# The Canadian Adolescent Gambling Inventory (CAGI)

# Phase II Final Report

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## EXECUTIVE SUMMARY

This report is an overview of the development and validation of the Canadian Adolescent Gambling Inventory (CAGI), a survey instrument designed to measure gambling-related risk and harm. The research is a collaborative, two-phase initiative funded by a consortium of provincial funding organizations, and conducted by a research team under the aegis of the Canadian Centre on Substance Abuse (CCSA). The goals of the initiative were to develop a conceptual framework and operational definition that accurately reflect adolescent gambling and, from these, derive a new instrument for use in population surveys to identify adolescents experiencing problems associated with their gambling.

### Research Design and Methodology

The research project was undertaken in two phases. Phase I included an extensive examination of the gambling literature to determine how problem gambling has been conceptualized, defined, and measured. In addition, Phase I involved consulting with an expert panel and conducting focus groups with adolescents. This process resulted in the development of a conceptual framework, an operational definition of adolescent problem gambling, and a draft pool of 51 candidate items for measuring gambling risk/harm and problems among adolescents.

Phase II involved administering and testing English and French versions of the candidate items to determine which should be included in the final instrument. Data collection included: (1) an initial pilot test conducted with 472 students from Manitoba and Quebec; (2) a general school survey administered to 2,394 students from both provinces; (3) a re-test administered to 343 students from the general school survey; and, (4) clinical validation interviews conducted with 109 students from the general school survey.

The original research design called for further testing of the instrument with a sample of adolescents receiving treatment for gambling problems. Despite a Canada-wide search, the research team was unable to locate any adolescents in treatment. Consequently, the testing of the instrument was based exclusively on data collected from school populations.

### Development Process

The development process included conducting a range of statistical tests on the data and applying the results to the ongoing development of the CAGI. This process is described in the following sections.

**Factor Analysis:** Principal Components Analysis (PCA), a type of factor analysis, was used to determine which of the 51 candidate items formed coherent factors. The selected rotation strategy was orthogonal (VARIMAX). Items were retained for the instrument if they had factor loadings of .30 or greater and loaded on only one factor.

The results of the analysis revealed four distinct factors drawn from 26 of the original 51 candidate items. These included: (1) psychological consequences; (2) social consequences; (3) financial consequences; and, (4) preoccupation/impaired control. The four-factor model explained 56.47% of the total variance of the 26 items, with each factor explaining more than 22% of the model.

Following PCA, Confirmatory Factor Analysis (CFA) was conducted (using AMOS 6.0) to test whether the factor structure identified by PCA best fit the model. CFA allows for the comparison of competing models to determine which one best represents how items on a scale or subscale function together. This analysis was run to explore the possibility that the four factors identified by PCA may regroup within one supra-factor (i.e., a one-factor solution).

The results revealed statistically significant factor loadings (ranging from .34 to .84) for the four-factor model. A comparison of the one-factor and four-factor model revealed $\Delta\chi^2_{M2\text{-}M1} = 1597.02$, $df = 6$, $p < .001$, indicating that the four-factor model showed statistically significant improvement in model fit over the one-factor model. These results support the inclusion of the four factors (psychological consequences, social consequences, financial consequences, and preoccupation/impaired control) in the model.

**Domains:** The four factors, along with a fifth measure, *time spent gambling*, were designated as core elements or *domains* of the CAGI. The development of gambling-related harm, in the form of either impaired control or negative impact in specified life areas, was found to be strongly related to the amount of time spent gambling and justified retaining it as a key indicator of gambling risk and harm. The time spent gambling measure represents the sum of time spent across 18 different types of gambling. Evidence supporting the validity of this variable included modest-to-high correlations with gambling frequency ($r = .55$) and money spent on gambling ($r = .50$), as well as with the four other domains ($r =.16$ to .49). It was also found to be stable over time with a test-retest correlation of .83.

**Scoring:** The scoring of the CAGI allows for classification of gambling status in relation to four categories: (1) negligible-risk gambling; (2) low-risk gambling; (3) moderate-risk gambling; and, (4) problem gambling. CAGI scores also reflect risk and harm status in relation to each of the five domains: (1) time spent gambling; (2) psychological consequences; (3) social consequences; (4) financial consequences; and, (5) preoccupation/impaired control.

Due to the absence of a *gold standard* for the identification of adolescents with gambling problems, and the lack of success locating adolescents in treatment for problem gambling, the scoring and classification scheme developed for the CAGI was based on the frequency distribution of scores and measures of central tendency. This is not the ideal methodology and, consequently, it is important that the process be viewed as a first step in the development of the instrument. The results need to be cross-validated with other populations and, in particular, a population of adolescents experiencing gambling problems.

**Reliability:** Following factor analysis, two measures of reliability were explored: test-retest and internal consistency. Test-retest reliability refers to the ability of an instrument to achieve consistent outcomes across time periods. It was assessed by administering the instrument to a sub-sample of 343 adolescents from Quebec and Manitoba, and repeating the administration 7-14 days later. Internal consistency is an estimate of how well the items on a scale measure the same construct and was assessed using Cronbach's alpha coefficient. Higher Cronbach's alpha values (i.e., $\alpha \geq .70$) indicate stronger correlations among items.

Test-retest coefficients ranged from "acceptable" ($r = .60$) to "excellent" ($r = .91$). Internal consistency was calculated with scores from the whole sample, and was found to be very good, with three of the factors (psychological consequences, social consequences, and preoccupation/impaired control) having an alpha coefficient > .82, and the remaining factor (financial consequences) with an alpha of .74.

**Validity:** In addition to testing reliability, several measures of validity were assessed. The first, construct validity, refers to how well an instrument measures what it is designed to measure, and was assessed using tests of both convergent and discriminant validity. Convergent validity refers to the extent to which items that *should be* related *are* in fact related; discriminant validity refers to the extent to which items that *should not be* related *are not*. Both convergent and discriminant validity are required in order to achieve construct validity.

To assess convergent validity, the five domains were correlated with other indicators of high-risk gambling, such as gambling frequency and money spent on gambling. Discriminant validity was assessed by examining the relationships between the five domains and variables that should be unrelated to high-risk gambling, such as ethnicity and time spent on activities other than gambling.

In relation to convergent validity, each high-risk measure was correlated > .30 with at least one of the domains. In other words, as each measure increased, so did corresponding measures of negative consequences in the psychological, social, and financial consequences domains, the presence of preoccupation/impaired control, and the amount of time spent gambling. The moderate strength of the measured correlations suggests that gambling practices and consequences are, in fact, distinct concepts. Discriminant validity was supported by near-zero correlations between each of the five domains and various demographic variables anticipated to be unrelated to gambling problems, as well as time spent on activities other than gambling.

**Classification Accuracy:** This measure refers to an instrument's ability to identify all cases of a target phenomenon and to reject those that do not fit. It is typically assessed by calculating coefficients for: sensitivity, specificity, positive predictive power, and negative predictive power. In this study, classification accuracy was assessed by examining scores for the sample of 109 students who completed clinical interviews. Their scores were compared for consistency among the five domains, the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV), and in-person clinician ratings using the Gambling Problems Severity Scale (GPSS). The DSM-IV criteria were administered to adolescents in both self-report and clinician-rated formats.

The original goal of the project was to conduct confirmatory clinical interviews with 120 adolescents – 30 in each of the four CAGI gambling status categories (negligible-risk, low-risk, moderate-risk, and problem gambling). However, due to a minimal number of adolescents endorsing harm, a decision was made to conduct interviews with all students who reported any negative consequence associated with their gambling (*N* = 109). Due to a very low prevalence of gambling-related problems among students, the desired sample sizes for the moderate-risk and problem gambling groups were not achieved, resulting in weak comparisons of CAGI scores and DSM-IV criteria, and of CAGI scores and clinician ratings using the GPSS.

The results revealed low-to-moderate relationships between the domains (time spent gambling, preoccupation/impaired control, and negative financial, social, and psychological consequences), and three clinical measures (self-reported DSM-IV, clinician-rated DSM-IV, clinician ratings using the GPSS). Of the 109 students who agreed to participate in a clinical interview, none obtained a score of 5 or higher on the self-reported DSM-IV, and only two students obtained scores of 5 or higher on the clinician-rated DSM-IV. Given that the DSM-IV criteria represent late-stage adult symptoms, they may not be appropriate for the assessment of gambling problems among adolescents.

## The Final Instrument

The version of the CAGI that emerged from the developmental process includes measures in five areas:

(1) types of gambling activities;
(2) frequency of participation for each gambling activity;
(3) time spent gambling on each gambling activity;
(4) total money spent gambling; and,
(5) 26 items related to gambling risk and harm.

As mentioned, the 26 items related to gambling risk and harm are categorized as: (1) psychological consequences; (2) social consequences; (3) financial consequences; and, (4) preoccupation/impaired control.

The scoring schema for the CAGI can be used to classify adolescents into four gambling status categories: (1) negligible-risk gambling; (2) low-risk gambling; (3) moderate-risk gambling; and, (4) problem gambling. An adolescent's overall classification is calculated as follows:

- **Negligible-risk gambling** – adolescents in this group have gambled in the past 3 months and score in the negligible-risk range on all five domains.
- **Low-risk gambling** – adolescents in this group have gambled in the past 3 months and do not have scores in the moderate-risk or problem gambling categories on any of the five domains.
- **Moderate-risk gambling** – adolescents in this group have gambled in the past 3 months on one or more activities and score in the moderate-risk gambling category on one or more of the five domains, but do not have scores in the problem gambling category on any of the five domains.
- **Problem gambling** – adolescents in this group have gambled in the past 3 months on one or more activities and obtained a score in the problem gambling category on at least one of the five domains.

The CAGI represents significant progress in the assessment of gambling among adolescents. It moves beyond a single, simple scale to the measurement of more complex, multiple themes/domains related to gambling risk and harm.

## Revisiting the Conceptual Framework

The conceptual framework developed in Phase I challenged the common view that there is a discernable disorder that can be labelled *adolescent problem gambling.* It posited the possibility that problem gambling in adolescents may be better explained as a manifestation of other underlying intrapersonal conditions, such as a predisposing factor, physiological makeup, emotional stresses or disorders, or stage of development.

To test this assumption, the research team included validated scales in the survey instrument to concurrently examine: (1) cognitive distortions; (2) impulsivity; (3) decision-making; (4) risk-taking; (5) self-efficacy; and, (6) self-control. An ANOVA found statistically significant differences between the gambling status categories and the six scales. Adolescents in the problem gambling category scored significantly higher on general risk-taking and impulsivity and lower on self-control, decision-making, and self-efficacy than adolescents in the other three gambling status categories (negligible-risk gambling, low-risk gambling, and moderate-risk gambling). The relationship between adolescent problem gambling and general risk-taking, as well as its relationship to impulsivity, self-control, self-efficacy, and decision-making needs to be explored further with longitudinal designs. These factors (and perhaps others) are central to the identification and treatment of adolescents exhibiting the highest degree of gambling risk and harm.

**Next Steps**

As part of the research process, the draft Phase 2 report was submitted to the expert panel for review. An important observation was that the present research must be considered a first step, with more research needed to further refine the instrument. This caution was in response to the inability to examine the construct of problem gambling and conduct psychometric testing with a sample of youth with known gambling problems.

In response, Phase III has been initiated to address the limitation of Phase II by reaching a new sample of youth who are at greater risk of having problems with gambling or who are experiencing problems with gambling. This new sample will allow for the originally planned analyses wherein youth with gambling problems are identified and examined as a separate sub-group. Extensive efforts to locate youth with gambling problems will be undertaken by screening youth in treatment for substance abuse in seven sites across Quebec.

# 1. INTRODUCTION

## 1.1 Background

This report is an overview of the development and validation testing of the Canadian Adolescent Gambling Inventory (CAGI), a survey instrument designed to measure gambling-related risk and harm among adolescents. The research is a collaborative, two-phase initiative funded by a consortium of provincial funding organizations, and conducted by a research team under the aegis of the Canadian Centre on Substance Abuse (CCSA). The objectives of this initiative were to develop a conceptual framework and operational definition that accurately reflect adolescent gambling, and subsequently derive a new instrument for use in population surveys to identify adolescents who are experiencing problems with their gambling.

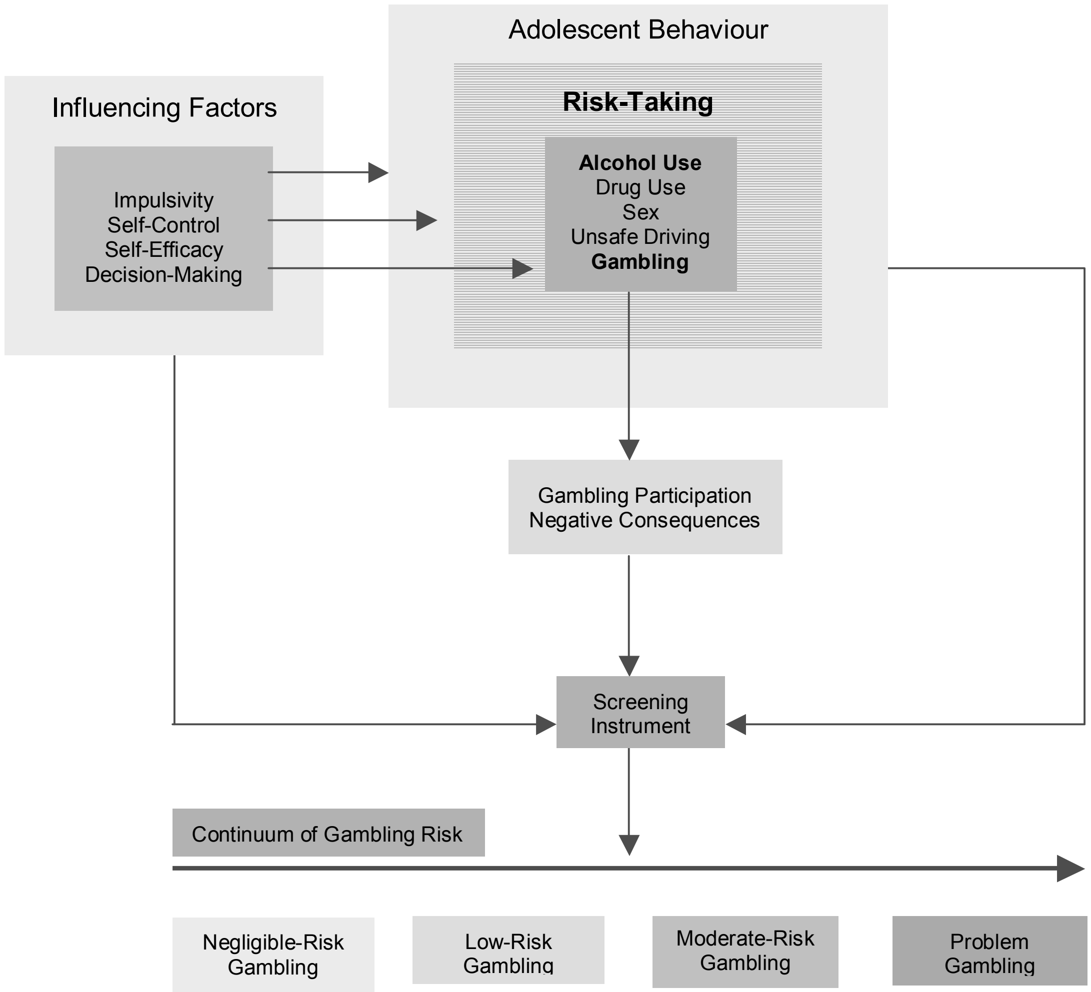
This initiative addresses concerns about the way problem gambling has been assessed in adolescent populations. Research examining the prevalence of problem gambling among adolescents has produced estimates ranging from as low as 2.3% to as high as 21.0% (see McGowan, Droessler, Nixon, & Grimshaw, 2000). A meta-analysis of North American research demonstrated that between 9.9 and 14.2% of adolescents are at-risk of developing gambling problems, and between 4.4 and 7.4% have gambling problems (Shaffer & Hall, 1996). Not only do estimates of adolescent problem gambling rates vary, they are also approximately 2-5 times higher than reported estimates for adults. These findings have led to questions regarding their validity, with a view that high prevalence estimates of adolescent problem gambling may be methodological artefacts (e.g., acquiescence bias, test scoring errors, demand characteristics, and/or self-fulfilling prophecy) of the assessment instrumentation and research (e.g., Ladouceur et al., 2000; Ladouceur, 2001; Walker & Dickerson, 1996). A potential limitation of the existing research is that adult conceptualizations and measurements of problem gambling have been applied to adolescents.

## 1.2 Phase I Overview

The research project was undertaken in two phases. Phase I involved re-conceptualizing the problem gambling construct within an adolescent population. The goal was to establish an operational definition of the construct that would guide the development of the survey instrument. Two main sources of data were used in this phase of this project. First, a thorough review of the scientific literature that described and explained adolescent problem gambling, substance use, and general risk-taking was conducted. Second, the expertise of key informant groups was solicited. Key informants included: eminent researchers in the fields of adolescent problem gambling, substance use, risk-taking, and general adolescent behaviour; clinicians/therapists who treat adolescents with mental health disorders, particularly problem gambling and other addictions; youth workers who counsel troubled adolescents; and adolescent gamblers themselves.

In the Phase I report, a conceptual framework was developed based on the literature reviewed and the input received from key informant groups. The framework as illustrated in Figure 1, was modified slightly (a) to include the four specific influencing factors measured in Phase II and (b) to reflect the re-labeling of the continuum components to focus on gambling risk versus problem gambling severity.

**Figure 1.** Conceptual Framework for Defining and Measuring Problem Gambling among Adolescents




The conceptual framework encompasses the following main elements:

- *Risk-Taking* is a subset of general adolescent behaviour that may be part of normal adolescent development. The inclusion of risk-taking as a variable allows for the possibility that adolescent problem gambling might better be described as a manifestation of general risk-taking proclivity rather than an etiologically distinct problem.

- *Influencing Factors,* including the wide range of individual, social, and environmental variables, impact adolescent behaviour, particularly risk-taking. The factors believed to be most pertinent are the individual factors of *impulsivity*, *self-efficacy*, *self-control*, and *decision-making*. Incorporating these variables into the framework allows for the evaluation of whether a nominal adolescent gambling problem might be better described as a manifestation of one or more of these constructs rather than an etiologically distinct problem.

- *Gambling Participation and Negative Consequences* are the domain variables scored and used to classify levels of gambling problems.

- *Continuum of Gambling Risk* includes negligible-risk, low-risk, moderate-risk, and problem gambling. Based on CAGI scores, respondents are situated along a continuum of risk relative to their gambling. The use of the term *problem* does not purport to be a clinical diagnosis of a gambling pathology; rather, it connotes that adolescents in the highest risk category are already experiencing significant negative consequences or problems associated with their gambling.

The conceptual framework resulted in the following operational definition of *adolescent problem gambling*:

> *Adolescent problem gambling* is persistent gambling behaviour that creates negative consequences for the gambler, others in his or her social network, or for the community.

This operational definition requires that two main elements central to the conceptual framework be measured to determine whether an adolescent is engaging in high-risk gambling: (1) participation/preoccupation with gambling activities, and (2) associated negative consequences (i.e., for the adolescent or others). The conceptual framework also suggests that adolescent problem gambling might be better explained as manifestations of: abnormally high levels of general risk-taking; high levels of impulsivity; low levels of self-control and self-efficacy; and, poor decision-making.

In summary, Phase I resulted in the development of a conceptual framework, an operational definition of adolescent problem gambling, and a draft pool of 51 candidate items for measuring gambling risk and problems among adolescents. Phase II involves administering and testing English and French versions of the candidate items identified in Phase I to determine which should be included in the final instrument.

# 2. RESEARCH DESIGN AND METHODOLOGY

## 2.1 Research Design

The research design follows the construct validation framework for test development adapted from classic references, including Cronbach and Meehl (1955), Campbell and Fiske (1959), and Jackson (1971). This approach to instrument development includes the following three interrelated components and corresponding research tasks:

1. *Theoretical Component*
    - Prepare a precise definition of each construct.
    - Specify structural relationships (processes) among constructs in the model/theory (nomological network).
    - Generate a large pool of items, in French and English, for each construct.
    - Choose items for preliminary scales based on expert ratings.

2. *Structural Component*
    - Administer preliminary scales to relevant samples (French and English sub-samples).
    - Conduct statistical analyses to evaluate item and scale measurement properties.
    - Select best items for each scale.

3. *External Validation Component*
    - Determine the perceived relevance of scale scores to users (content and face validity).
    - Compare scales with alternative measures of the constructs and other relevant assessment instruments (convergent and discriminant validity).
    - Evaluate the prognostic value of scales with respect to outcomes (sensitivity, specificity, positive predictive power, and negative predictive power).

While Phase I addressed the theoretical component, Phase II addresses the structural and external validation components. The provinces of Manitoba and Quebec were selected as the locations for test development. These provinces provided both Anglophone and Francophone adolescent populations for testing. As well, the testing process was facilitated in Quebec, with one of the co-investigators residing in the province. In Manitoba, the team worked with the Addictions Foundation of Manitoba (AFM), an organization with strong links to the school systems in that province.

## 2.2 Research Questions

The following research questions guided the overall project and addressed the three study objectives:

**Objective 1: Re-conceptualize problem gambling in the adolescent population**

*Research Question 1.* Which theories, conceptual/analytical frameworks, models, measurement instruments, and research findings have been used to describe and explain adolescent gambling and problem gambling?

*Research Question 2.* Which key elements (from Research Question 1) should be incorporated in a comprehensive, integrative framework for guiding research into gambling and problem gambling among adolescents?

**Objective 2: Operationally define problem gambling within the adolescent population**

*Research Question 3.* What is the most appropriate definition of adolescent gambling and problem gambling, and how can it be operationalized to facilitate the measurement of this construct?

*Research Question 4.* Which domains, variables, and specific items should be included in a measure of the adolescent problem gambling construct?

**Objective 3: Develop and validate a new instrument to identify adolescents who are experiencing problems with their gambling**

*Research Question 5*. To what extent is the proposed measure reliable and valid for assessing gambling and problem gambling in adolescent populations?

The first four questions guided the research in Phase I. The fifth question is addressed in Phase II and has been expanded to include the following four supplemental questions:

1. Can we find a factor structure of the candidate items consistent with the classification of domains, variables, and items in the conceptual framework that guided the development of the instrument?

