CPGI-POPULATION HARM: A SUPPLEMENT TO THE CANADIAN PROBLEM GAMBLING INDEX

Final report submitted to the Canadian Consortium for Gambling Research, September 2011

R. Michael Bagby 1, 2, 3

Lena C. Quilty 2

Chris Watson 2

1 Department of Psychology

University of Toronto Scarborough

2 Clinical Research Department

Centre for Addiction and Mental Health

3 Department of Psychiatry

University of Toronto

Canadian Consortium for Gambling Research

19 MARCH 2012

ccgr

canadian consortium
for gambling research

Table of Contents

List of Tables

Abstract

Objectives: A number of instruments have been developed to assess gambling problems; however, these measures tend to focus only on problems of the individual gambler. The aim of the present study was to develop and test additional items for the Canadian Problem Gambling Index (CPGI; Ferris & Wynne, 2001) to assess the impact of gambling problems at the population level (e.g., family, community, and other environmental levels such as work). An initial pool of items was generated through a systematic review of empirical literature and clinical instrumentation across the domains of gaming, gambling, impulse control, addiction and public health. The psychometric properties of these items were evaluated in a large sample of individuals with varying levels of gambling behaviour.

Method: 317 adults (mean age = 42.13, *SD* = 13.21) were recruited for the present study; 256 participants from across Canada were recruited through an online survey panel (*ResearchNow*; Sample 1), and 61 participants were comprised of individuals who completed a previous gambling study at the Centre for Addiction and Mental Health (Sample 2). Participants were administered the population harm items along with other problem gambling self-report measures (the *CPGI Problem Gambling Severity Index*, the *South Oaks Gambling Screen*, and the *Harmful Consequences Questionnaire*), and measures of disability and quality of life (the *Sheehan Disability Scale* and the *Quality of Life Inventory*). Clinician-derived Axis I and Axis II diagnoses were available for the 61 participants from a previous study. This subset of participants were re-administered the population harm items one week-later to evaluate test-retest reliability.

Results: The 10-item CPGI-Population Harm demonstrated good internal consistency and test-retest reliability, and a unifactorial structure. Internal consistency was high; however, one index was suggestive of item redundancy. One-week test-retest reliability was evaluated in Sample 2 and was high. Evidence of convergent and discriminant validity of the CPGI-Population Harm was demonstrated by a pattern of correlations with the other self-report measures.

Discussion and Implications: The CPGI-Population Harm was found to possess desirable levels of reliability and validity in a heterogeneous sample of adults with varying levels of gambling pathology. This instrument appears to be an efficient tool for use in future epidemiological and clinical research to assess gambling-related harm to family members, romantic partners, friends, the workplace and the community. Future examination of the CPGI-Population Harm utilizing different samples and different research methodologies (e.g., multi-trait multi-method designs and item response theory analysis) is encouraged.

Introduction

Gambling difficulties often cause substantial harm within the population, not only to individual gamblers but also to significant others such as romantic partners, family members, friends and colleagues, as well as the community at large (e.g., Afifi et al., 2010; Fong et al., 2010; Kalischuk et al., 2006; Korman et al., 2008). A number of self-report measures have been developed to assess the severity of gambling difficulties (e.g., Ben-Tovim et al., 2001; Ferris & Wynne, 2001; Lesieur & Blume, 1987). However, a limitation of existing measures is their focus on the problems of the individual gambler and a relative neglect of the potential harm to others. The present study developed and tested additional items for the Canadian Problem Gambling Index (CPGI; Ferris & Wynne, 2001) in order to provide an evaluation of the impact of gambling at the family, community, and other environmental levels (e.g., work productivity). The aim of this study was to strengthen the utility of the CPGI in the evaluation of population harm associated with problem gambling.

Literature Review

The contemporary assessment of gambling difficulties has been shaped predominantly by two perspectives: the medical or disease model and the public health or social model. The medical model defines pathological gambling as a disorder of impulse control characterized by symptoms such as a preoccupation with gambling, a need to gamble with escalating sums of money, and unsuccessful attempts to reduce or manage gambling (American Psychiatric Association, 2000). The South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) is a self-report measure specifically designed to assess pathological gambling severity in a clinical context and is the most widely used measure of gambling difficulties (Abbott & Volberg, 2006; Gambino & Lesieur, 2006).

In contrast to the medical model of gambling, the public health model defines problem gambling more broadly as gambling behaviour that is harmful to an individual gambler, his or her family, or the community at large (Dickerson et al., 1997). The CPGI is a self-report instrument designed to assess the harmful consequences of gambling behaviour in the general population, not only for the individual gambler, but also for others in his or her social network and the larger community (Ferris & Wynne, 2001). Included in the CPGI is the 9-item Problem Gambling Severity Index (PGSI), which is used to evaluate the severity level of gambling difficulties.

A number of concerns have been raised regarding the item content of the CPGI (e.g., McMillen & Wenzel, 2006; Svetieva & Walker, 2008). In particular, the majority of the CPGI items were adapted from the SOGS or from pathological gambling diagnostic criteria and thus reflect symptom-based features rather the broad gambling-related harm to the individual and society emphasized by the public health model. As such, the CPGI in its current form does not adequately assess gambling-related harm to society (Abbott & Volberg, 2006). Indeed, a recent content analysis of the CPGI revealed that the broader social consequences of individual gambling difficulties were evaluated through only one item (McMillen & Wenzel, 2006).

Recent empirical work has highlighted the need for gambling research focused on the development of an assessment instrument that evaluates the impact of gambling on partners, children, and other family members (Rogers et al., 2009). As outlined by Korn and Shaffer (1999), a public health model includes the interactions between a "host" (the individual gambler), "agent" (the gambling activity), "vector" (the money spent), and "environment" (the family, social, and cultural context). Although assessment instruments such as the CPGI and SOGS provide valuable information regarding individual gamblers, their behaviours and monetary losses, there are currently no gambling instruments that adequately assess the adverse effects of gambling on the environment – including family, friends, neighbours, colleagues, and communities, across health, social, economic, and cultural domains (McMillen & Wenzel, 2006). Thus, there is a need to develop and test new items for addition to the CPGI to allow for evaluation of the harmful effects of gambling that extend beyond the individual gambler.

To address the limitations of the CPGI, we developed and tested the psychometric properties of a supplement to this instrument (CPGI-Population Harm) in a large sample of individuals with varying levels of gambling behaviour. We first developed a pool of additional CPGI items that assess the harmful effects of gambling beyond the individual gambler (Appendix A). To develop the items, we conducted a systematic review of empirical literature and clinical instrumentation across the domains of gaming, gambling, impulse control, addiction and public health. In addition, we consulted with multidisciplinary staff engaged in gambling-related research, clinical practice and policy development. The original and additional CPGI items were then administered to adult participants along with other self-report measures. Study participants were recruited from across Canada via an online panel survey (*ResearchNow*), and from a current large-scale ongoing research investigation of personality and gambling in a community sample with a broad range of gambling involvement (including nongamblers) conducted at the Centre for Addiction and Mental Health. The inclusion of these two samples ensured a broad range of demographic features, including age, gender, and region, and a broad range of well-characterized clinical features, gambling behaviour and difficulties. The psychometric properties of the population harm items were evaluated using a classical test theory approach (Clark & Watson, 1995; Netemeyer et al., 2003). Based on data analyses, the initial pool of items was refined in order to produce a supplement to the CPGI (CPGI-Population Harm; Appendices B and C) for the purpose of assessing population harm associated with gambling.

