.43	2.16
		(0.12-1.57)	(0.33-14.25)
Education			
Less than high school (reference)	1.00	1.00	1.00
High school	1.00	1.66	0.80
		(0.41-6.68)	(0.17-3.68)
More than high school	1.00	1.45	0.25
		(0.43-4.86)	(0.06-1.06)
Employment			
Employed	1.00	1.00	1.00
Student	1.00	1.16	0.54
		(0.36-3.76)	(0.06-4.94)
Retired	1.00	2.14	0.35
		(0.83-5.48)	(0.04-3.41)
Unemployed	1.00	1.14	1.40
		(0.22-5.93)	(0.25-9.12)
DEQ Total Score	1.00	**1.10**	1.13
		(1.00-1.20)*	(0.99-1.28)
Model 4: Adjusted for Sociodemographics and Distress			
Marital Status			
Married/cohabiting	1.00	1.00	1.00
Separated/widowed/divorced	1.00	**0.19**	1.24
		(0.05-0.73)*	(0.28-5.47)

Never married	1.00	0.60	1.71
		(0.21-1.76)	(0.36-8.08)
Sex			
Male (reference)	1.00	1.00	1.00
Female	1.00	0.63	0.97
		(0.29-1.37)	(0.31-2.99)
Household Income			
<$6,000 - $33,999 (reference)	1.00	1.00	1.00
$34,000 - $54,999	1.00	0.60	0.19
		(0.19-1.91)	(0.02-1.96)
$55,000 - $89,999	1.00	0.49	1.36
		(0.14-1.73)	(0.23-8.05)
$90,000 and over	1.00	0.42	2.17
		(0.12-1.54)	(0.33-14.46)
Education			
Less than high school (reference)	1.00	1.00	1.00
High school	1.00	1.69	0.79
		(0.42-6.86)	(0.17-3.67)
More than high school	1.00	1.46	0.25
		(0.43-4.93)	(0.06-1.06)
Employment			
Employed	1.00	1.00	1.00
Student	1.00	1.16	0.54
		(0.36-3.79)	(0.06-4.94)
Retired	1.00	2.26	0.36
		(0.87-5.85)	(0.04-3.63)
Unemployed	1.00	1.06	1.46
		(0.20-5.61)	(0.24-9.05)
K6 Total Score	1.00	1.66	1.18
		(0.39-7.02)	(0.16-8.65)

DEQ Total Score	1.00	1.08 (0.97-1.20)	1.12 (0.97-1.30)

*p<0.05; **p<0.01; ***p<0.001

Table 17. Cross-tabulations and chi-square tests of association examining the relationship between gambling categories and gambling correlates

	Non-problem gambling (n=480)	**Low-risk gambling (n=55)**	**Moderate-risk/Problem gambling (n=29)**	
	n (%)	**n (%)**	**n (%)**	**χ^2 (df)**
Past Year Gambling Activities				
Scratch & Win Tickets				
No	261 (54.4)	18 (32.7)	4 (13.8)	**25.44 (2)*** **
Yes	219 (45.6)	37 (67.3)	25 (86.2)	
Lottery Tickets				
No	45 (9.4)	6 (10.9)	1 (3.4)	1.36 (2)
Yes	433 (90.6)	49 (89.1)	28 (96.6)	
Bingo				
No	433 (90.2)	48 (87.3)	21 (72.4)	**9.04 (2)***
Yes	47 (9.8)	7 (12.7)	8 (27.6)	
VLTs Outside Casino				
No	379 (79.1)	30 (54.5)	7 (25.0)	**52.32 (2)*** **
Yes	100 (20.9)	25 (45.5)	21 (75.0)	
VLTs or Slot Machines in Casino				
No	359 (74.9)	27 (49.1)	12 (41.4)	**28.60 (2)*** **
Yes	120 (25.1)	28 (50.9)	17 (58.6)	
Other Casino Games				
No	429 (89.4)	43 (78.2)	17 (58.6)	**26.27 (2)*** **
Yes	51 (10.6)	12 (21.8)	12 (41.4)	
Past Year Money Spent on Gambling Activities				
$1-50	241 (51.2)	12 (21.8)	4 (14.3)	**82.84 (6)*** **