2. How reliable is the instrument (temporal stability and internal consistency)?

3. How valid is the instrument (content, convergent, and discriminant validity)?

4. What is the classification accuracy of the instrument?

## 2.3 Language Translation

The *translation and back translation* method is the most widely used language translation method; however, specialists argue that it is often insufficient (Massoubre, Lang, Jaeger, Jullien, & Pellet, 2002), or even inadequate (Geisinger, 1994). The limitation is that translators tend to use wordings that perform better on back translation rather than ones well-adapted to the target culture (Hambleton, 1993 in Geisinger, 1994). As such, the translation process used in the present study was one proposed by Geisinger (1994) called the *experts committee translation method*.

In translating the candidate items from English to French, consideration was given to three types of equivalence: conceptual, semantic, and technical. *Conceptual equivalence* is present when the instrument measures the same construct/concept in both cultures. With *semantic equivalence*, the meaning of each item must remain the same as in the original version. *Technical equivalence* relates to language complexity, question length, and level of abstraction (Knudsen et al., 2000).

As a first step, the candidate items were translated by a translator fluent in both English and French, knowledgeable about both cultures, sufficiently familiar with the content measured by the instrument, and familiar with the context in which the instrument was to be used. The translation was then reviewed by a group of experts in clinical treatment and pathological gambling. Reviewers conducted independent reviews and participated in a group discussion to deliberate and reconcile differences of opinion. All dimensions of translation equivalence (conceptual, semantic, and technical) were examined.

## 2.4 Pilot Testing

English and French versions of the candidate items were administered to a sample of 472 adolescents: 195 students from one Manitoba school and 277 students from one Quebec school. The sample was not randomly selected, but rather was obtained from schools that agreed to participate. Students ranged in age from 12-17 years, and completed all testing in their classroom. Following completion, the research assistant reviewed each question with the students to ensure they understood and properly interpreted the items, and to identify any difficulties. The results from the pilot test were used to modify the candidate items and to create the draft instrument (see Appendix A).

## 2.5 School Survey

An English and French version of the newly created draft instrument was tested with a sample of 2,394 students drawn from grades 7-12 in Manitoba and Quebec. In Manitoba, participation required student and parental consent. In Quebec, parental consent was required for students 13 years of age or younger. Between May and October 2005, the draft instrument was administered to 469 students from seven schools in Winnipeg, Manitoba. One week later, 57 students completed a retest of the same instrument. In January and February 2006, the draft instrument was administered to another 530 students from four different schools in Winnipeg, and 1 week later was re-administered to 55 students. In Quebec, the instrument was administered between December and April 2006 to 1,395 students from three schools in the Quebec City area, one of which was a private school (*n* = 628). Approximately 10 days later, it was re-administered to 249 students. Students who participated in the retest were selected from schools that had agreed to participate in this aspect of the research.

Table 1 shows the demographic characteristics of the student sample by province. The sample was evenly distributed by gender, fairly evenly distributed by age and grade, and slightly over-represented with students from Quebec. While 12-17 year olds were the primary focus and intended target group, 4.6% of participants were 18 years of age or older. The majority of the sample was Caucasian (82.6%), living at home with both parents (71.1%), and not involved in the workforce (5.4%).

**Table 1.** School Sample Characteristics

| Demographics | Manitoba (*n* = 999) | Quebec (*n* = 1,395) | Total (*n* = 2,394)* |
|---|---|---|---|
| **Gender %** | | | |
| Male | 48.1 | 50.3 | 49.4 |
| Female | 51.7 | 49.1 | 50.2 |
| **Grade %** | | | |
| 7 | 20.9 | 18.1 | 19.3 |
| 8 | 19.2 | 17.7 | 18.3 |
| Senior 1 | 15.2 | 16.7 | 16.1 |
| Senior 2 | 16.4 | 21.5 | 19.4 |
| Senior 3 | 12.8 | 21.6 | 18.0 |
| Senior 4** | 14.7 | 0 | 6.1 |
| Professional*** | 0 | 3.9 | 2.3 |
| **Age %** | | | |
| 12 | 15.9 | 11.3 | 13.2 |
| 13 | 18.1 | 16.8 | 17.4 |
| 14 | 16.1 | 16.6 | 16.4 |
| 15 | 16.3 | 21.6 | 19.4 |
| 16 | 13.5 | 20.8 | 17.8 |

| Demographics | Manitoba ($n$ = 999) | Quebec ($n$ = 1,395) | Total ($n$ = 2,394)* |
|---|---|---|---|
| 17 | 11.3 | 11.0 | 11.2 |
| 18 + | 8.5 | 1.8 | 4.6 |
| **Ethnicity %** | | | |
| Caucasion | 72.2 | 90.1 | 82.6 |
| Asian | 6.8 | .9 | 3.3 |
| Aboriginal/First Nations | 2.5 | .4 | 1.3 |
| Black | 1.5 | 1.9 | 1.7 |
| Hispanic | 1.0 | .6 | .8 |
| Mixed Race | 7.3 | 1.1 | 3.7 |
| Other | 4.8 | 1.7 | 3.0 |
| **Family Structure %** | | | |
| Live with Both Parents | 71.4 | 70.9 | 71.1 |
| Mother Only | 14.8 | 15.6 | 15.3 |
| Father Only | 2.8 | 3.4 | 3.2 |
| Other | 9.6 | 10.0 | 9.8 |
| **Hours Worked at a Job/Week %** | | | |
| Don't Work | 54.6 | 47.5 | 50.4 |
| 1-4 hours | 13.5 | 17.8 | 16.0 |
| 5-9 hours | 8.7 | 13.0 | 11.2 |
| 10-20 hours | 12.4 | 13.0 | 12.7 |
| > 20 hours | 10.2 | 8.0 | 8.9 |

* Totals may not equal 100% due to missing data.
** *Senior 4* does not exist in Quebec high schools.
*** 3.9% of Quebec students were enrolled in a professional program designed to create employment opportunities following graduation.

## 2.6 Clinical Interviews

Clinical interviews were conducted with 109 students (44 from Manitoba and 65 from Quebec) who participated in the school survey and agreed to participate in this aspect of the study. Professionals trained in problem gambling assessment conducted the interviews using a general protocol (Ladouceur et al., 2005; Stinchfield, Govoni, & Frisch, 2005) that involved collecting detailed information on gambling participation, beliefs, and impact, as well as DSM-IV criteria. The DSM-IV criteria were administered to students in both self-report and clinician-rated formats. Clinicians also rated the severity of students' gambling on a scale divided into the following five levels: (1) no gambling – score of 0; (2) gambling without problems – score of 1; (3) low severity – score of 2-4; (4) moderate severity – score of 5-7; and, (5) high severity – score of 8-10. This item, referred by the research team as the Gambling Problem Severity Scale (GPSS), was specifically developed for this study. Clinicians were also encouraged to supplement the interviews with their own questions.

In Manitoba, one-on-one interviews were conducted in a private office at the AFM, and in Quebec, interviews took place in the students' school. Interviews were tape-recorded and took approximately 1 hour to complete. Clinicians also recorded additional observations and provided an overall rating of the students' gambling severity on a continuum ranging from 0 (no gambling) to 10 (high problem severity) based on the information gathered during the interviews.

## 2.7 Data Analysis

The following section provides an overview of the data analysis procedure, with a discussion of the statistical criteria used to guide the process.

### *2.7.1 Data Cleaning*

Data cleaning procedures were used to eliminate data that might adversely affect the results. First, a fake gambling item named "Blinko" was included in the questionnaire to identify distorted responses. Data from students who reported participating in Blinko were not included in the analyses. Second, frequency distributions of time spent gambling and number of gambling activities were examined to identify and subsequently remove out-of-range responses. A logical criterion of a maximum of 2,400 minutes (40 hours) per week devoted to gambling was considered acceptable. Students who reported gambling more than this amount were eliminated from the analyses. As well, students who reported gambling at 12 or more different games during the last 3 months were eliminated. An informal analysis of the school survey data of excluded participants supported these exclusion criteria by identifying numerous inconsistencies for these participants.

### *2.7.2 Development Process*

One of the first data analytic procedures in scale development involves examining the frequency distributions of the item pool. The original pool included 51 candidate items in the following areas: cognition, behaviour, negative consequences, and problem gambling correlates. As a general rule, items endorsed too infrequently (i.e., < 5%) or too frequently (i.e., > 95%) are removed. However, because problem gambling is a relatively low base rate phenomenon, some items with low endorsement rates (< 5%) were retained.

### *2.7.3 Factor Analysis*

Principal Components Analysis (PCA), a type of factor analysis, was used to identify which of the 51 candidate items formed coherent factors. As a rule of thumb, this procedure requires 10 participants for each item (Tabachnick & Fidell, 2000). The selected rotation strategy was orthogonal (VARIMAX). Inter-factor correlations of .30 or more could indicate that an oblique rotation is preferable ( Tabachnick & Fidell, 2000). At the same time, it seems advantageous to use an orthogonal rotation, particularly if factor scores will eventually be used as independent variables in a predictive model. Moreover, orthogonal rotation is preferable when a simple structure is possible; that is, a structure with variables having high factor loadings on one factor and weak loadings on others (Thurstone, 1975). Items were retained in the instrument if they had factor loadings of .30 or greater and loaded on only one factor (Tabachnick & Fidell, 2000).

While statistical decision-making is important in factor analysis, there is also a significant conceptual element. As such, items that were not conceptually meaningful to the factor on which they loaded were rejected even if they had good psychometric properties. For example, if an item intended to address financial consequences also loads highly on a factor with items that address preoccupation/impaired control, the item may be removed.

*2.7.4 Confirmatory Factor Analysis (CFA)*

Following PCA, Confirmatory Factor Analysis (CFA) was conducted (using AMOS 6.0) to test whether the factor structure identified by PCA best fit the model. CFA allows for the comparison of competing models to determine which one best represents how items on a scale or subscale function together. The process of determining the best fit model is accomplished by examining the fit statistics, which are the products of CFA. This study examined the following fit statistics: chi-square, goodness-of-fit (GFI), adjusted goodness-of-fit (AGFI), root mean square error of approximation (RMSEA), comparative fit index (CFI), normed fit index (NFI), and non-normed fit index (NNFI).

The chi-square compares the observed covariance matrix with the expected covariance matrix. A smaller chi-square value indicates better fit. For example, a chi-square value of 0 indicates that there is no difference between the two matrices (i.e., perfect fit), whereas higher values indicate significant differences between the matrices.

One limitation of the chi-square statistic is that it is very sensitive to sample size; therefore, a significant value found with a larger sample is difficult to accurately interpret as a poor fit. Two indices that are less sensitive to sample size are the GFI and AGFI, which measure the proportion of variance accounted for by the model. The AGFI is similar to the GFI, except it also adjusts for the degrees of freedom in the model, which results in more conservative estimates of model fit. A GFI and AGFI value closer to 1.00 indicates better fit.

The RMSEA adjusts for parsimony in the model, and is less influenced by sample size than the chi-square, GFI, and AGFI. Parsimony is achieved when the model contains the minimum number of factors required to specify the model (i.e., the less factors, the more parsimonious). A perfect fit will yield a score of 0.0, and some researchers consider a score of less than .08 “adequate”, and a score less than .05 “good” (Steiger, 1990; Steiger & Lind, 1980).

The CFI, NFI, and NNFI involve comparing the tested model to an independence model (null model) in which all correlations between variables are 0 (i.e., variables are independent of each other). A value of 1.00 indicates perfect fit, a value between .90 and .95 is considered “acceptable”, and a value above .95 is considered “good”. A limitation of the NFI is that it is sensitive to sample size, and does not perform as consistently with smaller samples. The NNFI was created to correct some of the shortcomings of the NFI (i.e., formula includes degrees of freedom).

Once the factors were identified through PCA and confirmed through CFA, the next step was to identify the reliability and validity of the instrument. For these analyses, only respondents with complete data were included.

### *2.7.5 Reliability*

Two types of reliability were explored: test-retest and internal consistency. Test-retest reliability refers to the ability of an instrument to achieve consistent outcomes across time periods, and was assessed by administering the pool of candidate items to the school samples and repeating the administration 7-14 days later. Test-retest reliability was measured with Intraclass Correlation (ICC), a procedure sensitive to mean changes over time (Bartko, 1976). An ICC of .60 or higher is required to demonstrate satisfactory reliability. (Cicchetti, 1994).

Internal consistency is an estimate of how well the items on a scale measure the same construct, and was assessed using Cronbach's alpha coefficient (Cronbach, 1951). Alpha scores range from 0 to 1, with scores closer to 1 indicating stronger correlations among items. As a criterion, Nunnally (1978) suggests that instruments with $\alpha \geq .70$ have adequate internal consistency for research purposes.

### *2.7.6 Validity*

Several measures of validity were examined. Construct validity refers to how well an instrument measures the construct that it is designed to measure, and was assessed using tests of convergent and discriminant validity (Campbell & Fiske, 1959). Convergent validity refers to the extent to which items that *should be* related *are* in fact related; discriminant validity refers to the extent to which items that *should not be* related *are not*. Both convergent and discriminant validity are required in order to achieve construct validity.

To assess convergent validity, the five domains were correlated with other indicators of high-risk gambling, such as gambling frequency and money spent on gambling. Moderate to high correlations ($r > .30$) provide support for convergent validity (Cicchetti, 1994). Discriminant validity was assessed by examining the relationships between the five domains and variables that should be unrelated to high-risk gambling, including various demographic variables (e.g., ethnicity) and time spent on activities other than gambling. Near-zero correlations ($r < .20$) provide support for discriminant validity.

### *2.7.7 Classification Accuracy*

Classification accuracy refers to an instrument's ability to identify all cases of a target phenomenon and to reject those that do not fit. It is typically assessed by calculating coefficients for: sensitivity, specificity, positive predictive power, and negative predictive power. Sensitivity refers to the true-positive rate; that is, the ability of a test or instrument to identify people who display the target phenomenon in a sample. Specificity refers to the true-negative rate; that is, the ability of a test or instrument to identify people who do not display the target phenomenon in a sample. Positive predictive power refers to the rate of true-positives among all people who display the target phenomenon in a sample. Negative predictive power refers to the rate of true-negatives among all people who do not display the target phenomenon in a sample.

Classification accuracy was assessed by examining scores for the sample of 109 students who completed clinical interviews. Their scores were compared for consistency among the five domains, diagnostic criteria of the DSM-IV, and in-person clinician ratings using the GPSS.

*2.7.8 Limitations*

The low prevalence of problem gambling among adolescents proved to be a significant challenge in this study. The original goal was to conduct clinical interviews with 120 students – 30 in each of the four CAGI gambling status categories (negligible-risk, low-risk, moderate-risk, and problem gambling) for a total of 120 interviews (60 in each province). However, due to a minimal number of students endorsing harm, a decision was made to conduct interviews with all students who reported any negative consequence associated with their gambling ($n$ = 109), resulting in the following distribution: negligible-risk gambling – $n$ = 26; low-risk gambling – $n$ = 51; moderate-risk gambling – $n$ = 26; and, problem gambling – $n$ = 6. The desired sample sizes for the moderate-risk and problem gambling groups were not achieved, resulting in weak comparisons of CAGI scores and DSM-IV criteria, and of CAGI scores and clinical ratings.

There is no *gold standard* for the identification of adolescents with gambling problems. The two most commonly used measures of youth gambling – the South Oaks Gambling Screen - Revised for Adolescents (SOGS-RA) and Diagnostic and Statistical Manual of Mental Disorders - fourth edition - Multiple Response – Juvenile (DSM-IV-MR-J) – have questionable reliability and validity. Therefore, this study relied on clinicians' evaluations derived from the clinical interviews. These interviews, however, were partially based on the DSM-IV measure of adult pathological gambling.

The original research design called for further testing of the candidate items with a sample of adolescents receiving treatment for gambling problems. Despite a Canada-wide search (Quebec, Ontario, Manitoba, Alberta, and British Columbia), we were unable to locate any adolescents in treatment for a gambling problem. Efforts were made to identify adolescents with gambling problems by screening adolescents in treatment for substance abuse at the AFM; however, this undertaking was also unsuccessful. Consequently, the testing of the candidate items was based exclusively on data collected from the school sample drawn from Manitoba and Quebec. Moreover, as the school sample was not randomly selected, provincial comparisons cannot be made. Theoretically, administering the pool of candidate items in different schools and/or provinces may yield different results.

Adolescents in the school sample were asked whether they had gambled on a list of activities in the past 3 months. Theoretically, responses could differ with shorter or longer timeframes. A 3-month timeframe was chosen based on expert consensus after examining timeframes used in existing instruments and on what is known about adolescent development and test-taking: adolescents tend to live in the present, making a shorter timeframe more meaningful. There is presently no known empirical study of adolescent gamblers that explores the effects of the recall timeframe; however, Wulfert et al. (2005) studied the effects of shortening the timeframe on the psychometric properties of the SOGS and NORC Diagnostic Screen for Gambling Problems (NODS) with a sample of adults seeking treatment for gambling problems. A comparison of lifetime, past-year, and 3-month retrospective timeframes for the SOGS and NODS demonstrated that shortening the timeframe to 3 months did not have adverse effects on the psychometric properties of these measures.

# 3. RESULTS

Results are presented and discussed in four main areas: (a) school survey sample; (b) development process; (c) reliability and validity; and, (d) classification accuracy.

## 3.1 School Survey Sample

Twenty students were removed from the analyses for the following reasons: 12 reported gambling on Blinko (fake gambling item); 2 reported gambling in excess of 2,400 minutes per week; and, 11 reported gambling on 12 or more different games during the past 3 months (see Table 2). Five students met more than one removal criteria.

**Table 2.** Criteria Used to Select Cases for Data Analysis

| Validity Item | Total time spent gambling per week during past 3 months | | | | | |
|---|---|---|---|---|---|---|
| | 0 to 2,400 minutes | | | More than 2,400 minutes | | |
| | Number of different games played in the last 3 months | | | Number of different games played in the last 3 months | | |
| | 0 | 1-11 | ≥12 | 0 | 1-11 | ≥12 |
| Reported playing Blinko | 0 | 8 | 3 | 0 | 0 | 1 |
| Did not report playing Blinko | 1,510 | 864 | 7 | 0 | 1 | 0 |

*Note:* Shaded cells indicate excluded participants.

Table 3 shows the frequency distribution of gambling participation by province for the total school sample. The majority of participants (63.6%) reported not gambling on any activity in the past 3 months. This relatively low participation rate (36.4%) may be related to the 3-month timeframe. Of those who reported gambling, most did so 2-3 times per month or less frequently, and approximately 10% gambled weekly or more frequently. Approximately one-quarter of gambling participants spent 1 hour or less gambling in a typical week, and 2.8% spent 6 hours or more gambling in a typical week. Most participants did not have a favourite gambling activity; however, dice/cards/board games was the most highly endorsed activity, followed by scratch tickets. Among those who reported gambling, most spent $10 or less in the past 3 months, and less than 2% spent more than $100.

**Table 3.** Frequency Distribution of Gambling Participation

| Gambling Participation | Manitoba % (*n* = 991) | Quebec % (*n* = 1,383) | Total* % (*n* = 2,374) |
|---|---|---|---|
| **Highest Level of Gambling Frequency during Past 3 Months** | | | |
| No gambling | 59.0 | 66.9 | 63.6 |

| Gambling Participation | Manitoba % ($n$ = 991) | Quebec % ($n$ = 1,383) | Total* % ($n$ = 2,374) |
|---|---|---|---|
| Once/month | 13.3 | 15.3 | 14.4 |
| 2-3 times/month | 9.1 | 8.7 | 8.8 |
| Once/week | 6.6 | 3.4 | 4.7 |
| 2-6 times/week | 3.8 | 1.4 | 2.4 |
| Daily | 6.1 | .9 | 3.0 |
| Missing data | 2.1 | 3.5 | 2.9 |
| **Favourite Gambling Activity** | | | |
| No gambling | 59.0 | 66.9 | 63.6 |
| No favourite | 14.9 | 1.3 | 12.3 |
| Dice/cards/board games | 4.3 | 2.0 | 3.0 |
| Scratch tickets | 2.5 | 2.7 | 2.7 |
| Dare for participant | 1.9 | 1.2 | 1.5 |
| Sports pools/games | 1.1 | 1.7 | 1.4 |
| Arcade/video games | 1.2 | 1.4 | 1.3 |
| Games of skill | .7 | .9 | .8 |
| Table games at casino | 1.1 | .5 | .8 |
| Sport select | .5 | .6 | .5 |
| Dare for someone else | .9 | .4 | .6 |
| Internet | .8 | .1 | .4 |
| Other | .5 | .4 | .4 |
| Raffle | .3 | .2 | .3 |
| VLTs | .4 | .3 | .3 |
| Slot machines | .5 | .2 | .3 |
| Lottery | .2 | .1 | .1 |
| Horse races | .3 | .1 | .2 |
| Bingo | 1.1 | .4 | .7 |
| Sports with a bookie | .1 | .0 | .0 |
| Missing data | 7.5 | 9.5 | 8.6 |

| Gambling Participation | Manitoba % (*n* = 991) | Quebec % (*n* = 1,383) | Total* % (*n* = 2,374) |
|---|---|---|---|
| **Time Spent Gambling in a Typical Week** | | | |
| No gambling | 47.8 | 66.5 | 58.7 |
| 15 minutes | 7.7 | 11.8 | 10.1 |
| 30 minutes | 3.7 | 2.9 | 3.2 |
| 1 hour | 7.2 | 5.3 | 6.1 |
| 2 hours | 4.5 | 2.7 | 3.5 |
| 3 hours | 2.2 | 1.4 | 1.8 |
| 4 hours | 0.9 | 0.8 | 0.8 |
| 5 hours | 1.1 | 0.7 | 0.8 |
| 6 hours or more | 5.1 | 1.1 | 2.8 |
| Missing data | 19.7 | 6.6 | 12.2 |
| **Money Spent Gambling during Past 3 Months** | | | |
| No gambling | 59.0 | 66.9 | 63.6 |
| $1-10 | 12.1 | 13.3 | 12.8 |
| $11-20 | 4.0 | 3.6 | 3.8 |
| $21-30 | 1.6 | 1.9 | 1.8 |
| $31-40 | 1.5 | .9 | 1.2 |
| $41-100 | 3.8 | 1.3 | 2.4 |
| $101-200 | 1.2 | .5 | .8 |
| $201-500 | .9 | .1 | .5 |
| $ >500 | .5 | .1 | .2 |
| Missing data | 15.2 | 11.4 | 13.0 |

* Totals may not equal 100% due to missing data.