Study Objectives

The present research investigation aimed to answer the following questions:

(1) What forms of gambling-related harm to family, community, and environment are most meaningful to assess from a multidisciplinary, public health perspective (i.e., what are useful items to add to the CPGI)?

(2) What are the characteristics of a supplement to the CPGI that incorporates items evaluating this broad gambling-related harm (i.e., what are the psychometric properties of the CPGI-Population Harm)?

Research Design

An initial set of items reflecting population harm from gambling to supplement the CPGI was developed based on extensive literature review and expert consultation (Appendix A). This item set was subsequently revised based on classical test theory to produce a final set of items to be added to the CPGI (CPGI-Population Harm; Appendices B and C). The internal reliability and one week test-retest reliability of the CPGI-Population Harm was evaluated, as well as its factorial validity and construct validity. Convergent and discriminant validity were evaluated through an examination of the association between the CPGI-Population Harm and other related measures.

Method

Participants. A total of 317 participants completed study protocol. Two subsamples were collected to ensure variation in demographic features and gambling behaviour in the total sample. Sample 1 consisted of 256 adults (126 men, 130 women) from *ResearchNow*, an online survey panel of respondents across Canada. Participants were selected to be nationally representative in terms of age (ranging from 18 to 65 years; mean age = 42.63 years [SD = 13.23]) and region of residence (37% Ontario, 23% Quebec, 30% Western provinces, 10% Atlantic provinces). Sample 2 consisted of 61 adults (34 men, 27 women) who previously participated in a clinical research study investigating the association between personality and gambling at the Centre for Addiction and Mental Health (CAMH) in Toronto, Canada. Participants ranged in age from 20 to 63 (mean age = 40.03 years [SD = 13.03]) and resided in Ontario.

Item Development. Item content was generated based on an extensive review of empirical literature and clinical instrumentation across the domains of gambling and gaming, impulse control and addiction, and public health. Empirical literature pertaining to identified harm to others and the community associated with diverse forms of impulsive and addictive behaviour (e.g., drug and alcohol use) was obtained from a review of PsycINFO and Medline keyword searches including "public health model," "social model," "population harm," "addiction," and "gambling." Articles published in English over the past 15 years were considered. This review identified the following domains of harm to be of theoretical and clinical importance: family, romantic partners, friends, work, and community (c.f. Nutt et al., 2010; Room et al., 2010). In order to produce a measure distinct from existing measures of pathological gambling diagnostic criteria and individual harm to gamblers, legal and financial consequences of gambling were not included in the CPGI-Population Harm. Items were thus generated to assess gambling-related harm to family members, romantic partners, friends, the workplace and the community, based upon this review as well as adapted from existing, related measures (e.g., Alvarez et al., 2006; Eadington, 2003; Fong et al., 2010; Giesbrecht et al., 2010; Gmel et al., 2000; Rehm et al., 1997; Room, 2000; Saunders et al., 1993; Selin & Room, 2007). Items were largely adapted from existing measures relevant to alcohol-related harm, or generated to ensure a broad sampling of the identified domains.

The Problem Gambling Institute of Ontario (PGIO), a multidisciplinary organization of CAMH staff expert in the areas of clinical practice, policy, prevention, and education, was further consulted for recommendations regarding scale format and content. The purpose of the

current study was presented at the monthly meeting of the PGIO for discussion and feedback, where it was determined that (1) the CPGI-Population Harm should be comparable to the CPGI PGSI in terms of item scaling and scale length, to ensure its utility within both epidemiological and clinical research, and (2) the CPGI-Population Harm initial item pool should include both items with direct reference to gambling and those without (e.g., "Has your gambling caused problems for your family?" versus "Have you experienced a loss of productivity at work/school?"), as respondent insight into the impact of their gambling behaviour is likely to be variable and a barrier to the accurate assessment of population harm. Although items without a direct reference to gambling may assess difficulties arising from a variety of sources in addition to or instead of gambling, the unanimous feedback of the PGIO was that items not requiring respondents to be aware of and willing to concede the impact of their gambling would be beneficial to ensure the correct and valid assessment of gambling-related harm. Items would include respondent perceptions of harm (with and without direct reference to gambling) as well as behavioural indicators of the same, to address this issue to the greatest degree possible.

Items were reviewed for consistency, clarity of the wording, and content redundancy by each investigator. The final pool of 39 items was then administered to study participants with other self-report measures described below (see Appendix A).

Measures

Canadian Problem Gambling Questionnaire (CPGI). The CPGI is a 31-item self-report measure for assessing problem gambling (Ferris & Wynne, 2001). The CPGI includes scales assessing gambling difficulties as well as to indicate gambling behaviour and correlates. A subset of nine items known as the Problem Gambling Severity Index (PGSI) provides a quantitative index of problem gambling, and can be used to differentiate between non-problem gambling, low and moderate risk gambling, and problem gamblers. The PGSI total score ranges from 0 to 27 and a cut-point of eight or more is used to generate a prevalence estimate for problem gambling. Recently, a cut-point of three of more has been utilized to more broadly classify problem gambling (Cox et al., 2005; McIntyre et al., 2007). The PGSI has demonstrated high levels of internal consistency reliability and validity (Ferris & Wynne, 2001). Participants in the present study completed only the PGSI section of the CPGI. The internal consistency of the PGSI in this sample was high ($\alpha = .95$).

South Oaks Gambling Screen (SOGS). The SOGS is a 16-item self-report screening instrument for pathological gambling that has demonstrated strong construct validity (Gambino & Lesieur, 2006; Lesieur & Blume, 1987). The SOGS was designed to assess gambling pathology in a clinical context, and is the most frequently used measure of gambling worldwide (Abbott & Volberg, 2006; Gambino & Lesieur, 2006). The total score ranges from 0 to 20, and a cut-point of five is used to differentiate probable pathological gamblers from non-pathological gamblers. The prevalence rates for problem gambling produced by the SOGS are congruent with the rates obtained by the CPGI (Ferris & Wynne, 2001). The internal consistency of the SOGS in this sample was high ($\alpha = .90$).

Harmful Consequences Q*uestionnaire* (HCQ). The HCQ is a 12-item self-report measure of gambling-related harm to self and others (Turner & Liu, 1999). Individuals rate the extent to

which gambling causes problems in various areas of functioning (e.g., physical and mental health, social relationships, work, finances). The total score ranges from 0 to 30. The psychometric properties of the HCQ have received limited empirical attention; however, this measure has been successfully utilized in recent gambling research (Turner et al., 2006; Turner et al., 2008). The internal consistency of the HCQ in this sample was high (α = .98).