$51-100	98 (20.8)	11 (20.0)	3 (10.7)	
$101-250	72 (15.3)	12 (21.8)	1 (3.6)	
$251-1000+	60 (12.7)	20 (36.4)	20 (71.4)	
Favorite Gambling Activity				
Scratch & Win				
No	452 (94.2)	49 (89.1)	26 (89.7)	2.79 (2)
Yes	28 (5.8)	6 (10.9)	3 (10.3)	
Lottery Tickets				
No	264 (55.0)	40 (72.7)	28 (96.6)	**24.34 (2)*** **
Yes	216 (45.0)	15 (27.3)	1 (3.4)	
Bingo				
No	462 (96.3)	50 (90.9)	28 (96.6)	3.50 (2)
Yes	18 (3.8)	5 (9.1)	1 (3.4)	
VLTs Outside Casino				
No	457 (95.2)	46 (83.6)	18 (62.1)	**49.25 (2)*** **
Yes	23 (4.8)	9 (16.4)	11 (37.9)	
VLTs or Slot Machines in Casino				
No	452 (94.2)	48 (87.3)	24 (82.8)	**8.34 (2)***
Yes	28 (5.8)	7 (12.7)	5 (17.2)	
Other Casino Games				
No	446 (92.9)	46 (83.6)	25 (86.2)	**6.76 (2)***
Yes	34 (7.1)	9 (16.4)	4 (13.8)	
Favorite Gambling Activity Categories				
Other/No Preference/Multiple Favorites	133 (27.7)	4 (7.3)	4 (13.8)	**89.50 (12)*** **
Scratch & Wins	28 (5.8)	6 (10.9)	3 (10.3)	
Lottery Tickets	216 (45.0)	15 (27.3)	1 (3.4)	
Bingo	18 (3.8)	5 (9.1)	1 (3.4)	
VLTs Outside Casinos	23 (4.8)	9 (16.4)	11 (37.9)	
VLTs or Slot Machines in Casinos	28 (5.8)	7 (12.7)	5 (17.2)	

Other Casino Games	34 (7.1)	9 (16.4)	4 (13.8)	
Who do you usually do your favorite gambling activity with?				
Family/friends/others	168 (47.1)	27 (50.9)	11 (44.0)	4.53 (4)
Alone	145 (40.6)	15 (28.3)	10 (40.0)	
Combination of the above	44 (12.3)	11 (20.8)	4 (16.0)	
Where do you usually do your favorite gambling activity?				
Casino	43 (12.3)	10 (19.6)	9 (36.0)	**64.67 (4)*** **
Neighbourhood bar or restaurant	24 (6.8)	9 (17.6)	12 (48.0)	
Other	284 (80.9)	32 (62.7)	4 (16.0)	
How long do you usually play your favorite gambling activity?				
Less than one hour	433 (90.2)	48 (87.3)	12 (72.4)	**43.29 (2)*** **
More than one hour	47 (9.8)	7 (12.7)	8 (27.6)	

*p<0.05; **p<0.01; ***p<0.001

Table 18. Bivariate multinomial regression models examining the relationship between gambling categories and gambling correlates

	Non-problem gambling (n=480)	**Low-risk gambling (n=55)**	**Moderate-risk/Problem gambling (n=29)**
	OR (95%CI)	**OR (95%CI)**	**OR (95%CI)**
Past Year Gambling Activities			
Scratch & Win Tickets			
No	1.00	1.00	1.00
Yes	1.00	**2.45 (1.36-4.43)****	**7.45 (2.55-21.73)*****
Lottery Tickets			
No	1.00	1.00	1.00
Yes	1.00	0.85 (0.35-2.09)	2.91 (0.39-21.90)
Bingo			
No	1.00	1.00	1.00
Yes	1.00	1.34 (0.58-3.14)	**3.51 (1.47-8.36)****
VLTs Outside Casino			
No	1.00	1.00	1.00
Yes	1.00	**3.16 (1.78-5.61)*****	**11.37 (4.70-27.50)*****
VLTs or Slot Machines in Casino			
No	1.00	1.00	1.00
Yes	1.00	**3.10 (1.76-5.47)*****	**4.24 (1.97-9.13)*****
Other Casino Games			