## 3.2 Development Process

### *3.2.1 Time Spent Gambling*

In addition to the pool of 51 candidate items for measuring gambling risk, the draft instrument included questions related to gambling frequency, money spent gambling, and time spent gambling. Of these, time spent gambling was retained in the final instrument.

Time spent gambling was selected over gambling frequency and money spent gambling as a key indicator of gambling risk for a number of reasons. First, with respect to gambling frequency, the response options included in the instrument make it a rather gross measure. Furthermore, gambling frequency does not take into account the amount of time spent gambling during each gambling event. For example, a person who buys a lottery ticket every day is gambling “daily” even though it takes minutes to purchase a lottery ticket, while a person who plays poker every Saturday night is gambling “once a week” even though poker games may last hours. Second, money spent on gambling can be difficult to measure accurately because of the “churn”; that is, money bet is either lost or more money is won. Also, gamblers may or may not consider the winnings that they wager money lost or spent. Finally, time spent gambling was more highly correlated with the other four domains than were gambling frequency and money spent on gambling.

### *3.2.2 Gambling Consequences and Practices*

An important goal of the research was to develop an instrument adapted to both English and French languages. It was also important to examine factorial structures by age and sex to account for the possibility of developmental and gender-specific differences.

Many of the items on the draft instrument had a low endorsement rate, which may reflect the low prevalence of gambling and especially problem gambling, among adolescents. Appendix B includes the endorsement rates for each candidate item broken down by province, sex, and age. Quebec students rarely endorsed (i.e., 10 students or less) approximately 30% of the items, girls rarely endorsed 35% of the items, and younger students (12-14 years old) rarely endorsed 25% of the items.

The lack of variability for approximately 30% of the items precluded any division of the sample by cultural subgroups, sex, or age. Given that the items were conceptually and clinically significant, they were retained and entered into a factor analysis. Considering, as a rule of thumb, the necessity to obtain 10 participants for each item included in the factor analysis, a minimum sample of 510 participants was required for the 51 candidate items (Tabachnick & Fidell, 2000). The student sample of 864 gamblers was therefore insufficient to conduct separate analyses by province, sex, and age.

All 51 candidate items were included in the factor analysis, and were classified as follows: (1) problem gambling cognitions - 7 items; (2) problem gambling practices - 18 items; (3) negative consequences - 19 items; and, (4) influence of peers on gambling - 7 items. PCA revealed 11 factors with an eigenvalue of 1 or greater, and a scree test revealed four distinct factors. Next, solutions with two to six factors were examined (Tabachnick & Fidell, 2000), revealing a five-factor solution. A total of 16 items were eliminated due to poor conceptual classification; that is, the item content was different than the content of the other items loading on the factor (see Appendix C for a summary). PCA was repeated (with VARIMAX rotation) with 35 items, resulting in a four-factor solution. The final solution contained 26 items (see Table 4).

**Table 4.** Factor Loadings of the 26 Items Retained in the Four-Factor Solution

| Items | Theoretical category | Psychological consequences (6 items) | Social consequences (6 items) | Financial consequences (8 items) | Preoccupation/ impaired control (6 items) |
|---|---|---|---|---|---|
| 35q. How often have you felt guilty about how much money you have lost gambling/betting? | Negative consequences (personal consequences) | .786 | | | |
| 35r. How often have you felt sad or depressed about how much money you have lost gambling/betting? | Negative consequences (personal consequences) | .772 | .325 | | |
| 35o. How often has gambling/betting made you feel frustrated? | Negative consequences (personal consequences) | .719 | | | |
| 35n. How often have you felt bad about the way you gamble/bet or what happens when you gamble/bet? | Negative consequences (personal consequences) | .680 | | | |
| 35p. How often has gambling/betting made you feel stressed? | Negative consequences (personal consequences) | .662 | | | |
| 35s. How often have you felt it would be better for your well-being to stop gambling/betting? | Negative consequences (problem recognition) | .647 | | | |
| 35dd. How often have you skipped practice or dropped out of activities (such as team sports or band) due to your gambling/betting? | Problem gambling practices (school problems) | | .842 | | |
| 35aa. How often have you skipped family gatherings in order to gamble/bet? | Negative consequences (social consequences) | | .838 | | |
| 35z. How often have you skipped hanging out with friends who do not gamble/bet to hand out with friends who do gamble/bet? | Problem gambling correlates (peer group) | | .750 | | |
| 35bb. How often have you skipped get-togethers with friends in order to | Negative consequences (social | .344 | .716 | | |

| Items | | Theoretical category | Psychological consequences (6 items) | Social consequences (6 items) | Financial consequences (8 items) | Preoccupation/ impaired control (6 items) |
|---|---|---|---|---|---|---|
| | gamble/bet? | consequences) | | | | |
| 35v. | How often has your family or friends complained that you gamble/bet too much? | Negative consequences (personal consequences) | .314 | .662 | | |
| 35cc. | How often have you spent time gambling/betting when you were supposed to be doing homework? | Problem gambling practices (school problems) | | .539 | | .403 |
| 34c. | How often have you sold your personal property (such as CDs, a Game boy, etc.) to have money to gamble/bet or to pay off your gambling/betting debts? | Problem gambling practices (financing) | | | .696 | |
| 34b. | How often have you taken money that you were supposed to spend on lunch, clothing, movies, etc., and used it for gambling/betting or for paying off gambling/betting debts? | Problem gambling practices (financing) | | | .661 | |
| 37c. | How often have you had difficulties paying your gambling/betting debts? | Negative consequences (personal consequences) | | | .652 | |
| 37b. | How often has your gambling/betting caused money problems for you? | Negative consequences (personal consequences) | .384 | | .594 | |
| 34e. | How often have you, or someone on your behalf, bullied, threatened, or beaten up another person to pay back the gambling/betting money he or she owed you? | Problem gambling correlates (peer group) | | | .537 | |
| 34a. | How often have you borrowed money from family, friends, or | Problem gambling practices (financing) | | | .473 | |

| Items | Theoretical category | Psychological consequences (6 items) | Social consequences (6 items) | Financial consequences (8 items) | Preoccupation/ impaired control (6 items) |
|---|---|---|---|---|---|
| others to gamble/bet? | | | | | |
| 37d. How often has someone put pressure on you, in any way, to pay what you owe after you lost a gamble/bet? | Negative consequences (personal consequences) | | | .454 | |
| 35i. How often have you gambled/bet more than you could really afford to lose? | Problem gambling practices (impaired control) | .347 | .326 | .453 | |
| 35b. How often have you thought about gambling/betting? | Problem gambling cognitions | | | | .803 |
| 35a. How often have you talked about gambling/betting? | Problem gambling cognitions | | | | .793 |
| 35c. How often have you planned your gambling/betting activities? | Problem gambling practices (impaired control) | | | | .706 |
| 35l. How often have you gambled/bet your winnings? | Problem gambling practices (financing or impaired control) | .324 | | | .640 |
| 35h. How often have you gambled/bet for longer periods of time than you intended to? | Problem gambling practices (impaired control) | | | .335 | .502 |
| 35f. How often have you gambled/bet with more money than you intended to? | Problem gambling practices (impaired control) | .372 | | .393 | .460 |

*Note:* Shaded cells indicate factor loadings.

As shown in Table 5, the four-factor model explained 56.47% of the total variance of the 26 items, with each factor explaining more than 22% of the model (after rotation). The four factors were labelled: (1) psychological consequences; (2) social consequences; (3) financial consequences; and, (4) preoccupation/impaired control.

**Table 5.** Variance Explained by Each Factor and Internal Consistency (α)

| **Factor** | **Rotated eigenvalue** | **Total variance explained %** | **Model variance explained %** |
|---|---|---|---|
| Psychological consequences (6 items) | 4.17 | 16.04 | 28.40 |
| Social consequences (6 items) | 3.98 | 15.30 | 27.09 |
| Financial consequences (8 items) | 3.26 | 12.54 | 22.21 |
| Preoccupation/impaired control (6 items) | 3.27 | 12.59 | 22.30 |
| Total | 14.68 | 56.47 | 100 |

Table 6 shows the correlations between the four factors identified in PCA and time spent gambling (i.e., the five domains). The average correlation was .35 (*SD* = .14) for females and .47 (*SD* = .12) for males. These correlations tended to be low to moderate, supporting the presence of unique factors while at the same time indicating the possibility of a higher order factor.

**Table 6.** Inter-Factor Correlations of Five Domains by Sex

| **Domain** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| 1. Psychological consequences (6 items) | -- | .666 * | .434 * | .459 * | .322 * |
| 2. Social consequences (6 items) | .548 * | -- | .212 * | .284 * | .290 * |
| 3. Financial consequences (8 items) | .547 * | .560 * | -- | .343 * | .158 * |
| 4. Preoccupation/impaired control (6 items) | .531 * | .578 * | .535 * | -- | .358 * |
| 5. Time spent gambling | .218 * | .392 * | .303 * | .490 * | -- |

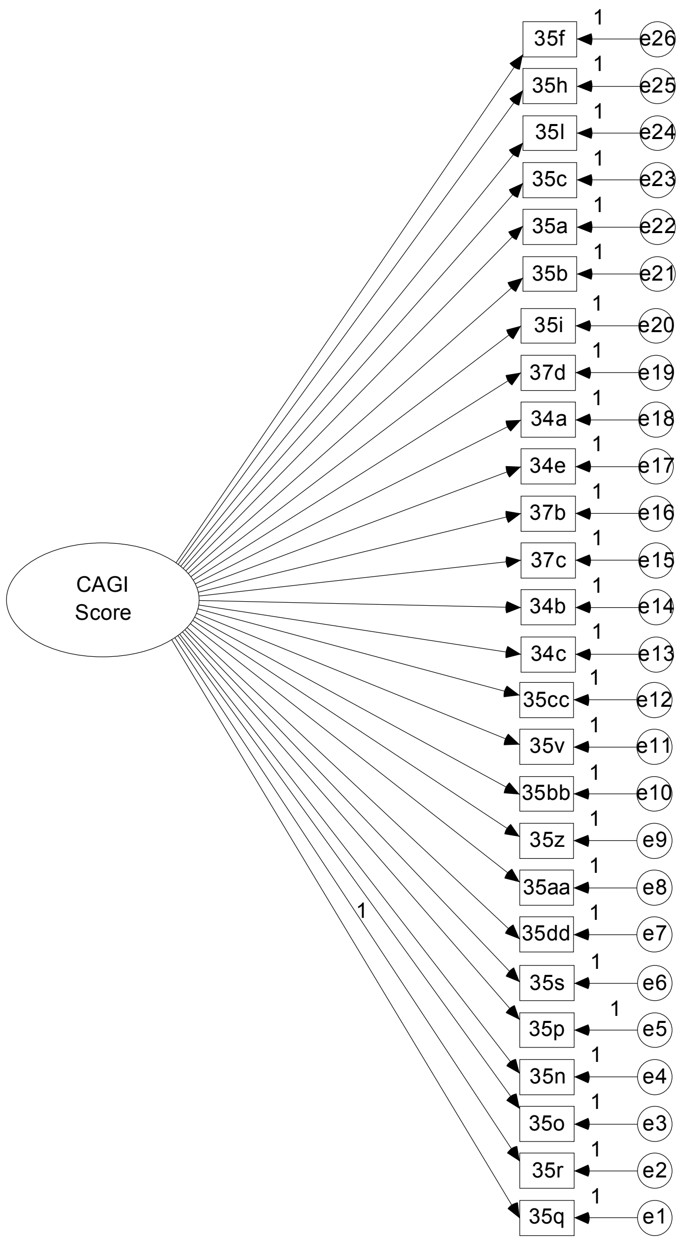
*Note:* Under the diagonal, correlations concern males ($n$ = 394) and over the diagonal, females ($n$ = 339).

* $p < .01$

Following PCA, CFA was used to test the resulting four-factor model. This analysis was run to explore the possibility that the four factors identified by PCA may regroup within one supra-factor (i.e., a one-factor solution). The first step involved comparing a one-factor solution to an independent model (suggesting no relationship between the variables). Results showed that the one-factor model had statistically significant factor loadings (.26 to .73); however, consensus of fit indexes showed very poor model fit, $\chi^2$ = 3334.68, $df$ = 299, $p < .001$, GFI = .673, NNFI = .617, CFI = .647, and RMSEA = .122. It should be noted that *none* of the fit indices reached a level of acceptability, and most were far below the cut-off.

Squared multiple correlations (SMCs) for all variables ranged from .7 (7% of variance in item 34a accounted for by the factor) to .54, or 54% of the variance in item 35r explained by the factor (see Figure 2). An independence model showed even worse fit, $\chi^2 = 8935.78$, $df = 325$, $p < .001$, GFI = .252, NNFI = .000, CFI = .000, and RMSEA = .197. Although a comparison of the one-factor model to the independence model showed that the one-factor model was a better fit, it was not an acceptable representation of the data.

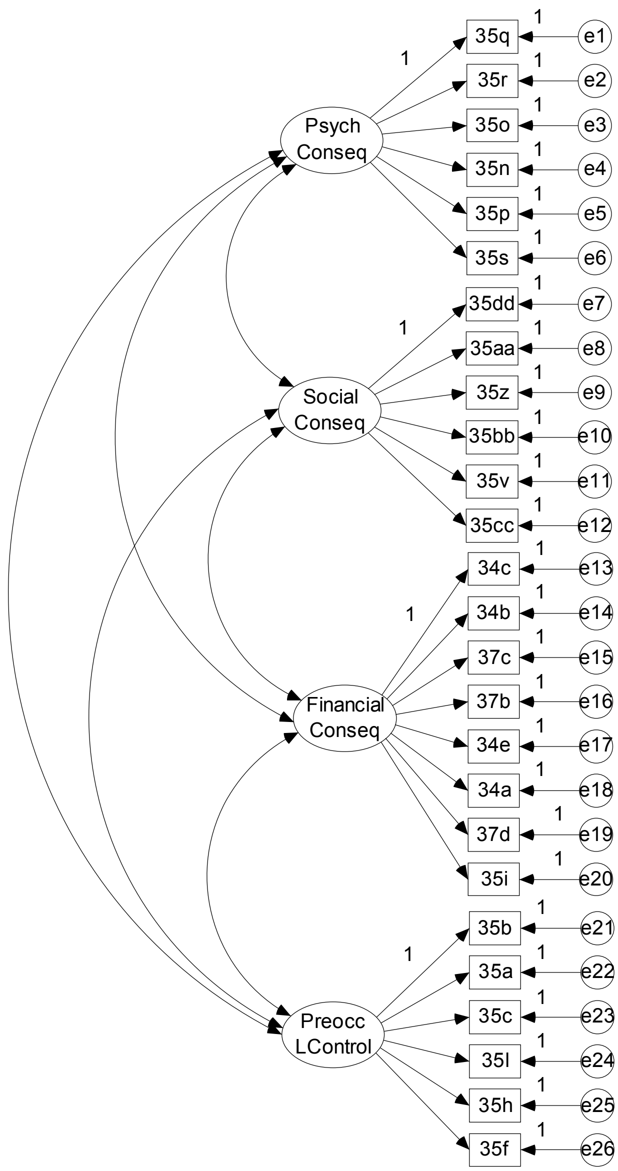
**Figure 2.** One-Factor Model




Next, the four-factor model was tested and resulted in statistically significant factor loadings that ranged from .34 to .84. Correlations among the four factors were all moderate ($M_r = .63$). Model fit was improved but still questionable for all fit indices, $\chi^2 = 1737.66$, $df = 293$, $p < .001$, GFI = .835, NNFI =.814, CFI = .832, and RMSEA =.085.

SMCs for all variables ranged from .11 (11% of variance in item 34a accounted for by the factor) to .70, or 70% of the variance in item 35r. A comparison of the one-factor and four-factor model revealed $\Delta\chi^2_{M2\text{-}M1} = 1597.02$, $df = 6$, $p < .001$, indicating that the four-factor model showed statistically significant improvement in model fit over the one-factor model. All fit indices showed substantial improvement for the four-factor model (see Figure 3).

**Figure 3.** Four-Factor Model




Whereas the four-factor model fit better than the independence model or one-factor model, fit indices indicated that the model could be further improved to potentially meet acceptable levels. For instance, the examination of factor loadings demonstrated that the weakest factor in the model was financial consequences. In particular, item 34a ("How often have you borrowed money from family, friends, or others to gamble/bet") showed the smallest factor loading and lowest SMC. Item 34b ("How often have you taken money that you were supposed to spend on lunch, clothing, movies, etc., and used it for gambling/betting or for paying off gambling/betting debts") had the second lowest factor loading and SMC. These two items could be considered for deletion from the model; however, the small factor loadings may have resulted from the extremely low endorsement rate of items on the instrument. Future research with different samples of adolescents may observe stronger relationships with these items; therefore, the research team decided to retain all items in the four-factor model identified by PCA rather than deleting the two financial consequences items for the purpose of improving model fit.

### *3.2.3 Scoring*

The original research design included two external data sources to establish cut scores (i.e., scores used to divide participants into categories) for levels of gambling risk: adolescents in treatment for gambling problems and clinical assessments. However, as discussed previously, the research team was unable to locate any adolescents in treatment for gambling problems. Also, very few students were identified as having a gambling problem based on the clinical assessments. In the absence of external validation criteria, expert consensus, frequency distributions, and measures of central tendency were used to determine what constitutes gambling risk in the student sample.

The four domains (psychological consequences, social consequences, financial consequences, and preoccupation/impaired control) were scored by summing the items that belonged to each. These factors collectively contained 26 items: 6 psychological consequences items; 6 social consequences items; 8 financial consequences items; and, 6 preoccupation/impaired control items. Time spent gambling was calculated by summing the time (minutes or hours) spent gambling across 18 different types of gambling, with higher scores indicating higher a level of gambling risk. (See Appendix E for questionnaire items and scoring.)

In order to provide an interpretation of the draft instrument scores, cut scores were developed from the sample of 682 students who answered all 26 CAGI items (minus time spent gambling). Analyses comparing the 682 students who provided responses to all CAGI items to those with missing data revealed few differences and no differences related to the participation levels by type of gambling activity (see Appendix D). Frequency distributions and measures of central tendency were used to identify scores that reflect level of gambling risk: scores above the 98th percentile (i.e., upper 2% of the sample) are in the problem gambling range; scores between the 84th and 98th percentile are in the moderate-risk gambling range; and, scores below the 84th percentile are in the low-risk gambling range, or what would be considered normal or having no problems with gambling. Because a considerable portion of the low-risk gambling group scored 0 on psychological consequences, social consequences, financial consequences, and preoccupation/impaired control, this group was further divided to include a negligible-risk gambling category. Time spent gambling did not fit this protocol because students were required to have gambled in the past 3 months to be included. After examining the frequency distribution of time spent gambling, the research team decided that gambling for 1 hour or less best fit the negligible-risk gambling category.

While the goal was to obtain cut scores that divided the frequency distribution into groups at selected percentiles, the frequency distributions did not always provide cut scores that fit these percentiles. One explanation is that some domains had only six items, resulting in a small spread of scores. Also, the distributions of the school sample were positively skewed, with most students falling in the lower range of scores for each domain; therefore, cut scores at each percentile, such as those that yielded 2% in the problem gambling category or 14% in the moderate-risk category (based on a normal distribution), could not always be identified (e.g., 14% was not achieved in the moderate-risk category for social consequences because most students scored 0 or 1 on this domain).

Table 7 shows the cut scores for the five domains. The average scores were as follows: psychological consequences – 1.0 (*SD* = 2.3); social consequences – .4 (*SD* = 1.6); financial consequences – .6 (*SD* = 1.6); preoccupation/impaired control – 2.1 (*SD* = 2.4); and, time spent gambling – 2.1 (*SD* = 2.9).

**Table 7.** Cut Scores and Classification (*n* = 682)

| Domain | Negligible-risk gambling | Low-risk gambling | Moderate-risk gambling | Problem gambling |
|---|---|---|---|---|
| Psychological consequences (score range 0-18) | 0 | 1-2 | 3-8 | 9+ |
| Social consequences (score range 0-18) | 0 | 1 | 2-5 | 6+ |
| Financial consequences (score range 0-24) | 0 | 1 | 2-5 | 6+ |
| Preoccupation/impaired control (score range 0-18) | 0 | 1-4 | 5-9 | 10+ |
| Time spent gambling (total hours across all gambling activities) | 1 or less | 1.25-3.75 | 4-11.75 | 12+ |

Table 8 shows the overall count and percentages of cut scores for adolescents who gambled in the 3 months prior to the survey. Scores in the five domains yield an indication of the level of risk and type of harm experienced by participants. Adolescents scoring in the problem gambling range on any one of the five domains are considered to have a gambling problem. As shown, the majority of gamblers were in the negligible-risk (22%) or low-risk (46%) gambling status categories, with 26% in the moderate-risk category and 6% in the problem gambling category.

**Table 8.** Cut Score Frequency Distribution among Gamblers (*n* = 682)

| Domain | Negligible-risk gambling *n* (%) | Low-risk gambling *n* (%) | Moderate-risk gambling *n* (%) | Problem gambling *n* (%) |
|---|---|---|---|---|
| Psychological consequences | 477 (70) | 102 (15) | 89 (13) | 14 (2) |
| Social consequences | 587 (86) | 46 (7) | 36 (5) | 13 (2) |
| Financial consequences | 490 (72) | 101 (15) | 79 (12) | 12 (2) |
| Preoccupation/impaired control | 221 (32) | 378 (55) | 73 (11) | 10 (2) |
| Time spent gambling | 305 (53) | 186 (32) | 77 (13) | 11 (2) |
| Overall highest level across all domains | 153 (22) | 313 (46) | 177 (26) | 39 (6) |

Table 9 shows the distribution of the cut scores for the entire student sample (gamblers and non-gamblers). Most (69%) were non-gamblers (i.e., had not gambled on any activity in the past 3 months), 8% were in the moderate-risk gambling category, and 2% were in the problem gambling category.

**Table 9.** Cut Score Frequency Distribution for Entire Sample (*N* = 2,226)

| Domain | Negligible-risk gambling *n* (%) | Low-risk gambling *n* (%) | Moderate-risk gambling *n* (%) | Problem gambling *n* (%) |
|---|---|---|---|---|
| Psychological consequences | 477 (21) | 102 (5) | 89 (4) | 14 (1) |
| Social consequences | 587 (26) | 46 (2) | 36 (2) | 13 (1) |
| Financial consequences | 490 (22) | 101 (5) | 79 (4) | 12 (1) |
| Preoccupation/impaired control | 221 (10) | 378 (17) | 73 (3) | 10 (0) |
| Time spent gambling | 305 (14) | 186 (8) | 77 (3) | 11 (0) |
| Overall highest level across all domains | 153 (7) | 313 (14) | 177 (8) | 39 (2) |

Table 10 shows the distribution of the cut scores for gamblers by sex. Based on the criteria, 3% of female gamblers and 8% of male gamblers were classified as gambling at problematic levels.