Sheehan Disability Scale (SDS). The SDS is a brief self-report instrument of impairment secondary to general emotional difficulties in three domains: work/school, social life/leisure activities, and family life/home responsibilities (Sheehan, 1983). Individuals are asked to rate the extent to which each domain is impaired by emotional symptoms on a 10-point rating scale (from 0 = "not at all" to 10 = "extremely"). The three items can be summed into a single dimensional measure of global functional impairment that ranges from 0 (unimpaired) to 30 (impaired). Several studies have found the SDS to possess adequate reliability and validity (e.g., Leon et al., 1997; Olfson et al., 1997; Sheehan et al., 1996). The internal consistency of the SDS in this sample was high (α = .89).

Quality of Life Inventory (QOLI). The QOLI is a 32-item self-report measure of life satisfaction across 16 domains (Frisch et al., 1992; Frisch, 1994). Respondents rate the perceived importance of each domain to their overall happiness (0 = "not important" to 2 = "very important") and the degree of satisfaction they have with that particular domain (-3 = "very dissatisfied" to $+3$ = "very satisfied"). Overall quality of life is calculated by multiplying perceived importance by satisfaction within each domain, and summing these product terms to obtain an overall score that ranges from -96 to +96. Numerous studies have determined that the QOLI possesses high levels of reliability and validity in various samples (e.g., Frisch et al., 1992; Frisch et al., 2005). The internal consistency of the product terms in this sample was high (α = .89).

The following diagnostic information was available only for Sample 2:

Structured Clinical Interview for DSM-IV, Axis I Disorders, Patient version (SCID-I/P). Current and lifetime psychopathology were assessed using the SCID-I/P (First et al., 1995). The SCID-I/P is a widely used semi-structured interview that yields data on current and past DSM-IV Axis I disorders. The SCID-I/P possesses good reliability and validity and is considered the gold standard in determining the accuracy of DSM-IV diagnoses (e.g., Shear et al., 2000). Pathological gambling was assessed via a similarly structured interview-based assessment of DSM-IV pathological gambling symptoms.

Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV). Axis II personality symptoms and disorders were assessed using the DIPD-IV (Zanarini et al.,1996). The DIPD-IV has been demonstrated to possess good inter-rater and test-retest reliability (Zanarini et al., 2000).

Multi-source Assessment of Personality Pathology (MAPP). The MAPP is a 105-item measure of Axis II personality symptoms that is available in two versions: self-report and peer-report (Oltmanns & Turkheimer, 2006). Eighty-one items assess DSM–IV personality disorder diagnostic criteria, and the remaining 24 items describe other personality characteristics, most of

which are positive. The self-report version of the MAPP has evidenced good test–retest reliability (Okada & Oltmanns, 2009) and adequate internal consistency reliability was recently shown for the majority of Axis II disorders when spousal ratings were used (South et al., 2011). For the present study, information obtained from the peer-report version of the MAPP was utilized. Family members or friends of over one year's acquaintance completed this measure.

Procedure

Sample 1 participants were active members of *ResearchNow*, a Canadian panel of adults recruited from a variety of sources (e.g., email lists, banner ads). This panel is consulted for research purposes only (rather than marketing) and for a modest incentive. This panel is further carefully managed to ensure that members are not overly contacted and that membership is frequently refreshed. Sample 2 participants were previously involved in a gambling study at the CAMH who consented to be contacted for future research. Participants were contacted by email and informed of the study. Interested participants provided informed consent and completed the measures described above online. Sample 2 was contacted one week following participation, and completed the CPGI-Population Harm items on a second occasion to evaluate test-retest reliability. All participants were informed of the purpose of the present study, and given contact information should they have any questions or comments. Participants received a $10 honorarium for their participation in the study.

Data Analyses

Item Selection. The psychometric properties of the CPGI-Population Harm were evaluated using a classical test theory approach. Following classical test construction theory (Clark & Watson, 1995; Netemeyer et al., 2003), we utilized Internal Scale and Item Reliability Analysis (ISIRA). ISIRA analyses (i.e., scale internal consistency and item-based statistics) that were conducted include Cronbach's alpha (α), the corrected item-to-total correlation (CITC), and the average corrected item-to-total correlation (AIC). Item variances and frequency of response option distribution were also examined. Item analysis and selection proceeded in the following fashion: First, item variances and response option distributions were examined. Items with clearly skewed distributions were explored (e.g., eliminated, transformed). Next, exploratory factor analysis was conducted to identify relevant factors. CITCs were calculated for items on the identified factors and then the item-factor loadings were examined for each item with the total score from its corresponding factor. The items with the factor loadings > .30 and CITCs > .25 were retained. The goal of this set of analyses was to maximize the internal consistency for each of the factors. A final factor analysis was conducted to confirm the structure of the final scale and so the correctness of calculating and interpreting a total versus subscale scores.

For both factor analyses, parallel analysis was utilized to determine how many factors to extract (Horn, 1965). Parallel analysis involves the comparison of eigenvalues from a factor analysis of the actual data with eigenvalues from a factor analysis of a random dataset; the number of factors to retain is based on the number of actual data eigenvalues greater in size than random data eigenvalues. This empirical method has been demonstrated to be superior to other retention guidelines (Zwick & Velicer, 1986). Due to the nonnormal distributional properties of the CPGI-Population Harm items, 1000 randomly generated permutations of the existing data set

were utilized, as this method results in random datasets with the same distributional properties as the actual data. Consistent with the recommendations of O'Connor (2000), we compared actual data eigenvalues with the 95th percentile eigenvalues in the random data. Factor analyses were then conducted within *MPlus*, utilizing unweighted least squares estimation (Muthén & Muthén, 1998-2006).

Internal Consistency. For the CPGI-Population Harm items that were retained following the above procedure, CITCs and AICs for the full set of items and the identified factors were calculated and examined. Cronbach's α coefficients were also computed for the total scale and each factor. Items with CITCs >.25 with their corresponding factor and > .10 with non-corresponding factor scores were retained. These figures are based on the ranges recommended by Clark and Watson (1995). The goal is to obtain factors with a Cronbach's α > .70 and an AIC of > .40 (but < .50, which reflects item content redundancy) and a total scale Cronbach's α of > .80 and AICs > .15 but < .50, which reflects item redundancy.

Test-Retest Reliability. We examined the test-retest reliability of the CPGI-Population Harm across one week within the participants recruited in the laboratory ($n = 61$). The intraclass coefficient (ICC) was used to assess test-retest reliability, with estimates > .60 considered to represent adequate test-retest reliability (Landis & Koch, 1977).

Convergent and Discriminant Validity. Another approach to assessing the validity of a newly developed scale is to examine whether it correlates significantly with measures of related constructs. To evaluate convergent validity, we examined the association between the CPGI-Population Harm and the PGSI, the SOGS and the HCQ using Pearson's product-moment correlation coefficients. To evaluate discriminant validity, Pearson's correlations between the CPGI-Population Harm and the SDS and QOLI were evaluated.

Results

Sample Descriptives. Means and standard deviations of the PGSI, SOGS, HCQ, SDS, and QOLI are displayed in Table 1. Age of first gambling experience, average number of days gambled per month over the past 12 months, and average amount of money spent on gambling per month over the past 12 months are also displayed. Sample differences were evaluated via *t*-tests and supplemented with effect size estimates (i.e., Cohen's *d*), with *d* values of .10, .30, .50, reflecting small, medium and large effect sizes, respectively. Sample 2 endorsed greater gambling frequency and expenditures, as well as greater gambling pathology and associated harm. Samples 1 and 2 did not differ significantly in age of first gambling experience, and the two samples endorsed comparable levels of quality of life. Of note, Sample 1 and 2 did not differ significantly in gender ($\chi^2 = .84$, $p = .39$) or age ($t = 1.38$, $p = .17$, $d = .20$).