No	1.00	1.00	1.00
Yes	1.00	**2.35**	**5.94**
		(1.16-4.74)*	**(2.68-13.14)*****
Past Year Money Spent on Gambling Activities			
$1-50	1.00	1.00	1.00
$51-100	1.00	2.25	1.84
		(0.96-5.28)	(0.41-8.39)
$101-250	1.00	**3.35**	0.84
		(1.44-7.77)**	(0.09-7.61)
$251-1000+	1.00	**6.69**	**20.08**
		(3.10-14.45)***	**(6.62-60.95)*****
Favorite Gambling Activity			
Scratch & Win			
No	1.00	1.00	1.00
Yes	1.00	1.98	1.86
		(0.78-5.01)	(0.53-6.53)
Lottery Tickets			
No	1.00	1.00	1.00
Yes	1.00	**0.46**	**0.04**
		(0.25-0.85)*	**(0.01-0.32)****
Bingo			
No	1.00	1.00	1.00
Yes	1.00	2.57	0.92
		(0.91-7.21)	(0.12-7.12)
VLTs Outside Casino			
No	1.00	1.00	1.00
Yes	1.00	**3.89**	**12.14**
		(1.70-8.90)***	**(5.14-28.67)*****

VLTs or Slot Machines in Casino			
No	1.00	1.00	1.00
Yes	1.00	2.35	**3.36**
		(0.98-5.68)	**(1.19-9.48)***
Other Casino Games			
No	1.00	1.00	1.00
Yes	1.00	**2.57**	2.10
		(1.16-5.68)*	(0.69-6.38)
Who do you usually do your favorite gambling activity with?			
Family/friends/others	1.00	1.00	1.00
Alone	1.00	0.64	1.05
		(0.33-1.26)	(0.44-2.55)
Combination of the above	1.00	1.56	1.39
		(0.72-3.38)	(0.42-4.57)
Where do you usually do your favorite gambling activity?			
Casino	1.00	1.00	1.00
Neighbourhood bar or restaurant	1.00	1.61	2.39
		(0.58-4.52)	(0.88-6.48)
Other	1.00	0.49	**0.07**
		(0.22-1.06)	**(0.02-0.23)*****
How long do you usually play your favorite gambling activity?			
Less than one hour	1.00	1.00	1.00
More than one hour	1.00	**3.79**	**8.71**
		(2.09-6.87)***	**(3.51-21.60)*****

*p<0.05; **p<0.01; ***p<0.001

Appendix A. Diagnostic criteria for 312.31 Pathological Gambling according to the Diagnostic and Statistical Manual of Mental Disorders – 4th Edition (Text Revision)

A. Persistent and recurrent maladaptive gambling behavior as indicated by five (or more) or the following:

(1) is preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways with which to gamble)
(2) needs to gamble with increasing amounts of money in order to achieve the desired excitement
(3) has repeated unsuccessful efforts to control, cut back or stop gambling
(4) is restless or irritable when attempting to cut down or stop gambling
(5) gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)
(6) after losing money gambling, often returns another day to get even ("chasing" one's losses)
(7) lies to family members, therapist, or others to conceal the extent of involvement with gambling
(8) has committed illegal acts such as forgery, fraud, theft or embezzlement to finance gambling
(9) has jeopardized or lost a significant relationship, job or education or career opportunity because of gambling
(10) relies on others to provide money to relive a desperate financial situation caused by gambling

B. The gambling behavior is not better accounted for by a Manic Episode

(American Psychiatric Association, 2000)

Appendix B: Coding of ethnicity categories

	Category Endorsed	Frequency	Ethnicity Coding
	British	8	European
	English	42	European
	Scottish	26	European
	Welsh	2	European
	Irish	21	European
	French	22	European
	Ukrainian	54	European
	Italian	13	European
	German	50	European
	Hungarian	2	European
	Polish	11	European
	Jewish	4	Asian
	Scandinavian	11	European
	East/S. East Asian	44	Asian
	Dutch	15	European
	Czech	1	European
	Indian/Pakistani	6	Asian
	Icelandic	11	European
	Russian	1	European
	Metis	17	Aboriginal
	French-Canadian	20	North American
	European & Canadian	20	North American
	European Multiple	32	European
	European & Other	1	European
	Asian & European	1	Asian
	Other & Canadian	9	North American
	Other Multiple	8	Other
	British Multiples	23	European
	British & French	7	European
	British & Canadian	13	North American