**Table 10.** Cut Score Frequency Distribution among Gamblers by Sex

| Domain | Negligible-risk gambling *n* (%) | Low-risk gambling *n* (%) | Moderate-risk gambling *n* (%) | Problem gambling *n* (%) |
|---|---|---|---|---|
| **Female Gamblers (*n* = 314)** | | | | |
| Psychological consequences | 225 (72) | 174 (55) | 23 (7) | 1 (0) |
| Social consequences | 278 (89) | 24 (8) | 10 (3) | 2 (1) |
| Financial consequences | 239 (76) | 39 (12) | 34 (11) | 2 (1) |
| Preoccupation/impaired control | 116 (37) | 174 ( 55) | 23 (7) | 1 (0) |
| Time spent gambling (*n* = 267) | 159 (60) | 78 (29) | 28 (11) | 2 (1) |
| Overall highest level across all domains | 88 (28) | 142 (45) | 75 (24) | 9 (3) |
| **Male Gamblers (*n* = 363)** | | | | |
| Psychological consequences | 248 (68) | 53 (15) | 54 (15) | 8 (2) |
| Social consequences | 305 (84) | 22 (6 ) | 25 (7 ) | 11 (3) |
| Financial consequences | 247 (68) | 62 (17) | 44 (12) | 10 (3) |
| Preoccupation/impaired control | 102 (28) | 202 (56) | 50 (14 ) | 9 (3) |
| Time spent gambling (*n* = 309) | 144 (47) | 107 (35) | 49 (16) | 9 (3) |

| Domain | Negligible-risk gambling<br>*n* (%) | Low-risk gambling<br>*n* (%) | Moderate-risk gambling<br>*n* (%) | Problem gambling<br>*n* (%) |
|---|---|---|---|---|
| Overall highest level across all domains | 63 (17) | 169 (47) | 101 (28) | 30 (8) |

Table 11 displays the distribution of the cut scores for the entire sample (gamblers and non-gamblers) by sex. Overall, 1% of females and 3% of males were classified as gambling at problematic levels.

**Table 11.** Cut Score Frequency Distribution for Entire Sample by Sex

| Domain | Negligible-risk gambling<br>*n* (%) | Low-risk gambling<br>*n* (%) | Moderate-risk gambling<br>*n* (%) | Problem gambling<br>*n* (%) |
|---|---|---|---|---|
| **Females (*n* = 1,121)** | | | | |
| Psychological consequences | 225 (20) | 49 (4) | 34 (3) | 6 (1) |
| Social consequences | 278 (25) | 24 (2) | 10 (1) | 2 (0) |
| Financial consequences | 239 (21) | 39 (3) | 34 (3) | 2 (0) |
| Preoccupation/impaired control | 116 (10) | 174 (16) | 23 (2) | 1 (0) |
| Time spent gambling | 159 (14) | 78 (7) | 28 (2) | 2 (0) |
| Overall highest level across all domains | 88 (8) | 142 (13) | 75 (7) | 9 (1) |
| **Males (*n* = 1,105)** | | | | |
| Psychological consequences | 248 (22) | 53 (5) | 54 (5) | 8 (1) |
| Social consequences | 305 (28) | 22 (2) | 25 (2) | 11 (1) |
| Financial consequences | 247 (22) | 62 (6) | 44 (4) | 10 (1) |
| Preoccupation/impaired control | 102 (9) | 202 (18) | 50 (5) | 9 (1) |
| Time spent gambling | 144 (13) | 107 (10) | 49 (4) | 9 (1) |
| Overall highest level across all domains | 63 (6) | 169 (15) | 101 (9) | 30 (3) |

### 3.3 Reliability and Validity

Internal consistency, calculated with scores from the entire school sample, was very good, with three of the domains (psychological consequences, social consequences, and preoccupation/impaired control) having an alpha coefficient > .82 (see Table 12). Financial consequences had a lower but acceptable alpha coefficient of .74. Test-retest coefficients ranged from "acceptable" ($r$ = .60) to "excellent" ($r$ = .91).

**Table 12.** Internal Consistency and Temporal Stability

| CAGI Domain | Internal consistency (α) ($n$ = 682) | Test-retest ($r$) ($n$) |
|---|---|---|
| Psychological consequences (6 items) | .86 | .77 (56) |
| Social consequences (6 items) | .88 | .65 (55) |
| Financial consequences (8 items) | .74 | .60 (54) |
| Preoccupation/ impaired control (6 items) | .83 | .91 (56) |
| Time spent gambling | n/a | .83 (41) |

Convergent validity was examined by computing correlation coefficients between the five domains and indicators of high-risk gambling for the sample of students who had gambled in the past 3 months. As shown in Table 13, each high-risk measure was correlated > .30 with at least one domain, and ranged from $r$ = .12 to .84. These findings suggest that as each high-risk measure increased, so did corresponding measures in the five domains. The moderate strength of the measured correlations suggests that gambling practices and consequences are, in fact, distinct concepts.

**Table 13.** Convergent Validity Correlation Coefficients ($r$) between Domains and High-Risk Gambling Measures

| High-risk measure | Psychological consequences | Social consequences | Financial consequences | Preoccupation/ impaired control | Time spent gambling |
|---|---|---|---|---|---|
| Number of games played | .24 | .25 | .25 | **.42** | **.51** |
| Highest level of gambling frequency | .29 | .28 | **.33** | **.40** | **.54** |
| Sum of gambling frequency | **.32** | **.36** | **.34** | **.42** | **.55** |
| Highest amount of time spent gambling | .22 | **.42** | .15 | **.33** | **.84** |
| Time spent gambling in a typical week | **.37** | **.50** | **.35** | **.59** | **.51** |
| Highest amount of money lost on gambling | .16 | **.46** | .18 | **.33** | **.50** |
| Sum of money lost on gambling | .12 | **.47** | .13 | **.31** | **.50** |

| High-risk measure | Psychological consequences | Social consequences | Financial consequences | Preoccupation/ impaired control | Time spent gambling |
|---|---|---|---|---|---|
| Highest amount of money lost in one day | .17 | **.33** | .14 | .28 | **.48** |
| Sum of the highest amount of money lost in one day | .18 | **.38** | .16 | .29 | **.52** |
| Current gambling debt | **.36** | **.54** | **.46** | .22 | .17 |
| How many friends gamble | .23 | .23 | .18 | **.44** | .26 |

*Note:* correlations >.30 are bolded.

Table 14 shows the results of a number of stepwise multiple regressions for the entire school sample, conducted to assess the relationship between the five domains and high-risk measures. These results demonstrate that each domain contributed to predicting the high-risk measures. For example, 40% of the variance in sum of money spent gambling was explained by all five domains. For sum of gambling frequency, 37% of the variance was explained by three domains (time spent gambling, preoccupation/impaired control, and financial consequences).

**Table 14.** Stepwise Multiple Regression between Domains and Five High-Risk Gambling Measures ($n = 579$)

| Regression step | Related variables | β | Multiple $r$ | $r^2$ |
|---|---|---|---|---|
| **Number of Games Played** | | | | |
| 1 | Time spent gambling | .40 | .51 | .26 |
| 2 | Preoccupation/impaired control | .25 | .56 | .31 |
| **Highest Level of Gambling** | | | | |
| 1 | Time spent gambling | .42 | .54 | .29 |
| 2 | Preoccupation/impaired control | .18 | .58 | .34 |
| 3 | Financial consequences | .14 | .59 | .35 |
| **Sum of Gambling Frequency** | | | | |
| 1 | Time spent gambling | .43 | .55 | .30 |
| 2 | Preoccupation/impaired control | .19 | .59 | .35 |
| 3 | Financial consequences | .14 | .61 | .37 |
| **Sum of Money Spent Gambling** | | | | |
| 1 | Time spent gambling | .36 | .50 | .25 |

| Regression step | Related variables | β | Multiple $r$ | $r^2$ |
|---|---|---|---|---|
| 2 | Social consequences | .48 | .59 | .35 |
| 3 | Psychological consequences | -.20 | .62 | .38 |
| 4 | Financial consequences | -.15 | .63 | .39 |
| 5 | Preoccupation/impaired control | .10 | .63 | .40 |
| **Current Gambling Debt** | | | | |
| 1 | Social consequences | .49 | .55 | .31 |
| 2 | Financial consequences | .32 | .60 | .36 |
| 3 | Preoccupation/impaired control | -.18 | .62 | .38 |

The five domains were compared to the high-risk measures by computing an ANOVA between the gambling status categories and the convergent scales. Results showed that students in the problem gambling category gambled more frequently and with larger amounts of money than students in the negligible-risk, low-risk, and moderate-risk gambling categories (see Table 15).

**Table 15.** Comparison of Domains and Gambling Status Categories with High-Risk Gambling Measures

| High-risk measures | Negligible-risk gambling mean (*SD*) | Low-risk gambling mean (*SD*) | Moderate-risk gambling mean (*SD*) | Problem gambling mean (*SD*) | *F* | *p* |
|---|---|---|---|---|---|---|
| **Preoccupation/Impaired Control** | | | | | | |
| Number of games played | 2.3 (1.7) [b,c,d] | 3.4 (2.2) [c,d] | 4.9 (2.7) | 6.3 (2.9) | 35.5 | < .001 |
| Highest level of gambling | 1.7 (1.2) [b,c,d] | 2.1 (1.1) [c,d] | 3.2 (1.3) | 3.8 (1.3) | 36.4 | < .001 |
| Sum of gambling frequency | 4.1 (5.1) [b,c,d] | 6.0 (5.5) [c,d] | 11.1 (8.8) [d] | 18.4 (12.3) | 38.5 | < .001 |
| Sum of money spent gambling | 6.2 (17.4) [c,d] | 16.4 (37.7) [c,d] | 98.3 (286.1) [d] | 432.1 (968.2) | 32.3 | < .001 |
| Current gambling debt | .6 (5.4) [c,d] | 1.0 (7.3) [c,d] | 16.6 (89.7) [d] | 6.0 (189.7) | 11.1 | < .001 |
| **Financial Consequences** | | | | | | |
| Number of games played | 2.9 (2.1) [b,c,d] | 3.7 (2.5) [d] | 4.3 (2.6) [d] | 5.9 (3.7) | 16.0 | < .001 |
| Highest level of gambling | 1.8 (1.1) [b,c,d] | 2.3 (1.3) [c,d] | 3.0 (1.3) [d] | 3.8 (1.1) | 32.3 | < .001 |

| High-risk measures | Negligible-risk gambling<br><br>mean (*SD*) | Low-risk gambling<br><br>mean (*SD*) | Moderate-risk gambling<br><br>mean (*SD*) | Problem gambling<br><br>mean (*SD*) | *F* | *p* |
|---|---|---|---|---|---|---|
| Sum of gambling frequency | 5.2 (5.6) [b,c,d] | 6.8 (6.3) [c,d] | 9.6 (7.8) [d] | 15.8 (11.6) | 21.8 | < .001 |
| Sum of money spent gambling | 2.5 (147.2) | 2.0 (42.2) [c] | 75.3 (278.9) | 93.4 (85.3) | 3.5 | .02 |
| Current gambling debt | 1.5 (5.7) [d] | 7.3 (6.1) [d] | 1.8 (8.3) [d] | 97.5 (213.4) | 27.6 | < .001 |
| **Social Consequences** | | | | | | |
| Number of games played | 3.0 (2.1) [b,c,d] | 4.2 (2.3) [d] | 5.7 (2.9) | 5.2 (3.5) | 23.8 | < .001 |
| Highest level of gambling | 1.9 (1.2) [b,c,d] | 2.7 (1.2) [c,d] | 3.3 (1.3) | 3.8 (1.2) | 25.7 | < .001 |
| Sum of gambling frequency | 5.4 (5.5) [b,c,d] | 8.7 (6.9) [c,d] | 12.9 (8.8) | 15.8 (13.6) | 3.2 | < .001 |
| Sum of money spent gambling | 12.7 (32.5) [c,d] | 43.7 (108.1) [d] | 98.8 (146.0) [d] | 466.5 (22.7) | 27.6 | < .001 |
| Current gambling debt | .6 (5.9) [c,d] | 1.7 (9.1) [c,d] | 19.4 (87.0) [d] | 9.4 (22.7) | 27.6 | < .001 |
| **Psychological Consequences** | | | | | | |
| Number of games played | 2.9 (2.1) [b,c,d] | 3.8 (2.3) [c] | 4.4 (2.7) | 4.8 (3.2) | 16.9 | < .001 |
| Highest level of gambling | 1.9 (1.1) [b,c,d] | 2.4 (1.2) | 2.8 (1.4) | 3.2 (1.3) | 21.1 | < .001 |
| Sum of gambling frequency | 5.2 (5.7) [b,c,d] | 6.8 (5.5) [c,d] | 9.3 (8.1) [d] | 14.3 (11.4) | 18.7 | < .001 |
| Sum of money spent gambling | 19.1 (148.3) [d] | 19.4 (27.1) [d] | 8.2 (267.1) | 64.8 (8.9) | 4.1 | .007 |
| Current gambling debt | .7 (6.5) [d] | 6.0 (5.5) [d] | .7 (5.5) [d] | 91.4 (211.9) | 28.0 | < .001 |
| **Time Spent Gambling** | | | | | | |
| Number of games played | 2.1 (1.4) [b,c,d] | 4.1 (2.1) [c,d] | 5.4 (2.7) [d] | 7.0 (1.8) | 98.6 | < .001 |
| Highest level of gambling | 1.6 (.9) [b,c,d] | 2.3 (1.1) [c,d] | 3.3. (1.4) [d] | 4.6 (.5) | 88.1 | < .001 |
| Sum of gambling frequency | 3.5 (4.0) [b,c,d] | 7.1 (5.4) [c,d] | 12.2 (8.1) [d] | 19.5 (8.9) | 84.6 | < .001 |
| Sum of money spent gambling | 8.2 (23.8) [c,d] | 25.3 (61.4) [d] | 64.0 (92.6) [d] | 594.0 (1083.8) | 53.8 | < .001 |

| High-risk measures | Negligible-risk gambling mean (*SD*) | Low-risk gambling mean (*SD*) | Moderate-risk gambling mean (*SD*) | Problem gambling mean (*SD*) | *F* | *p* |
|---|---|---|---|---|---|---|
| Current gambling debt | .4 (4.0) | 1.3 (9.8) [d] | 25.7 (113.0) [d] | .1 (.3) | 7.8 | < .001 |
| **Overall Highest Level Across CAGI Domains** | | | | | | |
| Number of games played | 1.9 (1.3) [b,c,d] | 3.1 (2.0) [c,d] | 4.1 (2.4) [d] | 5.6 (3.2) | 46.2 | < .001 |
| Highest level of gambling | 1.4 (1.0) [b,c,d] | 1.9 (1.0) [c,d] | 2.7 (1.3) [d] | 3.8 (1.2) | 72.6 | < .001 |
| Sum of gambling frequency | 3.2 (4.3) [b,c,d] | 5.2 (4.9) [c,d] | 8.3 (6.8) [d] | 15.4 (1.3) | 54.9 | < .001 |
| Sum of money spent gambling | 3.0 (6.3) [d] | 11.2 (21.8) [d] | 34.6 (69.8) [d] | 229.6 (613.3) | 26.0 | < .001 |
| Current gambling debt | .2 (2.5) [d] | .4 (3.8) [d] | 1.5 (9.6) [d] | 47.5 (151.1) | 19.2 | < .001 |

[b] Significantly different from low-risk gambling.
[c] Significantly different from moderate-risk gambling.
[d] Significantly different from problem gambling.

The conceptual framework developed in Phase I challenged the common view that there is a discernable disorder that can be labelled *adolescent problem gambling.* It posited the possibility that problem gambling in adolescents may be better explained as a manifestation of other underlying intrapersonal conditions, such as a predisposing factor, physiological makeup, emotional stresses or disorders, or stage of development. To test this assumption, the research team included validated scales in the survey instrument to concurrently examine: (1) cognitive distortions; (2) impulsivity; (3) decision-making; (4) risk-taking; (5) self-efficacy; and, (6) self-control.

An ANOVA found statistically significant differences between the gambling status categories and the six scales (see Table 16). Adolescents in the problem gambling category scored significantly higher on general risk-taking and impulsivity and lower on self-control, decision-making, and self-efficacy than adolescents in the other three gambling status categories (negligible-risk gambling, low-risk gambling, and moderate-risk gambling).

**Table 16.** Comparison of Gambling Status Categories and Validated Scales

| Scale | Negligible-risk gambling mean (*SD*) | Low-risk gambling mean (*SD*) | Moderate-risk gambling mean (*SD*) | Problem gambling mean (*SD*) | *F* | *p* |
|---|---|---|---|---|---|---|
| **Preoccupation/Impaired Control** | | | | | | |
| Cognitive distortions | .9 (1.0) [b] | 1.2 (1.2) | 1.3 (1.2) | 1.7 (1.3) | 4.4 | .004 |

| Scale | Negligible-risk gambling mean (*SD*) | Low-risk gambling mean (*SD*) | Moderate-risk gambling mean (*SD*) | Problem gambling mean (*SD*) | *F* | *p* |
|---|---|---|---|---|---|---|
| Impulsivity | 1.8 (1.6) $^{b,c,d}$ | 2.1 (1.7) $^{d}$ | 2.4 (1.7) $^{d}$ | 3.9 (1.0) | 6.9 | < .001 |
| Risk-taking | 2.3 (1.6) $^{b,c,d}$ | 2.7 (1.5) $^{c,d}$ | 3.3 (1.7) $^{d}$ | 5.1 (1.6) | 15.8 | < .001 |
| Decision-making | 1.6 (.8) | 1.7 (.7) | 1.5 (.9) | 1.1. (.9) | 3.4 | .02 |
| Self-efficacy | 16.1 (2.7) $^{d}$ | 16.2 (2.5) $^{d}$ | 16.1 (3.2) $^{d}$ | 13.6 (5.1) | 3.2 | .02 |
| Self-control | 45.7 (7.5) $^{b,c}$ | 43.4 (7.8) $^{c}$ | 39.2 (8.3) | 35.0 (8.5) | 8.1 | < .001 |
| **Financial Consequences** | | | | | | |
| Cognitive distortions | 1.1 (1.0) $^{c}$ | 1.2 (1.2) | 1.5 (1.3) | 1.5 (1.1) | 4.2 | .006 |
| Impulsivity | 1.9 (1.7) $^{c,d}$ | 2.1 (1.7) $^{d}$ | 2.6 (1.8) | 3.6 (1.4) | 7.4 | < .001 |
| Risk-taking | 2.5 (1.6) $^{c,d}$ | 2.8 (1.6) $^{c,d}$ | 3.3. (1.7) $^{d}$ | 4.3 (2.0) | 1.2 | < .001 |
| Decision-making | 1.7 (.7) $^{c,d}$ | 1.5 (.8) $^{d}$ | 1.3 (.8) | 1.0 (.8) | 11.4 | < .001 |
| Self-efficacy | 16.2 (2.5) $^{c}$ | 16.5 (2.6) $^{c}$ | 15.3 (3.6) | 14.7 (4.9) | 5.0 | .002 |
| Self-control | 44.7 (7.6) $^{c,d}$ | 44.1 (7.6) $^{c,d}$ | 4.0 (8.8) | 33.8 (4.4 ) | 7.8 | < .001 |
| **Social Consequences** | | | | | | |
| Cognitive distortions | 1.1 (1.1) | 1.4 (1.0) | 1.4 (1.3) | 1.5 (1.2) | 2.8 | .04 |
| Impulsivity | 1.9 (1.7) $^{b,c,}$ | 2.8 (1.7) | 2.8 (1.6) | 3.1 (1.7) | 7.7 | < .001 |
| Risk-taking | 2.5 (1.5) $^{b,c,d}$ | 3.3 (1.5) $^{d}$ | 3.6 (2.0) | 2.6 (2.2) | 15.4 | < .001 |
| Decision-making | 1.7 (.8) $^{b,d}$ | 1.4 (.7) | 1.4 (.6) | 1.1 (1.1) | 5.1 | .002 |
| Self-efficacy | 16.2 (2.6) | 15.8 (2.8) | 16.1 (2.9) | 14.6 (5.7) | 1.8 | .15 |
| Self-control | 44.6 (7.6) $^{b,c,d}$ | 39.8 (8.8) $^{c}$ | 39.3 (9.8) | 35.8 (8.9) | 7.6 | < .001 |
| **Psychological Consequences** | | | | | | |
| Cognitive distortions | 1.0 (1.1) $^{c}$ | 1.2 (1.1) $^{c}$ | 1.5 (1.2) | 1.6 (1.1) | 5.4 | .001 |
| Impulsivity | 1.9 (1.7) $^{c,d}$ | 2.1 (1.7) $^{d}$ | 2.5 (1.8) | 3.3 (1.5) | 5.7 | < .001 |
| Risk-taking | 2.4 (1.6) $^{b,c,d}$ | 3.0 (1.5) | 2.3 (1.7) | 3.9 (2.2) | 11.0 | < .001 |
| Decision-making | 1.7 (.8) $^{d}$ | 1.6 (.6) $^{d}$ | 1.5 (.8) $^{d}$ | 1.1 (.9) | 4.7 | .003 |
| Self-efficacy | 16.2 (2.6) | 16.0 (2.4) $^{d}$ | 16.1 (2.7) $^{d}$ | 14.4 (5.2) | 2.4 | .07 |
| Self-control | 44.7 (7.6) $^{c}$ | 43.1 (6.7) | 41.2 (9.8) | 38.8 (9.8) | 4.7 | .003 |
| **Time Spent Gambling** | | | | | | |
| Cognitive distortions | 1.0 (1.1) $^{b}$ | 1.3 (1.2) | 1.1 (1.1) | 1.3 (.9) | 3.5 | .02 |
| Impulsivity | 1.8 (1.7) $^{b,c}$ | 2.2 (1.8) | 2.6 (1.7) | 1.4 (1.5) | 5.1 | .002 |
| Risk-taking | 2.3 (1.5) $^{b,c}$ | 2.8 (1.5) $^{c}$ | 3.5 (1.9) | 3.3 (1.6) | 13.3 | < .001 |
| Decision-making | 1.8 (.7) $^{c}$ | 1.7 (.8) $^{c}$ | 1.3 (.8) | 1.8 (1.0) | 6.8 | < .001 |

| Scale | Negligible-risk gambling mean (*SD*) | Low-risk gambling mean (*SD*) | Moderate-risk gambling mean (*SD*) | Problem gambling mean (*SD*) | *F* | *p* |
|---|---|---|---|---|---|---|
| Self-efficacy | 16.3 (2.1) | 16.1 (2.7) | 16.1 (3.5) | 15.8 (3.9) | .4 | .75 |
| Self-control | 45.7 (7.4) [b,c] | 42.5 (7.6) [c] | 39.6 (9.9) | 46.0 (NA) | 1.2 | < .001 |
| **Highest Level of CAGI Scales** | | | | | | |
| Cognitive distortions | .9 (1.0) [c] | 1.1 (1.1) [c] | 1.3 (1.2) | 1.3 (1.0) | 3.7 | .01 |
| Impulsivity | 1.7 (1.6) [c,d] | 1.9 (1.7) [c,d] | 2.4 (1.8) | 2.7 (1.6) | 7.3 | .01 |
| Risk-taking | 2.2 (1.6) [c,d] | 2.5 (1.5) [c,d] | 3.1 (1.6) [d] | 3.7 (1.9) | 16.4 | < .001 |
| Decision-making | 1.7 (.7) [c,d] | 1.7 (.7) [c,d] | 1.5 (.8) | 1.3 (.9) | 7.1 | < .001 |
| Self-efficacy | 15.9 (2.5) | 16.4 (2.3) [d] | 16.2 (3.0) [d] | 14.9 (4.4) | 4.2 | .006 |
| Self-control | 45.6 (7.6) [c,d] | 44.7 (7.1) [c,d] | 41.6 (8.9) | 38.3 (8.4) | 9.1 | < .001 |

[b] Significantly different from low-risk gambling.
[c] Significantly different from moderate-risk gambling.
[d] Significantly different from problem gambling.