In Sample 2, 10% of participants met full DSM-IV criteria for pathological gambling in the past year according to structured interview; 73% of participants demonstrated one or more clinically significant symptoms of pathological gambling in the past year. Axis I and II information was available for Sample 2 only. Co-occurring Axis I diagnoses as determined by the SCID-I/P were present in 8 participants (mood disorders $n = 5$, psychotic disorders $n = 1$, anxiety disorders $n = 5$, somatoform disorders $n = 1$; 4 participants met criteria for more than one

co-occurring disorder). Co-occurring Axis II personality disorder diagnoses as determined by the DIPD-IV were present in 6 participants (antisocial $n = 1$, borderline $n = 1$, histrionic $n = 2$, narcissistic $n = 1$, avoidant $n = 3$, obsessive-compulsive $n = 1$; 2 participants met criteria for more than one co-occurring disorder). Co-occurring Axis II personality disorder diagnoses as determined by the MAPP were present in 38 participants (paranoid $n = 13$, schizoid $n = 18$, schizotypal $n = 3$, antisocial $n = 14$, borderline $n = 4$, histrionic $n = 9$, narcissistic $n = 12$, avoidant $n = 10$, dependent $n = 7$, obsessive-compulsive $n = 17$; 24 participants met criteria for more than one co-occurring disorder).

Item Selection. Items were systematically removed from consideration on the basis of rational and empirical grounds (e.g., item distribution properties and some participant feedback, $n=3$):

1. Items 5, 9, 17, 19, and 30 were deleted due to participant feedback that these items were interpreted to address harm to the individual gambler (e.g., associated impairment) rather than harm to the important others in question.
2. Items 6, 27, 29, 33, and 37 were deleted due to participant feedback that these items were ambiguous. Specifically, the unspecified nature of the "others" whose perspective is requested was described as unclear.
3. Items 1, 11, 14, 18, and 20 were deleted due to distributional properties and participant feedback that these items were ambiguous.

The 24 items remaining after initial item deletion have a 2-factor structure according to a parallel analysis. The first three eigenvalues from the actual data were 14.36, 2.10 and 1.25; the corresponding first three 95th percentile random data eigenvalues were 1.92, 1.74, and 1.63. The factor loadings derived from an exploratory factor analysis of these 24 items can be found in Table 2. Factor 1 and 2 consist of gambling-related harm versus non-gambling-related harm; these factors were correlated at .63.

As item structure appeared to reflect item format (i.e., presence or absence of direct reference to gambling) rather than domain of harm, these factors were not interpreted to represent substantive domains of population harm. Item endorsement and skew were reviewed and utilized to direct the choice of two items per domain of harm, including both a gambling-related and a non-gambling-related indicator of harm. The CPGI-Population Harm finally included 10 items: 3, 4, 7, 8, 10, 23, 28, 34, 35, and 36. The CPGI-Population Harm is thus comparable to the PGSI in scale length (10 versus nine items) and item format (4-point Likert); however item anchors reflect degree of agreement rather than frequency. These alternate response anchors were determined to be more appropriate, as a proportion of items refer to difficulties that are not discrete events and therefore relatively difficult to judge in terms of frequency.

The CPGI-Population Harm has a unifactorial structure according to a parallel analysis, utilizing 1000 randomly generated permutations of the existing data set. The first two eigenvalues from the actual data were 6.13 and 1.00; the corresponding first two 95th percentile random data eigenvalues were 1.52 and 1.35. The factor loadings derived from an exploratory factor analysis, specifying one factor and utilizing unweighted least squares estimation can be found in Table 3.

The CPGI-Population Harm descriptive statistics for the current sample are: total M = 2.72, SD = 4.72; Sample 1 M = 2.25, SD = 4.20; Sample 2 M = 4.77, SD = 5.91. Similar to the other gambling measures, the mean CPGI-Population Harm total score was significantly greater in Sample 2 as compared to Sample 1, t = 3.11, p < .01, d = .55. CPGI-Population Harm total scores were higher in males (M = 3.43, SD = 5.47) as compared to females (M = 2.10, SD = 3.64; t = 2.44, p = .02, d = .28), and were modestly negatively correlated with age, r = -.16, p < .01.

Internal Consistency. Item CITCs are displayed in Table 4. CPGI-Population Harm item CITCs were all > .25. CPGI-Population Harm total scale coefficient α was .92, greater than .70 and so providing further evidence for the internal consistency of the CPGI-Population Harm. CPGI-Population Harm item AIC was .56, greater than .15 but also .50, indicative of potential item redundancy.

Test-Retest Reliability. Test-retest reliability estimates are displayed in Table 5. The CPGI-Population Harm total scale score and item scores were all above established cut-offs, indicative of adequate test-retest reliability.

Convergent and Discriminant Validity. The CPGI-Population Harm was strongly correlated with each gambling measure (Table 6): PGSI r = .77, p < .01; SOGS r = .65, p < .01; HCQ r = .76, p < .01. The CPGI-Population Harm was also significantly associated with quality of life and disability measures, but to a lesser degree: QOLI r = -.35, p < .01, SDS r = .56, p < .01. The CPGI-Population Harm was also significantly associated with the average number of days participants gambled per month (r = .17, p < .01) and the average amount of money participants gambled per month (r = .19, p < .01).

Psychometric Properties of the CPGI-Population Harm (5 Item). In consideration of the fact that the alternate sources of harm that may contribute to the indirect items of the CPGI-Population Harm may prove a significant confound for some clinicians and researchers, we provide below the psychometric properties of a truncated 5-item scale including only items with a direct reference to gambling. Thus, clinicians and researchers may choose between these two scales based upon their own needs.

The CPGI-Population Harm was correlated with the CPGI-Population Harm (5 Item) at r = .93, p < .01. Similar to the full scale, the CPGI-Population Harm (5 Item) has a unifactorial structure: the first two eigenvalues from the actual data were 4.73 and .57; the corresponding first two 95th percentile random data eigenvalues were 1.27 and 1.15. Factor loadings were .89 (item 3), .94 (item 4), .92 (item 7), .69 (item 10), and .82 (item 23).

The CPGI-Population Harm (5 Item) descriptive statistics for the current sample are: total M = 1.11, SD = 2.61; Sample 1 M = .88, SD = 2.32; Sample 2 M = 1.83, SD = 3.29. Again, the mean CPGI-Population Harm (5 Item) total score was significantly greater in Sample 2 as compared to Sample 1, t = 2.06, p = .04, d = .37. CPGI-Population Harm total scores were higher in males (M = 1.45, SD = 3.04) as compared to females (M = .64, SD = 1.77; t = 2.58, p = .01, d = .31), and were modestly negatively correlated with age, r = -.15, p < .01.