	British & European	30	European
	French & Other	1	European
	British & Non-European	1	European
	Canadian	132	North American
	American	2	North American
	Aboriginal Peoples	13	Aboriginal
	African Origins	11	Other
	Austrian	1	European
	Portuguese	8	European
	Spanish	4	European
	Romanian	2	European
	Balkan Origins	2	European
	Caribbean Origins	8	North American
	Japanese	3	Asian
	Greek	3	European
	Arab Origins	2	Asian
	South Asian Origins	3	Asian
	Latin/Cntl/S. America	2	Other
	Chinese	7	Asian
	Other Europe (Single)	1	European
	Total	731	
Missing	Don't Know	4	
	No Response	15	
	Total	19	
	Total	750	

Appendix C: Coding of area of Winnipeg categories

Category Endorsed	Frequency	Neighborhood	Area of Winnipeg Coding
West Broadway	7	Downtown	Central
Spence	7	Downtown	Central
Earl Grey	5	River Heights	South
Daniel McIntyre	7	Downtown	Central
McMillan	7	River Heights	South
River-Osborne	9	River Heights	South
St. Matthews	8	Downtown	Central
Wolseley	7	Downtown	Central
Minto	3	Downtown	Central
Roslyn	4	River Heights	South
Sargent Park	6	Downtown	Central
Armstrong Point	1	Downtown	Central
South Portage	4	Downtown	Central
Broadway-Assiniboine	5	Downtown	Central
Colony	1	Downtown	Central
Portage-Ellice	1	Downtown	Central
Central Park	8	Downtown	Central
Exchange District	1	Downtown	Central
West Wolseley	1	Downtown	Central
Crescentwood	1	River Heights	South
Grant Park	4	River Heights	South
Rockwood	6	River Heights	South
Central River Heights	1	River Heights	South
Mathers	2	River Heights	South
North River Heights	7	River Heights	South
South River Heights	1	River Heights	South
Wellington Crescent	1	River Heights	South
Lord Roberts	5	River Heights	South
Riverview	6	River Heights	South
Polo Park	1	Downtown	Central
King Edward	9	St. James Assiniboia	West
Bruce Park	4	St. James Assiniboia	West
Deer Lodge	6	St. James Assiniboia	West
Birchwood	3	St. James Assiniboia	West
Booth	9	St. James Assiniboia	West
Buchanan	3	St. James Assiniboia	West
Crestview	16	St. James Assiniboia	West
Heritage Park	5	St. James Assiniboia	West
Jameswood	4	St. James Assiniboia	West

Sturgeon Creek	2	St. James Assiniboia	West
Silver Heights	9	St. James Assiniboia	West
Kirkfield	2	St. James Assiniboia	West
Woodhaven	1	St. James Assiniboia	West
Airport	1	St. James Assiniboia	West
Westwood	8	St. James Assiniboia	West
Beaumont	3	Fort Garry	South
Maybank	2	Fort Garry	South
Point Road	1	Fort Garry	South
Varsity View	7	Assiniboine S	South
Wildwood	1	Fort Garry	South
Crescent Park	4	Fort Garry	South
Edgeland	1	Assiniboine S	South
Eric Coy	6	Assiniboine S	South
Marlton	2	Assiniboine S	South
Tuxedo	2	Assiniboine S	South
Ridgedale	2	Assiniboine S	South
River West Park	2	Assiniboine S	South
Roblin Park	1	Assiniboine S	South
Southboine	4	Assiniboine S	South
Vialoux	3	Assiniboine S	South
Westdale	6	Assiniboine S	South
Betsworth	3	Assiniboine S	South
Linden Woods	7	Fort Garry	South
Elmhurst	6	Assiniboine S	South
Pembina Strip	3	Fort Garry	South
South Tuxedo	5	Assiniboine S	South
Whyte Ridge	6	Fort Garry	South
Wilkes South	1	Assiniboine S	South
Linden Ridge	1	Fort Garry	South
Brockville	2	Fort Garry	South
Logan-CPR	1	Downtown	Central
Centennial	2	Downtown	Central
West Alexander	3	Downtown	Central
Weston	7	Inkster	North
South Point Douglas	1	Point Douglas	North
Brooklands	2	Inkster	North
William Whyte	1	Point Douglas	North
Burrows Central	6	Point Douglas	North
Luxton	1	Point Douglas	North
St. John's	8	Point Douglas	North
Burrows-Keewatin	4	Inkster	North
Inkster-Faraday	5	Point Douglas	North
Jefferson	11	Seven Oaks	North
Mynarski	1	Point Douglas	North
Robertson	3	Point Douglas	North