Discriminant validity was assessed by examining the relationships between the five domains and variables that should be unrelated to high-risk gambling, such as time spent on activities other than gambling. Near-zero correlations between the domains and selected variables supported discriminant validity. For example, correlations with select demographic variables ranged from $r = .00$ to .11. For time spent on activities other than gambling, correlations ranged from $r = .01$ to .11, and all coefficients were below the criterion of $r < .2$.

**Table 17.** Discriminant Validity Correlation Coefficients ($r$) between Domains and Purported Unrelated Variables

| "Unrelated" variable | Psychological consequences | Social consequences | Financial consequences | Preoccupation/ impaired control | Time spent gambling |
|---|---|---|---|---|---|
| **Demographic Variables** | | | | | |
| Live in house vs. apartment | .07 | .02 | .02 | .02 | .00 |
| **Time Spent on Activities** | | | | | |
| Time playing video games | .07 | .14 | .07 | .15 | .23 |
| Time on internet | .03 | .07 | -.03 | .07 | .09 |
| Time watching TV | .05 | .06 | -.01 | .01 | -.03 |
| Time playing sports | -.01 | .08 | -.03 | .04 | .04 |
| Time listening to music | .07 | .09 | .03 | .12 | .11 |
| Time talking on the phone | .05 | .06 | .00 | .07 | .08 |
| Time shopping | .04 | .10 | -.01 | .00 | .03 |
| Time reading | -.03 | .00 | -.10 | -.07 | -.06 |
| Time hanging with friends | .03 | .01 | -.06 | .08 | .05 |

### 3.4 Classification Accuracy

Table 18 shows the correlations between the five domains and three clinical measures (self-reported DSM-IV, clinician-rated DSM-IV, clinician ratings using the GPSS). Correlation coefficients ranged from $r$ = .01 to .48. Social consequences, preoccupation/impaired control, and time spent gambling were moderately and consistently correlated with the clinical measures, while psychological consequences and financial consequences were less consistently correlated. The minimal variability in DSM-IV and GPSS scores contributed to these low correlations.

**Table 18.** Validity Correlation Coefficients ($r$) between Domains and Clinical Measures

| Clinical measures | Psychological consequences | Social consequences | Financial consequences | Preoccupation/ impaired control | Time spent gambling |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| DSM-IV self-reported | .26 | **.43** | .09 | **.31** | **.41** |
| DSM-IV clinician-rated | .10 | .20 | .01 | **.30** | **.34** |
| Clinician ratings using the GPSS | .20 | **.32** | .14 | **.48** | **.42** |

*Note:* correlations >.30 are bolded.

Table 19 shows a comparison of the three clinical measures with each of the four gambling status categories. The results support the validity of the instrument, as DSM-IV scores and clinician ratings using the GPSS were in the expected direction. As gambling risk increased from negligible-risk to problem gambling, DSM-IV scores and clinician ratings using the GPSS also increased. Gambling status categories yielded statistically significant differences for both DSM-IV self-report scores and clinician ratings using the GPSS, and approached significance for DSM-IV clinician-rated scores. Post-hoc comparisons between the gambling status categories showed mixed results, but the negligible-risk gambling category was most often significantly different from the other categories. The small sample size ($n$ = 109) limited this analysis by reducing the statistical power and resulted in skewed frequency distributions of the validity measures, with very low scores on the DSM-IV and clinician ratings using the GPSS.

**Table 19.** Comparison of Clinical Measures and Gambling Status Categories

| **Clinical measures** | **Negligible-risk gambling mean (*SD*)** | **Low-risk gambling mean (*SD*)** | **Moderate-risk gambling mean (*SD*)** | **Problem gambling mean (*SD*)** | ***F*** | ***p*** |
|---|---|---|---|---|---|---|
| DSM-IV self-reported | .0 (.0) [c,d] | .3 (.7) | .5 (.9) | 1.2 (1.6) | 5.0 | .003 |
| DSM-IV clinician-rated | .0 (.2) | .4 (1.0) | .8 (1.8) | 1.0 (2.0) | 2.3 | .08 |
| Clinician ratings using the GPSS | .4 (.9) [b,c,d] | 1.1 (.8) [d] | 1.5 (1.3) | 2.3 (2.0) | 7.7 | < .001 |

[b] Significantly different from low-risk gambling.
[c] Significantly different from moderate-risk gambling.
[d] Significantly different from problem gambling.

Tables 20 and 21 show the crosstabulations of CAGI case identification (with negligible-risk, low-risk, and moderate-risk gambling groups combined) and pathological gambling diagnosis based on DSM-IV self-report and clinician-rated scores, and Table 22 shows the cross-tabulation of CAGI case identification and high severity gambling based on clinician ratings using the GPSS.

The very low prevalence of gambling-related problems among students contributed to unsatisfactory classification rates. Specifically, the desired sample sizes for the moderate-risk and problem gambling groups were not achieved, resulting in weak comparisons of CAGI scores and DSM-IV criteria, and of CAGI scores and clinician ratings based on the GPSS. Also, there were no students in the school sample who were pathological gamblers based on the DSM-IV self-report scores, and only two based on the DSM-IV clinician-rated scores. Due to the lack of pathological gamblers in the sample, we were unable to adequately test the classification accuracy of the draft instrument. Nevertheless, classification indices were computed and demonstrated that the draft instrument was able to accurately identify non-pathological gamblers based on hit rates, specificity, and negative predictive power scores.

**Table 20.** Crosstabulation of CAGI Case Identification with Pathological Gambling Diagnosis based on DSM-IV Self-Report Scores

| DSM-IV diagnosis-student * | Problem gambling | Negligible-/low-/ moderate-risk gambling | Row totals |
|---|---|---|---|
| Present | 0 | 0 | 0 |
| Absent | 6 | 103 | 109 |
| Column Totals | 6 | 103 | 109 |

*Base Rate: 0/109 =.00; Hit Rate: 103/109 =.94; Sensitivity: 0/0 =.00; Specificity: 103/109 =.94; Positive Predictive Power: 0/6 =.00; and, Negative Predictive Power: 103/103 =1.0.

**Table 21.** Crosstabulation of CAGI Case Identification with Pathological Gambling Diagnosis based on DSM-IV Clinician-Rated Scores

| DSM-IV diagnosis-clinician * | Problem gambling | Negligible/low/ moderate-risk gambling | Row totals |
|---|---|---|---|
| Present | 1 | 1 | 2 |
| Absent | 5 | 101 | 106 |
| Column Totals | 6 | 102 | 108 |

*Base Rate: 2/108 =.02; Hit Rate: 102/108 =.94; Sensitivity: 1/2 =.50; Specificity: 101/106 =.95; Positive Predictive Power: 1/6 =.17; and, Negative Predictive Power: 101/102 =.99.

**Table 22.** Crosstabulation of CAGI Case Identification with High Severity Gambling Diagnosis based on Clinician Ratings using the GPSS

| Clinician Rating using the GPSS * | Problem gambling | Negligible/low/ moderate-risk gambling | Row totals |
|---|---|---|---|
| Present | 0 | 0 | 0 |
| Absent | 6 | 102 | 108 |
| Column Totals | 6 | 102 | 108 |

*Base Rate: 0/108 =.00; Hit Rate: 102/108 =.94; Sensitivity: 0/0 =.00; Specificity: 102/108 =.94; Positive Predictive Power: 0/6 =.00; and, Negative Predictive Power: 102/102 =1.0.

## 4. THE FINAL INSTRUMENT

The version of the CAGI emerging from the development process includes measures in the following five areas: (1) types of gambling activities; (2) frequency of participation for each gambling activity; (3) time spent gambling on each gambling activity; (4) total money spent gambling; and, (5) 26 items related to gambling risk/harm (see Appendix E).

As mentioned, the 26 items related to gambling risk and harm allow for four scored domains: (1) psychological consequences; (2) social consequences; (3) financial consequences; and, (4) preoccupation/impaired control. A fifth domain, time spent on gambling, is also scored.

Adolescents who have not gambled on any activity in the past 3 months are considered non-gamblers and do not complete the 26 scored items. For those who have gambled on at least one activity in the past 3 months, item scores are used to classify their gambling into one of the following four gambling status categories: (1) negligible-risk gambling; (2) low-risk gambling; (3) moderate-risk gambling; or, (4) problem gambling. An adolescent's overall classification is calculated as follows:

**Negligible-risk gambling**: Adolescents in this category have gambled in the past 3 months and score in the negligible-risk range on all five domains. They gamble infrequently (i.e., less than 1 hour in a typical week) and for short amounts of time, and experience no negative consequences as a result of their gambling. Adolescents in this category may be referred to as recreational, social, or non-problem gamblers. This category represents what is essentially common behaviour among gambling adolescents in a school setting.

**Low-risk gambling**: Adolescents in this category have gambled in the past 3 months and do not have scores in the moderate-risk or problem gambling categories on any of the five domains. They gamble infrequently (i.e., 1-4 hours in a typical week) and for short periods of time, and may experience a minimal degree of psychological, social, and financial consequences, and/or preoccupation/impaired control as a result of their gambling. This category also represents what is essentially common behaviour among gambling adolescents in a school setting; however, these adolescents acknowledge some degree of concern for their gambling. This category could represent an early indication of risk of developing a gambling problem.

**Moderate-risk gambling:** Adolescents in this category have gambled in the past 3 months on one or more activities and score in the moderate-risk gambling category on one or more of the five domains, but do not have scores in the problem gambling category on any of the five domains. They gamble frequently (i.e., 5-11 hours in a typical week) and for long periods of time, and may experience some moderately significant psychological, social, and financial consequences, and/or preoccupation/impaired control as a result of their gambling. This category represents behaviour that is above the norm among gambling adolescents in a school setting.

**Problem gambling**: Adolescents in this category have gambled in the past 3 months on one or more activities and score in the problem gambling category on at least one of the five domains. They gamble very frequently (i.e., 12 or more hours in a typical week) and for long periods of time, and may experience significant psychological, social, and financial consequences, and/or preoccupation/impaired control as a result of their gambling. They also participate in the highest number of gambling activities compared to gamblers in the negligible-risk, low-risk, and moderate-risk categories. This category represents very high-risk behaviour among gambling adolescents in a school setting.

An adolescent's overall classification is determined by the highest risk level (i.e., highest gambling status category) attained in the five domains. Therefore, assessors should examine item scores in all five domains to determine which domain(s) placed them into the moderate-risk and problem gambling categories. Appendix F provides an overview of the classification scheme, and Appendix G provides examples of adolescents classified in each gambling status category.

# 5. CONCLUSION

Gambling can affect numerous areas of an adolescent's life, and the CAGI captures this complexity. The CAGI addresses many important questions about adolescent gambling, including: How many adolescents gamble? To what extent do adolescents gamble in terms of frequency, time, and money? Who is engaging in high-risk gambling and to what degree? What are the negative psychological, financial, and social consequences of high-risk gambling? Are adolescents neglecting their responsibilities and obligations to gamble? Are adolescents preoccupied and spending too much time gambling? Do adolescents lose control when they gamble?

The CAGI represents significant progress in the assessment of gambling among adolescents. It moves beyond a single, simple scale to the measurement of more complex, multiple themes/domains related to gambling risk and harm. The goal of this research was to develop a screening instrument for use in population health surveys, to help identify adolescents engaging in high-risk gambling. Although the CAGI could be used in a clinical setting to gain a better understanding of gambling risk and harm and associated negative consequences, it's utility for diagnostic purposes has not been established.

## 5.1 Revisiting the Conceptual Framework

The conceptual framework developed in Phase I challenged the common view that there is a discernable disorder that can be labelled *adolescent problem gambling*. It posited the possibility that problem gambling in adolescents may be better explained as a manifestation of other underlying intrapersonal conditions, such as a predisposing factor (e.g., general risk-taking disposition), physiological makeup, emotional stresses or disorders, or stage of development.

To test this assumption, the research team included validated scales in the survey instrument to concurrently examine: cognitive distortions; impulsivity; decision-making; risk-taking; self-efficacy; and, self-control. Results demonstrated statistically significant differences between the four gambling status categories and each of these scales. Also, these differences were in the expected direction; that is, adolescents in the problem gambling category scored significantly higher on general risk-taking and impulsivity and lower on self-control, decision-making, and self-efficacy than adolescents in the moderate-risk, negligible-risk, and low-risk gambling categories. The relationship between adolescent problem gambling and general risk-taking, as well as its relationship to impulsivity, self-control, self-efficacy, and decision-making needs to be explored further with longitudinal methodology. These factors, and perhaps other, are central to the identification and treatment of adolescents exhibiting the highest degree of risk and harm.

## 5.2 Future Research

The development of the CAGI must be seen as a first step, with more research needed to further refine this instrument. This initial investigation suggests that the CAGI results in a multidimensional measure of problem gambling. Although PCA established a four-factor model, and CFA supported a four-factor solution, the results suggest that modifications are needed to improve model fit. For instance, two of the financial consequences items displayed low SMCs and should be evaluated for removal from the model. Replication with additional independent samples of adolescents, particularly samples with more youth with gambling problems, is required to inform future decisions regarding changes to the model.

Given the inability to identify a group of adolescents with known gambling problems, future research needs to cross-validate the preliminary cut scores used to classify adolescents into the gambling status categories. This should be conducted with populations more likely to have adolescents with gambling problems, such as alternative schools and juvenile detention centres. There is also a need for future research to explore different norms for sex and age. This study observed differences by sex and age in relation to the CAGI items; however, due to the lack of external criteria to validate the classification scores, it was premature to propose sex- or age-specific status categories.

Relationships between adolescent problem gambling and general risk-taking, impulsivity, self-control, self-efficacy, and decision-making need to be further explored. These factors (and perhaps others) are central to the identification and treatment of adolescents exhibiting the highest degree of gambling risk. Related to this is a need for research to explore the possibility that high levels of gambling risk may be a symptom of another underlying disorder.

The gambling risk assessed by the CAGI has a temporal dimension; that is, the adolescent is considered to be experiencing the gambling risk or harm *now*. It does not suggest that the adolescent is at risk of developing a gambling problem later in life. Although previous research has found a correlation between an early first experience with gambling and the development of a gambling problem in adulthood, evidence of a cause-and-effect relationship has not been empirically validated. Therefore, longitudinal research that follows adolescents over time is needed to determine whether gambling risk is episodic in adolescence or becomes chronic with the transition into adulthood.

Finally, the results of this study question the appropriateness of using DSM-IV criteria with adolescents, particularly school samples. Given that the DSM-IV criteria represent late-stage adult symptoms, it is possible that they are not appropriate for the assessment of gambling problems among adolescents. Additional research with samples of adolescents with gambling problems would assist in clarifying the limitations of using DSM-IV criteria to assess adolescent problem gambling.

## 5.3 Next Steps

The CAGI is an important development in the assessment of gambling risk and harm among adolescents. The five domain solution is a very strong result, pointing toward dimensions critical to our understanding of how adolescents express difficulties with gambling. Existing measures are conceptualized according to an adult definition of gambling and *pathological gambling*. Much more remains to be learned about the nature, meaning, and impact of gambling and high-risk gambling in adolescent development, including: How severe is the behaviour of skipping get-togethers in order to gamble when you are an adolescent learning new ways of socializing? How problematic is it to use gambling as a way to calm difficult emotions when you are at a period of intense learning of new ways to cope with life's demands?

As part of the research process, the draft Phase 2 report was submitted to the expert panel for review. A clear recommendation was research with populations containing adolescents with gambling problems to refine the scoring and classification scheme developed for the CAGI. At this stage, epidemiological studies using the CAGI to identify the prevalence of adolescent problem gambling should proceed with caution. The cut scores are preliminary, and the instrument will invariably be refined as additional research is conducted.

In response to the limitations of the present study and the recommendations of the expert panel, Phase III has been initiated to identify gambling and problem gambling among a sample of youth with gambling problems. Extensive efforts, involving screening youth in seven substance abuse centres across the province of Quebec, are being used to locate this sub-sample. This new sample will allow the researchers to complete the originally planned cut score analyses and to re-examine the construct of problem gambling.

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# 7. APPENDICES

## **Appendix A.** Draft CAGI

The following survey is about gambling. By gambling we mean when you bet or risk money or something of value so that you can win or gain money or something else of value. Please fill in the answers to the following questions. Some questions might make you feel uncomfortable. You do not have to answer any questions you don't want to. The survey is voluntary. You can choose not to complete this survey.

**How to fill in circles...** **Correct** ● **Incorrect** ✓ **Incorrect** ⊘

**Dark Pencil Please!**

**Please Print Neatly**

1. Are you male or female?

O Male O Female

2. How old are you?

O 12 O 13 O 14 O 15 O 16 O 17 O 18+

3. What grade are you in?

O Grade 7 O Grade 8 O Senior 1 O Senior 2 O Senior 3 O Senior 4

4. How would you describe yourself? *(Fill in all groups that apply)*

O White
O Mexican/Hispanic/Latin
O Black/African
O I don't know
O Asian
O Other, please write in ______________________
O Aboriginal/First Nations

5. During the past month, how much did you work at any job for pay (not including household chores paid through an allowance)?

O I didn't work at all for pay
O 10 - 20 hours/week
O 1 - 4 hours/week
O 20 or more hours/week
O 5 - 9 hours/week

6. During the past month, how much did you earn from your job?

O I didn't earn any money
O $51 - $100
O <$10
O $101 - $200
O $11 - $20
O >$201
O $21 - $50



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7. How much allowance do you receive each month?

- O I don't get allowance
- O <$10
- O $11 - $20
- O $21 - $50
- O $51 - $100
- O $101 - $200
- O >$201

8. During the past month, how much money did you get from your job, allowance, and all other sources?

- O I didn't get any money
- O <$10
- O $11 - $20
- O $21 - $50
- O $51 - $100
- O $101 - $200
- O >$201

9. What type of home do you live in?

- O House
- O Apartment, duplex, townhouse or condominium
- O Mobile home or trailer
- O Something else (Please write down ________________________________ )

10. Which of your parents live at home with you?

- O Both parents
- O Father/stepfather only
- O Mother/stepmother only
- O Other (Please write down ________________________________ )

11. How many adults (age 18 and older) live with you not counting your parents?

[ | ] adults

12. How many people under the age of 18 years live with you (including brothers, sisters, relatives, friends, all others)?

[ | ] people under the age of 18



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**13. If you wanted to, how easy would it be in terms of opportunity to gamble or bet on the following activities?**

| Activities | Very Easy | Kind of Easy | Kind of Hard | Very Hard | Don't Know |
|---|---|---|---|---|---|
| A. Lottery tickets (e.g. 649, Super 7) | O | O | O | O | O |
| B. Instant-win or scratch tickets (e.g. break-open, pull-tab, Nevada strips) | O | O | O | O | O |
| C. Raffle or fundraising tickets | O | O | O | O | O |
| D. Blinko | O | O | O | O | O |
| E. Dice, cards or board games | O | O | O | O | O |
| F. Video lottery terminals (VLTs) | O | O | O | O | O |
| G. Slot machines at casinos or racetracks | O | O | O | O | O |
| H. Arcade or video games for money or something of value | O | O | O | O | O |
| I. Internet | O | O | O | O | O |
| J. Sport Select (e.g. Pro Line, Over/Under, Point Spread) | O | O | O | O | O |
| K. Sports pools or games (i.e. hockey, basketball, etc) | O | O | O | O | O |
| L. Sports through a bookie (i.e., someone who accepts and pay off bets) | O | O | O | O | O |
| M. Horse races (i.e. live track and/or off-track) | O | O | O | O | O |
| N. Table games at casinos (e.g. poker, blackjack, roulette) | O | O | O | O | O |
| O. Own or someone else's performance in games of skill (e.g. pool, golf, bowling, darts) or other activities (e.g. sports, school) | O | O | O | O | O |
| P. A dare or challenge that you can do something | O | O | O | O | O |
| Q. A dare or challenge that someone else can do something | O | O | O | O | O |
| R. Bingo | O | O | O | O | O |
| S. Any other form of gambling/betting (What is it? Please write down ______________________________ ) | O | O | O | O | O |

14. Do your parents gamble?

O Yes  O No  O Don't know

15. How many of your friends gamble/bet frequently?

O None of them  O Some of them  O Most of them  O All of them

16. Do you prefer to hang out with friends who gamble/bet?

O Never  O Sometimes  O Most of the time  O Almost always



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17. How important is gambling/betting in your life?