The truncated version of the CPGI-Population Harm demonstrated adequate levels of internal reliability and one-week test-retest stability. CPGI-Population Harm (5 Item) CITCs were all > .67. Further, CPGI-Population Harm (5 Item) coefficient α was .92, and AIC was .72. Finally, CPGI-Population Harm (5 Item) test-retest ICC was .91.

The CPGI-Population Harm (5 Item) demonstrated similar convergent and discriminant validity to the full scale as well: PGSI r = .81, p < .01, SOGS r = .69, p < .01, HCQ r = .80, p < .01, QOLI r = -.24, p < .01, SDS r = .47, p < .01, Days/Month r = .21, p < .01, Money/Month r = .22, p < .01, and First Gambled r = -.07, p = .27.

Discussion

The purpose of the present study was to develop a supplement to the CPGI in order to better assess gambling-related harm to others. A review of the literature highlighted the centrality of gambling-related harm to family members, romantic partners, friends, the workplace, and the community within such a supplement. Expert consultation suggested that scale brevity and item format (i.e. a 4-point Likert scale) should be prioritized, in order to ensure its broad applicability. Respondent insight into the harm resulting from their gambling behaviour was repeatedly cited as a principal barrier to accurate assessment by experts in the field. Items were therefore generated to include items with and without reference to gambling specifically, and with appraisals of harm as well as behavioural indicators of the same. The newly developed CPGI-Population Harm provides an efficient tool for use in epidemiological and clinical research to provide an assay of harm resulting from gambling that extends beyond the individual gambler.

The internal consistency of the CPGI-Population Harm was highly satisfactory; however, one index was suggestive of item redundancy. Some degree of item redundancy is expected in this measure, as each domain of harm is represented by both a direct and indirect item. The test-retest reliability of the CPGI-Population Harm total scale and item scores were also high, suggesting that the CPGI-Population Harm is reliable across short durations (i.e., one week). The CPGI-Population Harm demonstrated a unifactorial structure, and strong associations with measures of gambling difficulties and pathology, and harmful consequences of gambling to gamblers and others were observed. The CPGI-Population Harm also demonstrated significant, but lesser, associations with gambling behaviours (monthly time and money expenditures, age of onset) as well as general measures of quality of life and disability. Finally, the CPGI-Population Harm was elevated in males as compared to females, and was modestly negatively associated with age. Although these results require replication, they provide initial evidence for the reliability and validity of the CPGI-Population Harm.

The CPGI was developed from a public health perspective, within which gambling-related harm is conceptualized broadly both to the gambler and to society. However, the commonly used PGSI consists largely of pathological gambling symptoms more reminiscent of the medical model. As both the widely used PGSI and SOGS include items assessing financial and legal consequences of gambling, the current project prioritized the assessment of gambling-related harm to family members, romantic partners, friends, the workplace and the community. Although a variety of measures include items assessing population harm secondary to alcohol use, such measures and items are relatively rare within gaming and gambling. The measures that

do exist within the gambling field have various features that may reduce their utility to some researchers. Namely, measures consist of (1) items assessing harm to the individual gamblers and to others (e.g., the HCQ); (2) items assessing diagnostic criteria of pathological gambling (e.g., PGSI); and/or (3) item format or scale length rendering use within epidemiological studies limited (e.g., Ladouceur et al., 1994). The CPGI-Population Harm is thus unique in its content and format, and specifically geared to be of broad utility.

The initial item pool of the CPGI-Population Harm scale incorporated items without direct reference to gambling due to unanimous expert feedback that respondent insight would form a major barrier to accurate assessment. Items without direct reference to gambling, however, may assess difficulties arising from a variety of sources. The empirical association of these items with measures of problem or pathological gambling as well as gambling behaviour supported their inclusion in the final measure. It may be preferable for investigators to include other sources of these difficulties to preclude any confounds critical to their specific research questions and to ensure the CPGI-Population Harm predicts over and above these sources. We provide, however, the psychometric properties of a truncated version of the CPGI-Population Harm, with only gambling-related items, should this method be preferable. Psychometric properties were largely similar within this version of the scale; item redundancy was elevated, however.

One strength of the current investigation is the participant sample. The sample size in the present study was well above 200, a conventional minimum sample size required for test construction studies (Netemeyer et al., 2003; Nunnally & Bernstein, 1994). Further, the sample included adults with a broad range of demographic features, including age, gender, and region, and a broad range of gambling behaviour and difficulties. Sample 1 was comprised of adults across Canada who agreed to be contacted to complete a wide range of online surveys. In contrast, Sample 2 was comprised of adults from the Greater Toronto Area who responded to print advertisements for a study of "personality and gambling." Participants in Sample 2 may therefore have a particular interest in gambling, as reflected by their greater gambling involvement and pathology. Sample 2 was particularly well-characterized in terms of clinical features. Of note, the increased prevalence of personality disorder diagnoses in Sample 2 as assessed by the MAPP as compared to the DIPD-IV is consistent with the broader literature on personality disorders, in which questionnaire instruments yield higher rates of disorder than interviewer-rated instruments (Zimmerman, 1994). Further, this discrepancy may reflect respondent effects, as peers may have a lower threshold for rating items of personality pathology than a trained clinical interviewer. In sum, it is necessary to develop an instrument on samples of sufficient size that coincide with the population for its intended use. This large, heterogeneous sample allowed for sufficient variability across the range of possible item scores.

The current study utilized web-based survey administration. Online administration of questionnaires has been empirically demonstrated not to decrease the reliability or validity of measures administered (Risko, Quilty, & Oakman, 2006). Further, clinician-rated Axis I and II pathology was available for Sample 2, who had recently participated in clinical research. Nevertheless, the current results require replication and would benefit from multi-trait multi-method designs (Campbell & Fiske, 1959). Item response theory perspectives would further complement these results (Embretson, Reise, 2000).

Study Implications and Limitations

The current study has some limitations that should be acknowledged. First, some demographic information (e.g., ethnicity, marital status) and clinical features (e.g., family psychiatric history, treatment history) were not obtained, which precluded investigation of the covariation of these features with gambling harms to others. Second, other analytic perspectives, such as item response theory, may provide further information regarding item features. Third, the CPGI-Population Harm was administered with the PGSI in the current investigation and did not specify an alternate time frame for respondents. It is recommended that researchers utilize a 12-month time frame similar to the PGSI. Alternate time frames may be preferable for some research questions and designs; it was beyond the scope of the current study to evaluate different instructional sets for the CPGI-Population Harm.

Changes to the Original Protocol

Several unforeseen circumstances required some modifications to the original research proposal. First, the original proposal included a 31-item measure developed by Ladouceur et al. (1994) to evaluate the social and economic costs of gambling. This measure was described as "available upon request" by Dr. Ladouceur and his colleagues; however, Dr. Ladouceur and his co-authors did not reply to repeated requests, and queries to the journal in which it was published and the gambling research community at large were not been successful in its recovery. At the recommendation of Dr. Nigel Turner and with the approval of the CPGI Refinement Oversight Committee, we utilized the Harmful Consequences Questionnaire instead. Second, the original proposal included a final sample size of 300, consisting of 225 panel respondents (i.e., Sample 1) and 75 previous participants in a clinical research protocol at CAMH (i.e., Sample 2). Due to the time required to finalize the research contract, the data collection period was truncated. There was an unanticipated low response rate in Sample 2 during that time; we thus initially collected additional participants in Sample 1 to ensure adequate power. As the CPGI Refinement Oversight Committee granted approval for the extension of the data collection period for an additional four weeks, we subsequently recruited additional participants for Sample 2. This solution did not result in the final sample sizes intended; however, the results of test-retest analyses clearly indicate that observed power was sufficient to detect effects.