Seven Oaks	2	Seven Oaks	North
Shaughnessy Park	3	Inkster	North
Garden City	10	Seven Oaks	North
The Maples	16	Seven Oaks	North
Margaret Park	2	Seven Oaks	North
Leila-McPhillips Triangle	1	Seven Oaks	North
Mandalay West	1	Seven Oaks	North
Riverbend	6	Seven Oaks	North
Templeton-Sinclair	8	Seven Oaks	North
Tyndall Park	19	Inkster	North
Rosser-Old Kildonan	1	Seven Oaks	North
Amber Trails	2	Seven Oaks	North
Chalmers	10	River East	North
Melrose	1	Transcona	North
Talbot-Grey	4	River East	North
Victoria West	5	Transcona	North
East Elmwood	5	River East	North
Kern Park	2	Transcona	North
Munroe West	2	River East	North
Radisson	3	Transcona	North
Glenelm	2	River East	North
Kildare-Redonda	6	Transcona	North
Kildonan Drive	1	River East	North
Munroe East	12	River East	North
Rossmere-A	13	River East	North
Canterbury Park	2	Transcona	North
Meadows	5	Transcona	North
Mission Gardens	3	Transcona	North
Pequis	1	Transcona	North
River East	6	River East	North
Springfield North	10	River East	North
Springfield South	3	River East	North
Valhalla	5	River East	North
Valley Gardens	11	River East	North
Eaglemere	2	River East	North
Grassie	1	River East	North
Rossmere-B	5	River East	North
North St. Boniface	4	St. Boniface	South
Central St. Boniface	6	St. Boniface	South
Tissot	1	St. Boniface	South
Alpine Place	2	St. Vital	South
Glenwood	7	St. Vital	South
Holden	1	St. Boniface	South
Lavalee	1	St. Vital	South
Maginot	3	St. Boniface	South

Norberry	2	St. Vital	South
Norwood East	5	St. Boniface	South
Norwood West	6	St. Boniface	South
St. George	4	St. Vital	South
Varennes	1	St. Vital	South
Worthington	4	St. Vital	South
Kingston Crescent	1	St. Vital	South
Minnetonka	4	St. Vital	South
Pulberry	9	St. Vital	South
Victoria Crescent	3	St. Vital	South
Vista	2	St. Vital	South
Windsor Park	12	St. Boniface	South
River Park South	17	St. Vital	South
Dakota Crossing	8	St. Vital	South
Stockyards	1	St. Boniface	South
Southland Park	1	St. Boniface	South
St. Vital Perimeter South	1	St. Vital	South
Niakwa Park	1	St. Boniface	South
Niakwa Place	4	St. Boniface	South
Southdale	3	St. Boniface	South
Meadowood	5	St. Vital	South
Royalwood	3	St. Boniface	South
Island Lakes	11	St. Boniface	South
Fort Richmond	11	Fort Garry	South
St. Norbert	1	Fort Garry	South
Cloutier Drive	1	Fort Garry	South
Richmond West	7	Fort Garry	South
Montcalm	6	Fort Garry	South
Richmond Lakes	4	Fort Garry	South
Parc La Salle	3	Fort Garry	South
Waverley Heights	3	Fort Garry	South
University	4	Fort Garry	South
East St. Paul	8	Rural	North
Springfield	1	Rural	North
Tache	2	Rural	South
West St. Paul	4	Rural	North
St. Clements	4	Rural	North
St. Andrews	4	Rural	North
Oak Bluff	2	Rural	South
South Headingley	1	Rural	West
Total	736		
Missing NR	14		
Total	750		