O Not at all important O Somewhat important O Very important O Extremely important

18. Are you a lucky person?

O Never O Sometimes O Often O Almost always

19. How old were you when you first gambled/bet money or something of value?

[ | ] years old O I have **never** gambled/bet

20. When you first started gambling/betting, did you win large amounts of money or something of value?

O Yes O No O I have **never** gambled/bet

21. How much money did you win the first time you gambled/bet?

O I don't remember
O I didn't win any money
O <$10
O $11 - $20
O $21 - $50
O $51 - $100
O $101 - $200
O more than $201
O I have **never** gambled/bet

**22. How much time do you spend on the following in a typical week?**

| Activity | None | Less than 1 hour | 1-2 hours | 3-4 hours | 5-7 hours | 8-10 hours | More than 10 hours |
|---|---|---|---|---|---|---|---|
| A. Video games | O | O | O | O | O | O | O |
| B. Internet | O | O | O | O | O | O | O |
| C. Watching TV | O | O | O | O | O | O | O |
| D. Playing Sports | O | O | O | O | O | O | O |
| E. Listening to Music | O | O | O | O | O | O | O |
| F. Talking on the Phone | O | O | O | O | O | O | O |
| G. Shopping | O | O | O | O | O | O | O |
| H. Reading | O | O | O | O | O | O | O |
| I. Hanging with Friends | O | O | O | O | O | O | O |
| J. Betting/Gambling | O | O | O | O | O | O | O |
| K. Other interests/hobbies | O | O | O | O | O | O | O |



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**23. Please tell us whether you think the following are either true or false.**

| | | |
|---|---|---|
| A. Staying at the same slot machine improves your chances of winning | O True | O False |
| B. Betting the same numbers for every lottery draw will help you win | O True | O False |
| C. If you flip a coin and get heads 5 times in a row, you are most likely to get tails if you flip the coin again | O True | O False |
| D. You have a better chance of becoming rich by gambling than by working hard | O True | O False |
| E. In a lottery, all numbers have the same chance of winning | O True | O False |
| F. A random series of numbers, such 12 -5 - 23 - 4 - 17, is more likely to win than a series of numbers in sequence, such as 1 - 2 - 3 - 4 - 5 | O True | O False |

**24. Please tell us "yes" or "no" to the following questions.**

| | | |
|---|---|---|
| A. Do you generally do and say things without stopping to think? | O Yes | O No |
| B. Do you usually think carefully before doing anything? | O Yes | O No |
| C. Do you mostly speak before thinking things out? | O Yes | O No |
| D. Do you often get into trouble because you do things without thinking? | O Yes | O No |
| E. Are you an impulsive person? (i.e., a person who uncontrollably reacts or does things immediately without any thought to the action or its consequences)? | O Yes | O No |

**25. Please tell us if you have done the following activities IN THE PAST 3 MONTHS.**

| | | |
|---|---|---|
| A. Drank alcohol (even one drink) | O Yes | O No |
| B. Smoked a cigarette (even a puff) | O Yes | O No |
| C. Used any illegal drug | O Yes | O No |
| D. Been in a physical fight | O Yes | O No |
| E. Rode a bicycle or motorcycle without a helmet (even once) | O Yes | O No |
| F. Rode in a car without wearing a seatbelt (even once) | O Yes | O No |
| G. Stolen anything from a store | O Yes | O No |



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**26. The next set of questions are about how you handled problems you had IN THE PAST MONTH.**

| Question | Never | Sometimes | Most of the times | Almost Always |
|---|---|---|---|---|
| A. How often did you think about what you could do before you did something about the problem? | O | O | O | O |
| B. How often did you think about what would happen before you decided what to do about the problem? | O | O | O | O |
| C. How often did you think about which ways were the best to handle the problem? | O | O | O | O |
| D. How often did you think about what you needed to know so you could solve the problem? | O | O | O | O |

**27. Please tell us whether you agree or disagree with the following.**

| Statement | Strongly disagree | Disagree | I don't agree or disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| A. I can usually achieve what I want if I work hard for it. | O | O | O | O | O |
| B. Once I make plans, I am almost certain to make them work. | O | O | O | O | O |
| C. I can learn almost anything if I set my mind to it. | O | O | O | O | O |
| D. My major accomplishments are entirely due to my hard work and ability. | O | O | O | O | O |

**28. Please indicate how much each of the following statements reflects how you typically are.**

| Statement | Not At All | Some Of The Time | About Half Of The Time | Much Of The Time | Very Much |
|---|---|---|---|---|---|
| A. I am good at resisting temptation | O | O | O | O | O |
| B. I have a hard time breaking bad habits | O | O | O | O | O |
| C. I am lazy | O | O | O | O | O |
| D. I say inappropriate things | O | O | O | O | O |
| E. I do certain things that are bad for me | O | O | O | O | O |
| F. I refuse things that are bad for me | O | O | O | O | O |
| G. I wish I had more self-discipline | O | O | O | O | O |
| H. People would say that I have iron self-discipline | O | O | O | O | O |
| I. Pleasure and fun sometimes keep me from getting work done | O | O | O | O | O |
| J. I have trouble concentrating | O | O | O | O | O |
| K. I am able to work effectively towards long-term goals | O | O | O | O | O |
| L. Sometimes I can't stop myself from doing something, even if I know it is wrong | O | O | O | O | O |
| M. I often act without thinking through all the alternatives | O | O | O | O | O |

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29. In the past 3 months, have you gambled on the following activities? Again by "gamble", we mean to bet or risk money or something of value so that you can win or gain money or something of value.

| Activity | Yes | No |
|---|---|---|
| A. Lottery tickets (e.g. 649, Super 7) | O | O |
| B. Instant-win or scratch tickets (e.g. break-open, pull-tab, Nevada strips) | O | O |
| C. Raffle or fundraising tickets | O | O |
| D. Blinko | O | O |
| E. Dice, cards or board games | O | O |
| F. Video lottery terminals (VLTs) | O | O |
| G. Slot machines at casinos or racetracks | O | O |
| H. Arcade or video games for money or something of value | O | O |
| I. Internet | O | O |
| J. Sport Select (e.g. Pro Line, Over/Under, Point Spread) | O | O |
| K. Sports pools or games (i.e. hockey, basketball, etc) | O | O |
| L. Sports through a bookie (i.e., someone who accepts and pays off bets) | O | O |
| M. Horse races (i.e. live track and/or off-track) | O | O |
| N. Table games at casinos (e.g. poker, blackjack, roulette) | O | O |
| O. Own or someone else's performance in games of skill (e.g. pool, golf, bowling, darts) or other activities (e.g. sports, school) | O | O |
| P. A dare or challenge that you can do something | O | O |
| Q. A dare or challenge that someone else can do something | O | O |
| R. Bingo | O | O |
| S. Any other form of gambling/betting (What is it? Please write down ______________________) | O | O |

**If you answered "no" to ALL of the activities in the last table you have finished the survey. Thank you for taking the time to full out the survey.**

**If you answered "yes" to ANY of the activities in the table, please continue.**

**Read the next instructions carefully and ask your teacher if don't understand them.**

**For question 30, you ONLY need to fill in the table for activities you said "yes" to in question 29. For example, if you said "yes" to gambling on lottery tickets, you will answer columns 1,2,3, and 4 for lottery tickets.**



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30.

| Activity | Columns<br>In the past 3 months……<br>1<br>How often have you gambled or bet on this activity? | | | | | 2<br>About how much time did you spend on this activity in a typical week? (in minutes) | 3<br>How much money in total did you lose on this activity? If you did not lose any money, enter "0". (in dollars) | 4<br>What is the largest amount of money you have lost in a day on this activity? If you did not lose any money, enter "0". (in dollars) |
|---|---|---|---|---|---|---|---|---|
| | About once/ month | 2 - 3 times/ month | about once/ week | 2 - 6 times/ week | Daily | | | |
| A. Lottery tickets (e.g. 649, Super 7) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| B. Instant-win or scratch tickets (e.g. break-open, pull-tab, Nevada strips) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| C. Raffle or fundraising tickets | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| D. Blinko | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| E. Dice, cards or board games | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| F. Video lottery terminals (VLTs) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| G. Slot machines at casinos or racetracks | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| H. Arcade or video games for money or something of value | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| I. Internet | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| J. Sport Select (e.g. Pro Line, Over/Under, Point Spread) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| K. Sports pools or games (i.e. hockey, basketball, etc) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| L. Sports through a bookie (i.e. someone who accepts and pays off bets) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| M. Horse races (i.e.live track and/or off-track) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| N. Table games at casinos (e.g. poker, blackjack, roulette) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| O. Own or someone else's performance in games of skill (e.g. pool, golf, bowling, darts) or other activities (e.g. sports, school) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| P. A dare or challenge that you can do something | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| Q. A dare or challenge that someone else can do something | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| R. Bingo | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |
| S. Any other form of gambling/betting (What is it? Please write down ____________) | ○ | ○ | ○ | ○ | ○ | min./week | $ .00 | $ .00 |

31. Of these activities you have done in the past 3 months, which is your favorite?

○ I don't have a favourite write down a letter from the above table (e.g. Bingo = R)

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☞ **The following questions (32-42) are about your gambling/betting OVER THE PAST 3 MONTHS.**

32. When you have gambled/bet has it **usually** been alone or with others? *(Please choose one)*

O Alone
O With friends
O With family members
O With people I work with
O With others (please write down) ______________________

**33. Why did you gamble/bet? Because.........**

| | | |
|---|---|---|
| you wanted to have fun? | O Yes | O No |
| you wanted to get a rush or excited? | O Yes | O No |
| you wanted to take risks? | O Yes | O No |
| you wanted to do like your friends were doing? | O Yes | O No |
| your family gambled/bet? | O Yes | O No |
| you saw gambling/betting on television? | O Yes | O No |
| you felt pressured by others to bet/gamble? | O Yes | O No |
| you felt lonely? | O Yes | O No |
| you felt rejected? | O Yes | O No |
| you needed money? | O Yes | O No |
| you wanted to win back money you lost before? | O Yes | O No |
| you felt stressed or anxious? | O Yes | O No |
| you felt angry or frustrated? | O Yes | O No |
| you felt annoyed? | O Yes | O No |
| you hoped to win a lot of money? | O Yes | O No |
| you wanted to impress your friends? | O Yes | O No |
| you consider yourself to be a professional gambler? | O Yes | O No |

**34. Sometimes people do things because of gambling/betting. Please tell us how often you have done the following things in THE PAST 3 MONTHS.**

| Question | Never | 1-3 times | 4-6 times | 7 or more times |
|---|---|---|---|---|
| A. How often have you borrowed money from family, friends, or others to gamble/bet? | O | O | O | O |
| B. How often have you taken money that you were supposed to spend on lunch, clothing, movies, etc., and used it for gambling/betting or for paying off gambling/betting debts? | O | O | O | O |
| C. How often have you sold your personal property(such as CDs, a Game boy, etc.) to have money to gamble/bet or to pay off your gambling/betting debts? | O | O | O | O |
| D. How often have you stolen money or other things of value in order to gamble/bet or to pay off your gambling/betting debts? | O | O | O | O |
| E. How often have you, or someone on your behalf, bullied, threatened, or beaten up another person to pay back the gambling/betting money he or she owed you? | O | O | O | O |
| F. How often have you changed friends from those who do not gamble/bet to those who do gamble/bet? | O | O | O | O |
| G. How often have you arrived late or skipped school because of your gambling/betting? | O | O | O | O |



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35. **Again, the following questions are about your gambling/betting OVER THE PAST 3 MONTHS.**

| Question | Never | Sometimes | Most of the time | Almost always |
|---|---|---|---|---|
| A. How often have you talked about gambling/betting? | O | O | O | O |
| B. How often have you thought about gambling/betting? | O | O | O | O |
| C. How often have you planned your gambling/betting activities? | O | O | O | O |
| D. How often have you gambled/bet to get your mind off your problems? | O | O | O | O |
| E. How often have you felt that gambling/betting is becoming too important to you? | O | O | O | O |
| F. How often have you gambled/bet with more money than you intended to? | O | O | O | O |
| G. How often have you gambled/bet with more money than you wanted to? | O | O | O | O |
| H. How often have you gambled/bet for longer periods of time than you intended to? | O | O | O | O |
| I. How often have you gambled/bet more than you could really afford to lose? | O | O | O | O |
| J. How often have you gone back another day to try to win back the money you lost while gambling/betting? | O | O | O | O |
| K. How often have you owed money to people because of your gambling/betting? | O | O | O | O |
| L. How often have you gambled/bet your winnings? | O | O | O | O |
| M. When you have won a gamble/bet, how often have you gambled/bet your winnings immediately? | O | O | O | O |
| N. How often have you felt bad about the way you gamble/bet or what happens when you gamble/bet? | O | O | O | O |
| O. How often has gambling/betting made you feel frustrated? | O | O | O | O |
| P. How often has gambling/betting made you feel stressed? | O | O | O | O |
| Q. How often have you felt guilty about how much money you have lost gambling/betting? | O | O | O | O |
| R. How often have you felt sad or depressed about how much money you have lost gambling/betting? | O | O | O | O |
| S. How often have you felt it would be better for your well-being to stop gambling/betting? | O | O | O | O |
| T. How often have you felt that you would like to stop betting money but didn't think you could? | O | O | O | O |
| U. How often have you hidden your gambling/betting from your parents, other family members, or teachers? | O | O | O | O |
| V. How often has your family or friends complained that you gamble/bet too much? | O | O | O | O |
| W. How often have people criticized your gambling/betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? | O | O | O | O |
| X. How often have you gambled/bet mainly because your friends were gambling/betting? | O | O | O | O |
| Y. How often have you gambled/bet because of pressure from others? | O | O | O | O |
| Z. How often have you skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet? | O | O | O | O |
| AA. How often have you skipped family gatherings in order gamble/bet? | O | O | O | O |
| BB. How often have you skipped get-togethers with friends in order to gamble/bet? | O | O | O | O |
| CC. How often have you spent time gambling/betting when you were supposed to be doing homework? | O | O | O | O |
| DD. How often have you skipped practice or dropped out of activities (such as team sports or band) due to your gambling/betting? | O | O | O | O |



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36a) In the past 3 months, how often have you felt that you might have a problem with gambling/betting ?

O Not at all  O A little bit  O Somewhat  O Very much

b) If you said in 36a) that you have felt you might have problem (a little, somewhat or very much) with gambling/betting, for how long have you felt that way?

O less than 1 month  O 1 month  O 2 months  O 3 months

**37. Once again, these questions are still about your gambling/betting in THE PAST 3 MONTHS**

| Question | Not at all | A little | Somewhat | Very much |
|---|---|---|---|---|
| A. How often has gambling/betting caused you any health problems, including stress or anxiety? | O | O | O | O |
| B. How often has your gambling/betting caused money problems for you? | O | O | O | O |
| C. How often have you had difficulties paying your gambling/betting debts? | O | O | O | O |
| D. How often has someone put pressure on you, in any way, to pay what you owe after you lost a gamble/bet? | O | O | O | O |
| E. How often has gambling/betting caused you problems in your friendship? | O | O | O | O |
| F. How often has gambling/betting caused you problems in your family relations? | O | O | O | O |
| G. How often have you gotten into trouble at school or work because of your gambling/betting? | O | O | O | O |

38. How much money do you currently owe from gambling/betting?

$ ☐☐☐☐.00

39. What is the largest amount of money you have ever owed from gambling/betting?

$ ☐☐☐☐.00

40. Have you ever taken on a part-time job to have money for gambling/betting or pay off gambling/betting debts?

O Yes  O No

41. In the past three months, how much of your allowance or other "free" money have you spent on gambling/betting?

O None  O A little  O Most of it  O All of it

42. Do you know when you're due for a win at gambling/bettling?

O Never  O Sometimes  O Most of the time  O Almost always

***Thank you for taking the time to fill out this questionnaire***

☺

**Appendix B**. Endorsement of Items

| DOMAIN | VARIABLES | ITEMS (based on Original CAGI) | TOTAL (*n* = 864) | PROVINCES (*n*) | | GENDER (*n*) | | AGE (*n*) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Manitoba (*n* = 406) | Quebec (*n* = 458) | Girls (*n* = 395) | Boys (*n* = 463) | 12-14 (*n* = 373) | 15-17 (*n* = 490) |
| Problem Gambling Cognition | Motivation | 35d. How often have you gambled//bet to get your mind off your problems? | 57 (6.6%) | 32 (7.9%) | 25 (5.5%) | 21 (5.3%) | 36 (7.8%) | 20 (5.4%) | 37 (7.6%) |
| | Preoccupation | 35b. How often have you thought about gambling/betting? | 392 (45.5%) | 210 (51.7%) | 182 (39.7%) | 162 (41.0%) | 228 (49.2%) | 127 (34.0%) | 265 (54.1%) |
| | | 17. How important is gambling/betting in your life? | 178 (2.6%) | 70 (17.2%) | 108 (23.6%) | 68 (17.2%) | 109 (23.5%) | 83 (22.3%) | 94 (19.2%) |
| | | 35e. How often have you felt that gambling/ betting is becoming too important to you? | 39 (4.5%) | 20 (4.9%) | 19 (4.1%) | 9 (2.3%) | 30 (6.5%) | 12 (3.2%) | 27 (5.5%) |
| | | 35a. How often have you talked about gambling / betting? | 438 (5.7%) | 219 (53.9%) | 219 (47.8%) | 190 (48.1%) | 248 (53.6%) | 142 (38.1%) | 296 (6.4%) |
| | Luck | 18. Are you a lucky person? | 785 (9.9%) | 366 (9.1%) | 419 (91.5%) | 353 (89.4%) | 426 (92.0%) | 347 (93.0%) | 437 (89.2%) |
| | | 42. Do you know when you're due for a win at gambling/betting? | 215 (24.9%) | 106 (26.1%) | 109 (23.8%) | 67 (17.0%) | 146 (31.5%) | 74 (19.8%) | 141 (28.8%) |
| Problem Gambling | Financing | 41. In the past three months, how much of your allowance or other "free" money have you spent on gambling/betting? | 233 (27.0%) | 123 (3.3%) | 110 (24.0%) | 84 (21.3%) | 149 (32.2%) | 69 (18.5%) | 164 (33.5%) |
| | | 34b. How often have you taken money that you were supposed to spend on lunch, clothing, movies, etc., and used it for gambling / betting or for paying off gambling / betting debts? | 81 (9.4%) | 42 (1.3%) | 39 (8.5%) | 22 (5.6%) | 58 (12.5%) | 38 (10.2%) | 43 (8.8%) |

| DOMAIN | VARIABLES | ITEMS (based on Original CAGI) | TOTAL ($n$ = 864) | PROVINCES ($n$) | | GENDER ($n$) | | AGE ($n$) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Manitoba ($n$ = 406) | Quebec ($n$ = 458) | Girls ($n$ = 395) | Boys ($n$ = 463) | 12-14 ($n$ = 373) | 15-17 ($n$ = 490) |
| | | 34c. How often have you sold your personal property (such as CDs, a Game boy, etc.) to have money to gamble/bet or to pay off your gambling/betting debts? | 22 (2.5%) | 16 (3.9%) | 6 (1.3%) | 4 (1.0%) | 18 (3.9%) | 14 (3.8%) | 8 (1.6%) |
| | | 34d. How often have you stolen money or other things of value in order to gamble/bet or to pay off your gambling/betting debts? | 17 (2.0%) | 13 (3.2%) | 4 (.9%) | 4 (1.0%) | 13 (2.8%) | 7 (1.9%) | 10 (2.0%) |
| | | 35k. How often have you owed money to people because of your gambling/betting? | 72 (8.3%) | 52 (12.8%) | 20 (4.4%) | 19 (4.8%) | 53 (11.4%) | 23 (6.2%) | 49 (10.0%) |
| | | 34a. How often have you borrowed money from family, friends, or others to gamble/bet? | 115 (13.3%) | 67 (16.5%) | 48 (1.5%) | 49 (12.4%) | 66 (14.3%) | 49 (13.1%) | 66 (13.5%) |
| | | 35l. How often have you gambled/bet your winnings? | 188 (21.8%) | 116 (28.6%) | 72 (15.7%) | 62 (15.7%) | 125 (27.0%) | 51 (13.7%) | 137 (28.0%) |
| | | 35m. When you have won a gamble/bet, how often have you gambled/bet your winnings immediately? | 170 (19.7%) | 99 (24.4%) | 71 (15.5%) | 55 (13.9%) | 114 (24.6%) | 38 (10.2%) | 132 (26.9%) |
| | Impaired control | 35i. How often have you gambled/bet more than you could really afford to lose? | 60 (6.9%) | 37 (9.1%) | 23 (5.0%) | 20 (5.1%) | 39 (8.4%) | 19 (5.1%) | 41 (8.4%) |
| | | 35c. How often have you planned your gambling/betting activities? | 215 (24.9%) | 133 (32.8%) | 82 (17.9%) | 64 (16.2%) | 150 (32.4%) | 66 (17.7%) | 149 (3.4%) |
| | | 35f. How often have you gambled/bet with more money than you intended to? | 101 (11.7%) | 69 (17.0%) | 32 (7.0%) | 36 (9.1%) | 64 (13.8%) | 23 (6.2%) | 78 (15.9%) |
| | | 35h. How often have you gambled/bet for longer periods of time than you intended to? | 94 (1.9%) | 64 (15.8%) | 30 (6.6%) | 30 (7.6%) | 64 (13.8%) | 27 (7.2%) | 67 (13.7%) |