References

Abbott, M. W., & Volberg, R. A. (2006). The measurement of adult problem and pathological gambling. *International Gambling Studies, 6,* 175-200.

Afifi, T. O., Brownridge, D. A., MacMillan, H., & Sareen, J. (2010). The relationship of gambling to intimate partner violence and child maltreatment in a nationally representative sample. *Journal of Psychiatric Research, 44,* 331-337.

Álvarez, F. J., Fierro, I., & del Río, M. (2006). Alcohol-related social consequences in Castille and Leon, Spain. *Alcoholism: Clinical and Experimental Research, 30*, 656-664.

American Psychiatric Association (2000). DSM IV-TR: *Diagnostic and statistical manual of mental disorders-Text revision (Fourth ed.).* Washington, D.C.: Author.

Ben-Tovim, D., Esterman, A., Tolchard, B., & Battersby, M. (2001). *The Victorian Gambling Screen.* Report prepared for the Victorian Casino and Gaming Authority. Gambling Research Panel, Melbourne.

Campbell, D.T., & Fiske, D.W. (1959). Convergent and discriminant validation by the multitrait multimethod matrix. *Psychological Bulletin*, *56*, 81-105.

Clark, L.A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7,* 309-319.

Cox, B. J., Yu, N., Afifi, T. O., & Ladouceur, R. (2005). A national survey of gambling problems in Canada. *Canadian Journal of Psychiatry, 50,* 213-217.

Dickerson M., McMillen J., Hallebone E., Volberg R., & Woolley R. (1997). *Definition and incidence of problem gambling, including the socio-economic distribution of problem gamblers.* Melbourne, Victoria, Australia: Victorian Casino and Gaming Authority.

Eadington, W. R. (2003). Measuring costs from permitted gaming: Concepts and categories in evaluating gambling's consequences. *Journal of Gambling Studies, 19*, 185-213.

Embretson, S. & Reise, S. (2000). *Item response theory for psychologists.* Mahwah, NJ: Erlbaum.

Ferris, J., & Wynne, H. (2001). *The Canadian Problem Gambling Index: User Manual.* Report to Canadian Inter-Provincial Task Force on Problem Gambling.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1995). *Structured Clinical Interview for DSM-IV Axis I disorders—patient edition (SCID-I/P, version 2.0).* New York: New York Psychiatric Institute.

Fong, T., Campos, M., Rosenthal, R., Brecht, M. L., Schwartz, B., Davis, A., & Chung, B. (2010). Problem gambling knowledge and perceived community impact among Asian-Pacific Islanders and non Asian-Pacific Islanders. *Journal of Immigrant and Minority Health, 12,* 173-178.

Frisch, M. B. (1994). Quality of life inventory: Manual and treatment guide. Minneapolis: National Computer Systems.

Frisch, M. B., Cornell, J., Villanueva, M., & Retzlaff, P. J. (1992). Clinical validation of the Quality of Life Inventory: A measure of life satisfaction for use in treatment planning and outcome assessment. *Psychological Assessment, 4,* 92-101.

Frisch, M. B., Clark, M. P., Rouse, S. V., Rudd, M. D., Paweleck, J. K., Greenstone, A., & Kopplin, D. A. (2005). Predictive and treatment validity of life satisfaction and the quality of life inventory. *Assessment, 12,* 66-78.

Gambino, B., & Lesieur, H. (2006). The South Oaks Gambling Screen (SOGS): A rebuttal to critics. *Journal of Gambling Issues, 17,* 1-16.

Giesbrecht, N., Cukier, S., & Steeves, D. (2010). Collateral damage from alcohol: Implications of 'second-hand effects of drinking' for populations and health priorities. *Addiction, 105*, 1323-1325.

Gmel, G., Rehm, J., Room, R., & Greenfield, T. K. (2000). Dimensions of alcohol-related social and health consequences in survey research. *Journal of Substance Abuse, 12*, 113-138.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30*, 179-185.

Kalischuk, R. G., Nowatzki, N., Cardwell, K., Klein, K., & Solowoniuk, J. (2006). Problem gambling and its impact on families: A literature review. *International Gambling Studies, 6,* 31-60.

Korman, L. M., Collins, J., Dutton, D., Dhayananthan, B., Littman-Sharp, N. & Skinner, W. (2008). Problem gambling and intimate partner violence. *Journal of Gambling Studies, 24,* 13-23.

Korn, D. A., & Shaffer, H. (1999). Gambling and the health of the public: Adopting a public health perspective. *Journal of Gambling Studies 15,* 223-234.

Ladouceur, R., Boisvert, J. M., Pepin, M., Loranger, M., & Sylvain, C. (1994). Social cost of pathological gambling. *Journal of Gambling Studies, 10,* 399-409.

Landis, J. R., & Koch, G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33,* 159-174.

Leon, A. C., Olfson, M., Portera, L., Farber, L. & Sheehan, D. V. (1997) Assessing psychiatric impairment in primary care with the Sheehan Disability Scale. *International Journal of Psychiatry in Medicine, 27,* 93-105.

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

McIntyre, R. S., McElroy, S. L., Konarski, J. Z., Soczynska, J. K., Wilkins, K., & Kennedy, S. H. (2007). Problem gambling in bipolar disorder: Results from the Canadian Community Health Survey. *Journal of Affective Disorders, 102,* 27-34.

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

Muthén, L. K., & Muthén, B. O. (1998-2006). *Mplus user's guide* (4th ed.). Los Angeles: Muthén & Muthén.

Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling procedures: Issues and applications*. Thousand Oaks: Sage.

Nunnally, J.C. & Bernstein, I.H. (1994). *Psychometric Theory* (3rd ed). New York: McGraw-Hill.

Nutt, D. J., King, L. A., & Phillips, L. D. (2010). Drug harms in the UK: A multicriteria decision analysis. *The Lancet*, 376, 1558–1565

O'Connor, B. P. (2000). SPSS, SAS, and MATLAB programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, and Computers, 32*, 396-402.

Okada, M. & Oltmanns, T. F. (2009). Comparison of three self-report measures of personality pathology. *Journal of Psychopathology and Behavioral Assessment, 31*, 358-367.

Olfson, M., Fireman, B., Weissman, M. M., Leon, A. C., Sheehan, D. V., Kathol, R. G., Hoven, C. & Farber, L. (1997). Mental disorders and disability among patients in a primary care group practice. *American Journal of Psychiatry, 154,* 1734-1740.

Oltmanns, T. F., & Turkheimer, E. (2006). Perceptions of self and others regarding pathological

personality traits. In R. F. Krueger & J. L. Tackett (Eds.), *Personality and psychopathology* (pp. 71-111). New York, NY: Guilford Press.

Rehm, J., Ashley, M. J., & Dubois, G. Alcohol and health: Individual and population perspectives. *Addiction, 92*, 109-115.