Appendix D. Reconstructed Depressive Experiences Questionnaire

I am now going to read a number of statements concerning <u>personal characteristics or traits</u>. For each item, please tell me to what extent you "Strongly Agree," "Agree," "Disagree," or "Strongly Disagree." Starting with the first item…

1. I often find that I don't live up to my own standards or ideals.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … Don't Know (DK)
9 … No Response (NR)

2. Many times I feel helpless.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

3. There is a considerable difference between how I am now and how I would like to be.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

4. I tend not to be satisfied with what I have.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

5. Often, I feel that I have disappointed others.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

6. No matter how close a relationship between two people is, there is always a large amount of uncertainty and conflict.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

7. I never really feel secure in a close relationship.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

8. Often, I feel threatened by change.

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

9. I am very satisfied with myself and my accomplishments (Reverse coded).

3 … Strongly Agree
2 … Agree
1 … Disagree
0 … Strongly Disagree
8 … DK
9 … NR

(Bagby, Parker, Joffe & Buis, 1994)

Appendix E. Canadian Problem Gambling Index (CPGI)

Note: Items 9-17 are scored summed to give the CPGI score. Items 1-9 and 18-22 measure indicators of gambling involvement or correlates of problem gambling and are not included in the sum.

People have different definitions of gambling. They may bet money and gamble on many different things, including buying lottery tickets, playing bingo or playing card games with their family or friends. The next questions are about gambling activities and experiences. Some of these questions may not apply to you, however they need to be asked of all respondents.

1. In the past 12 months have you spent money on any of the following gambling activities: instant win/scratch tickets, lottery or fund-raising tickets, bingo, VLTs inside a casino, or VLTs in bars or restaurant lounges, or casino games other than coin slots or VLTs – for example, poker, roulette, blackjack?

1 … Yes
2 … No

If respondents answer no to above question, they are not asked any further gambling questions, including the CPGI scored items.

2. In the past 12 months, how often have you bet or spent money on instant win/scratch tickets or daily lottery tickets, for example Keno, Pick 3, Encore, Banco, Extra?

1 … Daily
2 … Between 2 to 6 times a week
3 … About once a week
4 … Between
5 … About once a month
6 … Between 6 to 11 times a year
7 … Between 1 to 5 times a year
8 … Never
97 … NA
98 … DK
99 … NR

3. In the past 12 months, how often have you bet or spent money on lottery tickets, such as 6/49 and Super 7, raffles or fund-raising tickets?

1 … Daily
2 … Between 2 to 6 times a week
3 … About once a week
4 … Between

5 … About once a month
6 … Between 6 to 11 times a year
7 … Between 1 to 5 times a year
8 … Never
97 … NA
98 … DK
99 … NR

4. In the past 12 months, how often have you spent money on Bingo?

1 … Daily
2 … Between 2 to 6 times a week
3 … About once a week
4 … Between
5 … About once a month
6 … Between 6 to 11 times a year
7 … Between 1 to 5 times a year
8 … Never
97 … NA
98 … DK
99 … NR

5. In the past 12 months, how often have you bet or spent money on video lottery terminals – VLTs – outside of casinos?

1 … Daily
2 … Between 2 to 6 times a week
3 … About once a week
4 … Between
5 … About once a month
6 … Between 6 to 11 times a year
7 … Between 1 to 5 times a year
8 … Never
97 … NA
98 … DK
99 … NR

6. In the past 12 months, how often have you bet or spent money on coin slots or VLTs at a casino?

1 … Daily
2 … Between 2 to 6 times a week
3 … About once a week
4 … Between
5 … About once a month
6 … Between 6 to 11 times a year

7 … Between 1 to 5 times a year
8 … Never
97 … NA
98 … DK
99 … NR

7. In the past 12 months, how often have you bet or spent money on casino games other than coin slots or VLTs, for example, poker, roulette, blackjack, Keno?