| DOMAIN | VARIABLES | ITEMS (based on Original CAGI) | TOTAL ($n$ = 864) | PROVINCES ($n$) | | GENDER ($n$) | | AGE ($n$) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Manitoba ($n$ = 406) | Quebec ($n$ = 458) | Girls ($n$ = 395) | Boys ($n$ = 463) | 12-14 ($n$ = 373) | 15-17 ($n$ = 490) |
| | | 35g. How often have you gambled/bet with more money than you wanted to? | 84 (9.7%) | 52 (12.8%) | 32 (7.0%) | 29 (7.3%) | 55 (11.9%) | 23 (6.2%) | 61 (12.4%) |
| | Chasing | 35j. How often have you gone back another day to try to win back the money you lost while gambling/betting? | 72 (8.3%) | 44 (1.8%) | 28 (6.1%) | 22 (5.6%) | 50 (1.8%) | 18 (4.8%) | 54 (11.0%) |
| | Hiding | 35u. How often have you hidden your gambling/betting from your parents, other family members, or teachers? | 68 (7.9%) | 40 (9.9%) | 28 (6.1%) | 24 (6.1%) | 44 (9.5%) | 20 (5.4%) | 48 (9.8%) |
| | School problems | 34g. How often have you arrived late or skipped school because of your gambling/betting? | 31 (3.6%) | 25 (6.2%) | 6 (1.3%) | 6 (1.5%) | 24 (5.2%) | 8 (2.1%) | 23 (4.7%) |
| | | 35cc. How often have you spent time gambling/betting when you were supposed to be doing homework? | 78 (9.0%) | 55 (13.5%) | 23 (5.0%) | 29 (7.3%) | 49 (1.6%) | 20 (5.4%) | 58 (11.8%) |
| | | 35dd. How often have you skipped practice or dropped out of activities (such as team sports or band) due to your gambling/betting? | 23 (2.7%) | 16 (3.9%) | 7 (1.5%) | 6 (1.5%) | 17 (3.7%) | 10 (2.7%) | 13 (2.7%) |
| Negative Consequences | Problem recognition | 36a. In the past 3 months, how often have you felt that you might have a problem with gambling/betting? | 35 (4.1%) | 23 (5.7%) | 12 (2.6%) | 10 (2.5%) | 24 (5.2%) | 12 (3.2%) | 23 (4.7%) |
| | | 35t. How often have you felt that you would like to stop betting money but didn't think you could? | 54 (6.3%) | 28 (6.9%) | 26 (5.7%) | 22 (5.6%) | 32 (6.9%) | 21 (5.6%) | 33 (6.7%) |
| | | 35s. How often have you felt it would be better for your well being to stop gambling/betting? | 113 (13.1%) | 61 (15.0%) | 52 (11.4%) | 46 (11.6%) | 66 (14.3%) | 43 (11.5%) | 70 (14.3%) |

| DOMAIN | VARIABLES | ITEMS (based on Original CAGI) | TOTAL ($n$ = 864) | PROVINCES ($n$) | | GENDER ($n$) | | AGE ($n$) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Manitoba ($n$ = 406) | Quebec ($n$ = 458) | Girls ($n$ = 395) | Boys ($n$ = 463) | 12-14 ($n$ = 373) | 15-17 ($n$ = 490) |
| | Personal Consequences | 35w. How often have people criticized your gambling/betting or told you that you had a gambling/betting problem, regardless of whether or not you thought it was true? | 38 (4.4%) | 22 (5.4%) | 16 (3.5%) | 8 (2.0%) | 29 (6.3%) | 11 (2.9%) | 27 (5.5%) |
| | | 35v. How often has your family or friends complained that you gamble/bet too much? | 42 (4.9%) | 26 (6.4%) | 16 (3.5%) | 12 (3.0%) | 30 (6.5%) | 17 (4.6%) | 25 (5.1%) |
| | | 35o. How often has gambling/betting made you feel frustrated? | 131 (15.2%) | 80 (19.7%) | 51 (11.1%) | 51 (12.9%) | 80 (17.3%) | 43 (11.5%) | 88 (18.0%) |
| | | 35p. How often has gambling/betting made you feel stressed? | 82 (9.5%) | 38 (9.4%) | 44 (9.6%) | 33 (8.4%) | 48 (1.4%) | 25 (6.7%) | 57 (11.6%) |
| | | 35n. How often have you felt bad about the way you gamble/bet or what happens when you gamble/bet? | 95 (11.0%) | 70 (17.2%) | 25 (5.5%) | 34 (8.6%) | 60 (13.0%) | 26 (7.0%) | 69 (14.1%) |
| | | 35q. How often have you felt guilty about how much money you have lost gambling/betting? | 92 (1.6%) | 53 (13.1%) | 39 (8.5%) | 34 (8.6%) | 58 (12.5%) | 24 (7.4%) | 68 (13.9%) |
| | | 35r. How often have you felt sad or depressed about how much money you have lost gambling/betting? | 68 (7.9%) | 39 (9.6%) | 29 (6.3%) | 24 (6.1%) | 43 (9.3%) | 22 (5.9%) | 46 (9.4%) |
| | | 37a. How often has gambling/betting caused you any health problems, including stress or anxiety? | 18 (2.1%) | 10 (2.5%) | 8 (1.7%) | 4 (1.0%) | 14 (3.0%) | 4 (1.1%) | 14 (2.9%) |
| | | 37b. How often has your gambling/betting caused money problems for you? | 39 (4.5%) | 32 (7.9%) | 7 (1.5%) | 14 (3.5%) | 25 (2.5%) | 12 (3.2%) | 27 (5.5%) |
| | | 37c. How often have you had difficulties paying your gambling/betting debts? | 25 (2.9%) | 20 (4.9%) | 5 (1.1%) | 7 (1.8%) | 18 (3.9%) | 12 (3.2%) | 13 (2.7%) |

| DOMAIN | VARIABLES | ITEMS (based on Original CAGI) | TOTAL (*n* = 864) | PROVINCES (*n*) | | GENDER (*n*) | | AGE (*n*) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Manitoba (*n* = 406) | Quebec (*n* = 458) | Girls (*n* = 395) | Boys (*n* = 463) | 12-14 (*n* = 373) | 15-17 (*n* = 490) |
| | | 37d. How often has someone put pressure on you, in any way, to pay what you owe after you lost a gamble/bet? | 27 (3.1%) | 20 (4.9%) | 7 (1.5%) | 7 (1.8%) | 20 (4.3%) | 8 (2.1%) | 19 (3.9%) |
| | Social Consequences | 35aa. How often have you skipped family gatherings in order to gamble/bet? | 25 (2.9%) | 17 (4.2%) | 8 (1.7%) | 6 (1.5%) | 18 (3.9%) | 6 (1.6%) | 19 (3.9%) |
| | | 35bb.How often have you skipped get-togethers with friends in order to gamble/bet? | 28 (3.2%) | 20 (4.9%) | 8 (1.7%) | 9 (2.3%) | 18 (3.9%) | 8 (2.1%) | 20 (4.1%) |
| | | 37e. How often has gambling/betting caused you problems in your friendships? | 16 (1.9%) | 13 (3.2%) | 3 (.7%) | 4 (1.0%) | 11 (2.4%) | 6 (1.6%) | 10 (2.0%) |
| | | 37f. How often has gambling/betting caused you problems in your family relations? | 18 (2.1%) | 13 (3.2%) | 5 (1.1%) | 9 (2.3%) | 9 (1.9%) | 10 (2.7%) | 8 (1.6%) |
| | | 37g. How often have you gotten into trouble at school or work because of your gambling/betting? | 26 (3.0%) | 23 (5.7%) | 3 (.7%) | 4 (1.0%) | 22 (4.8%) | 7 (1.9%) | 19 (3.9%) |
| Problem Gambling Correlates | Peer Group | 34e. How often have you, or someone on your behalf, bullied, threatened, or beaten up another person to pay back the gambling/betting money he or she owed you? | 25 (2.9%) | 17 (4.2%) | 8 (1.7%) | 4 (1.0%) | 20 (4.3%) | 7 (1.9%) | 18 (3.7%) |
| | | 34f. How often have you changed friends from those who do not gamble/bet to those who do gamble/bet? | 18 (2.1%) | 13 (3.2%) | 5 (1.1%) | 7 (1.8%) | 11 (2.4%) | 8 (2.1%) | 10 (2.0%) |

| DOMAIN | VARIABLES | ITEMS (based on Original CAGI) | TOTAL (*n* = 864) | PROVINCES (*n*) | | GENDER (*n*) | | AGE (*n*) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Manitoba (*n* = 406) | Quebec (*n* = 458) | Girls (*n* = 395) | Boys (*n* = 463) | 12-14 (*n* = 373) | 15-17 (*n* = 490) |
| | | 35z. How often have you skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet? | 31 (3.6%) | 20 (4.9%) | 11 (2.4%) | 8 (2.0%) | 22 (4.8%) | 9 (2.4%) | 22 (4.5%) |
| | | 16. Do you prefer to hang out with friends who gamble/bet? | 469 (54.3%) | 219 (53.9%) | 250 (54.6%) | 188 (47.6%) | 279 (6.3%) | 195 (52.3%) | 273 (55.7%) |
| | | 15. How many of your friends gamble/bet frequently? | 510 (59.0%) | 248 (61.1%) | 262 (57.2%) | 208 (52.7%) | 300 (64.8%) | 169 (45.3%) | 340 (69.4%) |
| | | 35y. How often have you gambled/bet because of pressure from others? | 42 (4.9%) | 26 (6.4%) | 16 (3.5%) | 15 (3.8%) | 27 (5.8%) | 11 (2.9%) | 31 (6.3%) |
| | | 35x. How often have you gambled/bet mainly because your friends were gambling/betting ? | 113 (13.1%) | 70 (17.2%) | 43 (9.4%) | 42 (1.6%) | 71 (15.3%) | 26 (7.0%) | 87 (17.8%) |
| Number of items with extremely low endorsement rate (10 or less respondents / shaded cells). The scale has 51 items. | | | 0 | 1 | 15 | 18 | 1 | 13 | 3 |

*Note:* Items with extremely low endorsement rates are highlighted.

**Appendix C.** Items Eliminated in the Factor Analysis by Classification

| DOMAIN | VARIABLES | INDICATORS | ITEMS | ITEMS ELIMINATED IN THE 1ST 5- FACTOR SOLUTION | ITEMS ELIMINATED IN THE SUBSEQUENT 4-FACTOR SOLUTION |
|---|---|---|---|---|---|
| Problem Gambling Cognition | Motivation | Escape | 35d. How often have you gambled//bet to get your mind off your problems? | The best loading of the item is in a factor non congruent with the original conceptual classification of the item | |
| | **Preoccupation** | Thinking about gambling | 35b. How often have you thought about gambling/betting? | | |
| | | Importance of gambling/betting | 17. How important is gambling/betting in your life? | | … in a factor non congruent with the original conceptual classification of the item |
| | | | 35e. How often have you felt that gambling/betting is becoming too important to you? | | … in a factor non congruent with the original conceptual classification of the item |
| | | Talking about gambling | 35a. How often have you talked about gambling/betting? | | |
| | Luck | Lucky person | 18. Are you a lucky person? | | No significant loading on any factor |
| | | Predicting luck | 42. Do you know when you're due for a win at gambling/betting? | | … in a factor non congruent with the original conceptual classification of the item |

| DOMAIN | VARIABLES | INDICATORS | ITEMS | ITEMS ELIMINATED IN THE 1ST 5- FACTOR SOLUTION | ITEMS ELIMINATED IN THE SUBSEQUENT 4-FACTOR SOLUTION |
|---|---|---|---|---|---|
| Problem Gambling | Financing | Allowance | 41. In the past three months, how much of your allowance or other “free” money have you spent on gambling/betting? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Using other designated money | 34b. How often have you taken money that you were supposed to spend on lunch, clothing, movies, etc., and used it for gambling/betting or for paying off gambling/betting debts? | | |
| | | Sold property | 34c. How often have you sold your personal property (such as CDs, a Game boy, etc.) to have money to gamble/bet or to pay off your gambling/betting debts? | | |
| | | Stolen money or valuables | 34d. How often have you stolen money or other things of value in order to gamble/bet or to pay off your gambling/betting debts? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Owe money | 35k. How often have you owed money to people because of your gambling/betting? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Borrowing | 34a. How often have you borrowed money from family, friends, or others to gamble/bet? | | |
| | | Investing gambling winnings | 35l. How often have you gambled/bet your winnings? | | |
| | | | 35m. When you have won a gamble/bet, how often have you gambled/bet your winnings immediately? | Redundancy: Item 35l is a better measure of the concept | |
| | Impaired control | Bet more than could afford | 35i. How often have you gambled/bet more than you could really afford to lose? | | |

| DOMAIN | VARIABLES | INDICATORS | ITEMS | ITEMS ELIMINATED IN THE 1ST 5- FACTOR SOLUTION | ITEMS ELIMINATED IN THE SUBSEQUENT 4-FACTOR SOLUTION |
|---|---|---|---|---|---|
| | | Planning to gamble | 35c. How often have you planned your gambling/betting activities? | | |
| | | Gamble more than intended | 35f. How often have you gambled/bet with more money than you intended to? | | |
| | | | 35h. How often have you gambled/bet for longer periods of time than you intended to? | | |
| | | Gamble more than wanted | 35g. How often have you gambled/bet with more money than you wanted to? | … in a factor non congruent with the original conceptual classification of the item<br>Double loadings | |
| | Chasing | Returning to win back loses | 35j. How often have you gone back another day to try to win back the money you lost while gambling/betting? | | … in a factor non congruent with the original conceptual classification of the item<br>Double loadings |
| | Hiding | Hiding gambling evidence from others | 35u. How often have you hidden your gambling/betting from your parents, other family members, or teachers? | … in a factor non congruent with the original conceptual classification of the item | |
| | School problems | Skipped school to gamble | 34g. How often have you arrived late or skipped school because of your gambling/betting? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Skipped homework to gamble | 35cc. How often have you spent time gambling/betting when you were supposed to be doing homework? | | |

| DOMAIN | VARIABLES | INDICATORS | ITEMS | ITEMS ELIMINATED IN THE 1ST 5- FACTOR SOLUTION | ITEMS ELIMINATED IN THE SUBSEQUENT 4-FACTOR SOLUTION |
|---|---|---|---|---|---|
| | | Skipped/dropped out of activities | 35dd. How often have you skipped practice or dropped out of activities (such as team sports or band) due to your gambling/betting? | | |
| Negative Consequences | Problem recognition | Felt problem | 36a. In the past 3 months, how often have you felt that you might have a problem with gambling/betting? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Could not quit | 35t. How often have you felt that you would like to stop betting money but didn't think you could? | | Bad formulation, measuring two concepts<br>Double loadings |
| | | Avoidance | 35s. How often have you felt it would be better for your well being to stop gambling/betting? | | |
| | Personal Consequences | Criticism | 35w. How often have people criticized your gambling/betting or told you that you had a gambling/betting problem, regardless of whether or not you thought it was true? | Double loadings<br>Redundancy: Item 35v is a better measure of the concept | |
| | | Complaints | 35v. How often has your family or friends complained that you gamble/bet too much? | | |
| | | Frustration | 35o. How often has gambling/betting made you feel frustrated? | | |
| | | Stress | 35p. How often has gambling/betting made you feel stressed? | | |
| | | Feeling bad | 35n. How often have you felt bad about the way you gamble/bet or what happens when you gamble/bet? | | |
| | | Feeling guilty | 35q. How often have you felt guilty about how much money you have lost gambling/betting? | | |
| | | Feeling depressed | 35r. How often have you felt sad or depressed about how much money you have lost gambling/betting? | | |

| DOMAIN | VARIABLES | INDICATORS | ITEMS | ITEMS ELIMINATED IN THE 1ST 5- FACTOR SOLUTION | ITEMS ELIMINATED IN THE SUBSEQUENT 4-FACTOR SOLUTION |
|---|---|---|---|---|---|
| | | Health problems | 37a. How often has gambling/betting caused you any health problems, including stress or anxiety? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Financial problems | 37b. How often has your gambling/betting caused money problems for you? | | |
| | | | 37c. How often have you had difficulties paying your gambling/betting debts? | | |
| | | | 37d. How often has someone put pressure on you, in any way, to pay what you owe after you lost a gamble/bet? | | |
| | Social Consequences | Skipped family gatherings | 35aa. How often have you skipped family gatherings in order to gamble/bet? | | |
| | | Skipped get-togethers with friends | 35bb. How often have you skipped get-togethers with friends in order to gamble/bet? | | |
| | | Problems with friendships | 37e.How often has gambling/betting caused you problems in your friendships? | | No significant loading on any factor |
| | | Problems with family | 37f. How often has gambling/betting caused you problems in your family relations? | | … in a factor non congruent with the original conceptual classification of the item |
| | | Problems at school/work | 37g. How often have you gotten into trouble at school or work because of your gambling/betting? | | … in a factor non congruent with the original conceptual classification of the item |
| | | Intimidation | 34e. How often have you, or someone on your behalf, bullied, threatened, or beaten up another person to pay back the gambling/betting money he or she owed you? | | |

| DOMAIN | VARIABLES | INDICATORS | ITEMS | ITEMS ELIMINATED IN THE 1ST 5- FACTOR SOLUTION | ITEMS ELIMINATED IN THE SUBSEQUENT 4-FACTOR SOLUTION |
|---|---|---|---|---|---|
| Problem Gambling Correlates | Peer Group | Changed Friends | 34f. How often have you changed friends from those who do not gamble/bet to those who do gamble/bet? | | … in a factor non congruent with the original conceptual classification of the item |
| | | Hanging out with Friends | 35z. How often have you skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet? | | |
| | | Gambling Friends | 16. Do you prefer to hang out with friends who gamble/bet? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Friend's gambling frequency | 15. How many of your friends gamble/bet frequently? | … in a factor non congruent with the original conceptual classification of the item | |
| | | Peer pressure to gamble | 35y. How often have you gambled/bet because of pressure from others? | … in a factor non congruent with the original conceptual classification of the item<br>Double loadings | |
| | | | 35x. How often have you gambled/bet mainly because your friends were gambling/betting ? | … in a factor non congruent with the original conceptual classification of the item | |

## Appendix D Comparison of Missing Data Participants

Among the sample of gamblers, 682 provided responses to all 26 items of the CAGI and 182 had missing data and were omitted. Analyses were conducted in order to identify particularities or differences among those youth with missing data.

A key observation is that a majority (52.7%) of participants with missing data stopped the questionnaire after responding to the question concerning gambling activities (question #29). Approximately one-third (about 30%) of missing data cases jumped over questions, failing to respond to more than 10% of the items. Finally, approximately 20% of participants with missing data had 1 or 2 unanswered items.

When compared to those with complete data, incompletes tend to be younger (m = 14,40 years old, s.d. = 1.8 versus m = 14.69, s.d. = 1.7), $t$ (861) = 3.87, $p < .001$. This age difference is reflected in the distribution of the school grade: 29.7% of the rejected cases are in grade 7 compared to 14.2% from the selected cases. It is also reflected in the proportion of students who reported working for money during the last three months (51.6% of the not included sample versus 58.8%), $\chi^2 = 3.84$, $p < .05$. Distribution by sex, living arrangements (i.e. proportion living with both parents) and type of residence (more than 80% living in a house) are not different between the two groups. Participants with complete data are more likely to be Caucasian (80.9% vs 74.7%), $\chi^2 = 4.49$, $p < .05$.

Table D1 illustrates the degree of access to different types of gambling activities. The results show that the missing data group are less able to access a number of different types of games compared to the complete data group. This is likely related to their younger age.

**Table D1.** Easy Access to Gambling Among Complete and Incomplete Data Groups

| Gambling / betting activities | Complete % (*n* = 682) | Incomplete% (*n* = 182) | Total % (*n* = 864) |
|---|---|---|---|
| Lottery tickets | 48.7 | 33.3 | 45.6**** |
| Instant win / scratch tickets | 66.4 | 54.1 | 63.9*** |
| Raffle / fundraising tickets | 60.7 | 52.4 | 59.0* |
| Dice, cards, board games | 67.6 | 60.6 | 66.2 |
| VLTs | 24.2 | 20.1 | 23.4 |
| Slote machines, casino, racetracks | 18.9 | 18.2 | 18.8 |
| Arcade, video games for money | 63.0 | 68.0 | 64.0 |
| Internet gambling | 61.3 | 58.1 | 60.6 |
| Sport Select | 44.1 | 42.6 | 43.8 |
| Sport pools or games | 61.5 | 50.6 | 59.3*** |
| Sports through a bookie | 15.5 | 16.1 | 15.6 |

| | | | |
|---|---|---|---|
| Horse races | 26.4 | 22.6 | 25.7 |
| Table games at casinos | 17.5 | 19.9 | 18.0 |
| Betting on own or someone else performance | 69.3 | 59.2 | 67.3*** |
| Dare or challenge that you can do something | 76.9 | 66.3 | 74.7*** |
| Dare of challenge that someone else can do something | 74.0 | 66.9 | 72.6* |
| Bingo | 64.2 | 58.8 | 63.1 |
| Other | 22.4 | 21.4 | 22.2 |

Chi squared used to compare proportions
* $p < .05$, ** $p < .01$, *** $p < .001$, **** $p < .0001$

However, there were no differences between the two groups related to type of gambling participation. As shown in the table below, students with complete data who were retained in the analyses gamble proportionately on the same activities as those excluded due to missing data.

**Table D2.** Gambling Participation Among Complete and Incomplete Data Groups

| **Gambling / betting activities** | **Included (*n* = 682)** | **Not included (*n* = 182)** | **Total (*n* = 864)** |
|---|---|---|---|
| Lottery tickets | 13.9 | 9.1 | 12.9 |
| Instant win / scratch tickets | 39.2 | 33.9 | 38.1 |
| Raffle / fundraising tickets | 25.7 | 20.1 | 24.5 |
| Dice, cards, board games | 39.6 | 40.4 | 39.8 |
| VLTs | 6.4 | 6.9 | 6.5 |
| Slote machines, casino, racetracks | 4.7 | 5.8 | 4.9 |
| Arcade, video games for money | 23.5 | 26.3 | 24.1 |
| Internet gambling | 12.1 | 16.6 | 13.1 |
| Sport Select | 12.2 | 9.8 | 11.7 |
| Sport pools or games | 26.2 | 21.7 | 25.2 |
| Sports through a bookie | 2.0 | 1.2 | 1.8 |
| Horse races | 4.3 | 4.6 | 4.3 |
| Table games at casinos | 7.1 | 7.6 | 7.2 |

| | | | |
|---|---|---|---|
| Betting on own or someone else performance | 26.3 | 28.4 | 26.7 |
| Dare or challenge that you can do something | 38.6 | 34.7 | 37.8 |
| Dare of challenge that someone else can do something | 33.5 | 28.1 | 32.4 |
| Bingo | 12.9 | 14.9 | 13.3 |
| Other | 9.1 | 9.2 | 9.1 |

Chi squared used to compare proportions
* $p < .05$, ** $p < .01$, *** $p < .001$, **** $p < .0001$,

Overall, with the exception of being younger and less likely to be Caucasion, the sample of students excluded from the factorial analysis and classification analyses are similar to the sample that was retained.