Risko, E., Quilty, L. C., & Oakman, J. M. (2006). Socially desirable responding on the web: Investigating the candor hypothesis. *Journal of Personality Assessment, 87,* 269-276.

Rogers, B., Caldwell, T., & Butterworth, P. (2009). Measuring gambling participation. *Addiction, 104,* 1065-1069.

Room, R. (2000). Concepts and items in measuring social harm from drinking. *Journal of Substance Abuse, 12*, 93-111.

Room, R., Ferris, J., Leslett, A., Livingston, M., Mugavin, J., & Wilkinson, C. (2010). The drinker's effect on the social environment: A conceptual framework for studying alcohol's harm to others. *International Journal of Environmental Research and Public Health, 7*, 1855-1872.

Saunders, J. B., Aasland, O. G., & Amundsen, A. (1993). Alcohol consumption and related problems among primary health care patients: WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption: I. *Addiction, 88*, 349-362.

Selin, K. H. & Room, R. (2007). Social problems from drinking in the Swedish general population: Measurement and reliability. *Journal of Substance Use, 12*, 103-118.

Shear, M. K., Greeno, C., Kang, J., Ludewig, D., Frank, E., Swartz, H. A., & Hanekamp, M. (2000). Diagnosis of nonpsychotic patients in community clinics. *American Journal of Psychiatry, 157,* 581-587.

Sheehan, D. V. (1983). *The anxiety disease*. New York: Charles Scribner and Sons.

Sheehan, D. V., Harnett-Sheehan, K. & Raj, B. A. (1996) The measurement of disability. *International Clinical Psychopharmacology, 11(Suppl. 3),* 89-95.

South, S. C., Oltmanns, T. F., Johnson, J., & Turkheimer, E. (2011). Level of agreement between self and spouse in the assessment of personality pathology. *Assessment, 18,* 217-226.

Svetieva, E., & Walker, M. (2008). Inconsistency between concept and measurement: The Canadian Problem Gambling Index (CPGI). *Journal of Gambling Issues, 22,* 157-173.

Turner, N.E. & Liu, E. 1999. 'The naive human concept of random events', Paper presented at the August 1999 conference of the American Psychological Association, Boston.

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

Turner, N. E., Zangeneh, M., & Littman-Sharp, N. (2006). The experience of gambling and its role in problem gambling. *International Gambling Studies, 6*, 237-266.

Zanarini, M. C., Frankenburg, F. R., Sickel, A. E., & Yong, L. (1996). *The diagnostic interview for DSM-IV personality disorders (DIPD-IV).* Belmont, MA: McLean Hospital.

Zanarini, M. C., Skodol, A. E., Bender, D., Nolan, R., Sanislow, C. A., Schaefer, E., et al. (2000). The collaborative longitudinal personality disorders study: Reliability of Axis I and Axis II diagnoses. *Journal of Personality Disorders, 14,* 291-299.

Zimmerman, M. (1994). Diagnosing personality disorders: A review of issues and research methods. *Archives of General Psychiatry, 51,* 225–245.

Zwick, W. R. & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*, *99*, 432-442.

Appendix A.

CPGI-Population Harm Initial Item Pool

Some of the next questions may not apply to you, but please try to be as accurate as possible. Please respond according to the following scale:

?	Not applicable
0	Not at all / Disagree
1	Mildly Agree
2	Moderately Agree
3	Strongly Agree

1. Do you often try to "give back" to your community?
2. When you gambled, did it hurt your family in some way?
3. Has your gambling made things more difficult for your partner?
4. Has your gambling in any way negatively affected people at work?
5. Are your friends upset or angry with you because of your gambling?
6. Have others felt that your community has been negatively affected by your gambling?
7. Has your gambling caused problems for your family?
8. Are there problems with your romantic relationship?
9. Are your friends concerned about your gambling?
10. Has your gambling had a negative impact on your neighbourhood?
11. Do you feel that your family works well together as a team?
12. Has your gambling negatively affected your romantic partner?
13. Do you have conflicts with friends over borrowing/lending money?
14. Have you performed to the best of your ability at work/school?
15. Have members of your community been hurt in any way from your gambling?
16. Have you spent less time with your family than they prefer?
17. Is your romantic partner concerned about your gambling?
18. Have you been as supportive of your friends as possible?
19. Has your gambling resulted in problems at work/school?
20. Are you actively engaged in neighbourhood events?
21. Have you felt that your family is being harmed by your gambling?
22. Have you spent less time with your romantic partner than they prefer?
23. Has your gambling caused problems for your friends?
24. Has your gambling caused you to be away a lot from your family?
25. Have strangers been hurt in some way by your gambling?
26. Have you lost a friendship or drifted away from a friend?
27. Have others felt that your performance at work/school has suffered because of your gambling?
28. Do you regularly make use of social services (e.g., legal aid, welfare)?
29. Have others felt that your gambling has negatively affected your family?
30. Is your romantic partner upset or angry with you because of your gambling?
31. Do you often receive negative feedback at work/school?
32. Do you often have conflicts or arguments with your romantic partner?
33. Have others felt that your gambling has negatively affected your friends?

34. Have you experienced a loss of productivity at work/school?
35. Do you frequently have conflicts or disagreements with your family?
36. Have you spent less time with your friends than they prefer?
37. Have others felt that your gambling has negatively affected your romantic partner?
38. Are you often absent from work/school?
39. Have your friends been hurt somehow from your gambling?

Appendix B.

Final CPGI-Population Harm

Some of the next questions may not apply to you, but please try to be as accurate as possible.
Please respond according to the following scale:

?	Not applicable
0	Not at all / Disagree
1	Mildly Agree
2	Moderately Agree
3	Strongly Agree

1. Has your gambling made things more difficult for your partner?
   (Partner; Direct)
2. Have you spent less time with your friends than they prefer?
   (Friends; Indirect)
3. Has your gambling caused problems for your family?
   (Family; Direct)
4. Have you experienced a loss of productivity at work/school?
   (Work; Indirect)
5. Has your gambling had a negative impact on your neighbourhood?
   (Community; Direct)
6. Are there problems with your romantic relationship?
   (Partner; Indirect)
7. Do you regularly make use of social services (e.g., legal aid, welfare)?
   (Community; Indirect)
8. Has your gambling caused problems for your friends?
   (Friends; Direct)
9. Do you frequently have conflicts or disagreements with your family?
   (Family, Indirect)
10. Has your gambling in any way negatively affected people at work?
    (Work; Direct)

Appendix C.