1 … Daily
2 … Between 2 to 6 times a week
3 … About once a week
4 … Between
5 … About once a month
6 … Between 6 to 11 times a year
7 … Between 1 to 5 times a year
8 … Never
97 … NA
98 … DK
99 … NR

8. In the past 12 months, how much money, not including winnings, did you spend on all of your gambling activities?

1 … Between 1 dollar and 50 dollars
2 … Between 51 dollars and 100 dollars
3 … Between 101 dollars and 250 dollars
4 … Between 251 and 500 dollars
5 … Between 501 and 1000 dollars
6 … More than 100 dollars
97 … NA
98 … DK
99 … NR

The next questions are about gambling attitudes and experiences. Again, all the questions will refer to the past 12 months.

9. In the past 12 months, how often have you needed to gamble with larger amounts of money to get the same feeling of excitement?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … Don't Know (DK)
9 … No Response (NR)

10. In the past 12 months, when you gambled, how often did you go back another day to try and win back the money you lost?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

11. In the past 12 months, how often have you borrowed money or sold anything to get money to gamble?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

12. In the past 12 months, how often have you felt that you might have a problem with gambling?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

13. In the past 12 months, how often has gambling caused you any health problems, including stress or anxiety?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

14. In the past 12 months, how often have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?

3 … Almost Always
2 … Most of the Time

1 … Sometimes
0 … Never
8 … DK
9 … NR

15. In the past 12 months, how often has your gambling caused financial problems for you or your family?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

16. In the past 12 months, how often have you felt guilty about the way you gamble or what happens when you gamble?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

17. In the past 12 months, how often have you bet more than you could really afford to lose?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

18. In the past 12 months, have you gambled as a way of forgetting problems or to feel better when you were depressed?

3 … Almost Always
2 … Most of the Time
1 … Sometimes
0 … Never
8 … DK
9 … NR

19. Thinking about these gambling activities that we have just discussed, which one would you say is your favourite game or activity?

1 … Instant win/scratch tickets or daily lottery tickets; for example, Keno Pick 3, Encore, Banco, Extra
2 … Lottery tickets, such as 6/49 and Super-7 raffles, or fund-raising tickets
3 … Bingo
4 … VLTs outside of casinos
5 … VLTs at a casino
6 … Casino games other than coin slot or VLTs; for example, poker, roulette, blackjack, Keno
7 … Other type of gambling activity (specify)
8 … RESPONDENT HAS NO PREFERENCE
97 … NA
98 … DK

20. When you think of [**INSERT NAME OF FAVOURITE ACTIVITY]**, which you named as your favourite gambling activity, do you usually do it …

1 … Alone
2 … With your spouse or significant other
3 … With other family members
4 … With friends or co-workers
6 … Combination
7 … NA
8 … DK
9 … NR

21. When you think of [**INSERT NAME OF FAVOURITE ACTIVITY]**, on each occasion that you participate in this activity, for how long do you usually play? Would you say …

1 … Less than one hour
2 … 1 – 2 hours
3 … 3 – 5 hours
4 … 6 – 12 hours
5 … More than 12 hours
7 … NA
8 … DK
9 … NR

22. And thinking of [**INSERT NAME OF FAVOURITE ACTIVITY]**, where do you usually do this activity? Would you say …

1 … Neighbourhood bar and restaurant lounge
2 … Casino

3 … At home on the internet
4 … In the USA
5 … Other (specify)
7 … NA
8 … DK
9 … NR

(Ferris & Wynne, 2001a,b)

Appendix F. Kessler-6 Distress Scale

During the last 30 days, about how often did…

1. You feel nervous?

3 … All of the time
2 … Most of the time
1 … A little of the time
0 … None of the time
8 … Don't Know (DK)
9 … No Response (NR)

2. You feel hopeless?

3 … All of the time
2 … Most of the time
1 … A little of the time
0 … None of the time
8 … DK
9 … NR

3. You feel restless or fidgety?

3 … All of the time
2 … Most of the time
1 … A little of the time
0 … None of the time
8 … DK
9 … NR

4. You feel so depressed that nothing could cheer you up?

3 … All of the time
2 … Most of the time
1 … A little of the time
0 … None of the time
8 … DK
9 … NR

5. You feel that everything was an effort?

3 … All of the time
2 … Most of the time
1 … A little of the time

0 … None of the time
8 … DK
9 … NR

6. You feel worthless?

3 … All of the time
2 … Most of the time
1 … A little of the time
0 … None of the time
8 … DK
9 … NR

(Kessler et al., 2002)