**Appendix E.** Final CAGI

# CAGI



**Canadian Adolescent Gambling inventory, V 1.08, novembre 2007**

Wiebe, J., Wynne, H., Stinchfield, R., Tremblay, J. (2007)

**Name** (optional) ____________ **ID** ______ **Date** ____ - __ - __
Year Month Day

**How old are you?** 11 ○ 12 ○ 13 ○ 14 ○ 15 ○ 16 ○ 17 ○ 18+ ○

**Are you male or female?** ○ Female ○ Male

**The following questionnaire is about gambling. By gambling, we mean when you**
***bet or risk money or something of value***
**to have a chance to win or gain money or something else of value.**

**IN THE LAST 3 MONTHS...**
**How often did you bet or gamble money or something of value on the following activities and approximately how much time per week did you spent on each one?**

How often have you gambled or bet on this activity? If you answer "Not in the past 3 months" go to the next activity

About how much time did you spend on this activity in a typical week?

| Activity | Not in the past 3 months | About once/ month | 2 - 3 times/ month | about once/ week | 2 - 6 times/ week | Daily | 15 min. or less | 30 min. | 1 hour | 2 hours | 3 hours | 4 hours | 5 hours | 6 hours or more |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Lottery tickets (e.g. 6/49, Super 7) | 1a) ○ | ○ | ○ | ○ | ○ | ○ | 1b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. Instant-win or scratch tickets (e.g. break-open, pull-tab, Nevada strips) | 2a) ○ | ○ | ○ | ○ | ○ | ○ | 2b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. Raffle or fundraising tickets | 3a) ○ | ○ | ○ | ○ | ○ | ○ | 3b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4. Blinko | 4a) ○ | ○ | ○ | ○ | ○ | ○ | 4b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5. Dice, cards or boardgames | 5a) ○ | ○ | ○ | ○ | ○ | ○ | 5b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6. Video lottery terminals (VLTs) | 6a) ○ | ○ | ○ | ○ | ○ | ○ | 6b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 7. Slot machines at casinos or racetracks | 7a) ○ | ○ | ○ | ○ | ○ | ○ | 7b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8. Arcade or video games for money or something of value | 8a) ○ | ○ | ○ | ○ | ○ | ○ | 8b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9. Internet | 9a) ○ | ○ | ○ | ○ | ○ | ○ | 9b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10. Sport Select (e.g. Pro Line, Over/Under, Point Spread) | 10a) ○ | ○ | ○ | ○ | ○ | ○ | 10b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11. Sports pools or games (i.e. hockey, basketball, etc) | 11a) ○ | ○ | ○ | ○ | ○ | ○ | 11b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12. Sports through a bookie (i.e. someone who accepts and pays off bets) | 12a) ○ | ○ | ○ | ○ | ○ | ○ | 12b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 13. Horse race (i.e.live a track and/or off-track) | 13a) ○ | ○ | ○ | ○ | ○ | ○ | 13b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 14. Table games at casinos (e.g. poker, blackjack, roulette) | 14a) ○ | ○ | ○ | ○ | ○ | ○ | 14b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15. Own or someone else's performance in games of skill (e.g. pool, golf, bowling, darts) or other activities (e.g. sports, school) | 15a) ○ | ○ | ○ | ○ | ○ | ○ | 15b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 16. A dare or challenge that you can do something | 16a) ○ | ○ | ○ | ○ | ○ | ○ | 16b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17. A dare or challenge that someone else can do something | 17a) ○ | ○ | ○ | ○ | ○ | ○ | 17b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 18. Bingo | 18a) ○ | ○ | ○ | ○ | ○ | ○ | 18b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 19. Any other form of gambling/betting (What is it? Please write down (________________) | 19a) ○ | ○ | ○ | ○ | ○ | ○ | 19b) ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

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**If you have not gambled on any of the above activities DURING THE LAST THREE MONTH, the questionnaire is done. If you gambled on one or more activies, please continue to item #20.**

20. DURING THE LAST 3 MONTHS, how much money in total did you lose on gambling/betting? If you did not lose any money, enter "0" (in dollars). $ [ | | ] .00

| **The following questions are about your gambling/betting OVER THE PAST 3 MONTHS.** | Never | Some-times | Most of the time | Almost always |
|---|---|---|---|---|
| 21. How often have you felt guilty about how much money you have lost gambling/betting? | 0 | 1 | 2 | 3 |
| 22. How often have you skipped practice or dropped out of activities (such as team sports or band) due to your gambling/betting? | 0 | 1 | 2 | 3 |
| 23. How often have you gambled/bet more than you could really afford to lose? | 0 | 1 | 2 | 3 |
| 24. How often have you thought about gambling/betting? | 0 | 1 | 2 | 3 |
| 25. How often have you felt sad or depressed about how much money you have lost gambling/betting? | 0 | 1 | 2 | 3 |
| 26. How often have you skipped family gatherings in order to gamble/bet? | 0 | 1 | 2 | 3 |
| 27. How often have you talked about gambling/betting? | 0 | 1 | 2 | 3 |
| 28. How often has gambling/betting made you feel frustrated? | 0 | 1 | 2 | 3 |
| 29. How often have you skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet? | 0 | 1 | 2 | 3 |
| 30. How often have you planned your gambling/betting activities? | 0 | 1 | 2 | 3 |
| 31. How often have you felt bad about the way you gamble/bet or what happens when you gamble/bet? | 0 | 1 | 2 | 3 |
| 32. How often have you skipped get-togethers with friends in order to gamble/bet? | 0 | 1 | 2 | 3 |
| 33. How often have you gambled/bet your winnings? | 0 | 1 | 2 | 3 |
| 34. How often has gambling/betting made you feel stressed? | 0 | 1 | 2 | 3 |
| 35. How often have your family or friends complained that you gamble/bet too much? | 0 | 1 | 2 | 3 |
| 36. How often have you gambled/bet for longer periods of time than you intended to? | 0 | 1 | 2 | 3 |
| 37. How often have you felt it would be better for your well-being to stop gambling/betting? | 0 | 1 | 2 | 3 |
| 38. How often have you spent time gambling/betting when you were supposed to be doing homework? | 0 | 1 | 2 | 3 |
| 39. How often have you gambled/bet with more money than you intended to? | 0 | 1 | 2 | 3 |
| 40. How often has your gambling/betting caused money problems for you? | 0 | 1 | 2 | 3 |
| 41. How often have you had difficulties paying your gambling/betting debts? | 0 | 1 | 2 | 3 |
| 42. How often has someone put pressure on you, in any way, to pay what you owe after you lost a gamble/bet? | 0 | 1 | 2 | 3 |

| **Sometimes people do things because of gambling/betting. Please tell us how often you have done the following things in THE PAST 3 MONTHS** | Never | 1-3 times | 4-6 times | 7 or more times |
|---|---|---|---|---|
| 43. How often have you borrowed money from family, friends, or others to gamble/bet? | 0 | 1 | 2 | 3 |
| 44. How often have you taken money that you were supposed to spend on lunch, clothing, movies, etc., and used it for gambling/betting or for paying off gambling/betting debts? | 0 | 1 | 2 | 3 |
| 45. How often have you sold your personal property (such as electronics, clothings, etc) to have money to gamble/bet or to pay off your gambling/betting debts? | 0 | 1 | 2 | 3 |
| 46. How often have you, or someone on your behalf, bullied, threatened, or beaten up another person to pay back the gambling/betting money he or she owed you? | 0 | 1 | 2 | 3 |

**Appendix F. CAGI Framework, Scoring, and Classification**

**Framework and Questionnaire Items**

| DOMAIN | VARIABLES | INDICATORS | ITEMS |
|---|---|---|---|
| Demographics | Gender | Male or female | Are you male or female? |
| | Age | Years | How old are you? |
| Gambling Activity | Gambling | Gambling activities and frequency | 1a – 19a. In the last 3 months, how often did you bet or gamble money or something of value on the following activities (list of gambling/betting activities)? |
| | Duration | Time at play/session | 1b – 19b. About how much time did you spend on this activity in a typical week [list of gambling/betting activities]? |
| | Expenditure | Money wagered monthly | 2. During the last 3 months, how much money in total did you lose on gambling/betting? |
| Psychological Consequences | Negative feelings | Frustration | 28. How often has gambling/betting made you feel frustrated? |
| | | Stress | 34. How often has gambling/betting made you feel stressed? |
| | | Feeling bad | 31. How often have you felt bad about the way you gamble/bet or what happens when you gamble/bet? |
| | | Feeling guilty | 21. How often have you felt guilty about how much money you have lost gambling/betting? |
| | | Feeling depressed | 25. How often have you felt sad or depressed about how much money you have lost gambling/betting? |
| | | Stop gambling | 37. How often have you felt it would be better for your well being to stop gambling/betting? |
| Social Consequences | Avoidance | Skipped homework to gamble | 38. How often have you spent time gambling/betting when you were supposed to be doing homework? |
| | | Skipped/dropped out of activities | 22. How often have you skipped practice or dropped out of activities (such as team sports or band) due to your gambling/betting? |
| | | Skipped family gatherings | 26. How often have you skipped family gatherings in order to gamble/bet? |
| | | Skipped get-togethers with friends | 32. How often have you skipped get-togethers with friends in order to gamble/bet? |

| | | | |
|---|---|---|---|
| | | Hanging out with Friends | 29. How often have you skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet? |
| | Criticism | Complaints | 35. How often have your family or friends complained that you gamble/bet too much? |
| Financial Consequences | Financing gambling | Using other designated money | 41. How often have you taken money that you were supposed to spend on lunch, clothing, movies, etc., and used it for gambling/betting or for paying off gambling/betting debts? |
| | | Sold property | 42. How often have you sold your personal property (such as electronics, clothings, etc) to have money to gamble/bet or to pay off your gambling/betting debts? |
| | | Borrowing | 4. How often have you borrowed money from family, friends, or others to gamble/bet? |
| | Financial problems | Bet more than could afford | 23. How often have you gambled/bet more than you could really afford to lose? |
| | | Money problems | 44. How often has your gambling/betting caused money problems for you? |
| | | Difficulties paying debts | 45. How often have you had difficulties paying your gambling/betting debts? |
| | | Pressure to pay debts | 46. How often has someone put pressure on you, in any way, to pay what you owe after you lost a gamble/bet? |
| | | Intimidation | 43. How often have you, or someone on your behalf, bullied, threatened, or beaten up another person to pay back the gambling/betting money he or she owed you? |
| Preoccupation and Impaired control Consequences | Preoccupation | Thinking about gambling | 24. How often have you thought about gambling/betting? |
| | | Talking about gambling | 27. How often have you talked about gambling/betting? |
| | Impaired control | Planning to gamble | 3. How often have you planned your gambling/betting activities? |
| | | Gamble more money than intended | 39. How often have you gambled/bet with more money than you intended to? |
| | | Gambled more time than intended | 36. How often have you gambled/bet for longer periods of time than you intended to? |
| | | Investing gambling winnings | 33. How often have you gambled/bet your winnings? |

**Response Scales**

| | |
|---|---|
| Gender | male; female |
| Age | 11 years; 12 years, 13 years, 14 years, 15 years, 16 years, 17 years, 18+ years |
| Question 1a – 19a | Not in the past 3 months; about once/month; 2-3 times/month; about once/week; 2-6 times/week; daily |
| Question 1b – 19b | 1 hours or less; 2 hours; 3 hours; 4 hours; 5 hours; 6 hours; 7 hours or more / week. |
| Questions 20 | record actual dollar amount |
| Questions 21 – 42 | never = 0; sometimes = 1; most of the time = 2; almost always = 3 |
| Questions 43 – 46 | never = 0; 1-3 times = 1; 4-6 times = 2; 7 or more times = 3 |

**Scoring**

a) Time Spent Gambling

- Time spent gambling is measured with the following response options for each gambling activity and these are then summed across all games: 0 = 0; 15 minutes = .25; 30 minutes = .50; 1 hour = 1; 2 hours = 2; 3 hours = 3; 4 hours = 4; 5 hours = 5; 6 or more hours = 6

b) Consequence Questionnaire Items

For each domain, add item according to response scales above.

Psychological Consequences

- Add items 21, 25, 28, 31, 34, 37. Scores range from 0 to 18.

Social Consequences

- Add items 22, 26, 29, 32, 35, 38. Scores range from 0 to 18.

Financial Consequences

- Add items 23, 40, 41, 42, 43, 44, 45, 46. Scores range from 0 to 24.

Preoccupation and Impaired control

- Add items 24, 27, 30, 33, 36, 39. Scores range from 0 to 18

**Classification of Adolescent Gambler Risk Sub-Types**

There are five classification categories of gambling risk based on the following cut-points. An individual's overall classification is the highest risk level attained on any of the five domains.

| **Domain** | **Negligible-risk gambling** | **Low-risk gambling** | **Moderate-risk gambling** | **Problem gambling** |
|---|---|---|---|---|
| Psychological consequences | 0 | 1-2 | 3-8 | 9+ |
| Social consequences | 0 | 1 | 2-5 | 6+ |
| Financial consequences | 0 | 1 | 2-5 | 6+ |
| Preoccupation/impaired control | 0 | 1-4 | 5-9 | 10+ |
| Time spent gambling | 1 or less | 1.25-3.75 | 4-11.75 | 12+ |

**Appendix G.** Examples of CAGI Classifications

Table A1 presents domain ratings for adolescents classified into the four gambling status categories. Below are brief descriptions of adolescents classified into each category to give the reader a deeper understanding of the continuum of gambling risk/harm. Personal identifiers have been omitted or modified. Descriptions are based on responses to the CAGI, and when available, include information obtained from the clinical interview.

**Table A1.** Examples of Domain Scores for Gamblers Classified into each Gambling Status Category

| Gambling Status Category | Psychological consequences | | Social consequences | | Financial consequences | | Preoccupation / impaired control | | Time spent gambling | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Score | Cat. | Score | Cat. | Score | Cat. | Score | Cat. | Score | Cat. |
| **Problem gambling** | | | | | | | | | | |
| Fu (17 years old)- 781 | 13 | Prob. | 7 | Prob. | 11 | Prob. | 12 | Prob. | 3 | Low |
| Marina (13 years old) – 9469 | 11 | Prob. | 9 | Prob. | 7 | Prob. | 5 | Mod. | 3.25 | Low |
| Jason (12 years old) -3034 | 7 | Mod. | 9 | Prob. | 9 | Prob. | 6 | Mod. | 6 | Mod. |
| Judith (15 years old)- 2027 | 10 | Prob. | 3 | Mod. | 0 | Neg. | 1 | Low | 1 | Low |
| **Moderate-risk gambling** | | | | | | | | | | |
| Eric (17 years old) – 4025 | 4 | Mod. | 0 | Neg. | 2 | Mod. | 5 | Mod. | 1 | Neg. |
| Steven (15 years old) – 9975 | 1 | Low | 2 | Mod. | 0 | Neg. | 7 | Mod. | 4.5 | Mod. |
| **Low-risk gambling** | | | | | | | | | | |
| Phillip (13 years old) – 2091 | 0 | Neg. | 0 | Neg. | 1 | Low | 2 | Low | 3 | Low |
| William (16 years old) - 2033 | 0 | Neg. | 0 | Neg. | 1 | Low | 2 | Low | 1.5 | Low |
| **Negligible-risk gambling** | | | | | | | | | | |
| Helen (15 years old) – 2053 | 0 | Neg. | 0 | Neg. | 0 | Neg. | 0 | Neg. | 0.25 | Neg. |
| Samuel (17 years old) – 4047 | 0 | Neg. | 0 | Neg. | 0 | Neg. | 0 | Neg. | 1 | Neg. |

## Descriptions of Students in the Problem Gambling Category

Fu is 17 years of age and in Senior 4 grade. He works approximately 20 hours/week. He buys instant win or scratch tickets 2-3 times per month, plays dice or cards for money once/week, and plays arcade or video games for money approximately once/month. He spends about an hour/week on gambling and lost around $200 in the last three months. While he says that gambling is not at all important in his life, Fu reports frequently using lunch or clothing money to gamble. He also frequently arrives late or misses school because of his gambling. He thinks about gambling most of the time, and gambles with more money and longer periods than intended. He almost always goes back another day to try and win back gambling losses.

Marina is 13 years old, and in grade 7. She has between $20 and $50 per month from allowance and jobs, and reports using it all to gamble / bet. She has access to lottery tickets or scratch tickets about once a week, play cards or dice for money once a week, and bets each day on own or someone else's performance. She spends approximately 3 hours/week on these activities. However, she reports a loss of only $15 in the last three months (which is likely an under-reporting). She gives the following reasons for gambling/betting: to have fun, the excitement with taking risks, needing money, and dealing with stress, anger and frustration. She borrowed money in order to gamble (4 times), sold personal objects, has been bullied/threatened to pay gambling debts, and has skipped school once to gamble. She has sometimes gambled more money than she wanted and for longer periods. She almost always feels guilty about gambling. She almost always thinks it would be better to stop gambling. Most of the time significant people have criticized her gambling activities.

Jason is 12 years old, in 6th grade and lives with both parents. He reports getting more than $200 per month from allowance and small jobs. He plays dice / cards for money about 2-3 times / month, plays arcades or video-games for money numerous times / week (5 hours/ week), and bets on Sport Select once/month. He reports losing $125 in the last three months to gambling. In the last three months Jason has borrowed money 1 to 3 times in order to gamble and reports almost always gambling / betting more than he could really afford to lose. Almost always he feels that it would be better for his well-being to stop gambling / betting. Often he skips hanging out with friends who dot not gamble / bet in order to hang out with friends who do gamble. Jason didn't participate in the clinical interview.

Judith is 15 years old, Senior 2. She's considered to have problematic gambling behaviour on the CAGI primarily because of her psychological consequences domain score of 10. In terms of gambling activities, she reports only buying raffle or fundraising tickets once/month or less. In the last three months she has lost approximately $2. She reports almost always feeling guilty or sad about the money she has lost, and almost always feeling it would be better for her well-being to stop gambling. The clinical interview revealed that when she was young her mother bought her scratch tickets, but that her mother has since stopped because of the legal age limits. Judith is preoccupied with the secret wish to obtain these tickets and having free access when she turns 18 years of age. Judith self-rated one on DSM-IV symptoms, indicating that she returned gambling another day (even if it was for less than $1) to try to win back her money.

**Descriptions of Students in the Moderate-Risk Gambling Category**

Eric is 17 years old, Senior 2 grade. He earns more than $200 per month. His mother buys him lottery tickets 5 times / month. He says gambling in not at all important for him but participates in many gambling activities. He plays cards or dice for money 3 times a month. He bets on sports events (approximately 15 games of basket or hockey seen on television during the last three months, mainly with friends). On each game he bets between $2 and $20 dollars, and estimates that he has lost $40 in the last three months. He also bet on games of skills 5 times in the same period, betting $5 each time. Ten times a week he gambles on dice games, spending about $10 a week on it ($120 during the last three months). He doesn't talk to his parents about his gambling for fear of disapproval. His father is a past pathological gambler. Friends sometimes tell him he should gamble less. He has gambled 1 to 5 times to try and win back lost money. He sometimes feels that he is gambling too much, but reports having a feeling of excitation when gambling. He thinks gambling is not a problem for him because he says he can stop whenever he wants.

Steven is 15 years old, Senior 1 grade. He has about $50 /month of free money. He says gambling is very important to him. He obtains scratch tickets once a month from his parents. He bet on sports events once a month ($10 each time), on games of skills once in the last three months and plays cards once a week ($5 each time). He bets on video games 3 times / month. He estimated he lost $65 in the last three months. He sometimes thinks gambling is becoming too important and sometimes gambles with more money than intended. Sometimes significant people (mother) have criticized his gambling activities. Sometimes he skips hanging out with friends to gamble. The clinician felt that Steven was underestimating the importance of gambling in his life, and how much time he is spending on gambling or thinking about gambling.

**Descriptions of Students in the Low-Risk Gambling Category**

Phillip is 13 years old, in $7^{th}$ grade and has less than $10/month of spending money. He plays video or arcade games for money, participates in Sporting pools/events, and bets on someone's performance. He spends about three hours/week on these activities and reports a $5 lost in the last three months. He sometimes bets because he is angry or frustrated, or because he needs money. The symptoms he reports are sometimes using money intended for lunch or leisure activities to gamble and sometimes thinking and talking about gambling.

William is 16 years old, Senior 1 grade. He works 20 hours / week and earns more than $200 per month. He buys scratch tickets 3 times a month, goes to bingo once a month, bets on his own or someone else's performance 2-3 times / month, and lost about $10 in the last 3 months. He sometimes talks or thinks about gambling, and when he wins he gambles his winning immediately. He doesn't think that he has a gambling problem. Sometimes he takes his dinner or clothes money and uses it to gamble.

**Descriptions of Students in the Negligible-Risk Gambling Category**

Helen is 16 years old, Senior 3. She works more than 20 hours / week and has more than $200/month of available money. She bought fund-raising tickets 2 or 3 times in the last three months for a total of $1. She reports none of the consequences or preoccupations.

Samuel is 17 years old in Senior 3. He has an allowance between $50 and $100 per month. He reports gambling on Sport Select, sports pools and dice or betting on someone's performance. He spends less than one hour/week on gambling activities and has lost approximately $50 in the last three months. He reports none of the risk indicators and says gambling in not at all important for him. The clinical interview revealed no signs of problem gambling.

Table A2 shows the distribution of responses to some items included in the draft instrument that were not retained in the final CAGI. These items ask about whether the participant or others in the participant's life feel that gambling is a problem or becoming too important. Examination of the endorsement of these items provides further understanding of the profile of students classified in the different gambling status categories. Essentially, the information is an informal post-hoc validation of the cut scores developed based on percentiles.

**Table A2.** Proportions of Students or Student's Family or Friends Endorsing the Belief that there is a Problem with Gambling

| Item | Negligible-risk % | | Low-risk % | | Moderate-risk % | | Problem gambling % | |
|---|---|---|---|---|---|---|---|---|
| | Sometimes | Most of the time or almost always | Sometimes | Most of the time or almost always | Sometimes | Most of the time or almost always | Sometimes | Most of the time or almost always |
| 35e. How often have you felt gambling/betting is becoming too important to you? | 0 | 0 | 2.2 | 0 | 6.8 | .6 | 28.2 | 7.7 |
| 35t. How often have you felt that you would like to stop betting money but didn't think you could? | .7 | 0 | .6 | 1.0 | 7.3 | 5.6 | 28.2 | 2.6 |
| 35w. How often have people criticized your gambling/betting or told you that you had a gambling problem, regardless or whether or not you thought it was true? | 0 | 0 | .6 | 0 | 9.0 | 0 | 2.5 | 18.0 |
| 36a. In the past 3 months, how often have you felt that you might have a problem with gambling/betting? | .7 | 0 | 0 | 0 | 9.0 | 1.2 | 28.2 | 7.7 |
| Highest score among the above five items, i.e, admitting a problem or family/friends said there is a problem. | 1.3 | 0 | 3.2 | 1.0 | 19.8 | 7.4 | 3.8 | 33.3 |