Final CPGI-Population Harm (5 Item)

Some of the next questions may not apply to you, but please try to be as accurate as possible. Please respond according to the following scale:

?	Not applicable
0	Not at all / Disagree
1	Mildly Agree
2	Moderately Agree
3	Strongly Agree

1. Has your gambling made things more difficult for your partner?
   (Partner; Direct)
2. Has your gambling caused problems for your family?
   (Family; Direct)
3. Has your gambling had a negative impact on your neighbourhood?
   (Community; Direct)
4. Has your gambling caused problems for your friends?
   (Friends; Direct)
5. Has your gambling in any way negatively affected people at work?
   (Work; Direct)

Table 1. *Means and Standard Deviations of Gambling, Quality of Life, and Disability Measures*

Measure	Total Sample M (SD)	Sample 1 (n = 256) M (SD)	Sample 2 (n = 61) M (SD)	t (p)	d
PGSI	2.42 (4.62)	1.70 (3.88)	5.46 (6.08)	4.62 (<.01)	.86
SOGS	3.54 (5.19)	2.71 (4.34)	7.02 (6.83)	4.78 (<.01)	.88
HCQ	7.45 (15.49)	5.78 (13.48)	14.60 (20.77)	3.14 (<.01)	.58
Days/Month	11.72 (44.74)	7.38 (20.58)	31.19 (93.54)	1.91 (.06)	.53
Money/Month	420.23 (2899.69)	225.59 (743.42)	1264.78 (6465.96)	1.23 (.23)	.36
First Gambled	19.60 (9.49)	19.79 (9.70)	18.82 (8.55)	.70 (.48)	.10
QOLI	28.54 (27.87)	29.75 (26.28)	23.05 (33.95)	1.37 (.17)	.24
SDS	6.64 (7.74)	6.22 (7.41)	8.44 (8.91)	1.78 (.08)	.29

Note: PGSI = Problem Gambling Severity Index; SOGS = South Oaks Gambling Screen; HCQ = Harm Consequences Questionnaire; Days/Month = Number of days participant gambles per month over the past 12 months; Money/Month = Amount of money ($) participant spends on gambling per month over the past 12 months; First Gambled = Age participant first gambled; QOLI = Quality of Life Inventory; SDS = Sheehan Disability Scale

Table 2. *Factor Loadings of Two-Factor Structure of Initial Item Pool*

Item	F1	F2
21. Have you felt that your family is being harmed by your gambling?	**.92**	.01
2. When you gambled, did it hurt your family in some way?	**.90**	-.02
4. Has your gambling in any way negatively affected people at work?	**.88**	.02
7. Has your gambling caused problems for your family?	**.88**	.03
39. Have your friends been hurt somehow from your gambling?	**.84**	.09
23. Has your gambling caused problems for your friends?	**.83**	.02
12. Has your gambling negatively affected your romantic partner?	**.82**	.07
15. Have members of your community been hurt in any way from your gambling?	**.82**	-.02
3. Has your gambling made things more difficult for your partner?	**.80**	.03
13. Do you have conflicts with friends over borrowing/lending money?	**.68**	.12
25. Have strangers been hurt in some way by your gambling?	**.68**	.02
28. Do you regularly make use of social services (e.g., legal aid, welfare)?	**.66**	.04
10. Has your gambling had a negative impact on your neighbourhood?	**.64**	.14
38. Are you often absent from work/school?	**.63**	.31
24. Has your gambling caused you to be away a lot from your family?	**.61**	.24
31. Do you often receive negative feedback at work/school?	**.60**	.28
26. Have you lost a friendship or drifted away from a friend?	-.19	**.83**
22. Have you spent less time with your romantic partner than they prefer?	-.10	**.82**
36. Have you spent less time with your friends than they prefer?	-.02	**.82**
32. Do you often have conflicts or arguments with your romantic partner?	.12	**.72**
16. Have you spent less time with your family than they prefer?	.17	**.70**
8. Are there problems with your romantic relationship?	.15	**.61**
35. Do you frequently have conflicts or disagreements with your family?	.29	**.52**
34. Have you experienced a loss of productivity at work/school?	**.44**	**.51**

Note: F1 = Factor 1, F2 = Factor 2. All factor loadings > .40 in bold.

Table 3. *CPGI-Population Harm Item Factor Loadings*

Item	
3. Has your gambling made things more difficult for your partner?	**.84**
4. Has your gambling in any way negatively affected people at work?	**.89**
7. Has your gambling caused problems for your family?	**.88**
8. Are there problems with your romantic relationship?	**.66**
10. Has your gambling had a negative impact on your neighbourhood?	**.73**
23. Has your gambling caused problems for your friends?	**.81**
28. Do you regularly make use of social services (e.g., legal aid, welfare)?	**.60**
34. Have you experienced a loss of productivity at work/school?	**.82**
35. Do you frequently have conflicts or disagreements with your family?	**.67**
36. Have you spent less time with your friends than they prefer?	**.61**

Note: All factor loadings > .40 in bold.

Table 4. *CPGI-Population Harm Corrected Item-Total Correlations*

Item	CITC
3. Has your gambling made things more difficult for your partner?	.79
4. Has your gambling in any way negatively affected people at work?	.84
7. Has your gambling caused problems for your family?	.83
8. Are there problems with your romantic relationship?	.64
10. Has your gambling had a negative impact on your neighbourhood?	.70
23. Has your gambling caused problems for your friends?	.76
28. Do you regularly make use of social services (e.g., legal aid, welfare)?	.56
34. Have you experienced a loss of productivity at work/school?	.81
35. Do you frequently have conflicts or disagreements with your family?	.66
36. Have you spent less time with your friends than they prefer?	.60

Note: CITC = Corrected Item-Total Correlation

Table 5. *Sample 2 CPGI-Population Harm Item and Total One-Week Test-Retest Reliability*

	ICC
3. Has your gambling made things more difficult for your partner?	.87**
4. Has your gambling in any way negatively affected people at work?	.75**
7. Has your gambling caused problems for your family?	.83**
8. Are there problems with your romantic relationship?	.83**
10. Has your gambling had a negative impact on your neighbourhood?	.60**
23. Has your gambling caused problems for your friends?	.85**
28. Do you regularly make use of social services (e.g., legal aid, welfare)?	.82**
34. Have you experienced a loss of productivity at work/school?	.89**
35. Do you frequently have conflicts or disagreements with your family?	.62**
36. Have you spent less time with your friends than they prefer?	.76**
CPGI-Population Harm Total	.93**

Note: ICC = Intraclass correlation coefficient; ** signifies $p < .01$.

Table 6. *Correlations among CPGI-Population Harm, Gambling, Quality of Life, and Disability Measures*

	CPGI-PH	PGSI	SOGS	HCQ	QOLI	SDS	Days/Month	Money/Month
CPGI-PH	--							
PGSI	.77**	--						
SOGS	.65**	.84**	--					
HCQ	.76**	.85**	.80**	--				
QOLI	-.35**	-.26**	-.27**	-.31**	--			
SDS	.56**	.43**	.37**	.51**	-.42**	--		
Days/Month	.17**	.29**	.28**	.24**	-.16**	.09	--	
Money/Month	.20**	.24**	.27**	.30**	-.09	.14*	.04	--
First Gambled	-.06	-.02	.03	.01	.03	-.12*	-.03	.01

Note: CPG1-PH = CPGI-Population Harm; PGSI = Problem Gambling Severity Index; SOGS = South Oaks Gambling Screen; HCQ = Harm Consequences Questionnaire; QOLI = Quality of Life Inventory; SDS = Sheehan Disability Scale; Days/Month = Number of days participant gambles per month over the past 12 months; Money/Month = Amount of money ($) participant spends on gambling per month over the past 12 months; First Gambled = Age participant first gambled; ** signifies $p < .01$.